# Evaluating temporal multiple sip approaches to characterise product experience

A thesis presented in partial fulfilment of the requirements for the degree of

## Doctor of Philosophy in Food Technology

at Massey University, Palmerston North Campus, New Zealand.


Maheeka Weerawarna N. R. P.

BSc Food Sc Tech (Hons), M Food Tech (Dist)


January 2021

To my mum and dad,

being my sunshine

trusting my journey...!

# Acknowledgements

I would like to express my special thanks to my primary supervisor Prof Joanne Hort, first for foreseeing my then unexplored skills for sensory and consumer science research. Also, I can't thank you enough for your guidance, encouragement, and assistance throughout the course of this study and being such a great mentor. Similarly, I greatly acknowledge my co-supervisors, Dr Jonathan Godfrey, for his support on resolving all the statistical combats in my data sets and always being patience to reply to my endless emails during the process and Dr Ashling Ellis for being a constructive support whenever I needed throughout this project and guiding me to bring all my writing together for this thesis.

Thanks to Riddet Institute Doctoral Scholarship, Massey University and Massey University Human Ethics Committee for ethics approval for this PhD research.

To Fonterra Research and Development Centre, Palmerston North for supplying ingredients and technical support to develop a model milkshake system for this research. Further, Invita NZ Ltd. for kindly sponsoring flavours for this research.

Thanks to all the participants in the expert panel, consumer panel and focus group studies for their dedication and commitment to milkshakes, providing a wealth of data for this research. Karina Gonzalez Estanol with the support from Dr Julia Low for conducting preliminary experiments and Feast Lab team for your generous support on conducting all the experiments of this project.

To my beloved family (mum, dad, sister, brother and in-laws), for all your love that I can't ever summarise here. My sincere thanks to friends in New Zealand who made a home away from home, especially during this global pandemic.

Ps. The sip by sip journey presented in this thesis was made of "*50,100 sample cups*" …!!!

# Publications and presentations

*Publications*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2021). Comparing temporal sensory product profile data obtained from expert and consumer panels and evaluating the value of a multiple sip TCATA approach. *Food Quality and Preference, 89*, 104141. https://doi.org/10.1016/j.foodqual.2020.104141.

*Oral presentations*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2020). Multiple sip TCATA: Comparing insights from expert and consumer assessors. *Early Career Researchers session, 9th European Conference on Sensory and Consumer Research, Rotterdam, The Netherlands (online conference).*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2020). Multiple sip TCATA: Insights from expert versus consumer assessors. *14th NZOZ Sensory and Consumer Science Symposium, Eltham VIC, Australia.*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2019). Combining sensory techniques over multiple sips provides better insights into consumer consumption experiences. Flash presentation at *Early Career Researchers session, 13th Pangborn Sensory Science Symposium, Edinburgh, Scotland.*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2019). Insights from TCATA across single and multiple sips of a vanilla milkshake. *13th NZOZ Sensory and Consumer Science Symposium, Dunedin, New Zealand.*

*Poster presentations*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2020). Multi-sip TCATA: Comparing insights from expert and consumer assessors. *Early Career Researchers session, 9th European Conference on Sensory and Consumer Research, Rotterdam, The Netherlands (online conference).*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2019). Consumer perception of milkshakes over multiple sips: As affected by sipping method. *Food Structures and Digestive Health International Conference, Rotorua, New Zealand.*

<u>Weerawarna N. R. P. M.</u>, Godfrey A. J. R., Ellis A., Hort J. (2019). *Top 100 posters*. Combining sensory techniques over multiple sips provides better insights into consumer consumption experiences. *13th Pangborn Sensory Science Symposium, Edinburgh, Scotland.*

# Abstract

As consumers become ever more demanding, methods that capture detailed insights into consumer product experiences are much needed. Adapting temporal sensory and affective measures to cater this demand beyond single time points and small sample sizes is one such approach, and of a recent interest in the sensory and consumer science research area.

Firstly, this research compared single and multiple sip sensory approaches using static and time-dependent sensory methodologies with an expert panel. Multiple sip evaluations were designed to represent the consumption of a whole product serving, in this case vanilla milkshakes. Generalised linear models with Analysis of Deviance were employed as a novel approach to analyse naturally correlated temporal data. Additionally, the impact of milkshake sipping method and panel type on multiple sip temporal profiles of the milkshakes was investigated.

In addition, temporal methods were adapted to investigate consumer affective responses, both hedonic and emotional response, over multiple sips. Temporal drivers of product acceptance and rejection were identified in analyses combining sensory and affective data. Finally, the impact of individual differences in sweet liker and PROP (6-*n*-propylthiouracil) taste phenotypes across multiple sip temporal emotion profiles of the milkshakes was investigated.

Multiple sip evaluation of both static and temporal methods (Temporal check all that apply (TCATA) and Temporal dominance of sensation (TDS)) provided further discrimination of products than on a single sip of milkshakes. The use of static and temporal methods as complementary approaches, rather than as alternatives, was valuable in obtaining holistic temporal profiles of products. Specifically, the use of generalised linear models and Analysis of Deviance allowed to investigate the dynamics of within-sip and between sip which was a novel addition to the knowledge of temporal data analysis. However, temporal sensory product profiles varied depending by sipping method and emphasised the importance of adapting product evaluation protocols based on intended consumption methods of the beverages.

Moreover, temporal sensory profiles were affected by panel type, i.e. experts or consumers, and the insights obtained from the two panel types were not interchangeable. Using expert panels, even on multiple sip evaluations did not provide closer insights into actual consumer product experience. The research highlighted that choice of panel type needs to be aligned with any respective project objectives.

Temporal sensory responses of consumers were associated with temporal liking and emotions over multiple sips. Furthermore, dominant emotions reported depended on sweet liker status and PROP taster status. The research findings highlighted the importance of investigating temporal affective responses, i.e. both liking and emotions, and individual differences alongside temporal sensory responses in consumer research to obtain closer insight into actual product experience.

Generally, findings were attribute and product specific and hence wider research using additional products and different food matrices are required to validate the findings. Overall, the research outcomes emphasised the importance of multiple sip sensory evaluations to represent the consumption of whole product servings, using appropriate sipping methods, and panels. Investigating the affective responses and individual differences were important to capture different insights according to respective project objectives.

# Preface

Sensory perception is dynamic and time dependent (temporal) in nature (Holway & Hurvich, 1937; Hort, Hollowood, & Kemp, 2017b). However, traditional descriptive evaluations capture sensory perceptions at a single time point (Kemp, Hollowood, & Hort, 2009). Consequently, the latter techniques provide generalised insights (i.e. sensory profiles of the products and respective attribute discrimination) over the whole consumption experience (Cliff & Heymann, 1993; Dijksterhuis & Piggott, 2000). The need to capture evolving sensory perceptions with time during product evaluation is somewhat obvious. Additionally, traditional descriptive approaches are often conducted on one or few sips of a beverage. Sensory evaluations over multiple sips could provide closer insights into consumer consumption experiences which usually occur over multiple sips of a whole serving of a beverage. Temporal data analysis techniques across multiple sips are also not well established.

Conventionally, expert panels are used for analytical profiling of products and consumers to obtain product preference (Meilgaard, Carr , & Civille, 2006; Stone, Bleibaum, & Thomas, 2012). Expert panels are primarily selected based on their sensory acuity (Meilgaard et al., 2006), and might not represent general consumers related to specific product categories. According to published work, product evaluation by expert panels varied compared to consumers (Ares, Antúnez, et al., 2015; Hopfer & Heymann, 2014; Mello, Almeida, & Melo, 2019) mainly due to the training expert panellists undergo prior to product evaluations (Lawless & Heymann, 2013). In fact, effective representation of naïve consumer product experiences from data from expert panels is questionable. Moreover, food manufacturers require deeper insights into dynamic trends in consumer wants to thrive in an increasingly demanding and competitive market. In fact, detailed clarity on drivers for consumer product preference using temporal sensory, emotion and liking responses over multiple sips is required. Additionally, research exploring the impact of individual difference in taste perception on temporal drivers of product preference may deepen understanding of consumer preference segmentation.

Sensory and consumer methodologies that capture deeper insights into actual product expereinces, in terms of temporal sensory and affective responses (emotions and liking), representing consumption of a whole serving of a beverage are yet to be adapted and established.This gap provided the opportunity for the research presented in this thesis. The aim of this research was to investigate the additional insights that can be obtained by evalauting a product over multiple intakes using temporal sensory and consumer methodologies. A model milkshake system was used to explore this aim as New Zealand being a widely established local and global dairy producer, this research offered the opportunity to closely profile consumer wants in this context. Additionally, the research findings added to the lacking knowledge on temporal profiling of dairy beverages.

*Thesis structure*

Initially, this thesis presents a general introduction and a review of the literature on current temporal sensory and consumer methodologies (chapter 1). Secondly, general materials and methodologies related to developing the model milkshakes system used in this research and other general experimental procedures are presented (chapter 2). The aim of this research was achieved through five key objectives, which are addressed from chapter 3 to chapter 7. Chapter 3 focuses on evaluating the relative insights gained from conventional static and more recent temporal sensory techniques (temporal check all that apply (TCATA) and temporal dominance of sensation (TDS)) over single and multiple sips. Chapter 4 details the impacts of sipping method on multiple sip TCATA profiles of the milkshakes. Chapter 5 compares the different insights gained from using expert versus consumer panels on multiple sip TCATA profiles. Chapter 6 explores consumer methodologies to identify temporal drivers of product preference using a multiple sip TCATA approach capturing temporal sensory and temporal emotion data alongside temporal liking. Chapter 7 investigates variation in temporal emotion responses in relation to individual variation in taste perception. Finally, chapter 8 summarises the key findings from this research, and presents some directions for future work and the overall conclusions.

# List of abbreviations

| | |
|---|---|
| GLM | Generalised linear modals |
| gLMS | General labelled magnitude scale |
| LAM | Labelled magnitude scale |
| PMT | PROP medium taster |
| PNT | PROP non-taster |
| PROP | 6-n-Propylthiouracil |
| PST | PROP super taster |
| PT | PROP taster |
| PTS | PROP taster status |
| QDA | Quantitative descriptive analysis |
| SD | Sweet disliker |
| SIP | Sweet ideal pointer |
| SL | Sweet liker |
| SLS | Sweet liker status |
| TCATA | Temporal check all that apply |
| TDE | Temporal dominance of emotions |
| TDS | Temporal dominance of sensations |

# Table of Contents

# Chapter 1. General introduction and literature review

## *1.1. General introduction*

Sensory and consumer testing is a key aspect in the product development process (Lawless & Heymann, 2013) and methodologies are ever evolving to cater for the dynamic nature of consumer demand. Since early insights into the time dependent nature of sensory perception (Holway & Hurvich, 1937), different techniques have been developed to capture the dynamic sensory profiles of products (Castura, Antunez, Gimenez, & Ares, 2016; Cliff & Heymann, 1993; Jack, Piggott, & Paterson, 1994; Pineau et al., 2009; Visalli, Mahieu, Thomas, & Schlich, 2020). Often studies with temporal techniques are conducted on a single intake of a product but that is less likely to represent an actual consumption occasion. In this chapter the use of temporal sensory techniques in single and multiple intake product evaluations in the literature is reviewed. Additionally, to date, manipulation and statistical modelling of temporal sensory data are not well established and hence existing temporal data analysis techniques are reviewed alongside the temporal techniques.

Sensory evaluation techniques are mainly split across two categories: objective measures including discriminative and descriptive approaches, and subjective measures (Meilgaard et al., 2006). Until recently, expert panels were used to objectively profile sensory characteristics of products, and consumers were used to obtain responses of product preference (Kemp et al., 2009). However, some studies using static sensory techniques have shown differences in the insights obtained from experts versus consumer panels (Ares, Antúnez, et al., 2015; Hopfer & Heymann, 2014; Mello et al., 2019). In fact, the use of objective sensory data from expert panels to investigate drivers of product preference of naïve consumers is questionable. With the recent development of alternative techniques like check all that apply (CATA) (Adams, Williams, Lancaster, & Foley, 2007), temporal CATA (TCATA) (Castura et al., 2016) and temporal dominance of sensation (TDS) (Pineau et al., 2009), researchers have begun to employ consumers to obtain descriptive sensory profiles of products. Use of consumers in descriptive and subjective profiling possibly provides a promising approach to capture more accurate insights into actual consumer product experiences and their subsequent drivers of product acceptance. Consequently, insights obtained from both expert and consumer panels are considered in this review. Additionally, different approaches used to measure temporal drivers, in terms of sensory, emotional and liking responses, of product acceptance or rejection are also reviewed.

As milkshake is used as the model product for the research presented in this thesis, some specific limitations and knowledge gaps in temporal sensory techniques related to dairy beverages are also outlined. Thereafter, the physicochemical drivers of key sensory attributes in dairy beverages are reviewed in order to provide a foundation for a model beverage system with a range of sensory properties. It is also evident that sensory perception of beverages was affected by the type of receptacles used for consumption (Pramudya, Singh, & Seo, 2020; Spence & Wan, 2015). Beverages are often available in bottles or single serving packages with a straw in the market. In fact, it is interesting to investigate whether beverages are perceived differently when sipped from a cup versus through a straw, which is also a subject of this review.

Regardless of the many factors mentioned above relating to perceptual differences, sensory perception is individual (Bajec & Pickering, 2008; Bartoshuk, 2000; Hayes & Duffy, 2008; Hort, Ford, Eldeghaidy, & Francis, 2016). In fact, sensory perception and consequent drivers of product preference are likely to vary among individuals. Therefore, the impact of individual differences in taste phenotypes on temporal sensory and affective responses are also reviewed in this chapter.

This chapter concludes by identifying the current research gaps which have led to the aim and objectives for the research presented in this thesis.

### *1.2. Temporal aspects of sensory perceptions*

Sensory perception of food starts before consumption begins and continues throughout swallowing, mastication and ingestion processes and beyond (Appelqvist, Poelman, Cochet-Broch, & Delahunty, 2016; Caul, 1957; Sjostrom, 1954). Physiological and psychological aspects such as, oral physiology (mastication, salivation and their interactions), sensory specific satiation, satiety, sensory adaptation, sensory memory and dynamics of liking may influence the time dependent nature of sensory perception (Hort et al., 2017b). However, conventional descriptive techniques are often designed to capture only one response related to each sensory perception of interest during a product evaluation (Kemp et al., 2009). Such techniques are likely to provide an averaged overview of the whole consumption experience (Cliff & Heymann, 1993; Dijksterhuis & Piggott, 2000) or sensory perception at a specific time point as dictated by tasting protocols (Hort et al., 2017b). Therefore, the need for temporal techniques that can capture the dynamic sensory profiles of food/ beverages is evident. Section 1.2.1 summarises temporal sensory techniques used in product evaluations and section 1.2.2 their application over multiple ingestion.

#### *1.2.1. Temporal sensory techniques and their applications*

##### *1.2.1.1. Time-intensity (TI)*

An early study by Holway and Hurvich (1937) revealed the temporal course of salt taste perception and thus the importance of measuring sensory attribute intensity as a function of time. Initially, the perceived intensity of a particular sensory attribute was recorded at discrete time points, and thus brought about the development of discrete TI evaluation as a temporal sensory technique (Cliff & Heymann, 1993). Sjostrom (1954) compared the perceived bitterness of two beer samples at 1 s intervals for 15 s using discrete TI curves. Discrete TI was extended to continuous TI (CTI) evaluation with the development of chart recorders (Larson-Powers & Pangborn, 1978) followed by computer software (Duizer, Gullett, & Findlay, 1996; Guinard, Pangborn, & Shoemaker, 1985; Lee iii, 1985). Applications of TI are still found in studies investigating the dynamics of a single attribute with respect to a stimulus (Eib, Janet Schneider, Hensel, & Seuß-Baum, 2020; Higgins, Gipple, & Hayes, 2020). Moreover, TI is used in combination with descriptive analysis (DA) in food product characterisation. Fuentes, Ventanas, Morcuende, and Ventanas (2013) employed panellists to perform DA and TI of dry cured ham with varying intramuscular fat served at different temperatures. TI has also provided further insights into DA; with better discrimination of the products based on the temporal nature of texture and flavour attributes (Lorido, Hort, Estévez, & Ventanas, 2016). Further, TI was used to record in-mouth and after-swallowing perception of astringency coupled with check all-that-apply (CATA, a method where assessors select all appropriate attributes from a given predefined list, and the relevance of each attribute is calculated by its frequency of use) to record other attributes in characterising sensory profiles of wine (Vidal, Antúnez, et al., 2017). However, this approach only provides insights into the dynamics of the intensity of a single attribute during one evaluation.

In more recent studies, different approaches have been taken to modify TI to enable recording the dynamics of multiple attributes of a product. Palazzo and Bolini (2009) studied sweetness, acid taste and raspberry flavour of flavoured gelatine, in three separate TI evaluations for each attribute. Then the results were analysed separately for each attribute as well as simultaneously (multiple TI analysis; MTIA) by overlaying individual TI curves from each attribute. Later, MTIA has been employed to study the effects of different sweeteners on sweetness, bitterness, chocolate flavour and melting rate of chocolate (Palazzo & Bolini, 2014).

Duizer, Bloom, and Findlay (1997) compared sweetness and peppermint flavour perception of chewing gum on individual TI scales for each attribute, versus perception of the two attributes simultaneously on a dual attribute TI (DATI) scale. Ten panellists had been initially trained to evaluate sweetness and peppermint flavour on separate TI scales followed by eight 1 h training sessions on DATI scale. Results from the DATI reported a difference in the rate of increasing perception in sweetness and peppermint flavour. Such deviations were not evident from the single attribute TI (SATI) on the two sensory attributes. Regardless, results and reliability of the DATI and SATI were not significantly different. Further, Zimoch and Findlay (1998) have characterised tenderness of commercial beef samples using DATI on toughness and juiciness using eight panellists. After the initial training on SATI, panellists were trained on simultaneous recording of the two attributes by diagonally moving a mouse across a mouse pad. In comparison to SATI, DATI has provided more or less similar sample discriminations, however it was advantageous where time of sensory evaluation was short (30 s) (Zimoch & Findlay, 1998).

In both the studies by Duizer et al. (1997) and Zimoch and Findlay (1998), the researchers emphasised that the effectiveness of DATI depends on the extent of training, sensory attributes of interest and their interactions. Further, Peyvieux and Dijksterhuis (2001) have emphasised the need for guidelines on training panellists on TI to enable comparison of results among different studies. Sensory attributes and their interaction effects could alter perceived sensory aspects in DATI. For example, Oladokun et al. (2016) showed increased perceived bitterness in beer due to the interaction of added hop aroma with inherent beer bitterness, as evaluated by SATI using with and without nose clips. Therefore, DATI requires meticulous attribute selection, experimental designs and tasting protocols to obtain accurate results. Therefore, the use of the TI approach is not sufficient to accurately measure the dynamics of multiple attributes simultaneously in a single evaluation.

#### *1.2.1.2. Progressive profiling*

Progressive profiling is another dynamic sensory technique for rating intensity of an attribute over multiple time points during oral processing and an option to evaluate several attributes simultaneously with less training than TI (Devezeaux de Lavergne, van Delft, van de Velde, van Boekel, & Stieger, 2015; Galmarini, Symoneaux, Visalli, Zamora, & Schlich, 2016). Jack et al.

(1994) used the technique to profile hard cheese texture across chewing strokes during mastication. Intensity of the texture characteristics of cheese were rated on a category scale for each chew stroke. However, progressive profiling could not capture detailed dynamics of texture with each chew stroke. Relatively recent use of progressive profiling complementing temporal dominance of sensation (TDS) and quantitative descriptive analysis (QDA) enabled obtain a holistic description of dynamic texture characteristics (firmness and creaminess) of semi solid gelatine gels (Devezeaux de Lavergne et al., 2015). Both Jack et al. (1994) and Devezeaux de Lavergne et al. (2015) employed progressive profiling with semi solid gels (cheese and gelatine) which undergo significant textural changes during oral processing. Additionally, Galmarini, Symoneaux, et al. (2016) showed the use of progressive profiling as a cost effective and efficient technique, to quantitatively characterise the dynamics of four attributes, sweetness, mint aroma, hardness and freshness of chewing gum with consumers in in-home contexts, as opposed to TI with a trained panel. The application of progressive profiling techniques is also found with beverages, in the quantitative profiling of astringency of wine by Kang, Niimi, Muhlack, Smith, and Bastian (2019). Esmerino et al. (2017) characterised fermented dairy beverages for strawberry flavour, sweet, sour, bitter taste, fermented flavour, milk flavour, creaminess and "I do not feel anything" using progressive profiling on one intake of each sample with 15 s intervals up to 45 s total evaluation time. The experiment failed to capture the dynamics of creaminess across samples over time from progressive profiling at 15 s time intervals. This is perhaps due to textural changes significantly evolve during early oral processing (Chen, 2014) specifically with an early onset in liquid food matrices and hence require progressive profiling at shorter time intervals. In fact, the requirement of thorough experimental design on a number of attributes and time intervals with respect to the product category was highlighted when using the progressive profiling technique. Therefore, application of progressive profiling likely limits the type of sensory attributes that a panellist can evaluate in one evaluation setup and also that the application is food matrix dependent.

### *1.2.1.3. Temporal check-all-that-apply (TCATA)*

TCATA is developed based on the assumption that subjects are able to recognise and evaluate one or more sensory attributes simultaneously (Castura et al., 2016). TCATA provides insights into the dynamics of the sensory attributes of a product during product evaluation. This means assessors can select attributes from a given list when they are perceived and deselect them when they are no longer applicable. It is also possible for more than one attribute to remain selected at the same time (Hort, Hollowood, & Kemp, 2017a). Computer software is used to record the time in between selection and deselection for each attribute. The attribute selection times of a sample are then calculated as mean citation proportions of the panel and plotted against evaluation time to obtain a TCATA curve for the sample (Figure 1.1), visualising the simultaneous evolution of sensory perceptions over time.

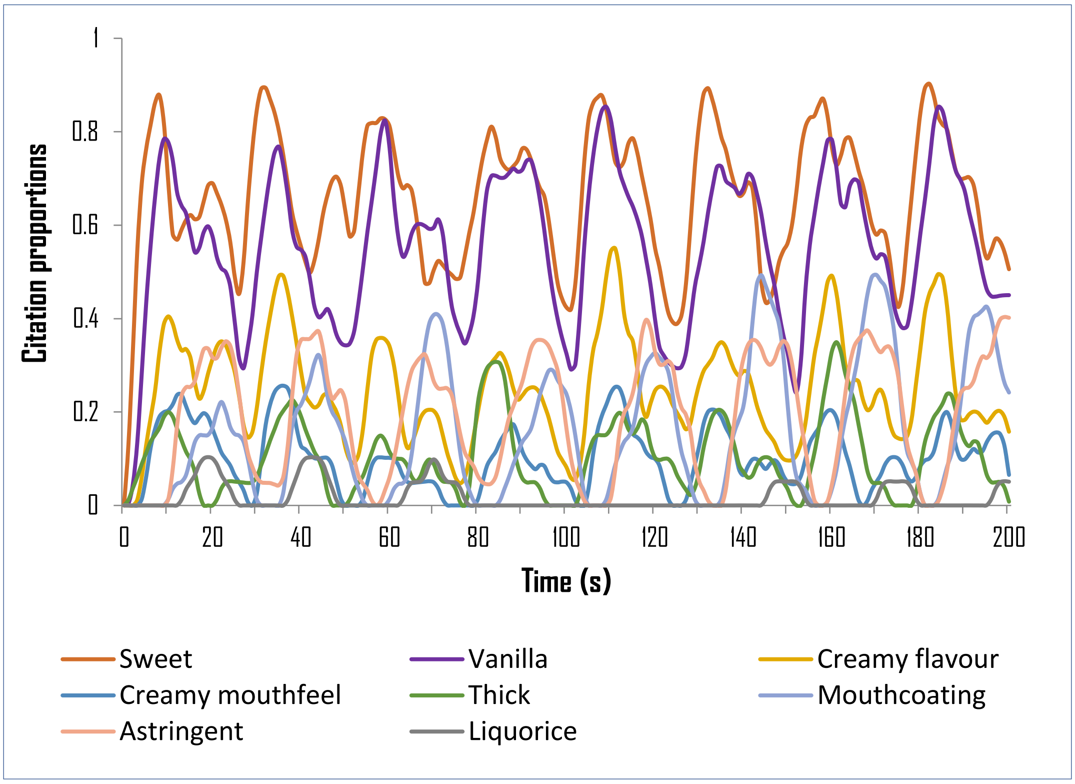



Figure 1.1: A TCATA curve representing the dynamics of the attribute evolution during sample evaluation. The TCATA curve was derived from data collected for the research presented in this thesis.

A maximum of ten attributes was tentatively recommended for inclusion in a TCATA approach (Castura et al., 2016). In general, researchers have tended to use between six and ten attributes in TCATA with either trained or consumer panels (Baker, Castura, & Ross, 2016; Boinbaser, Parente, Castura, & Ares, 2015; Esmerino et al., 2017; McMahon, Culver, Castura, & Ross, 2017). Occasionally more than ten attributes have been used in TCATA. Alcaire et al. (2017) used 11 attributes with 106 consumers to evaluate vanilla milk desserts. The significance of the number of TCATA terms on product discrimination and performance efficiency of consumers and trained panellists is inconclusive. Jaeger et al. (2018) compared 9 and 15 TCATA term lists to characterise four canned pineapple products and three types of crackers using a consumer panel. The use of 15 TCATA terms was not disadvantageous in sample discrimination (based on dynamic sensory profiles) nor on the ability of consumers to use them (based on task perception evaluation), it has however provided detailed temporal data on more attributes in TCATA profiles.

Familiarisation of the TCATA task with consumers by using verbal instructions, the TACATA task on a paper ballot, a demonstration video and a warm up sample prior to data collection were shown to increase sample discrimination in apricots, peanuts and milk chocolate evaluations (Jaeger et al., 2017). Reyes, Castura, and Hayes (2017) performed a familiarisation session for consumers with a guided example including use of Compusense® (the software used for data collection) and the option to repeat the example activity until they understood the procedure prior to TCATA data collection on nutritive and non-nutritive sweeteners. Therefore, optimised familiarisation and training techniques seem sensible depending on panellist type, product complexity and the number of attributes to ensure accurate results. TCATA has been used in combination with QDA to compare complex perceptions of carbonation in sparkling wine (McMahon et al., 2017) as well as in dairy products like yoghurt (Varela, Carolina Mosca, Cuong Nguyen, McEwan, & Berget, 2020).

TCATA was further developed to TCATA fading (Ares et al., 2016). In TCATA, sensory attributes/TCATA terms are selected when they are perceived and unselected when no longer prominent (Hort et al., 2017a). However, in TCATA fading selected terms automatically become unselected or faded out over time if not reselected. The time for automatic fading of TCATA terms is predefined. Ares et al. (2016) used 8 s fading, selected based on a pilot study, for eight food categories evaluated by both trained and untrained panellists. One of the perceived advantages of TCATA fading is that it provides an opportunity for panellists to re-select faded terms if they are perceived after fading. This perhaps assists the panellists to focus more on evolving sensory perceptions, rather than deselecting and selecting new perceptions at the same time. For instance, Reyes et al. (2017) reported no extinction time of attributes in TCATA evaluation of two types of sweeteners. This was hypothesised as due to the panellists forgetting to deselect attributes when they are focusing on selecting new evolving attributes. Therefore, Reyes et al. (2017) suggested TCATA fading to overcome this. Ares et al. (2016) revealed that both trained and untrained panellists were able to perform similarly with the two TCATA variants, however, TCATA fading resulted in significantly lower average citation proportions and sample discrimination.

Esmerino et al. (2017) also used this 8 s fading time in characterising strawberry flavoured fermented dairy products with TCATA, seven sensory attributes and 61 consumers. Rizo, Peña, Alarcon-Rojo, Fiszman, and Tarrega (2018) used a 4 s fading time with cooked ham. Rizo, Vidák, Fiszman, and Tarrega (2018) compared 4 s versus 8 s fading time with cooked ham and a strawberry flavoured dessert, and 3 s versus 6 s fading times with orange juice. The fading times were selected based on preliminary trials according to the adequacy of the times required for assessors to complete attribute evaluation and select or re-select any evolving perceptions. Longer fading times produced TCATA curves with higher citation proportions of attributes. However, the use of shortened fading times was recommended to avoid overestimation of attribute durations. In comparison, shorter fading times increased the occurrence of gaps in the

TCATA data as a result of the delay in attribute reselection. Such gaps in TCATA profiles could make it difficult to determine the nature of the respective sensory perception (i.e. either continuous or sporadic existence). Rizo, Vidák, et al. (2018) and Vidal, Castura, et al. (2017) have suggested imputation of TCATA fading data by filling such gaps to enhance the results. Filling gaps would introduce a risk of significant changes to the raw TCATA data if not performed with careful consideration, Rizo, Vidák, et al. (2018) for example, only filled gaps less than 4 s in TCATA fading data. Overall, these findings varied across the product categories and attributes used in TCATA fading. In fact, TCATA fading is a promising approach where fading time is defined based on preliminary studies with respect to the product category and sensory lexicon and familiarisation of the task, selection of attributes and products and data analysis are optimised.

#### *1.2.1.4. Temporal dominance of sensation (TDS)*

TDS was formally presented by Pineau et al. (2009). It was primarily aimed at detecting the sequence and the intensity of the dominant sensory perceptions within the tasting period of a product (Pineau & Schilch, 2015). The dominant sensations are recorded from the first bite or sip, through mastication and in some instances up to and after the swallowing period. TDS evaluations are performed using a computerised system, which displays a list of dominant sensory attributes on a computer screen. Ten attributes were recommended as an optimum number for TDS evaluations (Pineau et al., 2012). Panellists are asked to click on the 'start' button as the food product enters their mouth, then select the dominant attribute as it evolves and subsequently to record its intensity. Thereafter, panellists select or reselect the dominant attributes as either its quality or intensity changes, until the end of tasting period. During TDS evaluation, the computerised system records the name of the attribute selected, dominance time of the attribute, and the respective intensity (Schlich & Pineau, 2017). Mean dominance rates of each attribute related to each sample are calculated to create TDS curves (Figure 1.2).

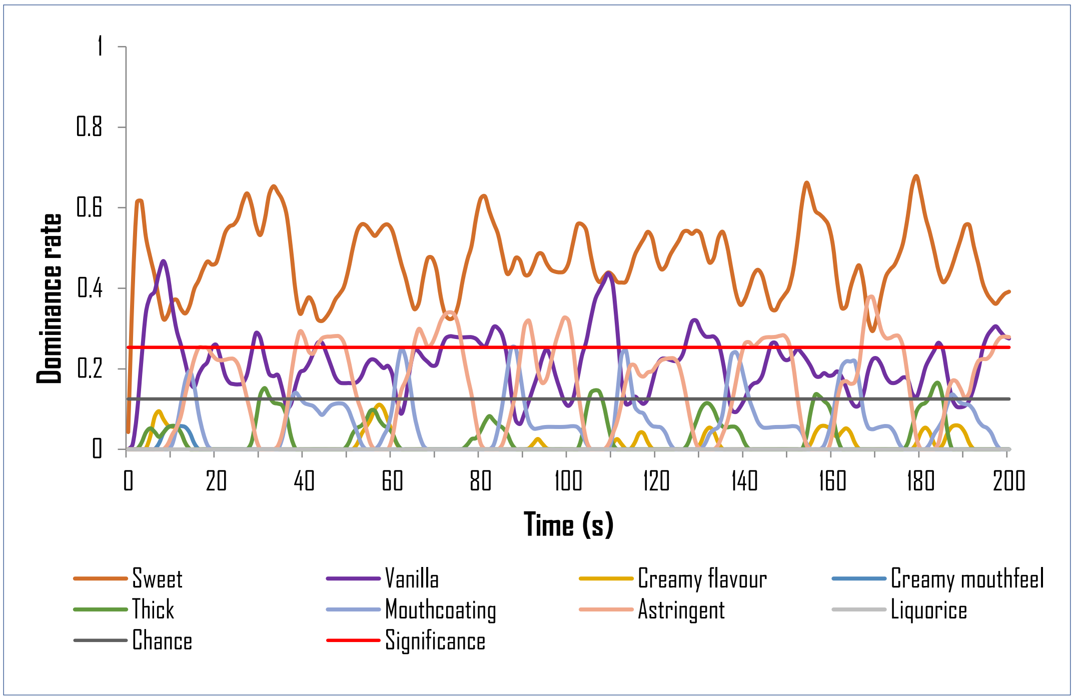



Figure 1.2: A TDS curve representing the dynamics of the dominance of attribute evolution during sample evaluation. The TDS curve derived from data collected for the research presented in this thesis

The original TDS protocol, with simultaneous selection of the dominant attribute with respective intensity scoring, was thereafter used by Labbe, Schilich, Pineau, Gilbert, and Martin (2009) in the evaluation of flavoured gels with 12 experienced panellists. They used five attributes according to the study objective, to investigate the impact of olfactory quality on taste and trigeminal perceptions. TDS has since been used to qualitatively record the dominant attributes but not their intensities, possibly because simultaneous evaluation of the dominant attribute with intensity made TDS a difficult task (Schlich, 2017).

An adapted TDS protocol (only recording dominant attributes) was successfully used in temporal characterisation of a variety of food products, such as wine (Frost, Harbertson, & Heymann, 2017; Meillon, Urbano, & Schlich, 2009; Sokolowsky & Fischer, 2012; Vidal et al., 2016), vodka (Déléris et al., 2011), de-chlorinated water (Teillet, Schlich, Urbano, Cordelle, & Guichard, 2010), blackcurrant squash (Ng et al., 2012), ham (Lorido et al., 2016), breakfast cereals (Lenfant, Loret, Pineau, Hartmann, & Martin, 2009), cheese (de Loubens et al., 2011), yoghurt (Bruzzone, Ares, & Giménez, 2013), candies (Saint-Eve et al., 2011), chocolate (J. F. Rodrigues et al., 2016; Varela et al., 2018) and sweeteners (Di Monaco, Miele, Volpe, Picone, & Cavella, 2014). However, TDS evaluations of products with contrasting textures, such as battered fish sticks (Albert, Salvador, Schlich, & Fiszman, 2012) were reported to be complicated. Therefore, the applicability of TDS needs to be considered with respect to the complexity of the products to be evaluated.

The TDS technique has also been used for each sensory modality of the same product separately, for example, taste and texture attributes of cheese (Rodrigues, Souza, Lima, Cruz, & Pinheiro, 2018), flavour and texture attributes of yoghurt (Nguyen, Næs, & Varela, 2018). In some instances, TDS has been used in combination with QDA (Ng et al., 2012), or TI (Di Monaco et al., 2014; Lorido et al., 2016; Sokolowsky & Fischer, 2012) to obtain quantitative descriptive data. This is considered a better approach to obtain quantitative descriptive data using TDS rather than the simultaneous evaluation of dominance and intensity as in the original TDS protocol (Pineau et al., 2009). TDS profiles were also correlated with physical parameters of the product (texture (Mayhew, Schmidt, Schlich, & Lee, 2017a) or product processing conditions (glass transition temperature (Mayhew, Schmidt, Schlich, & Lee, 2017b)) to predict their respective texture trajectories. Overall, capturing dominant perception using TDS will be useful to identify drivers of product experience (Rodrigues, Veríssimo, Pinheiro, & Souza, 2018; Simioni et al., 2018; Thomas, Visalli, Cordelle, & Schlich, 2015).

##### *1.2.1.5. Temporal order of sensation (TOS)*

The aim of TOS is to capture the order of key attributes as they evolve over the product consumption from the first ingestion and further to after-swallowing perceptions. In TOS, the panellist is given a list of key attributes from which they indicate a perceived order during the product evaluation. Product evaluation protocol for TOS may vary according to the objective of the test (Hort et al., 2017a). TOS is suggested as a relatively simple and efficient method compared to TDS to capture the order of attribute perceptions, with respect to panellist training and specialised software used in temporal data collection and analysis (Pecore, Rathjen-Nowak, & Tamminen, 2015). However, TOS does not capture the attribute intensity and other temporal information as in TI, TDS or TCATA techniques and thus has found limited application.

#### *1.2.1.6. Attack-evaluation-finish (AEF)*

Visalli et al. (2020) presented the AEF method based on the concepts from TOS and TDS techniques. In AEF assessors are requested to select one attribute each in the beginning, middle and end phases of a sample evaluation. Sample discrimination was found to be similar for dark chocolate when using AEF and TDS. However, AEF was deemed advantageous over TOS and TDS by eliminating variation in the number of assessor citations and citation duration and hence no data transformation was needed prior to analysis. AEF was also developed into free comment AEF (FC-AEF), assisting the collection of temporal free comment descriptors and eliminating the use or need for a predefined list of a limited number of descriptors (Mahieu, Visalli, Thomas, & Schlich, 2020). In depth studies are still required to establish the use of this novel approach in different food categories with varying complexities. Nevertheless, the choice of temporal technique will depend on study objectives and product category respectively.

### *1.2.2. Extension of temporal techniques for multiple ingestion evaluations*

Generally, temporal evaluations were often performed on a single or a few intakes of a product (Castura et al., 2016; Jaeger et al., 2018; Ng et al., 2012; Oliver, Cicerale, Pang, & Keast, 2018; Pineau et al., 2009; Tan, Wee, Tomic, & Forde, 2019), which is not representative of an actual product experience which occurs over multiple intakes. Progressive profiling evaluates multiple intakes/ sips/ bites by design (Jack et al., 1994). However, recently other methods have been adapted to include multiple intake evaluations up to few sips or bites, for example TI (Guinard, Pangborn, & Lewis, 1986), sequential profiling (Methven et al., 2010), TCATA (Oliveira et al., 2015) and TDS (Silva et al., 2018).

#### *1.2.2.1. TI*

Guinard et al. (1986) used TI over three successive sips to evaluate the temporal aspects of astringency in white wine using ten trained panellists. The researchers investigated the effects of sip size (8 mL and 15 mL) and interval between sips (5 s, 30 s and 40 s) on the intensity and duration of astringency perception. Results showed that regardless of the sip size, the interval between sips significantly affected the temporal nature of astringency in wine. In fact, the three sips TI approach has provided an in depth characterisation of wines (Guinard et al., 1986). In fact, it is evident that sip size and the interval between the sips need to be considered in designing multiple ingestion experiments. Further, sequential sipping TI was used to determine the astringency of soymilk after expectorating four sips (Courregelongue, Schlich, & Noble, 1999). As evident in the studies of Guinard et al. (1986) and Courregelongue et al. (1999) protocols of multiple ingestion TI could vary based on the test objective such as to focus on investigating the dynamics of an attribute at a specific phase/s of the product consumption period. Thereafter, analysis of traditional single ingestion TI data has been adapted to accommodate such multiple ingestion TI data (Busch, Tournier, Knoop, Kooyman, & Smit, 2009; Le Berrre, Boucon, Knoop, & Dijksterhuis, 2013).

#### *1.2.2.2. Sequential profiling*

Twelve trained panellists evaluated five attributes (sweet, metallic, soymilk flavour, mouthcoating and mouth drying) of oral nutritional supplements (ONS) using sequential profiling over eight 5 mL aliquots with a 2 min delay in between each tasting (Methven et al. 2010). The panellists scored the same attributes as aftertaste effects at 30 s and 60 s from swallowing. The results revealed that there was a significant build-up of metallic and soymilk flavours and mouthfeel attributes with suppression of sweetness as aftertaste effects over multiple sips. However, QDA of the ONS only showed a significant difference in sweetness. Primarily, sequential profiling utilises nominal product volumes with respect to real consumption behaviour. Withers, Barnagaud, Mehring, Ferris, and Thomson (2016) have modified the sequential profiling method demonstrated by Methven et al. (2010) to increase the total product consumption volume (from 8 sips of 5 mL to 8 sips of 15 mL) and the range of attributes (from five to ten) to investigate the effects of repeated ingestion. The increased total product consumption volume and broad range of attributes were found to have increased the product discrimination.

#### *1.2.2.3. TCATA*

Multiple sip TCATA (3 sips of 20 s) has been used with a trained panel (10 panellists) to characterise eight sensory attributes of chocolate milk (Oliveira et al., 2015). Researchers studied the effect of sugar reduction on the temporal profiles of chocolate milk samples over the three sips. This multiple sip approach provided further product characterisations over the three sips with respect to single sip and such data could be useful in studying the effects of formulation changes in products. However, to date the application of multiple sip TCATA with consumers is not evident.

#### *1.2.2.4. TDS*

Cosson, Souchon, Richard, Descamps, and Saint-Eve (2020) used single ingestion TDS to obtain insights into the effects of composition on sensory perceptions of pea-protein based beverages. However, if these evaluations had been done over multiple intakes it may have revealed how the products would be perceived during an actual consumption occasion over multiple sips. Additionally, in TDS the number of intakes (7 sips (Dugas, Pineau, & Folmer, 2012) versus 3 sips (Zorn, Alcaire, Vidal, Gimenez, & Ares, 2014)), evaluation time per intake (30 s (Dugas et al., 2012) versus 20 s (Zorn et al., 2014)) and tasting protocol (Barron et al., 2012; Zorn et al., 2014) are depended on the product and the objective of the study.

Use of modality TDS (Nguyen et al., 2018; Rodrigues et al., 2018) in multiple sip/ bite evaluations is not evident however it could be useful in characterising complex products over multiple ingestions.

### *1.3. Application of TCATA and TDS as complementary techniques*

TCATA and TDS methods have been compared in the characterisation of food with different complexities, for example; yogurt, salami, cheese, orange juice, French bread and marinated mussels (Ares, Jaeger, et al., 2015). TCATA has provided detailed dynamics of all the perceived attributes of a product during the evaluation period. Comparatively, the criterion of dominance in TDS has thinned such detailed dynamics of simultaneously perceived attributes. However, the use of TCATA and TDS as complementary methods (with either single or multiple ingestion) rather than alternative methods possibly provides a holistic and detailed temporal data set which includes simultaneously evolving perceptions along with dominant perceptions. Similar approaches were evident for single ingestion evaluations; TCATA, TDS and progressive profiling of fermented dairy products (Esmerino et al., 2017) and TCATA, TDS and modality TDS of yoghurt samples (Nguyen et al., 2018). The application of TCATA and TDS with multiple ingestion evaluations could provide better characterisation and discrimination of temporal profiles. However, depending on the assessors' age group (such as children) refinements to TCATA and TDS techniques are suggested to widen applicability (Velázquez, Vidal, Varela, & Ares, 2020).

### *1.4. TCATA and TDS data analyses*

Traditionally, TCATA data are analysed using exploratory techniques to investigate the main characteristics of variables often using visual methods rather than formal statistical modelling. For example, for TCATA Castura et al. (2016) used a two-sided Fisher-Irwin test (Fisher, 1935; Irwin, 1933) to analyse categorical temporal data summarised as counts in contingency tables to visualise product data in TCATA curves. TCATA difference curves were developed using citation differences for each attribute at each time slice across pairs of products and analysed using the Fisher-Irwin test, where pairwise product differences were of interest. A similar approach was used in analysing TDS data by Pineau et al. (2009). Additionally, in TDS, the chance level (i.e. the dominance rate that an attribute can obtain by chance) and significance level (i.e. the minimum dominance rate required to be considered as significantly higher than the chance level) were derived based on binomial proportion confidence intervals and normal approximation.

Moreover, TCATA and TDS recording data at high frequencies such as 0.01 s (Castura et al., 2016) produces autocorrelated data (Box, Hunter, & Hunter, 2005) on adjacent time slices. Additionally, all pairs of time slices closer together than the fading time in the TCATA fading method (Ares et al., 2016) are essentially correlated. Data being independent (i.e. not correlated), behaves in a normal distribution and having a constant variance are fundamental assumptions of standard linear models with Analysis of Variance (ANOVA) (Box et al., 2005). Therefore, standard linear models and ANOVA cannot be applied to analyse corelated data from TCATA or TDS methods. In fact, a different approach that can handle correlated data may be an option to analyse dependent temporal data.

Ares, Antúnez, et al. (2015) and Castura et al. (2016) used data visualisation techniques with a sign test at each time point to investigate whether citation proportions of the two timepoints were statistically significant. They used 27 time points from a 72 s timeline of product evaluation in functional regression using fANOVA. Galmarini, Loiseau, Visalli, and Schlich (2016) and Meyners and Castura (2019) used discrete but not independent standardised 100 time points in ANOVA. Dinnella, Masi, Naes, and Monteleone (2013) used averaged two time periods of 30 s each and three time periods of 20 s each in ANOVA. These studies have not specified or addressed the lack of independence in the temporal data neither how to analyse such data by sacrificing less temporal information such as within-sip/ bite dynamics. Moreover, there is no published research to date investigating within-sip variations in temporal data which would be affected even more by a lack of independence in the data.

Generally, TCATA and TDS record citation frequencies of each attribute which are then calculated as proportion data during data manipulation (Castura et al., 2016; Pineau et al., 2009). Generalised linear models (GLM) and Analysis of Deviance are standard approaches recommended to analyse counts or proportions related data (Agresti, 2018b). In statistical analysis, a likelihood function is used to explain the goodness of fit i.e. the difference between observed and the expected values of a fitted model to respective data set. For computational convenience likelihood is often calculated as log-likelihood which represents the additive of log-likelihood of individual observations (Box et al., 2005). Deviance is denoted by two times the log-likelihood (Agresti, 2018b). As a fitted model gets closer to the observed data, the likelihood tends towards one, and the deviance therefore reaches to zero. The advantage of Analysis of Deviance approach is that it is based on the fitted values for the models being compared and does not rely on the ability to correctly estimate standard errors for estimates as would be needed in standard linear models and ANOVA (Agresti, 2018b). This avoids problems caused by lack of independence among observations or having nonconstant variances, both of which compromise hypothesis testing for standard linear models.

Analysis of Deviance uses omnibus tests for each main effect and interaction by way of Chi-square distribution, with degrees of freedom determined by each main effect and interaction (Montgomery et al., 2012). Hence with orthogonal data (i.e. complete and balanced) the requirement of explaining the noise (i.e. panellist effect) is eliminated. Therefore, the use of GLM and Analysis of Deviance would be a better approach to analyse temporal data with a natural lack of independence. To date, there is no published research applying such an approach to analyse TCATA or TDS data.

### *1.5. Comparing expert and consumer temporal sensory evaluations*

Early use of temporal sensory techniques, such as time intensity, was limited to expert panels (Lawless & Heymann, 2013). Expert assessors are not representative of product category consumers however, they are generally chosen based on their good sensory acuity (Meilgaard et al., 2006). It is evident in the literature that for static sensory techniques expert and consumer panels approach product evaluation differently (Ares, Antúnez, et al., 2015; Hopfer & Heymann, 2014; Mello et al., 2019). Training develops an analytical versus holistic approach (Lawless & Heymann, 2013) and subsequently leads to different insights (Ares & Varela, 2017; Mello, Almeida, & Melo, 2019). Therefore, sensory profiles obtained from expert panels may not be representation of consumer actual product experience. Traditionally the ability of consumers to perform analytical tasks to provide reliable sensory profiles of products was not thought possible but was underestimated (Meilgaard et al., 2006; Stone et al., 2012). However, the development of more versatile temporal techniques such as TCATA (Castura et al., 2016) and TDS (Pineau & Schilch, 2015; Pineau et al., 2009) led to both expert and consumer panels being used in temporal product evaluations (Hort et al., 2017b; Jamieson & Watling, 2017) with adapted levels of training developed accordingly (Jaeger et al., 2017). Among the very limited number of published studies comparing the use of expert versus consumer panels in temporal sensory techniques, Ares et al. (2016) compared insights from standard TCATA and TCATA fading variants with expert and consumer assessors using different product categories across assessor types. TCATA fading improved discrimination from consumer data compared to TCATA with no fading. However, no publications to date have compared the insights obtained from expert versus consumer panels when using multiple ingestion temporal evaluations to capture the actual consumer whole product experience.

## *1.6. Temporal drivers of product acceptance or rejection*

Traditionally, descriptive sensory data from expert panels is related to liking responses from consumers to understand product performance and respective consumer experience (Kemp et al., 2009). However, the competitive food industry demands better insights into consumer affective responses beyond hedonic measurements (Ng & Hort, 2015). In particular, measuring emotional responses is becoming a more prominent tool in recent sensory and consumer research (Spinelli & Monteleone, 2018) where it has been shown to provide better product discriminations compared to hedonic responses (Ng, Chaya, & Hort, 2013). Furthermore, emotions are reported to affect hedonic responses, food intake as well as food acceptance or rejection (Macht, 2008). Therefore, there is considerable potential to adapt temporal sensory techniques in order to understand consumer affective response in terms of hedonic and emotional reactions, and to combine data to understand temporal drivers of product acceptance or rejection. This section first elaborates on the application of temporal techniques in measuring affective responses on single ingestion approaches (section 1.6.1) followed by the extensions of the approaches over multiple ingestions (section 1.6.2).

### *1.6.1. Single ingestion temporal techniques and affective responses*

#### *1.6.1.1. TI*

An earlier approach by Taylor and Pangborn (1990) in recording continuous liking (using TI and 9-point hedonic scale) for chocolate milk over 80 s revealed that, liking responses are also temporal in nature. The concept of temporal-hedonic scaling was also confirmed by measuring continuous TI or pleasantness of lemonade containing varying amounts of quinine sulfate over 30 s (Veldhuizen, Wuister, & Kroeze, 2006). However, if continuous liking or pleasantness is combined with dynamics of a sensory attribute measured using TI, the TI method often limits its application by only recording a single sensory attribute at a time (Cliff & Heymann, 1993).

#### 1.6.1.2. TCATA

TCATA was used previously to evaluate eight attributes of chocolate milk and subsequent overall liking (on a 9-point hedonic scale) (Oliveira et al., 2015). The use of TCATA with affective response data could be advantageous to study the correlation between affective responses with all applicable sensory attributes given that TCATA allows simultaneous recording of multiple sensory attributes (Hort et al., 2017a). Additionally, the findings of Ares et al. (2017) have revealed that, TCATA provides more discriminative results over TDS on drivers of liking where products have no clear differences on overall liking. Ramsey et al. (2018) used continuous temporal liking (on a 15 cm unstructured line scale over 60 s), overall liking (on 9-point hedonic scale) and TCATA (over a 60 s sip) to characterise beer samples. Their study found that the combination of TCATA and temporal liking data provided additional insights into temporal sensory drivers of beer preference. Therefore, the use of temporal liking could be beneficial over static liking to study the relationships between temporal sensory and affective responses. In addition, performing affective measurements prior to descriptive analysis is purported to minimise bias (Jaeger et al., 2013; Ramsey et al., 2018).

#### 1.6.1.3. TDS

TDS has been primarily used with trained panellists and complementing the dynamic descriptive results with consumer responses on overall liking (Bemfeito, Rodrigues, Silva, & Abreu, 2016; Paulsen, Næs, Ueland, Rukke, & Hersleth, 2013; Rodrigues et al., 2018). In some instances, consumer panels were used to obtain both TDS sensory responses and overall liking responses (Ares et al., 2017). Later, TDS data was correlated with temporal liking data to obtain insights into drivers of liking. For example, TDS and temporal liking data of flavoured cheese from some sixty eight consumers have been combined to study the temporal drivers of liking and attributes responsible for liking or disliking of a product (Thomas et al., 2015). The researchers identified the perception of fresh herb flavour in the absence of cooked herb flavour as a key driver of liking of the flavoured cheese.

TDS has also been modified to the record dynamics of dominant emotional responses during product consumption (Jager et al., 2014). Sixty two consumers evaluated chocolate for ten emotional attributes (temporal dominance of emotions (TDE); by replacing the sensory attributes with the emotional attributes) and ten sensory attributes (TDS). After TDS, consumers scored overall liking (9-point scale) of the respective sample. The use of TDE to measure both emotion responses enabled to capture the dynamics of dominant emotions during product evaluation. Additionally, both sensory and emotions data in the same temporal structure facilitated the identification of the drivers of the dynamics of dominant emotions.

### *1.6.2. Multiple ingestion temporal techniques and affective responses*

Affective responses possibly change over multiple ingestions, especially with respect to the build up of sensory aspects (Methven et al., 2010), and such evaluations could closely represent real product performance and consumer experience.

Corrêa Simioni, Ribeiro, de Souza, Nunes, and Pinheiro (2018) used 90 consumers to evaluate six sips (50 s or 90 s) of beers with scoring for liking on a 9-point scale after each sip. The results have revealed changes in liking concurrently to dominant attributes over the six sips. Similar alternate TDS and liking responses have been used to evaluate an oral nutrient supplement over ten sips and their subsequent liking, thrust and hunger status (Thomas, van der Stelt, Schlich, & Lawlor, 2018).

As an extension to TDS and static liking, TDS has been combined with temporal liking over multiple ingestion of cheese and wine alternately, evaluated by a consumer panel (Galmarini, Dufau, Loiseau, Visalli, & Schlich, 2018). The temporal liking data was associated with the TDS data and both were used in extensive discrimination of the wine-cheese combinations. Similar application of TDS and temporal liking has been published by Thomas et al. (2017) for the evaluation of different cheese types, two bites each.

The most recent advancement in TDS was multiple sip evaluation of wine (minimum four sips) using ten attributes followed by temporal dominance of emotions (TDE) with ten emotion terms and simultaneous evaluation of temporal liking with both TDS and TDE (Silva et al., 2018). Correlation of data obtained from sensory and affective (liking and emotions) responses over multiple sips possibly provided in depth information on temporal drivers of product acceptance or rejection. However, TDE has remained generally the same across multiple intake evaluation of yoghurt (van Bommel, Stieger, Visalli, de Wijk, & Jager, 2020). Therefore, more product specific studies will be required to investigate the use of multiple intake TDE evaluations to obtain additional insights into actual product consumption occasion.

Further, consumers participating in multiple intake evaluation of sensory, emotion and liking responses were given a one-to-one demonstration and a practice session before the first sample evaluation (Silva et al., 2018). In fact, simultaneous assessment of temporal liking with TDS or TDE with consumers possibly requires an intensive familiarisation step in order to obtain reliable data. Regardless of this, the evaluation of temporal liking, TDS and TDE in separate sessions would be more suitable for consumer studies where the assessors must focus on only one temporal aspect (either sensory perception, emotions or liking) per session.

In comparison to TDS, the application of multiple sip TCATA with temporal sensory, emotions and liking responses, specifically for flavoured dairy beverages, is not available. TCATA is suggested to provide more in depth information than TDS (Ares et al., 2017) where TCATA does not limit information only to dominant attributes (Ramsey et al., 2018). However, depending on the intended study objectives the choice of TDS versus TCATA could be made when to use in evaluating temporal sensory, emotions and liking responses of products.

## *1.7. Physicochemical drivers of key sensory attributes associated with dairy beverages*

Dairy beverages cover a wide range of products however this section only focuses on the key sensory attributes of cow milk based, non-fermented, sweetened and flavoured milk drinks. Table 1.1 summarises the sensory attributes which have been investigated in published studies on sweetened and flavoured dairy beverages. Different sweeteners (Boeneke, McGregor, & Aryana, 2006; Oliveira et al., 2016; Paixão, Rodrigues, Esmerino, Cruz, & Bolini, 2014), fat (Frøst, Dijksterhuis, & Martens, 2001; Paixão et al., 2014), thickeners (Frøst et al., 2001; Wagoner, Çakır-Fuller, Shingleton, Drake, & Foegeding, 2020; Yanes, Durán, & Costell, 2002) and added flavours (Akiyama et al., 2012; Parker, 2017; Piqueras-Fiszman & Spence, 2012) were often noticed with varying concentrations in these products.

Also, sweeteners, fat, thickeners, added flavours and their concentrations function as primary drivers of sensory properties of dairy beverages. Sucrose is a commonly used added sweetener in dairy beverages (Gomes et al., 2013; Oliveira et al., 2016). Variations in the sucrose level can therefore affect the perceived intensity of sweetness in products (Bartoshuk, Duffy, Hayes, Moskowitz, & Snyder, 2006). Similarly, dairy fat has contributed to a creamy flavour (Boelrijk, de Jong, & Smit, 2003), creamy mouthfeel, mouthcoating thickness and the viscosity (Frøst et al., 2001; ISO22935-1:2009(E); McClements & Decker, 2007) of products as well as the perceived intensity depending on the level of fat.

Table 1.1: Published sensory attributes for flavoured dairy beverages. Bold font represents sweetener, fat and thickener dependent key attributes.

| Product description | Sensory evaluation | Attributes | Reference |
|---|---|---|---|
| Milk protein beverages with hydrocolloids | QDA and TDS | **Thickness**, **creamy**/ oily, pasty, **astringency**, **mouthcoating**, **sweetness**, salty, **creamy flavour,** cardboard, cooked, **residual mouthcoating**, **residual astringency**, sweet aromatic flavour | Wagoner et al. (2020) |
| Ready to mix vanilla whey protein beverages | Time intensity<br>TDS and TCATA | **Sweetness**, bitterness, metallic<br>**Sweetness**, bitterness, metallic, sweet aroma, cardboard flavour | Parker (2017) |
| Sweetened chocolate flavoured milk | CATA | Bitter, rough, chocolate, **thick**, **sweet**, fluid, greasy, **milk flavour**, and vanilla | Oliveira et al. (2016) |
| Chocolate milk with varying fat and sweeteners | Just-about-right scale<br>Magnitude estimation | Chocolate flavour, **sweetness**<br>Equivalent sweetness | Paixão et al. (2014) |
| Ready-to-drink chilled cup coffee beverage | Semantic Differential Scale (straw sipping) | Aromatic, **feeling of milk**, feeling of coffee, bitter, sour, **sweet**, body, mild, **aftertaste**, weak, roast, light, mocha aroma, chocolate | Akiyama et al. (2012) |

Table 1.1 continued.

| Product description | Sensory evaluation | Attributes | Reference |
|---|---|---|---|
| Hot chocolate | QDA | **Sweetness**, bitterness, chocolate flavour, chocolate aroma, **creaminess** | Piqueras-Fiszman and Spence (2012) |
| Dairy-based espresso with varying sweeteners | QDA | Coffee flavour, **sweetness**, **aftertaste**, bitterness, **viscosity**, iciness, colour | Boeneke et al. (2006) |
| Chocolate milk with varying sucrose and hydrocolloids | Paired comparison | **Sweetness**, chocolate flavour, **thickness** | Yanes et al. (2002) |
| Ultrapasteurised milk with varying fat and lactose levels | QDA | Cooked flavour, caramelised, grainy/malty, **sweet**, bitter, metallic, **viscosity**, **drying**, chalky, lingering, aftertaste: **drying**, metallic, bitter | Chapman, Lawless, and Boor (2001) |
| Milk with varying fat, thickener, whitener, and creamy flavouring | QDA | **Creamy aroma**, boiled milk, **whiteness**, **yellowness**, **blueness**, **transparency**, **glass coating**, **thick appearance, creamy flavour**, boiled milk, **sweet, mouthfeel thickness, creaminess**, **residual mouthcoating** | Frøst et al. (2001) |

Ingredients such as carboxy methyl cellulose and carrageenan are commonly used in dairy foods to achieve general thickening properties (Frøst et al., 2001; Yanes et al., 2002) and also to help stabilise emulsions, suspensions and foams (Lindsay, 2017). Different flavours are added to dairy beverages with vanilla purportedly providing the most easily transferrable insights compared to other flavours.

In addition to direct sensory properties, physicochemical, cross-modal and perceptual interactions of these dairy beverage constituents/ ingredients are also evident (Keast & Breslin, 2003). For instance, sweetness was dependent on the amount of sucrose in a product up to individuals' terminal threshold (Bartoshuk et al., 2006). However, high thickener level was reported to suppress sweet taste due to cross-modal interactions (Kora, Latrille, Souchon, & Martin, 2003; Mälkki, Heiniö, & Autio, 1993). Moreover, high fat level was reported to suppress sweetness in liquid samples (Drewnowski et al. 1987, 1989 as cited in (Hayes & Duffy, 2007). Fat can potentially act as a barrier between sucrose molecules and sucrose taste receptors in the oral cavity and hence cause a reduction in the perceived sweetness intensity. However, hydrophilic sucrose tends to concentrate in the continuous aqueous phase (BeMiller & Huber, 2007) of high fat samples and consequently increase the perception of sweetness. Furthermore, consumers have perceived higher sweetness intensity in aqueous sweetener solutions with added vanilla flavour than the same concentration of sweetener sample without vanilla (Berget, Castura, Ares, Næs, & Varela, 2020). A similar incremental effect of perceived sweetness was also observed with added vanilla flavour (Lavin & Lawless, 1998) in milk beverages. The interactions of vanilla, for example variation in vanilla perception based on its interactions with varying levels of fat, sucrose and thickener have been noted in numerous studies (Sikorski, Pokorny, & Damodaran, 2007a; Stampanoni-Koeferli, Piccinali, & Sigrist, 1996). An increase in creaminess perception in the presence of vanilla (Oliveira et al., 2015) added complexity to sweetness-vanilla perceptual interaction. Therefore, perceived sweetness intensity in a dairy beverage system can vary depending on sweetener, fat, thickener and vanilla levels as a function of the interactions that can occur between these ingredients.

Mouthcoating and astringency are two sensory attributes often involved in perceptual interactions. Mucosal adhesion of milk proteins such as casein and β-lactoglobulin (Withers et al., 2013), thickening agents such as carboxy methyl cellulose (Cook, Woods, Methven, Parker, & Khutoryanskiy, 2018), sucrose and fat (Boeneke et al., 2006; Cardoso & Bolini, 2008; Oliveira et al., 2015; Stampanoni-Koeferli et al., 1996) are reported to increase mouthcoating. Differences in oral processing, and hence shear viscosity, have also been shown to affect mouthcoating perception (He, Hort, & Wolf, 2016). It is also possible that, individual differences in oral mucosa and oral processing affected the dynamics of mouthcoating (Stokes, Boehm, & Baier, 2013) in temporal sensory evaluations. Astringency in dairy beverages was hypothesised to be as a result of mucosal adhesion of dairy proteins based on the findings for high protein dairy beverages (Withers et al., 2013) and dairy protein isolates (Vardhanabhuti, Cox, Norton, & Foegeding, 2011). Build-up of astringency over multiple sips was evident in a study by Methven et al. (2010) with high protein beverages. However, increase of thickness (viscosity) in soy milk by added carboxy methyl cellulose has been shown to reduce the perceived astringency (Courregelongue et al., 1999). This was thought to be due to the complexation of carboxy methyl cellulose with astringents which limited salivary protein/astringent interactions. In fact, there are possible perceptual interactions of mouthcoating and astringency in dairy beverages specifically where temporal sensory profiles are of interest.

In the food industry ingredients are being constantly completely or partially replaced to create low calorie foods. Some examples of this are, when manufacturing low calorie or functional dairy beverages, sucrose can be partially or totally replaced with low-caloric sweeteners (Drewnowski & Rehm, 2014; Gardner et al., 2012) such as stevia (Pawar, Krynitsky, & Rader, 2013). Full fat milk/ ingredients are replaced with skimmed milk/ ingredients (Esmerino et al., 2017).

Substitution with these low caloric ingredients can cause significant changes to the food structure, the physicochemical and the sensory properties of the end product (Bayarri & Costell, 2009). These changes can also affect consumer acceptance of the products (Arancibia, Costell, & Bayarri, 2011; Boeneke et al., 2006; Lagast, De Steur, Schouteten, & Gellynck, 2018; Markey, Lovegrove, & Methven, 2015). For example, low-caloric sweeteners (like stevia) were reported to introduce bitterness, metallic taste, astringency (Cardoso & Bolini, 2008; DuBois & Prakash, 2012), and lingering or unpleasant after tastes and flavours (Bassoli & Merlini, 2003; Glória, 2003; Lagast et al., 2018; Markey et al., 2015; Zorn et al., 2014). Furthermore, hydrocolloids have been added in some low-calorie beverages to compensate for the loss of these properties, specifically texture attributes (pertaining to sucrose and dairy fat such as thickness), creamy mouthfeel and mouthcoating (Bayarri & Costell, 2009; Frøst et al., 2001; Kinghorn, Chin, Pan, & Jia, 2010; Villegas, Tárrega, Carbonell, & Costell, 2010; Wagoner et al., 2020). However, hydrocolloids (like carboxy methyl cellulose, carrageenan, xanthium and propylene glycol alginate) were also reported to deliver powdery, gritty (Gallardo-Escamilla, Kelly, & Delahunty, 2007) and astringency perceptions (Courregelongue et al., 1999) in beverages depending on the level used.

Moreover, changes in sweeteners, fat, thickeners and flavours not only affect their perceptions in taste, flavour, aroma, texture/ mouthfeel modalities but also in appearance related perceptions (Markey et al., 2015; Villegas et al., 2010). Therefore, depending on the study objective appropriate measures must be taken, such as product evaluations under red lights or use of food colorants, to include or exclude the interference of appearance modality on perceptions from other modalities. Investigating effects of formulation changes and their interactions on temporal sensory perceptions of dairy beverages over multiple sips is beyond the scope of this project. However, variations of sweetener, fat and thickener levels were used in model milkshake formulations to investigate the insights from temporal sensory techniques over multiples sips. Therefore, perceptual interactions of varying sweetener, fat and thickener levels are only discussed for completeness.

### *1.8. Impact of sipping method on sensory perceptions*

There is some evidence that the method of beverage consumption impacts sensory perception rather than just the food itself. Specifically, when it comes to beverages, the diameter of the drinking straw has been shown to affect the perceived taste and aroma attributes (Akiyama et al., 2012). This is in agreement with potential impacts of oral processing (Brown & Braxton, 2000; Engelen, 2018; Foster et al., 2011), mouth behaviour (Jeltema, Beckley, Vahalik, & Garza, 2020) and in-mouth flow properties (Chen & Engelen, 2012; Chen & Stokes, 2012; Stokes, Boehm, & Baier, 2013) on sensory perceptions of food. Pramudya et al. (2020) revealed the impacts of straw material (plastic, paper, copper, stainless steel, and silicone) on sensory and emotion responses to iced tea. Dairy beverages are often sold in bottles or as single servings with a straw and intended to be consumed either from a cup or through a straw. Consequently, the sensory perceptions have the potential to be affected by all the above factors. However, the effects of sipping method, specifically temporal sensory perception across multiple sips of dairy beverages remain inconclusive at the present.

### *1.9. The impact of individual differences in taste phenotypes on temporal sensory and affective responses*

Individual differences in taste phenotypes results in wide variation in sensory perception of the same stimulus (Hayes & Duffy, 2008; Hayes & Keast, 2011; Piochi, Dinnella, Spinelli, Monteleone, & Torri, 2020; Sandell, Hoppu, & Laaksonen, 2018). PROP (6-*n*-propylthiouracil) taster status (Fox, 1932), sweet liker status (Pangborn, 1970) and the relatively recent discovery of thermal taster status (Cruz & Green, 2000) are often studied to understand their effects on sensory and affective responses. Furthermore, evidence on associations of these taste phenotypes with each other and the consequent impacts on sensory and affective responses for food (Yang, Dorado, Chaya, & Hort, 2018; Yang, Hollowood, & Hort, 2014; Yang, Williamson, Hasted, & Hort, 2020; Yeomans, Tepper, Rietzschel, & Prescott, 2007) are debatable. All though flavour and texture perceptions are important for product experience, research presented in thesis only focused on the significance of individual differences in taste perception. Therefore, this section reviews PROP taster status and sweet liker status and their interactions on sensory and affective responses for food.

### *1.9.1. PROP taster status (PTS)*

PTS has been the most extensively studied taste phenotype since its discovery in the early 1930s (Blakeslee & Fox, 1932; Fox, 1932). PTS is defined based on the variations in the bitter taste perception of compounds with thiourea moiety (N-C=S) such as phenylthiocarbamide (PTC) and 6-*n*-propylthiouracil (PROP). Primarily, individuals were categorised into two groups such as PROP tasters (PT) and PROP non-tasters (PNT) based on their ability to taste bitterness for the same concentration of PROP (Kalmus, 1958). Later, the PT category was further divided into two groups: PROP regular/ medium tasters (PRT/PMT) and PROP super tasters (PST) (Bartoshuk, 1993; Lucchina et al., 1998). According to Guo and Reed (2001) percentages of PTS categories varies across ethnic groups such as for PNT 2 – 37 % in Africans, 7 – 37% in Europeans, 2 – 67% in Indians and 5 – 23% in Chinese. Yang et al. (2020) reported 33% PST, 46% PMT and 21% PNT in their study with Caucasian and Asian subjects. Furthermore, sensitivity to PROP bitterness was reported to be higher in female than males (Bartoshuk, Duffy, & Miller, 1994; Monteleone et al., 2017; Robino et al., 2014; Shen, Kennedy, & Methven, 2016).

In PTS phenotyping, subjects are asked to roll a cotton bud saturated with 0.32mM PROP solution (at 19 ± 2 °C) across the anterior tip of the tongue for about 3 s. Thereafter subjects rate the perceived maximum bitterness intensity using a general labelled magnitude scale (gLMS). A repeated measurement is taken following the same procedure after a 3 min break and palate cleansing. PTS is classified using mean PROP intensity ratings such as PNT below log intensity

0.15 ('barely detectable'), PMT between log intensity 0.15 and 1.23 ('moderate') and PST above log intensity 1.23 on the gLMS scale. Subjects practice rating on gLMS scale prior to phenotype evaluations (Lim, Urban, & Green, 2008; Yang et al., 2018; Yang, Kraft, Shen, MacFie, & Ford, 2019).

PROP tasters have reported higher sensitivity to basic tastes such as bitter, sweet, salty and sour than PNT (Bajec & Pickering, 2008; Bartoshuk, Duffy, Lucchina, Prutkin, & Fast, 1998; Lim et al., 2008; Mennella, Pepino, & Reed, 2005; Tepper, 2008; Tepper et al., 2009; Yang et al., 2014; Yeomans, Prescott, & Gould, 2009). Yang et al. (2020) found interaction effects of PTS and ethnicity on the perceived intensity of sour and metallic tastes. Furthermore, PTS has affected hedonic and emotional responses for different foods. In detail, subjects who perceived 3.2 mM PROP more bitter than 0.32 mM quinine genetic marker have reported higher liking for milk and sucrose mixtures at lower fat (3.3%) and sucrose (10%) levels (Hayes & Duffy, 2008). In addition, Yang et al. (2018) reported significant relationships of PST and PNT with some emotion categories for beer. Finally, a higher disgust propensity was reported to be associated with increased sensitivity to bitterness (Schienle, Osmani, & Schlintl, 2020). Startle eye blink response has also significantly differentiated PROP tasters from PNT (Herbert, Platte, Wiemer, Macht, & Blumenthal, 2014).

The effects of PTS on sensitivity, liking and emotional responses have subsequently influenced consumer preferences for different food categories. PMT or PST have significantly disliked cruciferous and some green raw vegetables and were purported to add fats/ sugars to mask the bitterness in such vegetables (Drewnowski, Henderson, Hann, Berg, & Ruffin, 2000). However, Tepper and Nurse (1998) showed that PNT prefers high fat salad dressings compared to PMT or PST. Furthermore, Yeomans et al. (2007) reported 67% of PST subjects as sweet dislikers. Duffy et al. (2004) showed a relationship of higher PROP sensitivity with lower alcohol intake (Keller, Steinmann, Nurse, & Tepper, 2002). PROP tasters were more influenced by food adventurousness and food liking than PNT (Ullrich, Touger-Decker, O'Sullivan-Maillet, & Tepper, 2004). However, some other researchers failed to identify relationships between PTS and affective responses or food choices (Catanzaro, Chesbro, & Velkey, 2013; Deshaware & Singhal, 2017; Drewnowski, Henderson, Shore, & Barratt-Fornell, 1997; Feeney, O'Brien, Scannell, Markey, & Gibney, 2014). Furthermore, the impact of PTS on temporal sensory and affective responses of multiple sip evaluation of dairy beverages has not been investigated.

### *1.9.2. Sweet liker status (SLS)*

Individual differences in liking for level of sweetness was initially reported in the early 1970s (Pangborn, 1970). These individual differences have been thereafter categorised into sweet likers (SL) and sweet dislikers (SDL) based on the level of liking to varying sweetness intensities in sucrose solutions. Increasing sweetness intensity results in an increase in liking for SL and a decrease for sweet dislikers (SDL) (Cabanac, 1979; Garneau, Nuessle, Mendelsberg, Shepard, & Tucker, 2018; Kim, Prescott, & Kim, 2014, 2017; Methven, Xiao, Cai, & Prescott, 2016; Yeomans et al., 2007). Generally, a series of sucrose solutions with varying concentrations is presented to subjects in SLS phenotyping. Then the subjects are instructed to taste each of the sucrose solutions and to rate the perceived intensity of sweetness and level of liking using two different scales.

From published work, the percentage of SL varied from 12% to 78% (Garneau et al., 2018; Kim et al., 2014; Pangborn, 1970; Yang et al., 2020), primarily owing to differences in the SLS classification approaches that were followed. Iatridi, Hayes, and Yeomans (2019b) summarised four types of SLS classifications used in different studies namely, visual (Yeomans et al., 2007) or statistical (Garneau et al., 2018; Kim et al., 2017) interpretation of the shape of hedonic response curves using ratings to determine highest preference (Eiler et al., 2018; Goodman et al., 2018), positive or negative average liking (Tuorila, Keskitalo-Vuokko, Perola, Spector, & Kaprio, 2017; Yeomans & Prescott, 2016; Yeomans et al., 2009) and the highest preference via paired comparison (Mennella, Finkbeiner, Lipchock, Hwang, & Reed, 2014). Furthermore, variations in SLS phenotyping protocols, such as the use of different number and concentrations of sucrose solutions (Garneau et al., 2018; Iatridi, Hayes, & Yeomans, 2019a; Kim et al., 2014, 2017; Methven et al., 2016; Yeomans et al., 2007) and use of different scales to capture hedonic responses; visual analogue scale (VAS) (Garneau et al., 2018; Kim et al., 2014; Methven et al., 2016; Yeomans et al., 2007), general label magnitude scale (gLMS) (Yeomans et al., 2007), semi-structured 15 cm line scale (Kim et al., 2017) are also evident. Such variations of SLS phenotyping protocol and classification likely make the data from different studies incomparable.

Yang et al. (2019) used five sucrose solutions (3, 6, 12, 24, 36% (w/v) and a labelled magnitude scale (LMS) to record hedonic responses and gLMS for perceived sweetness intensity in the phenotyping protocol. Agglomerative hierarchical clustering and the Pearson correlation coefficient between each subject's hedonic responses were used for SLS classification. Four clusters of SLS; high sweet likers (HSL) (34%), medium sweet likers (MSL) (16%), sweet dislikers (SD) (35%) and unclassified (15%) have been identified. Yang et al. (2019)'s approach of pairing cluster analysis with correlation study uplift consistency and reliability of SLS classification. In fact, this methodology possibly fills the lack of a standardised approach for SLS classification.

Additionally, impacts of SLS on the perception of gustatory stimuli in sucrose solutions and in actual food products were evident. Methven et al. (2016) revealed higher perceived sweetness intensity of SL for sucrose solutions than SDL. However, this was not reflected in the findings of Kim et al. (2014) and Garneau et al. (2018). The latter reported less consumption of sweet juices and tea by SDL and subsequently less energy intake than SL. According to Kim et al. (2014), SL preferred a high sweet strawberry beverage whereas SDL rejected an orange juice after a high intensity of sweetness. Yeomans et al. (2009) reported an increase in changes in pleasantness of odours paired with the taste of saccharin in SL and decrease in SDL. Further, some evidence was reported on alcohol dependence of SL middle aged men (Kampov-Polevoy, Tsoi, Zvartau, Neznanov, & Khalitov, 2001; Krahn et al., 2006) but not in the findings of Wronski et al. (2007). Moreover, SLS had affected the emotional responses to foods. For example, SL have reported strong positive emotions and high hedonic ratings for a beverage and a biscuit at high sweetness level rather than the same products at low sweetness level (Kim et al., 2017). Similar findings were reported by Yang et al. (2019) on sweetened iced tea samples. However, impacts of SLS on dynamic sensory and affective responses over multiple intakes of foods are not established but would be more insightful for understanding the real product consumption experience.

### *1.9.3. Taste phenotype interactions*

Some evidence has been found on the interaction effects of different taste phenotypes on sensory and affective responses. Yeomans et al. (2007) revealed heightened sensitivity of PST for sweetness. Furthermore, a few studies have showed the higher possibility of PST being SDL and PNT being SL (Looy & Weingarten, 1992; Yeomans et al., 2009; Yeomans et al., 2007). In fact, PTS may have an impact on hedonic responses to sweetness and hence a possible association between PTS and SLS phenotypes. Such an association of PTS and SLS was also reflected in emotional responses for sweetened iced tea (Yang et al., 2019). Yang et al. (2014) found significant interactions between PTS and thermal taster status (TTS) phenotypes across stimuli from taste, trigeminal and aroma modalities. However, other studies on primary taste perceptions showed PTS, TTS (Bajec & Pickering, 2008; Bajec, Pickering, & DeCourville, 2012) and SLS (Yang et al., 2020) as independent taste phenotypes. When it comes to hedonic responses, PTS has been more significant than TTS for beer (Yang et al., 2018). In contrast, thermal tasters (TT) have rated more emotion terms significantly higher than thermal non-tasters (TnT) for beer. Therefore, investigating emotional responses along with liking may provide more insights into variations across taste phenotypes. Further, more studies are required on actual food categories to identify any possible interaction effects of these taste phenotypes on sensory and affective responses. All the above studies investigating the impacts of taste phenotypes and/or their interactions on sensory, liking or emotional responses have been conducted on single intake evaluations of samples. However, these sensory and affective responses are dynamic in nature (Hort et al., 2017b) and provide closer insights into actual product experience when evaluated over multiple intakes (Corrêa Simioni et al., 2018; Galmarini et al., 2018; Jamieson & Watling, 2017; Silva et al., 2018). Up to date, there is no published work investigating impact of taste phenotypes PTS, SLS and TTS and their interactions on temporal sensory, liking and emotional responses over multiple intakes specifically of dairy beverages. Due to time and cost constraints TTS was not investigated in this thesis.

### *1.10. Conclusions*

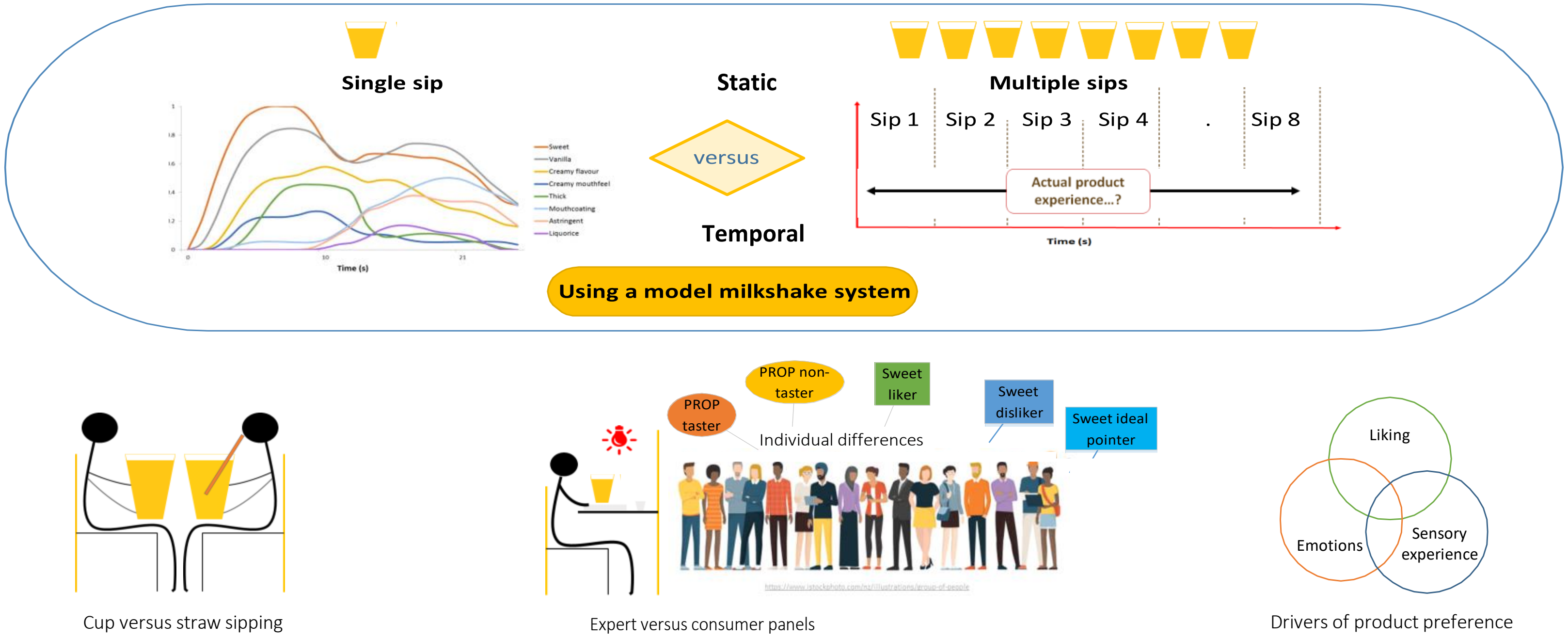
Multiple ingestion temporal techniques should be considered to provide closer insights into actual product consumption experiences. However, sample evaluation protocol; sample size per ingestion, total product ingested during an evaluation and product evaluation time could affect the discriminatory ability of each temporal technique and requires attention during experiment design. Multiple sip TCATA and TDS could be used as complementary methods to provide data on all applicable perceptions and those which dominate over the whole consumption period. It is also known that consumers and expert panels, and different sipping methods/product receptacles, provide different data concerning product profiles. However, a gap remains concerning comparisons across temporal methods, particularly over multiple sips.

Furthermore, combining temporal sensory responses with temporal affective responses may provide insights concerning the potential temporal drivers for product acceptance or rejection. Multiple sip TCATA or TDS with temporal affective measurements (temporal liking and emotions) would be suitable to achieve the above objective however such investigations have not yet been established for flavoured dairy beverages. Additionally, the TCATA fading option may assist multiple sip evaluations, especially in consumer studies. Finally, as all consumers do not perceive sensory properties in the same way, understanding whether taste phenotypes such as SLS and PTS affect temporal sensory and affective responses remains a question to be answered.

## *1.11. Research aim and objectives*

Consequently, the main aim of this research was to compare single and multiple sip sensory approaches using time dependent sensory methodologies to characterise the temporal sensory profile of a model milkshake system. The key objectives established to achieve this, summarised in Figure 1.3, were to:

1. Compare insights from static versus temporal sensory techniques (TCATA and TDS) over single and multiple sips with an expert panel (presented in **Chapter 3**).
2. Investigate the impact of sipping method on multiple sip TCATA profiles of the milkshakes (presented in **Chapter 4**).
3. Compare data from expert versus consumer panels on multiple sip TCATA milkshake profiles (presented in **Chapter 5**).
4. Investigate temporal drivers of product acceptance or rejection, using a multiple sip TCATA approach to profile consumer sensory and emotion responses alongside temporal liking of the milkshakes (presented in **Chapter 6**).
5. Examine the impact of individual differences in perception on temporal dominance of emotions across multiple sips of the milkshakes (presented in **Chapter 7**).




**Objective 1** – Different insights from static versus temporal sensory techniques (TCATA and (TDS)

**Objective 2** – Impact of sipping methods on multiple sip TCATA profiles

**Objective 3** – Different insights from expert versus consumer panels on multiple sip TCATA profiles

**Objective 4** – Temporal drivers of product acceptance or rejection, using a multiple sip TCATA approach to profile sensory, emotion and temporal liking

**Objective 5** – Impact of individual differences on multiple sip temporal dominance of emotion profiles

Figure 1.3: Research aim and objectives.

# Chapter 2. General materials and methods

The research presented in this thesis was conducted using vanilla milkshake as the sensory stimuli evaluated by both an expert panel and consumers. In this chapter the general methods detailing the manufacture of the milkshakes are described, as is the process for the recruitment and training of the expert panel. The different methodologies then employed to characterise perceptions of the milkshakes are provided. Specific data analysis methods are presented in the relevant respective chapters.

## *2.1 Materials*

Milkshake ingredients and the palate cleanser detailed in Table 2.1 were used throughout this study. Equipment and receptacles listed in Table 2.2 were used to manufacture milkshakes and to serve reference and milkshake samples during training and product evaluations. Any additional specific reference samples, ingredients and equipment used are listed in the respective methods sections in this chapter.

Panellist recruitment, training and product evaluations were carried out at the Feast Laboratory, Massey University, Palmerston North, New Zealand. All sample evaluations were conducted in isolation in sensory booths at 21±1 °C, and under red lights to avoid any interferences from slight differences in appearance (colour) of the samples. Panellist training and data collection was performed with Compusense® Cloud (Compusense Inc, Guelph, Ontario, Canada) on iPads, unless specified.

Table 2.1: Milkshake ingredients and palate cleanser materials used in this research.

| Materials | Specifications | Manufacturer |
|---|---|---|
| Whole milk powder | For ultra heat treated (UHT) milk | Fonterra Co-operative Group Ltd, New Zealand |
| Skim milk powder | For ultra heat treated (UHT) milk | |
| Pre-mixed thickener blend | Micro crystalline cellulose, carboxy methyl cellulose and carrageenan | |
| Sucrose | A1 | Davis Food Ingredients, New Zealand |
| Yellow colouring | Food colours (102, 122) | |
| Stevia | 95% total steviol glycosides | Stevita, New Zealand |
| Natural vanilla flavour | No. 507404 T | Invita NZ Ltd, New Zealand |
| Vanilla cream flavour | No. 504680 C8 | |
| Filtered water (palate cleanser) | Chlorine, taste and odour removal carbon cartridge filters at 1µm | Product development laboratory, Massey University, Palmerston North, New Zealand |
| Water crackers (palate cleanser) | Unsalted original | Arnott's, Australia |

Table 2.2: Equipment and receptacles used in this research.

| Equipment/ receptacles | Specifications | Manufacturer |
|---|---|---|
| Thermomix | Model: TM5 | Vorwerk Electrowerke, Germany |
| Hand blender | Model: HDP306WH | Kenwood, China |
| Storage containers | 2 L, polyethylene terephthalate (PET) | The Warehouse, New Zealand |
| Beakers | 2 L, stainless steel, graduated | Thomas Scientific, USA |
| Plastic cups for serving milkshakes and reference samples | 30 mL and 60 mL, recyclable polypropylene (PP), transparent, odour free | Davis Food Ingredients, New Zealand |
| Plastic straw | 6 mm x 70 mm, recyclable PP, white | |

## *2.2 Methods*

### *2.2.1 Vanilla milkshakes*

Six model vanilla milkshakes were developed with whole milk powder, skim milk powder, thickener blend, A1 sucrose, yellow colouring, stevia, vanilla flavour, vanilla cream flavour and filtered water (Table 2.1 and Table 2.2) using a thermomix in the Product Development Laboratory at Massey University, Palmerston North, New Zealand. A summary of the compositions of the model products used in this study is provided in Table 2.3. The composition of the milkshakes was varied within the ranges of the product formulation provided by the

Fonterra Research and Development Centre, Palmerston North, New Zealand (confidential) to acquire a range of sensory experiences.

Filtered water was heated to 60±1 °C before adding the dairy ingredients and A1 sucrose. The mixture was combined using the thermomix (speed 2.5 for 5min). Stabiliser and filtered water (60±1 °C) were mixed separately using a hand blender at speed 1 for 2 min. The stabiliser mix was then added to the thermomix and combined with the dairy ingredients/sucrose mixture. Contents were heated up to 90±1 °C and held for 2 min at a mixing speed of 2.5 in the thermomix. The heat treated mixture was immediately transferred into a stainless-steel beaker and cooled to 60±1 °C in an ice water bath followed by the addition of the vanilla flavours. The final vanilla milkshake was packaged in PET containers and stored at refrigerated conditions (4±1 °C). Products were used within 4 days of the preparation date. Microbial safety of the products was confirmed using a microbiological study according to maximum microbial standards for grade A pasteurised milk products for aerobic plate count (bacteria) (APC) (<2.0 x $10^4$ CFU/mL) and Coliforms (most probable number (MPN) <10/ mL) (Bradley, Houck, & Smukowski, 2013).

Table 2.3: The composition of the model vanilla milkshakes used in this study.

| Product | *Abbreviations for milkshake formulation | Composition (w/w %) | | | |
|---|---|---|---|---|---|
| | | Fat | Sucrose | Stevia | Thickener |
| P1 | HFHSLT | 6 | 6 | 0 | 0.1 |
| P2 | HFLSLT | 6 | 4 | 0 | 0.1 |
| P3 | LFHSLT | 0.1 | 6 | 0 | 0.1 |
| P4 | LFLSLT | 0.1 | 4 | 0 | 0.1 |
| P5 | LFLSHT | 0.1 | 4 | 0 | 0.3 |
| P6 | LFLS<u>S</u>HT | 0.1 | 1 | 0.007 | 0.3 |

* F – fat, S – sucrose, <u>S</u> – stevia, T – thickener. H – high level and L – low level of each ingredient.

### 2.2.2 Expert panel recruitment

The process of expert panel recruitment and product characterisation was peer reviewed following the Massey University's Human Ethics Committee processes and was judged to be low risk (ethics application ID 4000019630). All the participants in this study were offered an inconvenience allowance of $50 per session to participate. The volume of milkshake served in each training and evaluation session was maintained below 25% of a healthy adult female's recommended daily amounts for fat, sugar, salt and energy based on the Australia New Zealand Food Standards Code (2018).

The expert panel was required to characterise the sensory properties of the milkshakes before further experimentation. Panellist recruitment took place over 22 weeks from February – July 2018 with assistance from Feast lab group members. Participants were instructed not to consume anything (especially strong flavours, tobacco and alcohol) but water and not to wear perfumed toiletries or cosmetics for at least one hour before the sensory sessions (ISO-8586:2014). Seventy six volunteers aged 18 – 55 from Massey University Palmerston North Campus and Palmerston North city completed a pre-screening questionnaire (Appendix A) and three screening sessions were conducted based on ISO3972:2011(E) ; ISO5496:2006(E) ; ISO22935-1:2009(E) standards (Appendix B). Nine panellists (seven females; aged 26 – 52 (mean age 37 years) were selected based on their sensory acuity and ability to articulate sensory attributes.

### 2.2.3 Sensory lexicon development

A sensory lexicon specific to the model milkshake system was required to facilitate measurement and comparison of the key sensory characteristics across the milkshakes. Panellists tasted the full range of vanilla milkshakes (30 mL of each sample at 15±1 °C) across two 2 h sessions to develop descriptors. Initially, the panel developed 43 vanilla milkshake descriptors related to taste, flavour, mouthfeel, aftertaste/ flavour, and afterfeel perceptions.

After each descriptor development session, the panel discussed the attributes together to further clarify the definitions for each of the attributes to ensure there was agreement across similar terms. Thereafter, the attributes were further clarified over three 2 h sessions using reference products (Figure 2.1) as suggested by the panel and according to the ISO 3972:2011(E) standards. Filtered water and water crackers were used to cleanse the palate in between the milkshake and reference product tasting. Finally, eight vanilla milkshake attributes; sweetness, vanilla, creamy flavour, creamy mouthfeel, mouthcoating, thickness, astringency and liquorice, and definitions (Table 2.4) were developed with the panellists within a total of five 2 h lexicon development sessions.

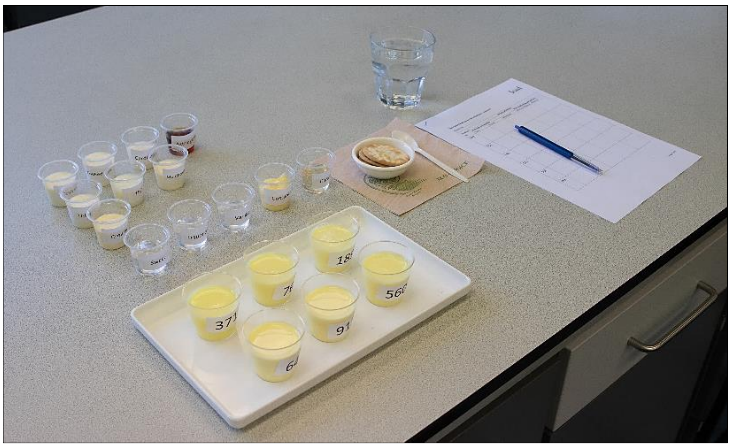


Figure 2.1: Vanilla milkshake descriptor development with reference products.

Table 2.4: Vanilla milkshake descriptors and reference products used for the first round of panel training.

| Attribute | Description | Reference product* |
|---|---|---|
| Sweetness | Sweet taste stimulated by sugar | 4% A1 sucrose in water |
| Vanilla | Natural vanilla flavour with a chemical note | 0.03% vanilla and 0.12% vanilla cream flavours in water |
| Creamy flavour | Retronasal perception of creamy flavour | Fresh cream: 36.9% (w/w) fat (Anchor™, New Zealand) |
| Creamy mouthfeel | In-mouth sensation of smooth, thick texture and moderate melting rate | Fresh cream: 36.9% (w/w) fat (Anchor™, New Zealand) |
| Thickness | Resistance to flow in-mouth | Vanilla custard (Anchor™, New Zealand) |
| Mouthcoating | Anything that is coating/ leaving a film in-mouth after the swallowing, but not necessarily creamy | 90% Full cream milk with 10% fresh cream (Anchor™, New Zealand) |
| Astringency | The feeling of drying/ lack of moistness resulting in friction throughout the mouth | 3 Black tea bags (Dilmah Ceylon Black Tea, Sri Lanka) of 2.5 g each soaked in 500 mL filtered water at 80±1 °C/ 10 min |
| Liquorice | Sweet and long lasting aftertaste | 0.007% stevia in filtered water |

*Reference products were developed based on ISO 3972:2011(E) standards and with selected panellists.

### 2.2.4 *Expert panel training*

At the beginning of the training, panellists ranked three milkshake formulations for each attribute (Table 2.5) to obtain further understanding of the attribute qualities and their respective definitions. Each sample trio provided a range of intensity levels for each of the attributes.

Table 2.5: Milkshake formulations used in ranking during the last lexicon development session.

| Attribute | Sample set |
|---|---|
| Sweetness | P1, P2, P3 |
| Vanilla | P1, P2, P3 |
| Creamy flavour | P2, P4, P5 |
| Creamy mouthfeel | P2, P4, P5 |
| Thickness | P1, P4, P5 |
| Mouthcoating | P1, P4, P5 |
| Astringency | P1, P5, P6 |
| Liquorice | P2, P4, P6 |

Thereafter, a rank-rating method (Cleaver, 2018) was adopted to train the panellists on intensity measurement of the attributes and investigate panel performance. The rank-rating method, differed from other QDA approaches and comprised of two tasks, first ranking attribute intensity and secondly rating. The two tasks were performed by attribute with panellists reminded that the top and the bottom of the scale represented the full sample range. Panellists were familiarised with the rank-rating method using a shaded symbol activity (Appendix C) followed by training on how to supply their answers in Compusense® Cloud using a simple series of sucrose solutions (0, 0.6, 1.5, 3, 5 and 6% (w/v) made using A1 sucrose and filtered water as training samples. Panellists then evaluated all six milkshakes at 15±1 °C in duplicate sipping from a cup (15 mL served in 30 mL cup) over 6 sessions (2 h each). The volume of 15 mL milkshake served in each cup was selected to represent the average volume of a sip based on a preliminary experiment measuring sip volumes via expectoration across a range of individuals (data not shown). Aliquots (15 mL) of each milkshake were served twice for ranking and rating separately. In the first serving panellists tasted the samples and ranked them according to the respective attribute followed by the second serving to re-taste the samples and rate relative attribute intensity (Figure 2.2).

Figure 2.2: The first tray of samples being served for ranking with the second set of samples set-up aside to be served for rating.

Milkshakes stored at refrigerated conditions (4±1 °C) were poured into serving cups 1 h before serving to ensure an average temperature of the served samples of 15±1 °C. Attributes were randomised across the sessions and panellists evaluated four attributes for each of the six samples per session. Samples were labelled with three-digit random codes and presented according to a balanced William Latin Square design (Cleaver, 2018) on a white tray. Panellists were given a forced 20 min break in between each attribute evaluation and were instructed to cleanse the palate with a bite of water cracker and 2 – 3 sips of filtered water to minimise fatigue and carryover effects.

After the first round of rank-rating, the data was analysed to identify any further training needed for panellists on specific attributes. The panel were not in agreement for astringency and liquorice attributes. Therefore, references shown in Table 2.6 were introduced to the panel followed by a second round of rank-rating on the sample set for the two attributes, in replicate. The results were investigated, and it was identified that further improvements were still needed among the panellists and the whole panel performance.

A third round of rank-rating on astringency and liquorice attributes was performed in replicate focusing on panellists who had deviated from the mean attribute ratings for the panel. Reference products shown in Table 2.7 were used in the third round of training for further clarification of the differences in astringency as varied by the fat and protein content in milk, and sweet and liquorice perceptions as differed by the fat content in milk. Panellists were instructed to focus on the after-swallowing phase to assist identification of astringency and liquorice attributes across the milkshakes.

Table 2.6: Reference products used to practice astringency and liquorice before the 2nd round of rank-rating.

| Milkshake attributes | Reference products* |
|---|---|
| Astringency | 2 g green tea (Dilmah Ceylon Green Tea, Sri Lanka) soaked in 400 mL filtered water at 100±1 °C for 10 min |
| | Full cream milk with 3.4% fat and 3.3% protein (Anchor™, New Zealand) |
| | Skimmed milk with 0.1% fat and 4% protein (Anchor™, New Zealand) |
| Liquorice | 4% A1 sucrose in full cream milk with 3.4% fat |
| | 4% A1 sucrose in skimmed milk with 0.1% fat |
| | 3% sucrose equivalent stevia in skimmed milk with 0.1% fat |

*Products/ ingredient suppliers are as shown in Table 2.4 if not otherwise specified.

Table 2.7: Reference products used to practice astringency and liquorice before the 3rd round of rank-rating.

| Milkshake attributes | Reference products* |
|---|---|
| Astringency | Full cream milk with 3.4% fat and 3.3% protein |
| | Skimmed milk with 0.1% fat and 4% protein |
| | Protein enriched skimmed milk with 1.5 % fat and 6% protein (Anchor™, New Zealand) |
| Liquorice | Full cream milk with 3.4% fat and 6% A1 sucrose |
| | Full cream milk with 3.4% fat and 4% A1 sucrose |
| | Skimmed milk with 0.1% fat and 6% A1 sucrose |
| | Skimmed milk with 0.1% fat and 4% A1 sucrose |
| | 3% sucrose equivalent stevia in skimmed milk with 0.1% fat |

*Products/ ingredient suppliers are as shown in Table 2.4 if not otherwise specified.

Appendix D shows mean attribute intensity ratings and standard deviation (SD) of vanilla milkshakes using rank-rating after training round 3. A two-factor (panellist and product) ANOVA was applied to the data for each attribute (Appendix E) and indicated that that the panellists were in general agreement regarding the intensity of each attribute and the rank order of the products, and indicated the panel were sufficiently trained to evaluate vanilla milkshake samples.

### 2.2.5 *Sensory characterisation of milkshakes*

After training the expert panel was used to characterise the milkshakes using a range of different sensory approaches.

#### *2.2.5.1 Attribute intensity*

Overall attribute intensity of the milkshakes was obtained using monadic presentation of the samples. Initially, panellists were trained on the method using vanilla milkshake P4 (Table 2.3) using Compusense® Cloud. An aliquot of 15 mL (one sip) of milkshake sample was served in a 30 mL cup, labelled with a three-digit random number, on a tray and the panellist was instructed to consume the whole volume in the cup. Sample cups were inspected after the evaluations to confirm any residues of the samples left were negligible. The panellists were asked to rate the intensity of all the eight attributes on separate 15 cm line scales with the left and right anchor points identified as the least and the most intense attribute perceptions. Scales were anchored according to the rating scales used in the rank-rating process during training.

#### *2.2.5.2 TCATA profiles of milkshake*

The temporal evolution of the attributes in a milkshake was obtained using the TCATA technique, introduced using a familiarisation session. The eight attributes in Table 2.4 were presented to panellists using Compusense® Cloud on iPads (Figure 2.3). Attributes were randomised and presented in two columns on the iPad screen, according to a balanced William Latin Square design to avoid attribute position and order related confounding effects. However, attribute order was fixed for a given panellist for all the evaluations (Meyners & Castura, 2016). Eight cups of milkshake (15 mL) were labelled with different three-digit random numbers and served on a white tray (Figure 2.4). Panellists were not aware that the eight cups of milkshake on one tray were from the same sample. Panellists clicked on the start button immediately when they place the first sip in their mouth (t = 0 s). Panellists were prompted to swallow the sample at t = 8 s and to evaluate the samples until t = 20 s had been reached. They were instructed to select all attributes that they perceived at any time throughout the evaluation. They were then prompted to take the next sip and repeat the same process until all eight sips had been taken. The total time for evaluation of the eight sips of one vanilla milkshake was 195 s. Attributes were designed to fade away after 8 s and panellists were instructed to re-select the attributes if they were still applicable after this time. The protocols concerning swallowing at t = 8 s, 20 s sip evaluation time and a fading time of 8 s were established during a pilot study with the panel. Start and stop times of each attribute selection were recorded for each vanilla milkshake at 0.01 s time slices.

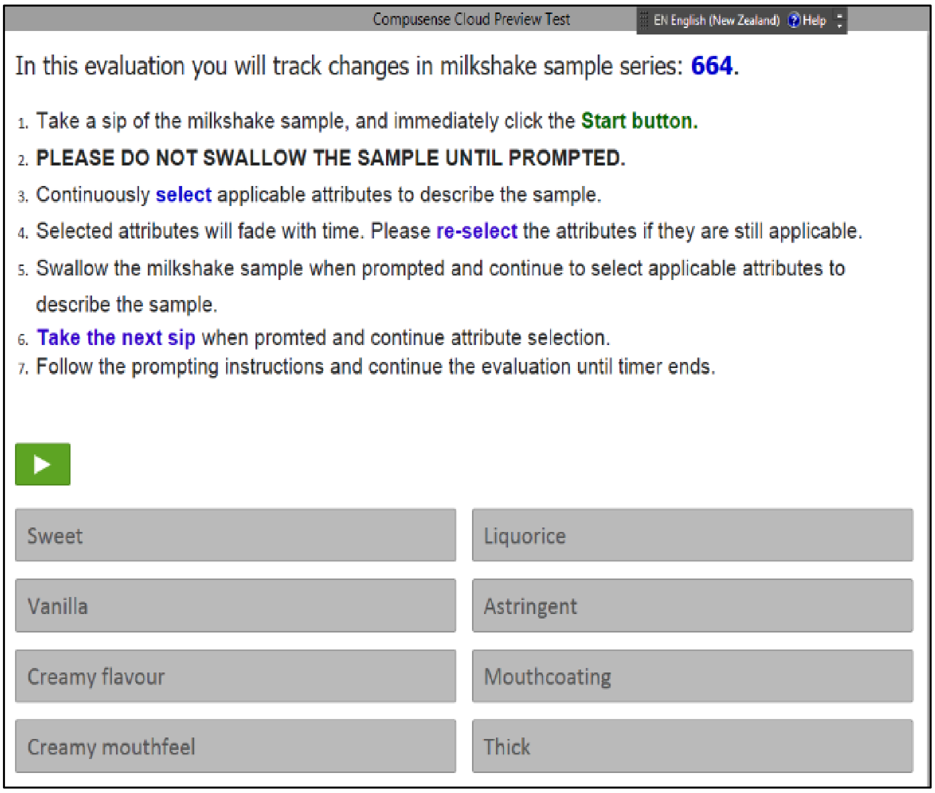


Figure 2.3: A screen shot of the TCATA test on Compusense® Cloud used in this experiment.

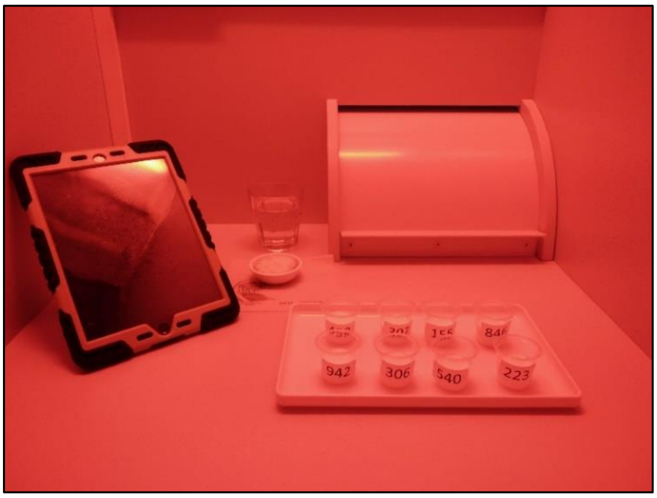


Figure 2.4: Eight sips of a vanilla milkshake served on a tray separately in cups labelled with different three-digit codes.

#### *2.2.5.3 TDS profiles of milkshakes*

To determine the dominant sensations in the milkshakes the TDS method was adopted. It was introduced to panellists in a familiarisation session followed by sample evaluation using the same protocol as explained in section 2.2.5.2 and Figure 2.4 except panellists were only instructed to select the dominant attribute being perceived. The dominant attribute was defined to the panel as the attribute which captured their attention the most either in intensity or in quality, rather than the attribute perceived with the highest intensity (Pineau & Schilch, 2015; Pineau et al., 2009). The selected attribute remained selected until the next dominant attribute was selected.

### *2.2.6 Consumer methods*

A subset of the milkshakes was also evaluated to obtain responses from consumers as evaluating all the six milkshakes was both time and cost prohibitive. This section details the consumer methods used in this research.

#### *2.2.6.1 Emotion lexicon development*

Emotion lexicon development with consumers were peer reviewed following the Massey University's Human Ethics Committee processes and were judged to be low risk (ethics application ID 4000021034). All the participants of this study were offered an inconvenience allowance of $50 to participate.

An emotion lexicon specific to the milkshakes was required to evaluate consumer emotional responses. To date, there are no dairy beverage specific emotion lexicons found in literature. Therefore, focus group studies were conducted to generate an emotion lexicon for the milkshakes.

Focus group participants were recruited from Massey University Palmerston North campus and Palmerston North city. Twenty four consumers (16 females and 8 males) aged 18 – 65 years were selected who were native speakers of, or were competent in the English language, consumed milkshakes at least once a week and had no dietary restrictions or food allergies.

Three 2 h focus groups, each with eight participants, were conducted in a discussion room (21±1ºC). At the beginning participants were given a briefing on emotions specifying to focus on how the vanilla milkshakes made them feel during the moment of consumption. A warm-up activity was conducted to clarify what constitutes an emotion versus other conceptualisations whereby each participant explained their emotional responses related to a picture selected by themselves from a set of 30 pictures following Eaton, Chaya, Smart, and Hort (2018); Ng et al. (2013).

Emotion terms were generated using triadic elicitation (Fransella & Bannister, 1977) where each individual was requested to evaluate milkshake sample triads and explain how two samples were similar, but different in the same way from the third, with respect to their emotional responses upon tasting. Three sensorially distinct vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) (Table 2.3) and two commercial vanilla milkshakes (Anchor™ protein$^+$ vanilla flavoured milk and Nippy's vanilla flavoured milk) from the New Zealand market were used in this activity. Two triad sets were randomly presented to each participant to ensure all the participants had all five samples at least once. Aliquots of 30 mL of each sample were served at 15±1 °C. Participants were instructed to cleanse their palates using 2 -3 sips of filtered water in between each sample tasting. At the end of triadic elicitation of each sample set participants discussed their responses in the group. The three focus groups generated 58 emotion terms in total. A much smaller number of items are used for TCATA and so the terms were reduced to the 12 key discriminative emotions by asking participants to group terms that represented the same emotions in the context of milkshakes. The participants were provided with a pack of 66 flashcards. On each card one of 66 emotion terms published in the literature and a list of their definitions (Appendix F) made by reducing synonymous terms from Eaton et al. (2018); King and

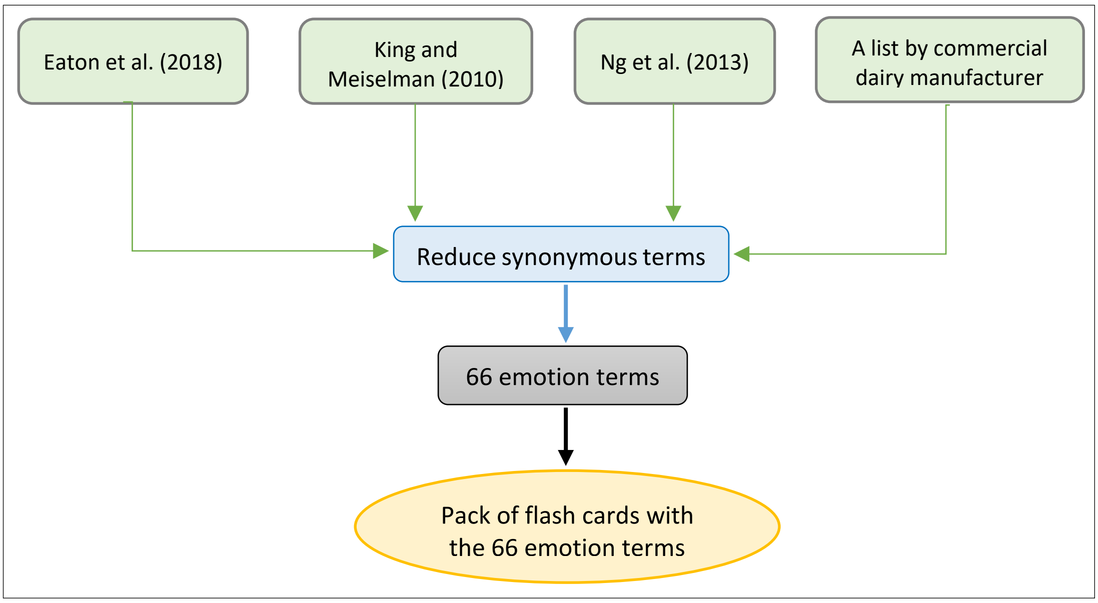



Figure 2.5: Process of generating emotion card pack with 66 flash cards.

Meiselman (2010); Ng et al. (2013) and a list sometimes used by a commercial dairy manufacturer were included (Figure 2.5). Participants selected emotion cards from the card pack related to the 58 terms they generated during triadic elicitation, any synonyms and other emotion terms in the card pack they think they could have used in triadic elicitation to describe the samples. Further, they were provided empty cards to write down any new emotion terms they had generated during triadic elicitation that were not in the given list. The next activity was to select dairy related emotion cards (from the given card pack and from any added cards by individual participants) and grouping synonymous or closely related terms. From the sorted groups they selected the 10 most discriminating emotion terms with respect to the sample triads they assessed. The final three lists of the most discriminating terms (from the three focus groups) were pooled together and from these the most cited 12 terms (Figure 2.5 and Table 2.8) were selected to be used for evaluation of the milkshakes.

Table 2.8: List of 12 dairy related emotion terms and their definitions generated by the three focus groups and use of a thesaurus (Microsoft Word for Office 365).

| Emotion term | Definitions |
|---|---|
| Satisfied | Filled with satisfaction |
| Comforted | Made comfortable (in a time of distress) |
| Happy | Enjoyment, joy or pleasure |
| Indulgent | I'm doing something I enjoy |
| Pleasant | Sense of likable satisfaction or enjoyment |
| Nostalgic | Happily reminded of familiar things or persons |
| Bored | Feel not interested in somebody/something |
| Disappointed | My hopes or expectations are not met |
| Disgusted | Repulsed |
| Relaxed | No strain or anxiety |
| Uncomfortable | Discomfort |
| Delight | Extreme pleasure or satisfaction |

#### *2.2.6.2 Consumer panel recruitment*

One of the key objectives of this research was to investigate whether different insights are obtained from expert panel and consumers during product evaluation over multiple sips, in addition to obtaining affective responses from consumers. Therefore, a consumer panel was recruited.

The approaches used for consumer recruitment and characterisation of milkshakes were evaluated by the Massey University Human Ethics Committee and approval was obtained (Ethics application ID SOA 19/50). All participants were offered an inconvenience allowance of $25 per session to participate.

The consumer panel was recruited through the Feast consumer database, internal emails to staff and students on the Massey University Palmerston North campus and residents of Palmerston North. One hundred and four consumers (70% female) aged 19 – 65 years (mean age 32 years) who consumed milkshakes at least once a month, were not pregnant or lactating, not allergic to vanilla or dairy and not taking medication for thyroid disease were selected to participate (Appendix G). Applicants on thyroid medication were rejected as 6-n-propylthiouracil, a compound used in thyroid medication was to be used to screen the PROP taster status of the participants (Chapter 7). Consumers who participated in emotion lexicon development focus groups (section 2.2.6.1) were not included in this consumer panel.

#### *2.2.6.3 Evaluation of the milkshakes over multiple sips by the consumer panel*

##### *2.2.6.3.1 Materials*

A subset of three sensorially distinct vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) from the developed model system (Table 2.3) were evaluated by consumers. P1 (HFHSLT) was characterised by high sweetness, creamy mouthfeel, creamy flavour, thickness, mouthcoating and less astringency and liquorice flavour with respect to P4 (LFLSLT). P6 (LFLS*S*HT) had distinct liquorice flavour than the other two products (sensory profiles of the three products are presented in chapter 3). Product evaluations were conducted at the Feast Laboratory, Massey University, Palmerston North, New Zealand. Consumers participated in one 1.5 h session per day over five days with a maximum of two sessions per week. Sample serving order, product evaluation on temporal sensory, emotions and liking and phenotyping methods were randomised across consumers. Each sample was evaluated over eight 15 mL sips (at 15±1 °C) using a total of four multiple sip temporal methods: sensory TCATA, emotions TCATA, TDE and temporal liking. Consumers evaluated all the three samples within a session with 20 min breaks in between. Filtered water and water crackers were used to cleanse the palate only in between the samples but not in between the eight sips of the same sample. Samples were evaluated in isolation in sensory booths at 21±1°C and under red lights. At the beginning of each session consumers were trained on a respective temporal method and tasting protocol on Compusense® Cloud using filtered water as a blank sample. Definitions for each sensory or affective response term were explained using reference products/examples and further clarifications were provided upon request from the participants. All the data collection was carried out on Compusense ® Cloud.

#### *2.2.6.3.2 Multiple sip TCATA sensory evaluation by consumers*

Consumers were given the list of the eight sensory attributes developed by the expert panel as described in section 2.2.3 and their definitions (Table 2.4). Each sensory attribute was explained with an imagined example (e.g. "sweetness as the taste of sugar"). Additionally, they were given the opportunity to further clarify any of the attributes or definitions where required prior to product evaluation. The TCATA method was introduced to consumers in a familiarisation session followed by sensory evaluation of vanilla milkshakes using the same TCATA tasting protocol as the expert panel detailed in section 2.2.5.2.

#### *2.2.6.3.3 Other temporal evaluations by consumers*

The methods for emotions TCATA and temporal liking are later detailed in chapter 6. Method relating to TDE and taste phenotyping in chapter 7.

In the next chapter a comparison of the insights from both static and temporal characterisations of the milkshakes by the expert panel are investigated.

# Chapter 3. Comparison of insights from static and temporal sensory techniques (TCATA and TDS) over multiple sips

## 3.1 Introduction

Sensory perception of food is a dynamic process, (Appelqvist et al., 2016; Caul, 1957; Sjostrom, 1954), which varies depending on many physiological and psychological factors (Hort et al., 2017b). Conventional descriptive techniques aim to evaluate sensory perception captured at a single time point (Kemp et al., 2009). Such approaches are likely to provide an overview of the whole consumption experience (Cliff & Heymann, 1993; Dijksterhuis & Piggott, 2000) or sensory perception at a specific time point as dictated by tasting protocols (Hort et al., 2017b). Temporal techniques were developed to capture the dynamic sensory profiles of food (Hort et al., 2017b). Temporal check-all-that-apply (TCATA) enables to capture simultaneously evolving attributes during product evaluation (Castura et al., 2016) and (TDS) enables the recording of which attributes were dominating the experience (Pineau et al., 2009). However, temporal methods do not provide insights into attribute intensity. Therefore, using static sensory techniques alongside TCATA and TDS may provide more detailed understanding of a product and product differences. QDA has been used alongside TDS to investigate the relationship between attribute intensity and dominance (Frost, Blackman, Ebeler, & Heymann, 2018; Frost et al., 2017; Ng et al., 2012; Oliver et al., 2018). QDA with expert panels has reported more product discrimination than CATA with consumers (Mello et al., 2019), and Alcaire et al. (2017) have compared static CATA against TCATA in product evaluation reporting that TCATA provided additional insights into sample similarities or differences as they evolved with time. TCATA and TDS were suggested as complementing methods rather alternative methods for product profiling (Ares, Jaeger, et al., 2015; Beaton & Meyners, 2018; Esmerino et al., 2017). However, at the onset of this study there are no published works which have compared static QDA with TCATA and TDS.

Generally, static or temporal techniques are often used to evaluate one to three sips of a product if re-tasting is allowed, or a larger portion of product where reporting overall experience at the end of the tasting is practiced. However, actual product consumption occurs over repeated ingestions. Various factors such as; oral processing (Engelen & Van Der Bilt, 2008; Jeltema et al., 2020), sensory specific satiation (Hetherington, Rolls, & Burley, 1989) and sensory adaptation (Zorn et al., 2014) can affect temporal sensory perception of a food product (Hort et al., 2017b). Therefore, evaluations of food based on single sips or bites is unlikely to capture the realistic product experience throughout a whole food portion (Corrêa Simioni et al., 2018; Lesschaeve & Noble, 2005). Consequently, temporal evaluation techniques have recently been extended to evaluate food products over multiple ingestions, up to 3 sips in TCATA (Oliveira et al., 2015) and up to 7 sips in TDS (Barron et al., 2012). Among static QDA, Methven et al. (2010) investigated sequential profiling over 8 sips, scored after each of the eight tastings and Jack et al. (1994) looking at texture changes, recorded a score per each chew stroke, from the start of chewing until swallowing. However, none of these methods were employed to investigate within sip dynamics of attributes over multiple sips.

In general, TCATA and TDS data are recorded at high frequency, 0.01 s intervals, (Castura et al., 2016) generating autocorrelated data in neighbouring time slices, specifically between time slices within the pre-determined fade out time in TCATA fading (Ares et al., 2016). Use of high frequency data may help with the visualisation of results (Castura et al., 2016), but the statistical models used to analyse temporal data such as ANOVA (Bi & Kuesten, 2013; Dinnella et al., 2013; Galmarini, Loiseau, et al., 2016) are at risk of over-stating the significance of experimental factors when the model's errors are not independent. Therefore, a more independent and possibly a better approach to analysing within sip TCATA and TDS data using multinomial logit specification with a Chi-square likelihood predictor (Mullahy & Robert, 2010) in generalised linear models (GLM) Analysis of Deviance (González Chapela, 2013; McCullagh & Nelder, 1989; Montgomery et al., 2012) has been presented.

The specific objectives of the research presented in this chapter were to:

- compare the insights obtained from static versus temporal techniques (TCATA and TDS) regarding product profiles and differences during single sip evaluation.
- investigate how sensory insights vary across single sip versus multiple sip evaluations.
- employ a more discrete approach to analysing within sip temporal data to reduce lack of data independence.

## *3.2 Materials and methods*

### *3.2.1 Products*

The six model vanilla milkshakes as detailed in Chapter 2, section 2.2.1 were evaluated in this research.

### *3.2.2 Participants*

Data obtained from the expert panel detailed in section 2.2.2 were used in this chapter.

### *3.2.3 Methodology*

The panel developed a sensory lexicon (section 2.2.3) and were trained using a QDA approach as described in section 2.2.4.

In all the multiple sip evaluations samples were presented according to a balanced William Latin Square design. Panellists were given a forced 20 min break in between each product evaluation and were instructed to cleanse the palate with a bite of cracker and 2 – 3 sips of filtered water to minimise fatigue and carryover effects. No palate cleansing was performed between the eight sips of the same product. Boredom of the panellists with the products during multiple sip evaluations was measured and the details are presented in chapter 6 section 6.3.3.

#### 3.2.3.1 Attribute intensity at sip 1 and 8

The expert panellists rated attribute intensity at the 1st and the last of eight sips of each vanilla milkshake to investigate any changes in perceived attribute intensities over multiple sips as described in section 2.2.5.1. Eight sips (15 mL sample per sip) of the same sample were served in eight separate cups, each labelled with a different three-digit code. Panellists were not aware that the eight cups of 15 mL milkshake in each were from the same sample. Initially, the first sip was served separately on a tray to obtain an overall assessment of a rating at sip 1. Next the panellists were served six cups (sips 2 to 7) on a tray and were prompted to consume the whole volume in each cup at 20 s intervals. No ratings were recorded during tasting of these six sips. Lastly, panellists were served the 8th sip on a separate tray followed by rating relative intensity of all the attributes on similar scales as explained for sip 1. After the training session panellists evaluated all the vanilla milkshake (n=6) at 15±1 °C in replicate over four 2 h sessions.

#### 3.2.3.2 Multiple sip TCATA

Multiple sip (eight sip) TCATA technique was first introduced to the panel during a familiarisation session using blank samples (filtered water at 15±1 °C) as detailed in section 2.2.5.2. After the familiarisation session, panellists evaluated the six vanilla milkshakes (at 15±1 °C) following the same protocol in duplicate, over four 2 h sessions.

#### 3.2.3.3 Multiple sip TDS

The multiple sip (eight sip) TDS technique was introduced to the panel during a familiarisation session using blank samples (filtered water at 15±1 °C) as detailed in section 2.2.5.3. After the familiarisation session, panellists evaluated the six vanilla milkshakes (at 15±1 °C) following the same protocol in duplicate, over four 2 h sessions.

### 3.2.4 Data analysis

Statistical analyses were performed using R software, version 4.0.0 (R Core Team, 2020) in RStudio (2019) with α=0.05. Package `dplyr` (Wickham, François, Henry, & Müller, 2020) for data manipulation and package `ggplot2` (Wickham, 2016) for data visualisation were used.

#### 3.2.4.1 QDA attribute intensity

Mean attribute intensity ratings and observed standard error (SE) for all attributes were calculated for each *product* and *sips* (1 and 8). GLM (`function=glm, family="gaussian", link="identity"`) was used to model attribute intensity rating on separate sip 1 and sip 8 data using one-factor (*product*) for each attribute. Analysis of Deviance was used to determine the product discrimination at sip 1 and sip 8. Analysis of Deviance is not based on the estimated coefficient nor contains a denominator based on residuals but on overall likelihood which in turn is based on the expected value (Montgomery et al., 2012). A hypothesis test was therefore not performed on the basis of estimates and their flawed standard error. Analysis of Deviance uses omnibus tests for each main effect and interaction by way of Chi-square distribution, with degrees of freedom determined by each main effect and interaction (Montgomery et al., 2012). Hence with orthogonal data (i.e. complete and balanced) the requirement of explaining the noise is eliminated. The data set used in this study is orthogonal. In fact, explicitly not including panellist as a model factor cannot alter the findings on the remaining factors of the model and this was confirmed during preliminary data analysis (data not shown). Exclusion of panellist as a factor in the model allows to compare the effects of remaining factors across different sensory techniques. Therefore, QDA data was analysed using GLM.

Further, pooled sip 1 and sip 8 data was analysed using two-factor (*product* and *sip*) GLM with one-way interactions in Analysis of Deviance to determine which main effects and interactions were statistically significant. Post-hoc tests were used to make pairwise comparisons of attribute ratings among experimental factors for which there was a significant main effect (Shaffer, 1995).

Holm's adjusted significance levels (Holm, 1979; Wright, 1992) were used to eliminate lack of independence in pair-wise comparisons.

#### *3.2.4.2 Discrete approach to processing temporal TCATA and TDS data*

##### *3.2.4.2.1 Processing of TCATA data for statistical analysis*

TCATA data are naturally correlated by structure, that is, adjacent time slices are correlated. Therefore, selected time slices within a sip were used in the data analysis to reduce the impact of this lack of independence without loss of dynamic information arising over the time frame within a sip. Time slices were chosen at 4 s intervals to provide five time slices within each of the eight sips; 3, 7, 11, 15, and 19 s after the "take a sip" prompt. At the 8$^{th}$ s of each sip panellists were prompted to "swallow" the sample. Therefore, the time slices selected at 3 s and 7 s represent in-mouth perception dynamics and 11, 15 and 19 s represent after-swallowing perception dynamics.  This resulted in a total of 40 time slices across the eight sips, but for the purposes of understanding the within and across sip effects, two factors were used to represent the within (*within-sip*) and between sip (*sip*) effects, as well as their interaction (*within-sip:sip*). *Within-sip:sip* thus measured the consistency of any within sip effect across the multiple sips.

##### *3.2.4.2.2 Statistical analysis of TCATA data*

TCATA curves were derived to visualise the dynamics of mean citation proportions of all attributes for each product within sip 1 and over 8 sips. Mean citation proportions and observed standard error (SE) were calculated for each *product, for sip* and *within-sip* for all attributes.

As an objective of this study was to determine the effects of evaluation on a single sip versus multiple sips on product perception, first, sip 1 data was considered separately for analysis. GLMs with default functions (`function=glm, family="binomial", link="logit"`) (Agresti, 2018b; McCullagh & Nelder, 1989; Montgomery et al., 2012) were used to model the citation proportions with two-factors (*product* and *within-sip*) and two-way interactions for each attribute. The experimental factor *product* (1, 2, 3, 4, 5 and 6) was included in the analysis models with special attention given to any changes each of these had over time using the interaction effects they had with the time slice factors. Analysis of Deviance (González Chapela, 2013; Montgomery et al., 2012) was used to determine which main and interaction effects were statistically significant. Analysis of Deviance is the standard method for comparing GLM and/ or factors within GLM, often analysing binary or proportional data outcomes (Montgomery et al., 2012).

Associated interaction plots were created to visualise observed responses against time for relevant experimental and statistical effects. Post-hoc tests were used to make pairwise comparisons of citation proportions among experimental factors for which there was a significant main effect (Shaffer, 1995). Holm's adjusted significance levels (Holm, 1979; Wright, 1992) were used to eliminate the lack of independence in pair-wise comparison.

To investigate the effects of multiple sips evaluations on TCATA product profiles, Analysis of Deviance was performed on TCATA data over 8 sips using three-factor (*product, sip and within-sip*) GLM and three-way interactions for each attribute.

###### *3.2.4.2.3 Processing of TDS data*

TDS dominance rates data was arranged as explained in section 3.2.4.2.1 for TCATA citation proportions data.

###### *3.2.4.2.4 Statistical analysis of TDS data*

TDS curves were derived to visualise the dynamics of mean dominance rates of all attributes for each product within sip 1 and over 8 sips. The significant dominance rate for attributes at p=0.05 was calculated using the `gamlss::getQuantile()` function (Rigby, Stasinopoulos, Heller, & De Bastiani, 2019) to identify the dynamics of attributes dominating the sensory experience of each product within sip 1 and over 8 sips. Observed mean dominance rates and standard error

(SE) for all attributes were calculated for each *product, sip* and *within-sip*. TDS data was then analysed as detailed in section 3.2.4.2.2.

## 3.3 Results and discussion

### 3.3.1 Product evaluation on a single sip

#### 3.3.1.1 Single sip QDA attribute intensity profiles

Table 3.1 details the mean intensity ratings at sip 1 of the eight attributes for the six model milkshakes and associated post-hoc comparisons. Table 3.2 presents a summary of deviances and p values from the one-factor ANOVA for attribute intensity ratings on sip 1. The main effect *product* was significant for all attributes except vanilla on sip 1 (Table 3.2). The same amount of vanilla was added in each formulation, but it was expected that it might be perceived differently due to interactions with varying levels of sweetener, fat and thickener (Sikorski et al., 2007a; Stampanoni-Koeferli et al., 1996). However, vanilla intensity perception was not significantly different at sip 1 across the milkshakes indicating formula differences did not result in detectable physicochemical effects. Additionally, the analytical approach of the panel due to their training (Lawless & Heymann, 2013) means they are less impacted by perceptual sensory interactions, for example increased vanilla intensity perception in sweeter samples.

Not surprisingly, on the first sip, P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS*S*HT) with low sucrose were perceived to be significantly less sweet overall than those with a high sucrose content (Table 3.1). However, an exception was the P2 (HFLSLT), which was not discriminated from the high sucrose samples. High fat P1 (HFHSLT) and P2 (HFLSLT) were characterised by significantly higher creamy flavour, creamy mouthfeel, thickness and mouthcoating perceptions compared to the low fat P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT), and P6 (LFLS*S*HT) (Table 3.1). Generally, low thickener level (P3 (LFHSLT) and P4 (LFLSLT)) was further discriminated from the low fat samples and perceived to be the least creamy mouthfeel, thick and mouthcoating at the first sip.

Table 3.1: Mean attribute intensity and observed standard error (SE) scores of the milkshakes for panel defined attributes at sip 1.

| *Product* | Sensory attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* |
| P1 | 13.8$^{a}$ | *0.3* | 10.7$^{a}$ | *1.3* | 13.9$^{a}$ | *0.3* | 13.4$^{a}$ | *0.4* | 13.2$^{a}$ | *0.4* | 13.3$^{a}$ | *0.4* | 1.4$^{b}$ | *0.5* | 0.1$^{b}$ | *0.0* |
| P2 | 10.3$^{ab}$ | *1.1* | 10.0$^{a}$ | *1.1* | 13.4$^{a}$ | *0.4* | 13.1$^{a}$ | *0.5* | 12.8$^{a}$ | *0.5* | 12.6$^{a}$ | *0.6* | 2.2$^{b}$ | *0.9* | 0.1$^{b}$ | *0.0* |
| P3 | 11.0$^{ab}$ | *1.1* | 10.1$^{a}$ | *1.1* | 3.5$^{b}$ | *0.7* | 3.2$^{c}$ | *0.5* | 3.1$^{c}$ | *0.8* | 3.5$^{bc}$ | *0.7* | 8.0$^{a}$ | *1.2* | 0.5$^{b}$ | *0.2* |
| P4 | 8.7$^{b}$ | *1.0* | 8.8$^{a}$ | *1.2* | 3.0$^{b}$ | *0.8* | 2.3$^{c}$ | *0.5* | 3.1$^{c}$ | *0.8* | 2.4$^{c}$ | *0.6* | 8.2$^{a}$ | *1.3* | 0.3$^{b}$ | *0.1* |
| P5 | 7.0$^{b}$ | *1.0* | 8.4$^{a}$ | *1.0* | 4.9$^{b}$ | *1.0* | 5.4$^{b}$ | *0.9* | 5.5$^{b}$ | *1.0* | 4.5$^{b}$ | *0.8* | 8.3$^{a}$ | *1.4* | 0.2$^{b}$ | *0.1* |
| P6 | 7.7$^{b}$ | *1.2* | 8.6$^{a}$ | *1.2* | 3.4$^{b}$ | *0.8* | 3.2$^{bc}$ | *0.6* | 4.7$^{bc}$ | *1.1* | 3.9$^{bc}$ | *0.6* | 8.2$^{a}$ | *1.3* | 13.5$^{a}$ | *1.0* |

Data are means of nine panellists and SE of duplicate. Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

$^{abcd}$ Products within a column with different lowercase letters, are significantly different from each other on 1$^{st}$ sip (*Holms*, p<0.01).

Table 3.2: Summary of deviances and p values from one-factor GLM Analysis of Deviance for attribute intensity ratings on the milkshakes on sip 1 data. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Product* (Df=5) | 6.674 | **<0.001** | 0.664 | 0.652 | 58.499 | **<0.001** | 79.598 | **<0.001** | 39.301 | **<0.001** | 67.189 | **<0.001** | 9.423 | **<0.001** | 144.162 | **<0.001** |

However, astringency only varied with fat content such that high fat (P1 (HFHSLT) and P2 (HFLSLT)) were perceived to be significantly less astringent than the low fat samples (Table 3.1). Only sample P6 (LFLS*S*HT) contained stevia and the panel characterised the sample as having a distinctly higher liquorice flavour over other sucrose containing samples at the first sip (Table 3.1).

#### *3.3.1.2 Single sip TCATA profiles*

Figure 3.1 presents TCATA curves of the milkshakes within sip 1 and pairwise post-hoc comparisons on mean citation proportions of attributes averaged over the whole sip across products. Appendix H shows TCATA observed mean citation proportions and standard error (SE) for each sensory attribute of milkshakes for each product by sip number and at each time points within a sip. Table 3.3 presents the deviances and associated p values from two-factor (*product* and *within-sip*) GLM with two-way interaction Analysis of Deviance for all the sensory attributes at sip 1.

Generally, citation proportions of sweetness decreased from 3 s to 19 s within the first sip however vanilla, creamy flavour, mouthcoating, astringency and liquorice increased (Figure 3.1). Moreover, flavour attributes (e.g. sweetness and vanilla) showed higher citation increments in-mouth from 3 s to 7 s and by comparison the texture attribute, thickness reached its maximum citation frequency immediately after-swallowing at 11 s. However, mouthcoating, astringency and liquorice were cited more often towards the latter after-swallowing at 15 s to 19 s (Figure 3.1). Additionally, mouthcoating was cited increasingly more often in-mouth for high fat P1 (HFHSLT) and P2 (HFLSLT) than low fat products. Astringency citations increased rapidly for P3 (LFHSLT) and P4 (LFLSLT) from 7 s to 11 s whereas for other products the higher citation increment occurred after 11 s. P4 (LFLSLT) behaved differently to other products for creamy mouthfeel showing only less than 12% citation difference within the sip (Figure 3.1).

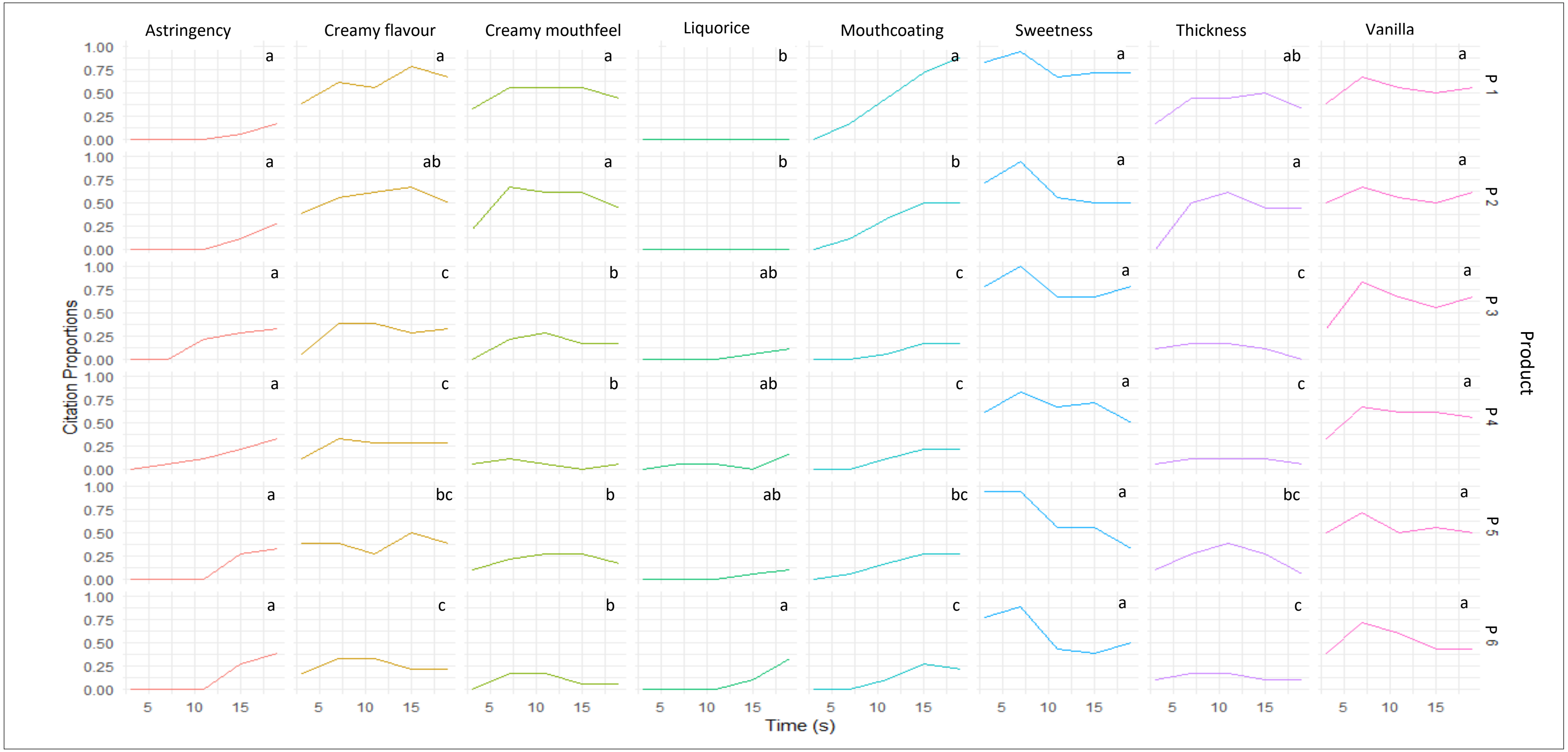



Figure 3.1: TCATA curves for sensory attributes of milkshakes on selected time slices (3, 7, 11, 15 and 19 s) within sip 1. Citation proportions with different letters ‘abc’ within each attribute across products are significantly different on 1st sip (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

Table 3.3: Summary of p values and deviances from two-factor GLM Analysis of Deviance for citation proportions of sensory attributes on selected time slices in sip 1. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Product* (Df=5) | 57.761 | **<0.001** | 21.507 | **<0.001** | 12.350 | **0.015** | 18.106 | **0.001** | 22.346 | **<0.001** | 100.229 | **<0.001** | 85.148 | **<0.001** | 28.173 | **<0.001** |
| *Within-sip* (Df=4) | 12.620 | **0.027** | 1.829 | 0.872 | 44.482 | **<0.001** | 99.349 | **<0.001** | 50.924 | **<0.001** | 63.784 | **<0.001** | 11.608 | **0.041** | 20.271 | **0.001** |
| *Product:Within-sip* | 19.598 | 0.483 | 7.060 | 0.996 | 11.447 | 0.934 | 10.769 | 0.952 | 19.119 | 0.514 | 6.020 | 0.999 | 15.422 | 0.752 | 8.365 | 0.989 |

Analysis of Deviance revealed that the panel differentiated products by all the attributes (Table 3.3). Higher citation proportions of creamy flavour, creamy mouthfeel and thickness in high fat P1 (HFHSL) and P2 (HFLSLT) were mainly differentiated from lower citation proportions of low fat products (Figure 3.1). In addition, for mouthcoating, high fat products were further discriminated across sucrose levels, higher citation proportions of high sucrose P1 (HFHSLT) from lower citation proportion of low sucrose P2 (HFLSLT) (Figure 3.1). Mean citation proportions of liquorice differentiated higher citation proportions of P6 (LFLSSHT) from lower citation proportions of high fat P1 (HFHSLT) and P2 (HFLSLT) but not from the remaining low fat products (Figure 3.1). Post-hoc comparison of mean citation proportions of sweetness, vanilla and astringency did not differentiate the products, however TCATA curves visually show lower citation proportions of astringency in high fat P1 (HFHSLT) and P2 (HFLSLT) than the low fat products, specifically after-swallowing (Figure 3.1). Therefore, further analysis on within sip time points were performed to identify any existing within sip effects.

According to the main effect *within-sip,* attributes citation, except vanilla was discriminated across the products to some extent within a sip. (Table 3.3). Generally, post-hoc comparisons (data not shown) differentiated mean citation proportions between the in-mouth (3 s and 7 s) and after-swallow (11, 15 and 19 s) phases of the sip. Sweetness was most cited in-mouth and was significantly differentiated from lower citation proportions after-swallowing. Fat related attributes, mouthcoating for example, showed an opposite dynamic to sweetness; i.e. lower citation proportions in-mouth and significantly higher citation proportions after-swallowing. Additionally, there were attribute specific differentiations of citation proportions within in-mouth and after-swallowing time points. For example, in-mouth creamy flavour, creamy mouthfeel and thickness were further differentiated by higher citation proportions at 7 s from lower citation proportions at 3 s. However, sweetness, astringency and liquorice were not further differentiated by citation proportions at 3 s and 7s. Mouthcoating showed no differentiation across in-mouth time points but after-swallowing, showed higher citation proportions at 15 s and 19 and lower citations immediately after-swallowing at 11 s. Interestingly, there were no significant *product:within-sip* interactions (Table 3.3) indicating no product specific within sip effects.

Overall, when using TCATA the panel differentiated fewer products on less attributes than with QDA at sip 1. For example, TCATA at sip 1 was not differentiating products on sweetness, vanilla and astringency (Figure 3.1), however in QDA except vanilla all the remaining attributes were differentiated across products (Table 3.1). Also in TCATA fat related attributes, creamy flavour, creamy mouthfeel, mouthcoating and thickness, were mainly differentiated only across high fat versus low fat products (Figure 3.1) but in attribute intensity (QDA) products were additionally differentiated across low thickener and high thickener levels (Table 3.1). Obviously QDA provide attribute intensity data (Sidel, Bleibaum, & Tao, 2018) whereas TCATA provide whether an attribute was present or not (Castura et al., 2016). Mello et al. (2019), Dos Santos et al. (2015) and (Cruz et al., 2013) have also reported higher product discrimination of QDA with expert panels however using check-all-that-apply (CATA) with consumers. In fact, attribute intensity was important to further discriminate products.

However, TCATA enabled characteristic analysis of within-sip dynamics of attributes which added details of how each attribute evolved within a sip, i.e. which attributes were evolving more in-mouth and after-swallowing respectively. A comparison of static CATA versus TCATA has shown similar product discriminations but TCATA has provided additional insights on attribute evolutions specifically on products undergoing extensive temporal sensory changes during consumption (Alcaire et al., 2017). Within-sip dynamic information of attributes would be useful in product development (e.g. functional ingredients in functional foods (Villegas et al., 2010)) or in formulation changes (e.g. sucrose reduction in formulations by adding non-nutritive sweeteners having undesirable lingering after tastes (Bassoli & Merlini, 2003; Kinghorn et al., 2010; Lagast et al., 2018)), to understand exact time points of how specific perceptions are evolve and become significant. Details on within-sip variations were not captured by QDA data where the panellist reflect the whole within-sip experience and provide an overall response at the end of tasting. Evidence of within-sip dynamics from TCATA emphasised the importance of when panellists reflect an attribute during QDA. For example, as TCATA data revealed, mouthcoating was cited significantly higher after-swallowing than in-mouth and vice versa for sweetness (Figure 3.1). Therefore, if a panellist reflected on mouthcoating intensity at the end of a sip that most likely was not a representation of perceived lower mouthcoating intensity at the beginning of the sips. In contrast, for sweetness, reflecting perceived intensity at the end of a sip could be an underestimation of higher sweetness intensity perceived at the beginning of a sip. This requires more emphasis during training QDA panels for attribute intensity ratings. In summary, attribute intensity data from QDA was important to further discriminate products on single sip evaluations and dynamic details from TCATA was complementary. However, TCATA dynamic profiles were more important where within-sip dynamics of attribute evolution are of interest.

#### *3.3.1.3 Single sip TDS profiles*

Figure 3.2 presents TDS curves of the milkshakes within sip 1 and pairwise post-hoc comparisons of mean dominance rates averaged over the whole sip across products. Appendix I shows TDS mean dominance rates and observed standard error (SE) for each sensory attribute of vanilla milkshake for each product by sip number and at each time points within a sip.

Table 3.4 presents the deviances and associated p values from two-factor (*product* and *within-sip*) GLM with two-way interaction Analysis of Deviance for all the sensory attributes at sip 1.

Sensory experience of products at sip 1 was mainly dominated by sweetness and additionally by vanilla in low fat products (Figure 3.2). Generally, sweetness was dominant in-mouth and later after-swallowing. However, for high fat P5 (LFLSHT) and P6 (LFLSSHT) sweetness was only significantly dominant in-mouth within the first sip. An exception was for P2 (HFLSLT) where sweetness was not significantly dominating within the first sip. Further, the sensory profile of P2 (HFLSLT) was characterised by significantly dominant creamy flavour towards later after-swallowing at sip 1. Dominance of vanilla was significantly higher in-mouth for all the low fat products except P4 (LFLSLT) showed significantly higher dominance rates towards later after-swallowing within the first sip (Figure 3.2).

Analysis of Deviance also revealed that the panel discriminated products at the first sip on the dominance rates of sweetness, vanilla and creamy flavour (Table 3.4). Post-hoc testing on mean dominance rates did not clearly differentiate the products on sweetness nor on vanilla (Figure 3.2). Creamy flavour however was only significant for P2 (HFLSLT) (Figure 3.2). Analysis of Deviance analysis provided further insights into the dynamics of attribute dominance within a sip, i.e. in-mouth and after-swallowing, for sweetness and creamy flavour but not for vanilla (Table 3.4). Post-hoc comparisons (data not shown) on average differentiated higher in-mouth dominance rates of sweetness. Creamy flavour of P2 (HFLSLT) showed higher after-swallowing dominance rates. Moreover, there were no significant *within-sip:product* interactions (Table 3.4) indicating dominance of within-sip experience was not affected by the products.

It was interesting to note that TCATA revealed decrease of citation proportions for sweetness within a sip for all products however in TDS, high sucrose P1 (HFHSLT) and P3 (LFHSLT) showed significantly increasing dominance rates towards later phase of sip 1. At high sucrose levels sweetness possibly reached adaptation towards the end of the sip resulting in lower citation proportions however it was still dominating the sensory experience. Overall, only sweetness, vanilla and creamy flavour dominated the sensory experience of the products.

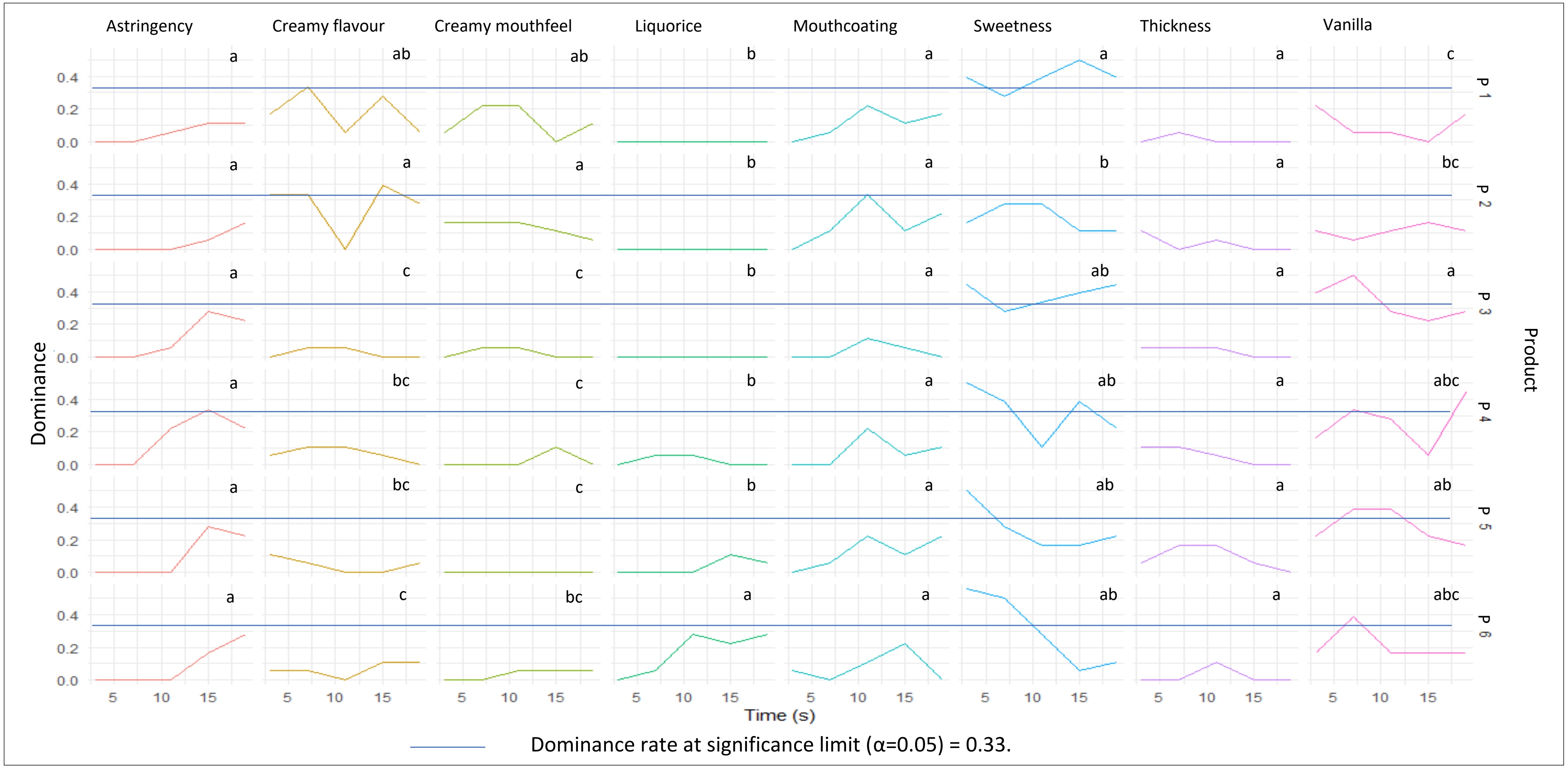



Figure 3.2: TDS curves for sensory attributes of vanilla milkshakes on selected time slices (3, 7, 11, 15 and 19 s) within sip 1. Dominance rates with different letters 'abc' within each attribute are significantly different across products on sip 1 (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

Table 3.4: Summary of p values and deviances from two-factor GLM Analysis of Deviance for dominance rates of sensory attributes on selected time slices in sip 1. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Product* (Df=5) | 12.299 | **0.031** | 24.900 | **<0.001** | 40.529 | **<0.001** | 29.747 | **<0.001** | 8.736 | 0.120 | 10.630 | 0.059 | 9.739 | 0.083 | 45.413 | **<0.001** |
| *Within-sip* (Df=4) | 10.802 | **0.029** | 7.235 | 0.124 | 11.687 | **0.020** | 3.807 | 0.433 | 17.336 | **0.002** | 32.696 | **<0.001** | 68.457 | **<0.001** | 12.130 | **0.016** |
| *Within-sip:Product* | 29.632 | 0.076 | 22.506 | 0.314 | 24.537 | 0.220 | 19.627 | 0.481 | 13.377 | 0.861 | 18.813 | 0.534 | 11.247 | 0.940 | 8.476 | 0.988 |

Obviously, TDS only provides information on temporal dominance of attributes (Pineau et al., 2009) and consequently provides less detailed descriptive data and attribute discrimination than in QDA (Sidel et al., 2018) and TCATA (Castura et al., 2016; Esmerino et al., 2017; Nguyen et al., 2018). However, when an attribute was dominant, e.g. sweetness and vanilla, TDS differentiated products more than in TCATA. When an attribute was dominant, panellist attention may have been drawn to the attribute that was important resulting in better product discrimination than in TCATA. Hence TDS is more valuable where identifying the dominant attributes is of interest, for example investigating the impact of lingering after taste of non-nutritive sweeteners used to replace sucrose in a product formulation. Possibly this will be better reflected by naïve consumers than experts trained on analytical approaches. Different insights from TDS and TCATA were broader particularly in complex products with multiple sensory modalities (Ares, Jaeger, et al., 2015). Kawasaki, Yoshimura, Wakita, and Kasamatsu (2019) have visualised the combined use of TCATA and TDS using dominance-highlighted TCATA curves emphasising holistic temporal product profiles as a result.

### *3.3.2 Product evaluation over multiple sips*

As the QDA, TCATA and TDS data were all collected over multiple sips, the analysis was extended to see if insights from single sip evaluations differ from when data is collected over multiple sips.

#### *3.3.2.1 QDA attribute intensity profiles at sip 8*

The panel also rated attribute intensity on the eighth sip of each product (Table 3.5). Key values from the Two-factor (*product* and *sip*) GLM analysis of Deviance on multiple sip data are shown in Table 3.6. All attributes were able to differentiate the products. But sip number was not a significant effect except for liquorice This was attributed to P6 (LFLS*S*HT) containing stevia which revealed an increased liquorice intensity at sip 8. Separate one-factor (*product*) GLM Analysis of Deviance on sip 8 data showed a significant main effect product for all attributes, including vanilla (Table 3.7) which was not significant at sip 1 (Table 3.2).

By sip 8, sweetness of P1 (HFHSLT), P2 (HFLSLT) and P3 (LFHSLT) increased more than at sip 1 and sweetness of the remaining products decreased. Vanilla was only increased for P1 (HFHSLT) by sip 8. Furthermore, by sip 8, the panel further discriminated the products on sweetness and also on vanilla intensity. At a high fat level, sweetness of high sucrose P1 (HFHSLT) was now differentiated from low sucrose P2 (HFLSLT). The high thickener products were further pulled out as significantly less sweet again alongside the P4 (LFLSLT). Similarly, by the eighth sip, the panel was further discriminating, perceiving low fat and high thickener products as the least intense for vanilla among the other products. In contrast, attribute intensities of creamy mouthfeel, thickness and mouthcoating were higher at sip 8 than sip 1. The panel was less discriminating on creamy mouthfeel, thickness and mouthcoating attributes on the eighth sip such that panellists only differentiated high fat versus low fat products for creamy mouthfeel, thickness and mouthcoating and no further differentiation was evident for the low fat products based on thickener level.

By the eighth sip product discrimination on creamy flavour, astringency and liquorice remained the same as at the first sip (Table 3.5). However, by sip 8 overall attribute intensity of creamy flavour increased and astringency decreased. Additionally, liquorice intensity was decreased only for P6 (LFLS*S*HT) by sip 8. Regardless, the attribute intensity differences across sip 1 and sip 8 for many attributes, Analysis of Deviance only revealed significant *sip:product* effect on liquorice (Table 3.5). This is possibly due to the decrease of liquorice intensity of P6 (LFLS*S*HT) which particularly contained stevia but not in other product formulations. On other attributes product differences were possibly not distinct enough for the panel to significantly differentiate attribute intensity, over multiple sips. Moreover, training and hence the analytical approach taken by expert panellists in product evaluation (Lawless & Heymann, 2013) potentially over engineered their responses over multiple sips. Therefore, it will be interesting to investigate whether naïve consumers would discriminate the products differently over multiple sip evaluations.

Table 3.5: Mean attribute intensity and observed standard error (SE) scores of the milkshakes for panel defined attributes at sip 8.

| *Product* | Sensory attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* | Mean | *SE* |
| P1 | 13.9$^{A}$ | *0.3* | 11.2$^{A}$ | *1.3* | 14.1$^{A}$ | *0.2* | 14.0$^{A}$ | *0.3* | 13.8$^{A}$ | *0.3* | 13.9$^{A}$ | 0.3 | 1.7$^{B}$ | *0.6* | 0.0$^{B}$ | *0.0* |
| P2 | 10.4$^{B}$ | *1.2* | 9.8$^{ABC}$ | *1.2* | 13.2$^{A}$ | *0.5* | 13.5$^{A}$ | *0.4* | 13.2$^{A}$ | *0.5* | 12.9$^{A}$ | 0.6 | 2.2$^{B}$ | *1.0* | 0.1$^{B}$ | *0.1* |
| P3 | 11.2$^{AB}$ | *0.9* | 10.6$^{AB}$ | *1.0* | 5.4$^{B}$ | *1.0* | 5.1$^{B}$ | *0.8* | 5.7$^{B}$ | *1.0* | 5.4$^{B}$ | 0.9 | 7.5$^{A}$ | *1.2* | 0.3$^{B}$ | *0.1* |
| P4 | 8.6$^{BC}$ | *1.0* | 7.8$^{BC}$ | *1.3* | 3.5$^{B}$ | *1.0* | 2.9$^{B}$ | *0.8* | 4.1$^{B}$ | *1.0* | 3.6$^{B}$ | 0.9 | 7.3$^{A}$ | *1.2* | 1.8$^{B}$ | *1.1* |
| P5 | 6.0$^{C}$ | *0.8* | 7.3$^{C}$ | *0.9* | 4.5$^{B}$ | *0.7* | 4.1$^{B}$ | *0.7* | 5.8$^{B}$ | *1.1* | 4.5$^{B}$ | 0.8 | 8.6$^{A}$ | *1.3* | 0.0$^{B}$ | *0.0* |
| P6 | 5.5$^{C}$ | *1.0* | 7.4$^{C}$ | *0.9* | 3.5$^{B}$ | *0.8* | 3.3$^{B}$ | *0.7* | 5.0$^{B}$ | *1.2* | 4.2$^{B}$ | 0.8 | 7.3$^{A}$ | *1.3* | 8.4$^{A}$ | *1.7* |

Data are means of nine panellists and SE of duplicate. Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS*S*HT).

$^{ABCD}$ Products within a column with different uppercase letters, are significantly different from each other on 8$^{th}$ sip (*Holms*, p<0.01).

Table 3.6: Summary of deviances and p values from two-factor GLM Analysis of Deviance for attribute intensity ratings on milkshakes at sip 1 and 8. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Product* (Df=5) | 3200.961 | **<0.001** | 2.678 | **0.023** | 110.700 | **<0.001** | 152.000 | **<0.001** | 52.178 | **<0.001** | 117.867 | **<0.001** | 20.313 | **<0.001** | 84.755 | **<0.001** |
| *Sip* (Df=1) | 3192.361 | 0.456 | 0.747 | 0.388 | 0.479 | 0.489 | 0.954 | 0.330 | 2.420 | 0.121 | 3.155 | 0.077 | 0.077 | 0.781 | 3.512 | 0.062 |
| *Product:Sip* | 3150.213 | 0.742 | 0.289 | 0.919 | 0.675 | 0.642 | 1.359 | 0.241 | 0.449 | 0.814 | 0.522 | 0.760 | 0.098 | 0.992 | 6.721 | **<0.001** |

Table 3.7: Summary of deviances and p values from one-factor GLM Analysis of Deviance for attribute intensity ratings on the milkshakes on sip 8 data. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Product* (Df=5) | 13.485 | **<0.001** | 4.2.413 | **0.042** | 43.631 | **<0.001** | 65.208 | **<0.001** | 25.004 | **<0.001** | 44.036 | **<0.001** | 8.042 | **<0.001** | 12.430 | **<0.001** |

Wijk, Engelen, Prinz, and Weenen (2003) have previously reported an increase in perceived creaminess intensity after five spoonfuls of vanilla custard dessert. In contrast, multiple exposure to a stimulus can result in carry over effects and consequently decrease the sensitivity to a stimulus (Hewson & Tarrega, 2017; Kemp et al., 2009). Therefore, the effects of either sensory build-up and/or adaptation might have resulted in the different effects observed in attribute discrimination by the 8$^{th}$ sip. Interestingly these effects exposed attribute specific impacts, and multiple sip evaluations enabled those variations to be captured, for example the increase of mouthcoating and decrease of astringency by sip 8 (Table 3.6). Further, multiple sip evaluations more closely represent an actual product consumption occasion and may be reflect characteristics of consumer experiences. Additionally, it is interesting to note that QDA expert panels do not require every sip of a product to be evaluated to capture sensory build-up or adaptation effects over multiple sips however QDA product evaluation approaches may sometimes want to be adjusted to enable testing more than one to three sips.

#### *3.3.2.2 Multiple sip TCATA profiles*

Figure 3.3 presents the TCATA curves over 8 sips by attribute for each product. Appendix 3.1 provides TCATA mean citation proportions and observed standard error (SE) for each sensory attribute of the milkshake for each product by sip number and at each time point within a sip. Table 3.8 presents the deviances and associated p values from the Analysis of Deviance using a four-factor (*product, within-sip, sip* and *within-sip:sip*) GLM with three-way interactions for all the sensory attributes.

According to multiple sip TCATA curves attributes generally did not show obvious differences by sip 8 nor between sip 1 to sip 8, however, for some attributes there were product specific slight increase or decrease of citation proportions from sip 1 to sip 8 (Figure 3.3). For example, increasing citation proportions over multiple sips for vanilla of P2 (HFLSLT), P3 (LFHSLT) and P4 (LFLSLT), creamy flavour of P2 (HFLSLT), thickness of P1 (HFHSLT), astringency of P4 (LFLSLT) and

P5 (LFLSHT) and mouthcoating of P3 (LFHSLT), P4 (LFLSLT) and P5 (LFLSHT) and decrease for liquorice of P6 (LFLS*S*HT) (Figure 3.3).

Analysis of Deviance revealed that generally all attributes were discriminated across the products to some extent (Table 3.8). Over multiple sips, sweetness, vanilla and astringency were differentiated across products (Figure 3.3) which were not evident at sip 1 (Figure 3.1). Post-hoc testing on mean citation proportions revealed sweetness was cited significantly more for high sucrose P1 (HFHSLT) and P3 (LFHSLT) than the low sucrose products (Figure 3.3). At low thickener level sweetness of P2 (HFLSLT) was not differentiated from low fat P4 (LFLSLT). Stevia P6 (LFLS*S*HT) was differentiated from low thickener products as the least sweet. Post-hoc differentiation by vanilla mirrored sweetness, however the higher vanilla citation proportion for P3 (LSHSLT) was differentiated from the rest (Figure 3.3). Post-hoc testing on mean citation proportions of astringency differentiated the most cited P3 (LFHSLT) for astringency from P1 (HFHSLT), the least cited for astringency (Figure 3.3).

The remaining products were not clearly differentiated for astringency. The remaining attributes which were already discriminated across products at sip 1 were further discriminated across products over multiple sips (Figure 3.3). For example, at low fat level, lower citation proportions for creamy mouthfeel of P4 (LFLSLT) was now further differentiated from P3 (LFHSLT). Higher citation proportions for thickness of P5 (LFSHT) was further differentiated from low fat low thickener products (Figure 3.3). Lower citations for creamy flavour and mouthcoating of high fat P5 (LFLSHT) was now differentiated from higher citation proportions of P2 (HFLSLT) (Figure 3.3). TCATA over multiple sips in comparison to QDA by sip 8, in both methods products were further discriminated over multiple sips for sweetness and vanilla which were not discriminated at sip 1. Additionally, astringency in multiple sip TCATA was discriminated across products, which was again not discriminated at sip 1, but only in TCATA.


Figure 3.3: TCATA curves for sensory attributes of milkshakes over 8 sips. Citation proportions with different letters 'abcd' within each attribute across products are significantly different on average of 8 sips (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

Table 3.8: Summary of p values and deviances from GLM four-factor Analysis of Deviance for citation proportions of sensory attributes on selected time slices over 8 sips. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip* (Df=4) | 272.42 | **<0.001** | 180.93 | **<0.001** | 184.75 | **<0.001** | 222.65 | **<0.001** | 286.39 | **<0.001** | 271.49 | **<0.001** | 208.08 | **<0.001** | 36.61 | **<0.001** |
| *Sip* (Df=7) | 7.855 | 0.346 | 5.757 | 0.568 | 2.841 | 0.899 | 13.417 | 0.063 | 2.238 | 0.945 | 10.238 | 0.176 | 29.114 | **<0.001** | 9.858 | 0.197 |
| *Product* (Df=5) | 151.32 | **<0.001** | 34.868 | **<0.001** | 249.92 | **<0.001** | 706.35 | **<0.001** | 307.74 | **<0.001** | 275.73 | **<0.001** | 56.533 | **<0.001** | 211.31 | **<0.001** |
| *Within-sip:Sip* | 228.9 | **<0.001** | 199.57 | **<0.001** | 118.52 | **<0.001** | 114.5 | **<0.001** | 143.03 | **<0.001** | 306.68 | **<0.001** | 269.62 | **<0.001** | 59.857 | **<0.001** |
| *Within-sip:Product* | 30.586 | 0.061 | 22.645 | 0.307 | 17.597 | 0.614 | 13.258 | 0.866 | 33.206 | **0.032** | 60.921 | **<0.001** | 14.069 | 0.827 | 28.096 | 0.107 |
| *Sip:Product* | 25.53 | 0.879 | 23.402 | 0.933 | 19.554 | 0.984 | 29.756 | 0.719 | 24.068 | 0.918 | 28.216 | 0.785 | 33.968 | 0.469 | 42.86 | 0.17 |
| *Within-sip:Sip:Product* | 104.86 | 0.988 | 88.03 | >0.999 | 76.599 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 |

Furthermore, by sip 8 in QDA, creamy mouthfeel, thickness and mouthcoating were less discriminated and creamy flavour, astringency and liquorice discriminations remained the same. However, all the attributes were more discriminated across products over multiple sips TCATA. These findings emphasis that even though TCATA does not provide attribute intensity related information, multiple sip TCATA is able to discriminate products more on all the eight attributes with respect to QDA by sip 8. When panellists were reflecting on attribute intensity, build-up of creamy mouthfeel, thickness and mouthcoating over multiple sips perhaps lead to less product discrimination by sip 8. However, in TCATA, when panellists were qualitatively reflecting on attributes for their presence or absence, all the attributes were more discriminated over multiple sips with additional information on build-up (increase of citation proportions) or adaptation (decrease of citation proportions) over multiple sips.

Further analyses of multiple sip TCATA data on temporal main effects (*sip, within-sip,* and *within-sip:sip*) were performed to investigate when the attribute perception dynamics became significant over multiple sip evaluations. *Sip* effect was only significant for astringency (Table 3.8), however post-hoc testing (data not shown) did not differentiate astringency over multiple sips indicating that citation differences were probably only marginal or were diminished by averaging over products. Interestingly, *sip* had no significant *product:sip* interactions with any attribute emphasising that the dynamic experience of attributes over multiple sips was not impacted by individual products. Investigations of the *sip* main effect generally did not discriminate citation proportion differences over multiple sips, however the *product* main effect on averaged multiple sip TCATA data discriminated attributes more than at sip 1, emphasising the importance of evaluating multiple sips in TCATA to capture closer representation of actual product consumption occasions.

Analysis of Deviance also revealed that all attributes were characterised to some extent by *within-sip* dynamics (Table 3.8). Post-hoc testing (data not shown) on *within-sip*, averaged over multiple sips, showed overall more discriminations than at *within-sip* of sip 1. For example, average after-swallowing citation proportions of thickness were further differentiated on higher citations at 11 and 15 s from 19 s (Figure 3.4), which were not clearly differentiated at sip 1. Similarly, higher citation proportions of in-mouth mouthcoating at 3 s were now differentiated from 7 s as well as after-swallowing time points from each other (Figure 3.5).

However, thickness and mouthcoating had significant p*roduct:within-sip* interactions (Table 3.8) emphasising variations of within-sip experiences depending on the products. The thickness of high fat P1 (HFHSLT) and P2 (HFLSLT) showed larger differences in citation proportion from 7 s to 11 s (just before and after-swallowing) (Figure 3.4), whereas for mouthcoating larger differences in citations were after 11 s to 19 s (Figure 3.5). Overall, high fat P1 (HFHSLT) and P2 (HFLSLT) showed larger citation proportion differences across within sip time points than the low fat products (Figure 3.4 and Figure 3.5). Significant *product:within-sip* effects were not evident at sip 1 (Table 3.3) but over multiple sips in TCATA (Table 3.8), indicating presence of product specific within-sip experience variations over averaged multiple sip data. However, there was no evidence of significant *product:within-sip:sip* interactions (Table 3.8), indicating the average of within-sip dynamics was not obviously affected by each additional sip evaluated for each product. Regardless, multiple sip evaluations are still important in TCATA to investigate attribute specific overall *product:within-sip* experience, as evident in thickness and mouthcoating.

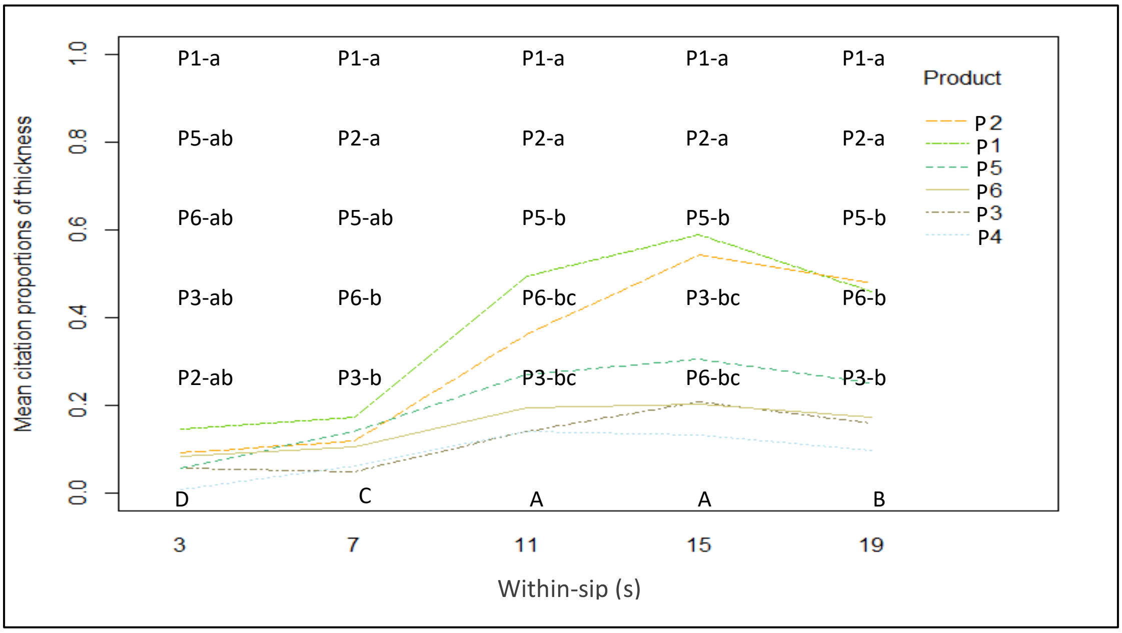



Figure 3.4: Interaction plot of *product:within-sip* for thickness. Citation proportions with different uppercase letters 'ABCD' at each time point, averaged over products, and lowercase letters 'abc' in a column for each *within-sip* time point across products are significantly different (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

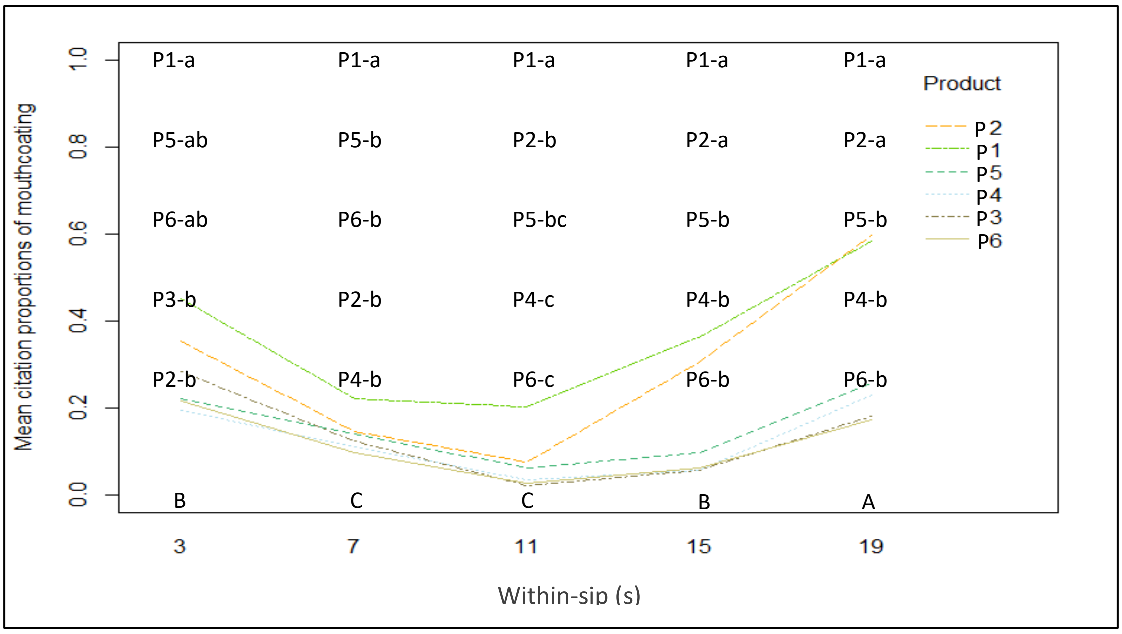



Figure 3.5: Interaction plot of *product:within-sip* for mouthcoating. Citation proportions with different uppercase letters 'ABC' at each time point, averaged over products, and lowercase letters 'abc' in a column for each *within-sip* time point across products are significantly different (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT).

Detailed analyses of *within-sip:sip* interactions, averaged over products, were performed to investigate whether the dynamics of within-sip varied for each additional sip evaluated in TCATA. Analysis of Deviance showed significant *within-sip:sip* effects for all attributes (Table 3.8), indicating significant variation of within-sip dynamics over multiple sips. The effects of *within-sip:sip* interactions showed attribute specific variations. For example, for sweetness (Figure 3.6), the interaction was caused by the fact that at start the (3 s) and the end (19 s) of sips, citation proportions remained fairly static across sips. However, at 7 s citation proportions decrease to sip 6, at 11 s increase towards sip 3 followed by a decrease and at 15 s overall increase across sips. This implies that the dynamics of the sweetness within a sip varied with each additional sip. Vanilla also displayed a similar *within-sip:sip* interaction to sweetness (data not shown).

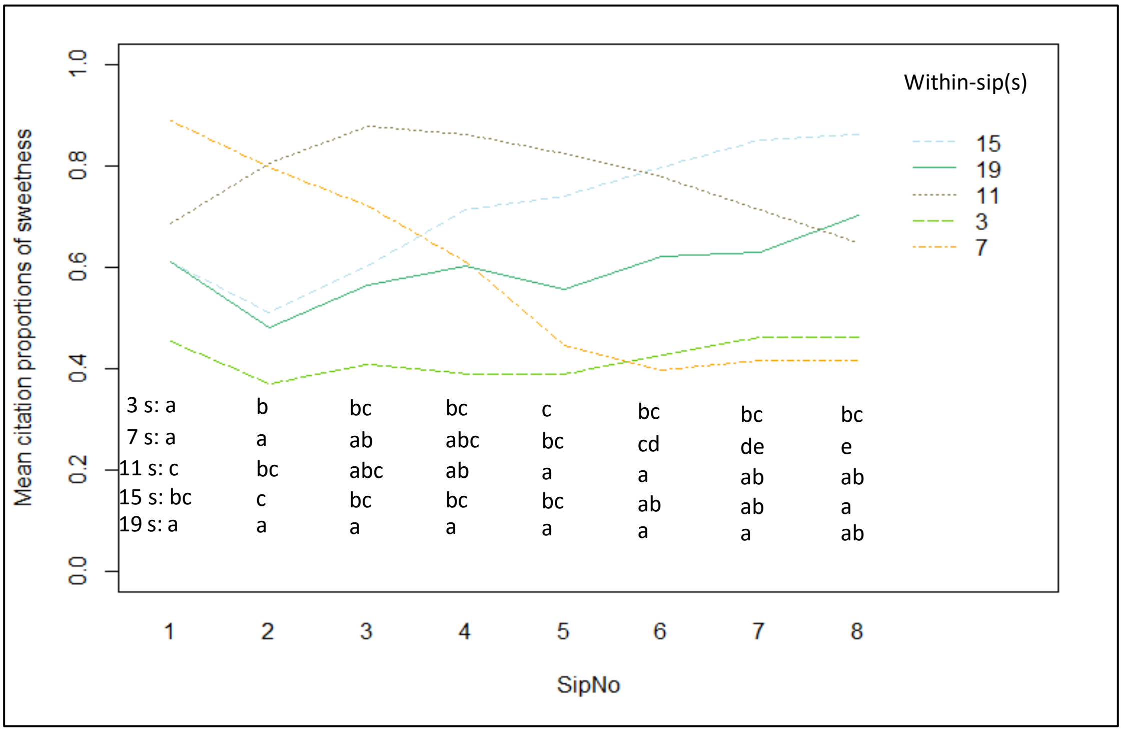



Figure 3.6: Interaction plot of *within-sip:sip* for sweetness. Citation proportions ‘abcde’ with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

Additionally, creamy flavour, creamy mouthfeel and thickness also showed similar magnitude citation differences as described for sweetness but with much smaller effect sizes across sips. For example, Figure 3.7 shows the significant *within-sip:sip* interaction for creamy flavour. In contrast, for mouthcoating, the highest differences in citation proportions occurred at 3 s and 15 s and the citations increased in-mouth and decreased after-swallowing at 15 and 19 s while at 11 s remained fairly the same across sips (Figure 3.8). Astringency also followed a similar interaction pattern to mouthcoating however the interaction of liquorice constitutes a very small effect (data not shown). The findings emphasise that generally the attributes became even more noticeable with each sip and the effects of *within-sip* dynamics varying over each additional sip in fact highlights the importance of multiple sip evaluations in TCATA.

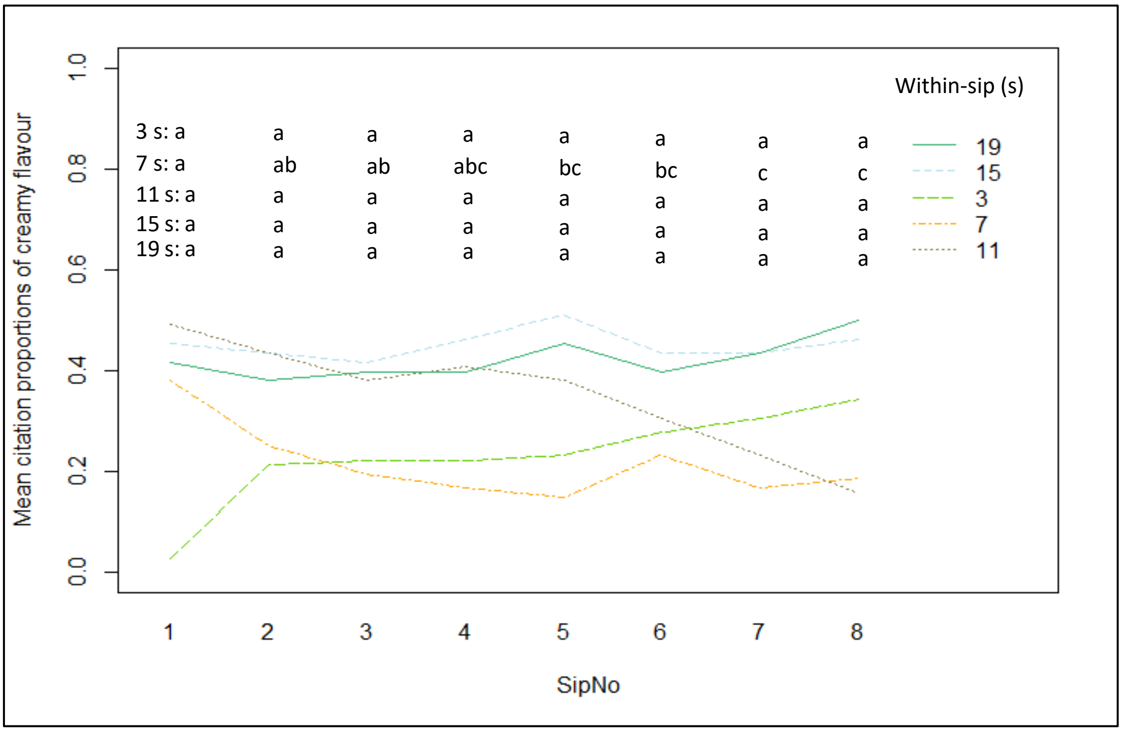



Figure 3.7: Interaction plot of *within-sip:sip* for creamy flavour. Citation proportions 'abc' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, $p<0.01$).

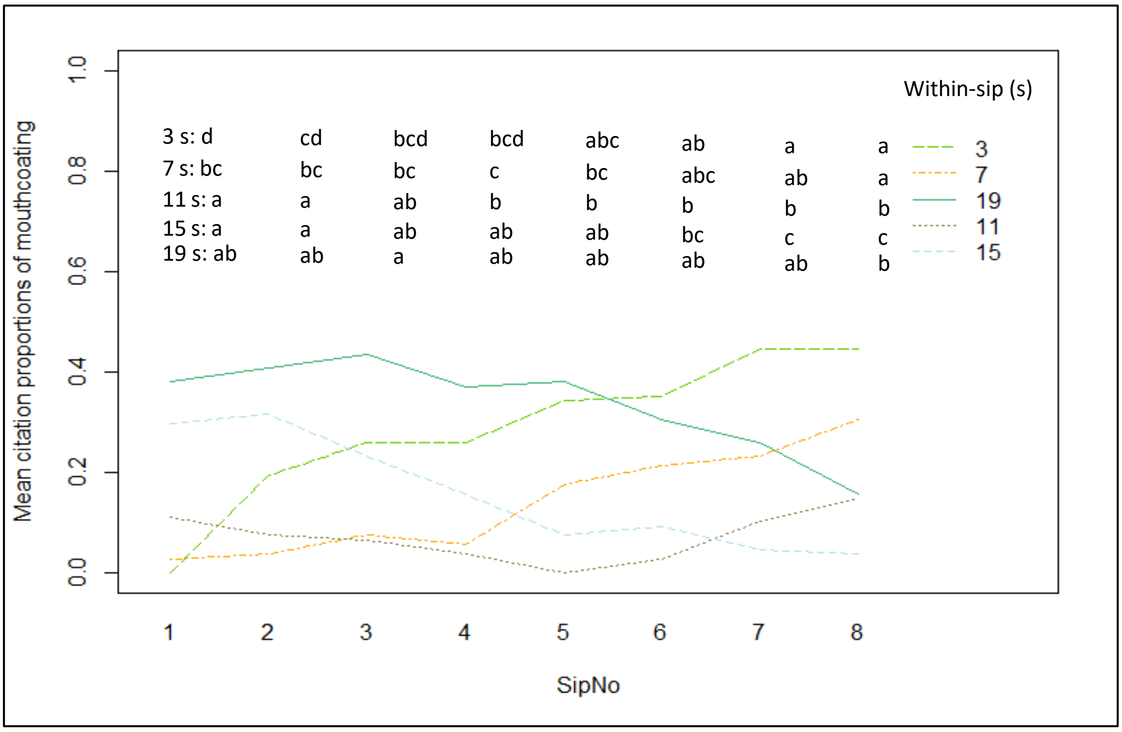



Figure 3.8: Interaction plot of *within-sip:sip* for mouthcoating. Citation proportions 'abcd' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, $p<0.01$).

TCATA across 8 sips overall showed more discrimination of attributes across products and within-sip time points compared to sip 1. Moreover, multiple sip TCATA product profiles added the missing details of attribute build-up or adaptation dynamics into rating intensity data collected using intensity rating the 8$^{th}$ sip. For example, sip 1 in QDA differentiated highest mouthcoating intensities of high fat products from lower mouthcoating of P4 (LFLSLT) and P5 (LFLSHT) (Table 3.1). At sip 8 QDA only discriminated high mouthcoating of high fat products from low fat products (Table 3.5). Multiple sip TCATA product profiles visualised the gradual increase of citation proportions of mouthcoating of low fat products over multiple sips emphasising the prominent build-up of mouthcoating in low fat products over multiple sips (Figure 3.3) which was not reported from single sip product evaluations. However, attribute intensity data on build-up could have been captured from QDA if evaluated at every sip, which might not be an efficient approach with respect to TCATA in multiple sip evaluations, specifically for the eight attributes used in this study.

#### *3.3.2.3 Multiple sip TDS profiles*

Figure 3.9 presents the TDS curves by attribute for each product. Appendix I provides mean dominance rates and observed standard error (SE) for each sensory attribute of milkshakes for each product by sip number and at each time point within a sip. Table 3.9 presents the deviances and associated p values from the Analysis of Deviance using a four-factor (*product, within-sip, sip* and *within-sip:sip*) GLM with three-way interactions for all attributes.

Over 8 sips of TDS, similar to sip 1 on TDS (Figure 3.2), product experiences were primarily dominated by sweetness of all products, vanilla of low fat products and creamy flavour at the first 2 sips of P2 (HFLSLT) (Figure 3.9). Additionally, over multiple sips, astringency of low fat P4 (LFLSLT) and P5 (LFLSHT) became significantly dominant while mouthcoating became significantly dominant towards later sips of high fat products. In P4 (LFLSLT), by sip 1 sweetness and vanilla were co-dominating the sensory experience however by sip 8 astringency become dominant. For high thickener level P5 (LFLSHT), by comparison, at sip 1 only sweetness was dominating the product experience and towards the later sips vanilla and astringency overrode the dominance of sweetness. In fact, additional insights were evident from multiple sip TDS evaluations into the changing dominance of the sensations during the actual consumption experience. Further, in P6 (LFLS*S*HT), the only product containing stevia, sweetness dominated the sensory experience at sip 1, however by sip 8 its liquorice and vanilla became significantly dominant (Figure 3.9). The information of dominance related to the sweetener would not be captured if the products were evaluated only using one sip rather than over multiple sips, which is what occurs during product consumption. Specifically, multiple sip TDS would be beneficial to understand the dominating sensory experience during consumption where alternative sweeteners were included in the product formulations.

Analysis of Deviance also revealed that the product set could be discriminated by differences in dominance of sweetness, vanilla, mouthcoating and astringency (Table 3.9). Post-hoc testing on average dominance rates of attributes over multiple sips further discriminated attributes across products (Figure 3.9) rather than at sip 1 (Figure 3.2). Sweetness, for example in multiple sips TDS, was further discriminated across low fat products i.e. the higher dominance rate of sweetness in P3 (LFHSLT) from the lower dominance of P6 (LFLS*S*HT) (Figure 3.9). Discrimination of dominance of sweetness across low fat products was not evident at sip 1 in TDS (Figure 3.2). Dominance of vanilla was clearly discriminated across high fat and low fat products over multiple sips (Figure 3.9) compared to sip 1 in TDS (Figure 3.2).

Mouthcoating and astringency, the two attributes which additionally became dominant over multiple sip evaluations were not significantly discriminated across respective products (Figure 3.9). Main effect *sip* was also analysed to investigate whether the average product experience over multiple sips were specifically affected by each additional sip evaluated. Analysis of Deviance only showed significant sip effect on astringency (Table 3.9). Post-hoc testing (data not shown) on mean dominance rates showed the higher dominance of astringency at sip 8 was differentiated from its lower dominance at sip 1, 2 and 4 but not from the remaining sips. Further, p*roduct:sip* interaction was used to investigate whether the sip effect varied across products. However, Analysis of Deviance showed no significant *product:sip* interactions for any of the attributes (Table 3.9).

Further, there was a *product:within-sip* interaction for astringency (Table 3.9), indicating that *within-sip* dominant experience was affected by the *product*. Astringency of products were most discriminated after-swallowing at 19 s (Figure 3.10). Overall, lower within-sip dominance rates of astringency were reported in high fat P1 (HFHSLT) and P2 (HFLSLT), however they were discriminated from higher dominant astringency of low fat products only at 19 s.

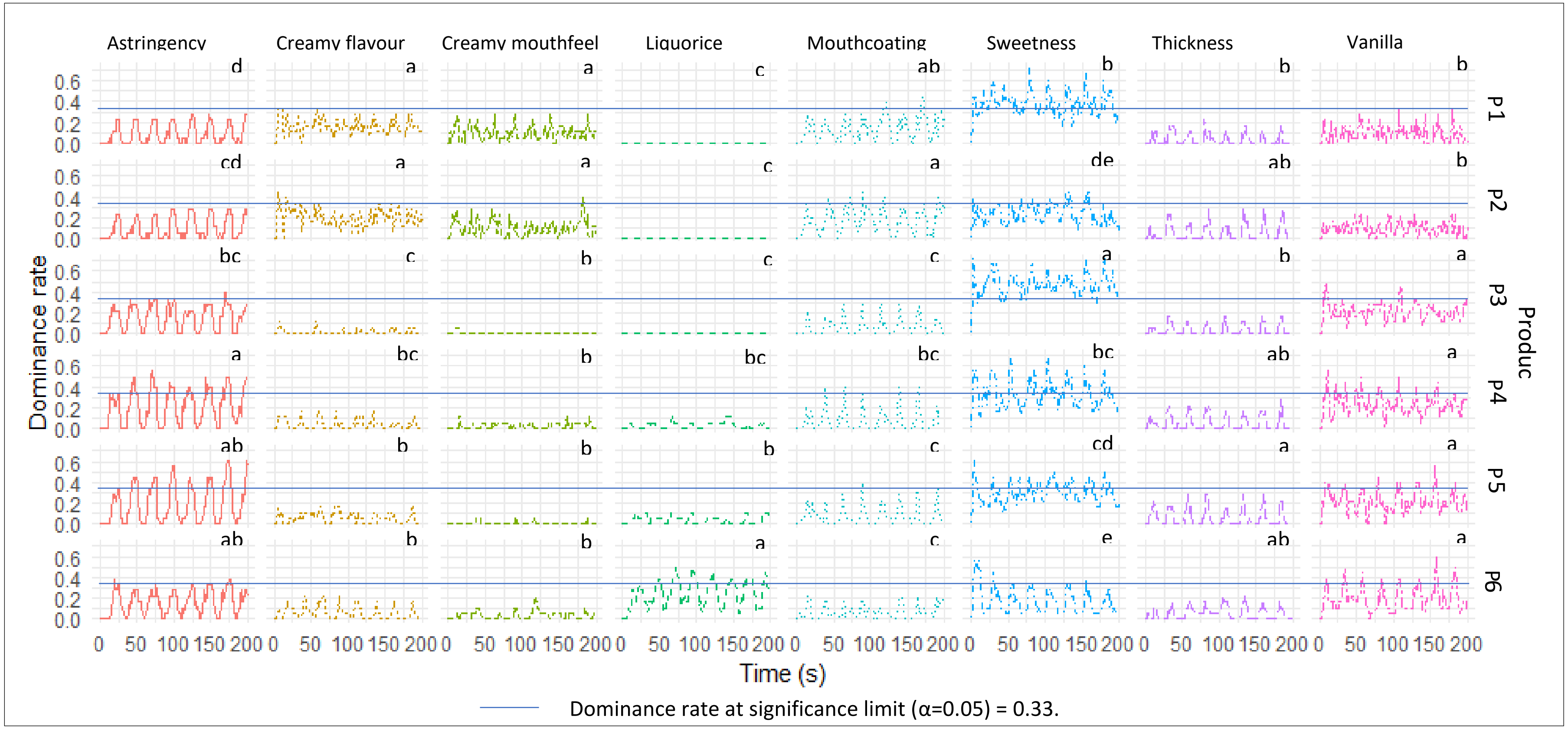



Figure 3.9: TDS curves for sensory attributes of milkshakes over 8 sips. Citation proportions with different letters ‘abcd’ within each attribute across products are significantly different on average of 8 sips (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS<u>S</u>HT).

Table 3.9: Summary of deviances and p values from a four-factor GLM Analysis of Deviance for TDS dominance rate of sensory attributes on selected time slices over 8 sips. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy Flavour | | Creamy Mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip* (Df=4) | 31.686 | **<0.001** | 55.278 | **<0.001** | 15.707 | **0.003** | 9.654 | **0.047** | 138.613 | **<0.001** | 132.492 | **<0.001** | 256.314 | **<0.001** | 22.816 | **<0.001** |
| *Sip* (Df=7) | 4.930 | 0.668 | 2.755 | 0.907 | 16.281 | **0.023** | 6.220 | 0.514 | 4.073 | 0.771 | 5.836 | 0.559 | 52.728 | **<0.001** | 6.797 | 0.450 |
| *Product* (Df=5) | 169.747 | **<0.001** | 129.327 | **<0.001** | 238.150 | **<0.001** | 197.292 | **<0.001** | 3.394 | 0.639 | 110887.923 | **<0.001** | 61.751 | **<0.001** | 479.613 | **<0.001** |
| *Within-sip:Sip* | 77.789 | **<0.001** | 55.336 | **0.002** | 32.563 | 0.252 | 23.447 | 0.710 | 97.839 | **<0.001** | 0.000 | >0.999 | 262.563 | **<0.001** | 27.671 | 0.482 |
| *Within-sip:Product* | 23.344 | 0.272 | 22.517 | 0.313 | 45.940 | **0.001** | 28.329 | 0.102 | 37.709 | **0.010** | 0.000 | >0.999 | 41.572 | **0.003** | 8.669 | 0.986 |
| *Sip:Product* | 30.577 | 0.682 | 30.319 | 0.694 | 36.443 | 0.401 | 42.597 | 0.177 | 26.963 | 0.833 | 0.000 | >0.999 | 20.410 | 0.977 | 22.750 | 0.945 |
| *Within-sip:Sip:Product* | 72.433 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 3460.191 | **<0.001** | 0.000 | >0.999 | 0.000 | >0.999 |

Additionally, *within-sip* dynamics of sweetness, vanilla and astringency varied over multiple sips in TDS (Table 3.9). Sweetness was only differentiated in-mouth at 3 s across sips (Figure 3.11). The higher dominance rate of sweetness at sip 1 was differentiated from the lower dominance rates at sip 5 to sip 8. This possibly explained the adaptation to sweetness sensation over multiple exposures (Lawless & Heymann, 2013). The significant *within-sip:sip* interaction for dominance of vanilla also followed similar dynamics to sweetness (data not shown). Astringency was most discriminated over sips in-mouth at 7 s (Figure 3.12). Lower dominance rates of astringency from sip 1 to sip 5 were discriminated from higher dominance rates of sips 6 to 8 at 7 s. Build-up of astringency over multiple sips perhaps resulted in higher dominance rates of astringency towards latter sips.

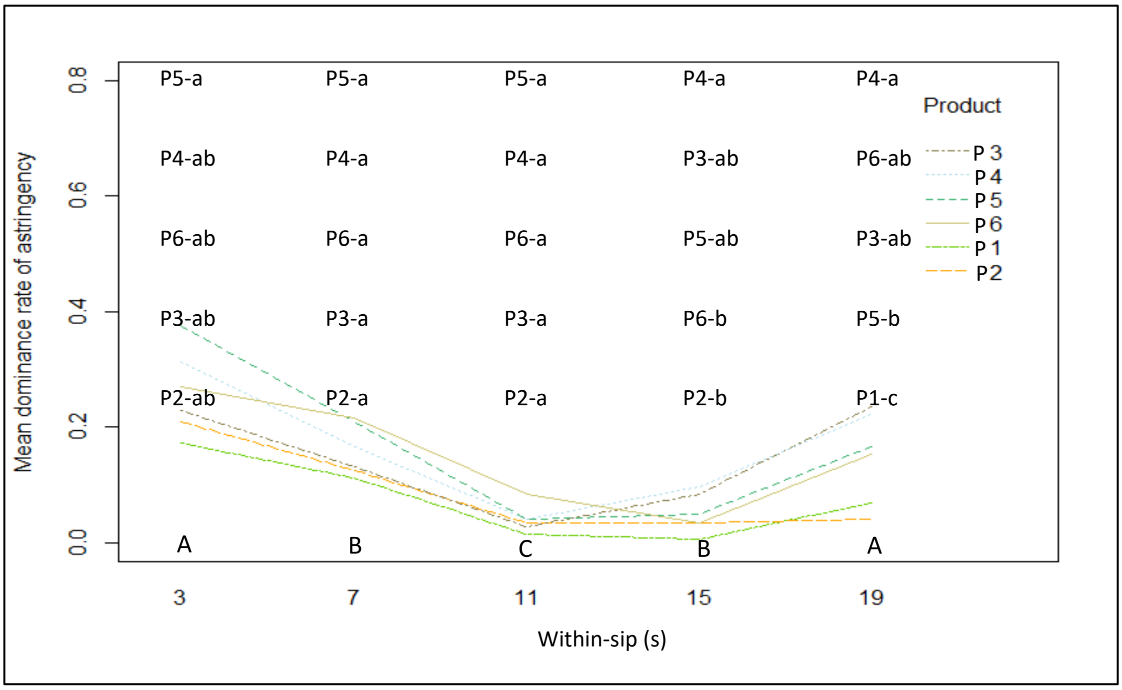



Figure 3.10: Interaction plot of *product:within-sip* for astringency. Dominance rates with different uppercase letters 'ABC' at each time point, averaged over products, and lowercase letters 'abc' in a column for each *within-sip* time point across products are significantly different (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS<u>S</u>HT).

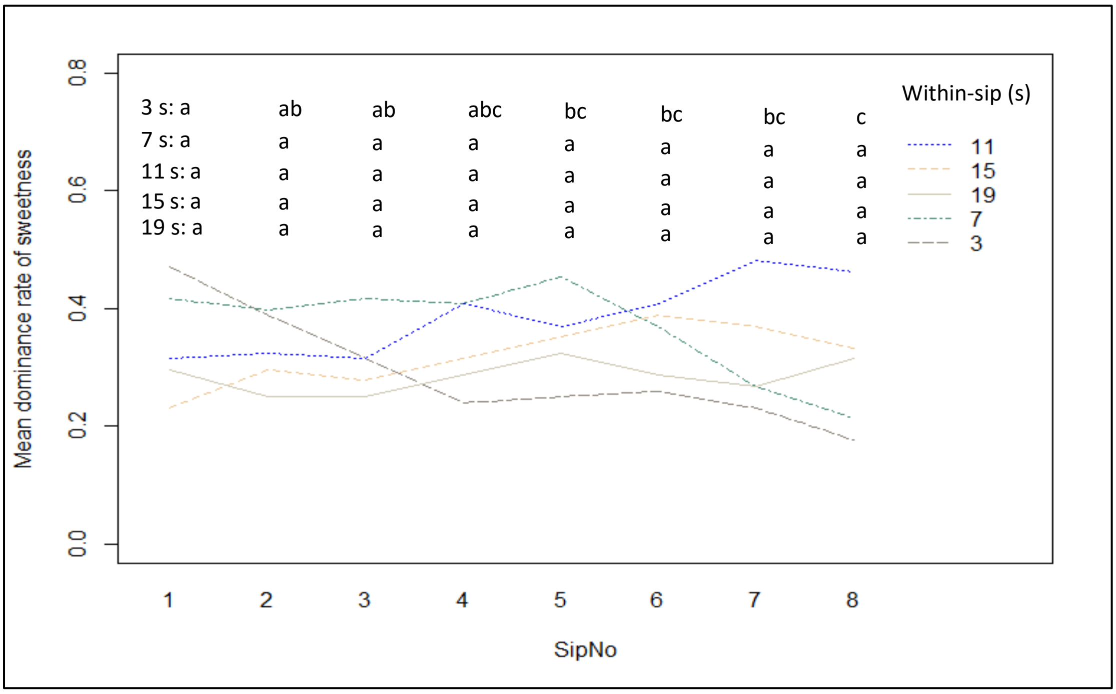



Figure 3.11: Interaction plot of *within-sip:sip* for sweetness. Dominance rates 'abc' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

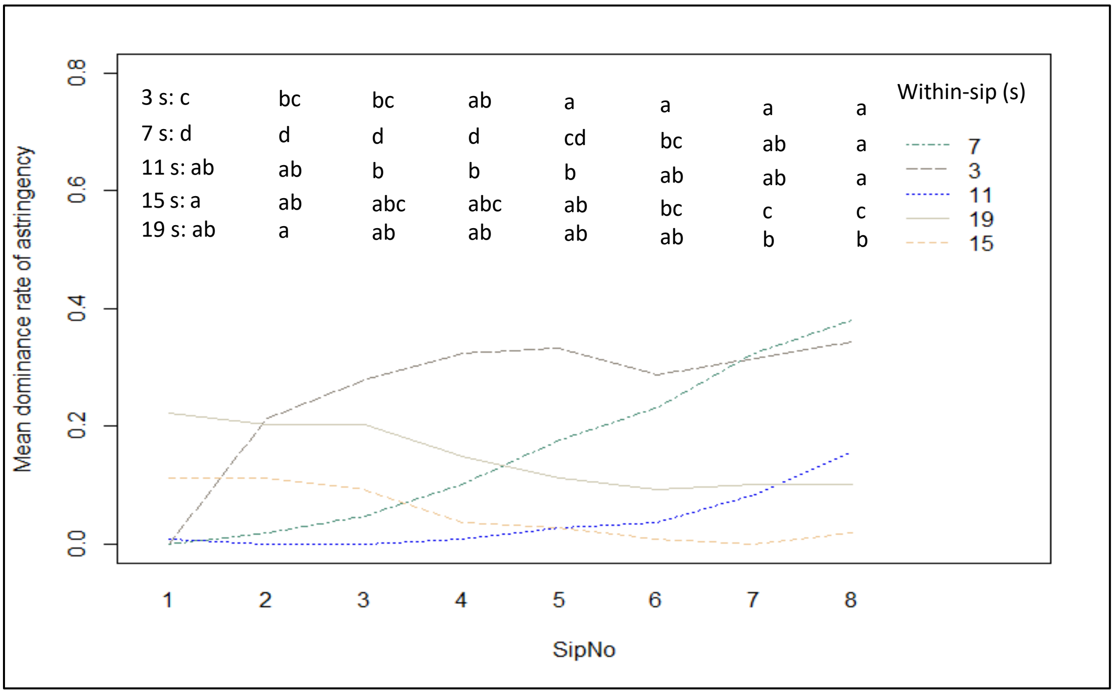



Figure 3.12: Interaction plot of *within-sip:sip* for astringency. Dominance rates 'abcd' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

The dominance of attributes over multiple sips was closely represented in multiple sip TCATA curves with higher citation proportions of respective attributes, for example higher citation proportions of astringency in low fat products over multiple sips in TCATA (Figure 3.3) were reflected by significant dominant rates of astringency in low fat products in TDS curves (Figure 3.9). However, the dynamics of dominance in TDS did not follow a similar pattern to the dynamics of citation proportions for attributes in TCATA. For example, citation proportions for liquorice of P6 (LFLS*S*HT) decreased over multiple sips in TCATA (Figure 3.3) however the dominance rates for liquorice increased towards latter sips in TDS (Figure 3.9).

Multiple sip TDS, in comparison to QDA and TCATA, was generally less discriminating for attributes, specifically texture attributes, over multiple sip. This was possibly explained by the significant dominance of flavour attributes (sweetness, vanilla and liquorice) and astringency which dragged all the attention of panellists during product evaluations. Additionally, milkshakes do not undergo dramatic textural changes affecting dominant sensations in-mouth and after-swallowing as would be expected in solid (Fiszman & Tarrega, 2018; Rizo, Peña, et al., 2018) or to a relatively less extent in semi-solid products (Bruzzone et al., 2013; Devezeaux de Lavergne et al., 2015; Jeltema et al., 2020). Ares et al. (2015) have also reported detailed descriptions obtained by TCATA versus diminishing of details in TDS around the concept of dominance.

However, TDS was providing information on which of the sensations became dominant over sips in the presence of different sweeteners in product formulation, as evident in P6 (LFLS*S*HT) containing both sucrose and stevia. By sip 8 dominance of liquorice increased (Figure 3.9) whereas QDA revealed decreased liquorice intensity (Table 3.5) and decreased citation proportions from TCATA (Figure 3.3) than sip 1. Additionally, TDS provided details on which sensations were co-dominating the product experience with the remaining significant attributes i.e. vanilla and astringency of low fat products and liquorice and sweetness in stevia P6

(LFLSSHT). Multiple sip evaluation added the advantage of capturing how these co-dominances of attributes varied over sips. Such information on attribute dominance would not have been captured from single sip TDS evaluations, neither from QDA, nor TCATA. The findings also imply product dependent variations, for example co-dominance of sweetness, liquorice and vanilla in P6 (LFLSSHT) and sweetness, vanilla and astringency in P4 (LFLSLT) and P5 (LFLSHT).

### *3.3.3. Impact of using GLM to analyse QDA and temporal data*

GLMs are often used in analysing binary or proportional data. Estimating the parameters in GLM is theoretically based on maximum likelihood and deviance is used to test overall model fit (Montgomery et al., 2012). Multinomial logit specification followed by Chi-square likelihood estimator with statistical deviance are recommended in the analysis of autocorrelated time dependent data (McCullagh & Nelder, 1989; Mullahy & Robert, 2010). In fact, this approach allows the investigation of temporal dynamics of attributes within-sips alongside investigating the variation of within-sip dynamics across sips, which was not effectively achieved by published work based on averaged temporal sensory data using ANOVA (Bi & Kuesten, 2013; Dinnella et al., 2013; Galmarini, Loiseau, et al., 2016; Meyners & Castura, 2019). The discrete approach within single sip evaluations, provides a rapid overview of products or ingredients. For example, within-sip time points differentiated in-mouth and after-swallowing dynamics of attributes, increase of citation proportions for sweetness in-mouth versus increase of mouthcoating after-swallowing and in the presence of stevia increase of liquorice of P6 (LFLSSHT) after-swallowing (Figure 3.1). In TDS, the dominance of sweetness of high fat products was identified after-swallowing whereas it was in-mouth for low fat products (Figure 3.2). Rapid analysis of within-sip experience on a single sip evaluation would be insightful at the beginning or early stages of product development. However, in product improvement, formulation changes or matching product profiles with competitors will require thorough investigations into product profiles specifically to capture consumer experience of the product during an actual consumption occasion. In such instances it is essential to perform product evaluations over multiple sips to investigate *within-sip:sip* interactions. The use of *within-sip:sip* effect explained the consistency or inconsistency of within-sip experience over multiple sips. As observed in multiple sip TCATA mouthcoating build-up over sips in low fat products (Figure 3.3) indicated the inconsistency of within-sip experience for mouthcoating over sips. Citation proportions for liquorice of stevia containing P6 (LFLS*S*HT) decreased over sips (Figure 3.3) however dominance rates for liquorice increased and became significantly dominant towards latter sips. Therefore, investigating within-sip dynamics and the respective variations over sips provided detailed insights into effects of formulation changes or ingredients on temporal sensory profiles of products. These insights would be specifically beneficial to investigate the effects of using non-nutritive sweeteners or combination of sweeteners in product formulations during product development or improvement.

Furthermore, GLM Analysis of Deviance does not contain a denominator based on residuals (Montgomery et al., 2012) and hence with orthogonal data (i.e. complete and balanced) the requirement of explaining the noise is eliminated. The data set used in this study is orthogonal. In fact, explicitly not including panellist as a model factor cannot alter the findings on the remaining factors of the model and this was confirmed during preliminary data analysis (data not shown). Exclusion of panellist as a factor in the model allows the effects of remaining factors across different sensory techniques to be compared. Therefore, QDA data was also analysed using GLM (`link="identity"`) (Montgomery et al., 2012).

## *3.4 Conclusions*

TCATA and TDS provide details on the dynamics of the evolution and dominance of sensory perception respectively however not the attribute intensity, which was only captured by QDA. Individual use of QDA, TCATA and TDS provide different information on sensory profiles, however complementary use of the information was more meaningful. In detail, attribute intensity alone is not sufficient to understand whether an attribute was impactful on the sensory experience of a product, however when combined with TCATA it provided the details of attribute evolution over consumption. Even though QDA and TCATA provided attribute intensity and evolution information, it is only when it is combined with TDS that whether the attribute significantly dominated the sensory experience can be understood. Therefore, combined use of QDA, TCATA and TDS provided holistic sensory profiles of products including attribute intensity, evolution and dominance. However, the choice of individual or combined use of QDA, TCATA and TDS will depend on intended project objectives, and budget available. Moreover, it is important to consider about over discrimination of attributes when selecting a method with respect to the context of product of interest.

Use of the novel approach to temporal data analysis provides detailed insights into within-sip product experiences. Furthermore, product evaluations over multiple sips provides details into attribute dynamics over multiple sips (build-up or adaptation dynamics), which closely represents actual product consumption occasion consumers would experience. Interestingly, from QDA, TCATA and TDS, attributes were more discriminated across products over multiple sips. In fact, regardless of the employed method in sensory evaluation, use of multiple sip evaluations appears advantageous where product discrimination is an important objective. Single sip evaluation would be insightful where rapid analyses of formulation changes are required in the product development stage. Overall, these findings varied across attributes and products, therefore cannot be generalised into all product categories. More research within different product categories will be useful to deepen understanding of the different insights obtained from static versus temporal sensory techniques and their variations over multiple sip evaluations.

# Chapter 4. Impact of cup versus straw sipping on multiple sip TCATA product profiles

## *4.1. Introduction*

It has been shown that consumer sensory product experience is affected by the receptacle in which a beverage is served such as a ceramic cup versus glass (Raudenbush, Meyer, Eppich, Corley, & Petterson, 2002; Spence & Wan, 2015), diameter of a straw (Akiyama et al., 2012; Lin, Lo, & Liao, 2013) and straw material (Pramudya, Singh, & Seo, 2020). Physical changes in drinking behaviour, possibly owing due to changes of receptacle, such as sip time, flow rate (Lin, Lo, & Liao, 2013), pressure, vibration and auditory cues (Hashimoto, Inami, & Kajimoto, 2008) and changes in mass transfer of tastants in-mouth and oropharynx (Salles et al., 2010; Selway & Stokes, 2014) have also been reported to alter the sensory perception. These changes which may result in perception of distinct differences when sipping from a cup versus through a straw, resulting in variations in sensory perception have not been investigated.

Additionally, effects of receptacle on sensory perception have only been studied using single sip evaluations with static sensory techniques (Akiyama et al., 2012; Lin et al., 2013; Pramudya et al., 2020; Raudenbush, Meyer, Eppich, Corley, & Petterson, 2002; Spence & Wan, 2015). However, the actual consumption occasion of a beverage generally occurs over multiple intakes resulting in dynamic sensory perceptions (Hort, Hollowood, & Kemp, 2017b). TCATA (Castura et al., 2016) provides a convenient approach to compare the attribute dynamics of a product using different ingestion methods used by the consumer or directed by packaging, e.g. straws provided for drinking 'on the go' packs. Investigating the effects of sipping method in a context closely representing an actual consumption occasion would provide closer insights into consumer product experiences.

Consequently, the key objectives of the research presented in this chapter were to,

- investigate the effects of cup versus straw sipping on multiple sip TCATA sensory profiles of vanilla milkshake.
- investigate whether sipping method impacts the extent of product discrimination.

## 4.2. Materials and methods

### 4.2.1. Products

The six model vanilla milkshakes detailed in Chapter 2, section 2.2.1 were evaluated for the research in this chapter.

### 4.2.2. Participants

Data was obtained using the expert panel detailed in section 2.2.2. Generally expert assessors are considered more sensitive in product discrimination due to their higher sensory acuity (Everitt, 2018; Kemp et al., 2009) and training (Lawless & Heymann, 2013) with respect to consumers (Ares & Varela, 2017). Employing an expert panel in multiple sip TCATA evaluation may provide insights into the effects of sipping methods on the dynamics of sensory perception with higher resolution. Consequently, the findings can be extended to optimise beverage tasting protocols with respect to consumer product usage.

### 4.2.3. Methodology

The expert panel used the sensory lexicon (section 2.2.3) to profile the milkshakes. Initially, perception of attributes when sipping through a straw was practiced using the rank-rating approach as explained in chapter 2, section 2.2.4 but using a straw (15 mL served in a 30 mL cup with a 6 mm x 70 mm straw), over 4 sessions (2 h each). The type of the straw was selected to represent take away straws served with milkshakes in New Zealand and was used in preliminary experiments conducted to investigate the sip volume for this PhD project (data not shown).

Panellists were instructed to sip the whole volume in one intake. Sample cups and straws were inspected after the evaluations to confirm any residue of the samples left were negligible. Then, the expert panel was familiarised with sipping through a straw over 8 sips using the TCATA protocol (section 2.2.5.2). Thereafter, the panel characterised the milkshakes over 8 sips of each product using two sipping methods, cup (15 mL served in 30 mL cup) and straw (15 mL served in a 30 mL cup with a 6 mm x 70 mm straw).

*4.2.4. Data analysis*

Statistical analyses were performed using R software, version 4.0.0 (R Core Team, 2020) in RStudio (2019) with α=0.05. Package `dplyr` (Wickham et al., 2020) for data manipulation and package `ggplot2` (Wickham, 2016) for data visualisation were used. TCATA data were analysed as detailed in Chapter 3, section 3.2.4.2. Observed mean citation proportions and standard error (SE) (pooled over sipping methods) were calculated for each *product, sip* and *within-sip* for all attributes. In addition, mean citation proportions and observed SE were calculated for each *sipping method* for each *product, sip* and *within-sip*.

Generalised linear models (GLM) with default functions (`function=glm, family="binomial", link=logit`) (Montgomery et al., 2012) were used to model the citation proportions of the four factor (*sipping method, product, sip* and *within-sip* ) with four-way interactions for each attribute to investigate their effects on temporal sensory perceptions. Analysis of Deviance (González Chapela, 2013; Montgomery et al., 2012) was used to determine which main and interaction effects were statistically significant. Associated interaction plots were created to visualise observed responses against time for relevant experimental and statistical effects. Post-hoc tests were used to make pairwise comparisons of citation proportions among experimental factors for which there was a significant main effect (Shaffer, 1995). Holm's adjusted significance levels (Holm, 1979; Wright, 1992) were used to eliminate the lack of independence in pair-wise comparisons. As an objective of this study was to determine if the sipping method impacted the level of discrimination on products over multiple sips, each sipping method was also considered separately in this analysis. Data was split by sipping method and Analysis of Deviance was performed using a three-factor (*product, sip* and *within-sip*) GLM with three-way interactions for each attribute.

## 4.3. Results and discussion

Figure 4.1 presents TCATA curves and post-hoc mean comparisons of citation proportions of the milkshakes from cup and straw sipping. Note that Appendix J provides the pooled TCATA observed mean citation proportions and standard error (SE) for each sensory attribute for each product by sip number and at each time point within a sip, and Appendix H and K breaks this data down further separating by sipping method, cup and straw respectively. Table 4.1 presents the deviances and associated p values from the Analysis of Deviance for all the sensory attributes using a four-factor (*sipping method, product, within-sip* and *sip*) GLM with four-way interactions. Table 4.2 summarises the deviances and p values from Analysis of Deviance using three-factor GLM (*product, within-sip* and *sip*) with three-way interactions, for each individual sipping method.

### 4.3.1. Effects of sipping method on sensory attribute perception

Generally, the panel cited all attributes more often when sipping through a straw (Figure 4.1). However, at sip 1, mouthcoating of P1 (HFHSLT) was cited more often from a cup than through a straw. Additionally, for low fat and low thickener P3 (LFHSLT) and P4 (LFLSLT), the increase of citation proportions of mouthcoating over sips was higher from a cup and was cited more often from a cup than through a straw after sip 2. Similar differences of citation proportions were noted for thickness of P1 (HFHSLT), P3 (LFHSLT) and P6 (LFLS*S*HT). In comparison for astringency of low fat products, the panel cited increasingly more often through a straw over multiple sips resulting wider citation proportion differences than from a cup.

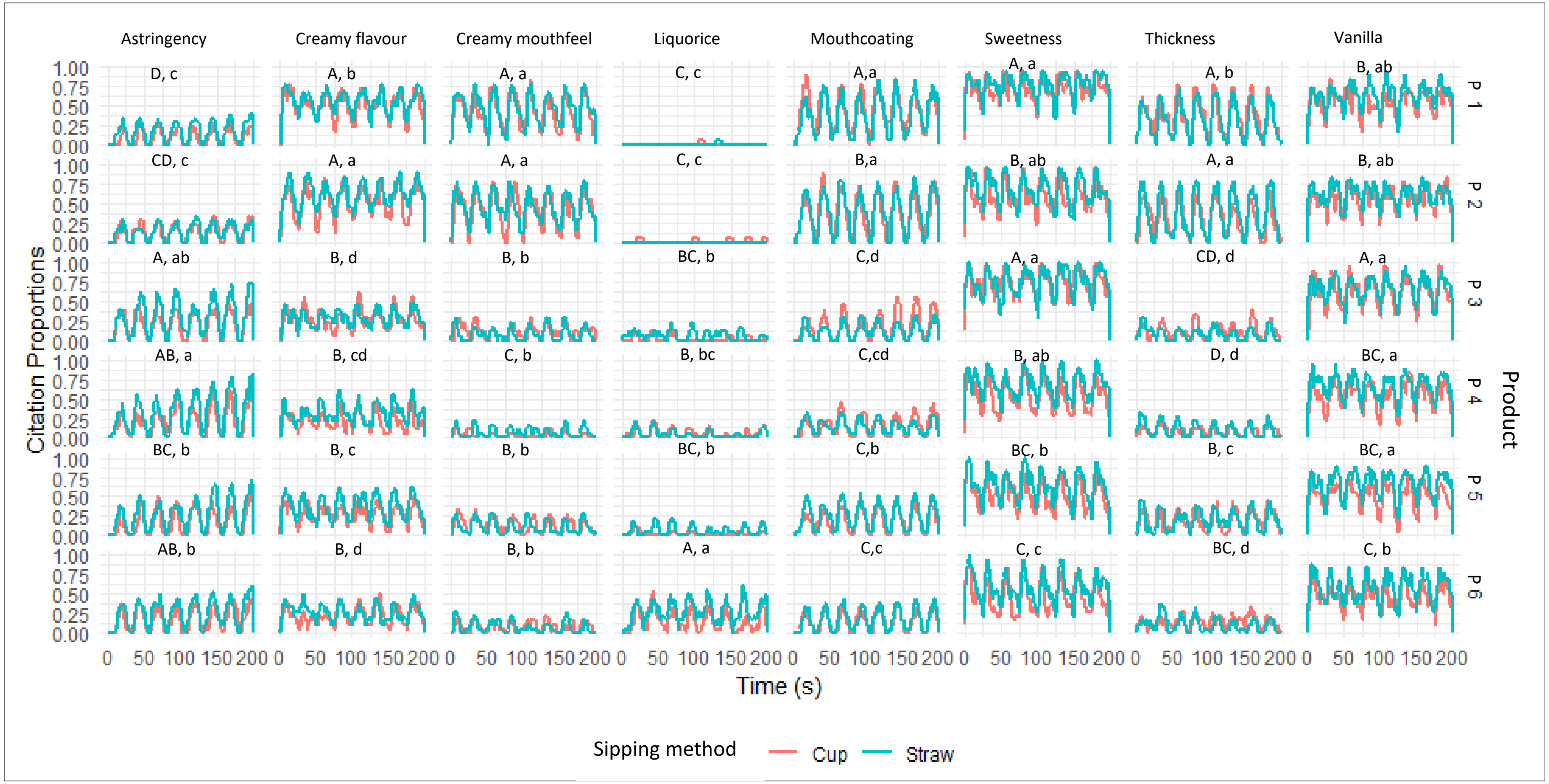



Figure 4.1: TCATA curves for sensory attributes of milkshakes by cup and straw sipping. Citation proportions 'ABCD' from cup and 'abcd' through straw with different letters of each attribute are significantly different across products (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS<u>S</u>HT).

Table 4.1: Summary of deviances and associated p values from a GLM four-factor Analysis of Deviance for citation proportions of sensory attributes on selected time slices for pooled sipping methods data. Bold font represents significant terms (p<0.05).

| | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip* (Df=4) | 381.14 | **<0.001** | 395.09 | **<0.001** | 280.59 | **<0.001** | 324.9 | **<0.001** | 587.197 | **<0.001** | 695.53 | **<0.001** | 550.37 | **<0.001** | 84.289 | **<0.001** |
| *Sip* (Df=7) | 29.033 | **<0.001** | 12.731 | 0.079 | 11.613 | 0.114 | 15.854 | **0.026** | 7.217 | 0.407 | 6.915 | 0.438 | 20.325 | **0.005** | 14.763 | **0.039** |
| *Product* (Df=5) | 240.84 | **<0.001** | 51.681 | **<0.001** | 550.85 | **<0.001** | 1554.2 | **<0.001** | 709.905 | **<0.001** | 552.01 | **<0.001** | 154.91 | **<0.001** | 607.54 | **<0.001** |
| *SippingMethod* (Df=1) | 65.563 | **<0.001** | 95.675 | **<0.001** | 42.581 | **<0.001** | 5.857 | **0.016** | 0.066 | 0.797 | 0.147 | 0.701 | 71.668 | **<0.001** | 44.448 | **<0.001** |
| *Within-sip:Sip* | 535.55 | **<0.001** | 224.48 | **<0.001** | 113.78 | **<0.001** | 211.35 | **<0.001** | 282.811 | **<0.001** | 483.7 | **<0.001** | 614.38 | **<0.001** | 70.854 | **<0.001** |
| *Within-sip:Product* | 30.192 | 0.067 | 24.257 | 0.231 | 51.97 | **<0.001** | 8.405 | 0.989 | 47.509 | **<0.001** | 48.8 | **<0.001** | 13.522 | 0.854 | 35.147 | **0.019** |
| *Sip:Product* | 27.021 | 0.831 | 15.905 | 0.998 | 15.705 | 0.998 | 21.163 | 0.968 | 17.826 | 0.993 | 22.607 | 0.948 | 10.702 | >0.999 | 45.307 | 0.114 |
| *Within-sip:Sip:Product* | 122.93 | 0.847 | 69.49 | >0.999 | 111.7 | 0.962 | 0 | >0.999 | 100.815 | 0.997 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 |
| *Within-sip:SippingMethod* | 32.524 | **<0.001** | 3.559 | 0.469 | 5.206 | 0.267 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 17733 | **<0.001** |
| *Sip:SippingMethod* | 8.934 | 0.257 | 3.391 | 0.847 | 3.437 | 0.842 | 125248 | **<0.001** | 37341.2 | **<0.001** | 14562 | **<0.001** | 4181.1 | **<0.001** | 0 | >0.999 |
| *Within-sip:Sip:SippingMethod* | 21.985 | 0.782 | 11.359 | 0.998 | 10.331 | 0.999 | 0 | >0.999 | 0 | >0.999 | 3748.5 | **<0.001** | 0 | >0.999 | 8506.3 | **<0.001** |
| *Product:SippingMethod* | 12.695 | **0.026** | 17.096 | **0.004** | 11.854 | **0.037** | 2616.2 | **<0.001** | 0 | >0.999 | 16292 | **<0.001** | 3748.5 | **<0.001** | 0 | >0.999 |
| *Within-sip:Product:SippingMethod* | 16.206 | 0.704 | 12.02 | 0.915 | 17.541 | 0.618 | 0 | >0.999 | 151063 | **<0.001** | 3316 | **<0.001** | 0 | >0.999 | 0 | >0.999 |
| *Sip:Product:SippingMethod* | 17.554 | 0.994 | 21.768 | 0.961 | 17.977 | 0.992 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 11390 | **<0.001** | 0 | >0.999 |
| *Within-sip:Sip:Product:SippingMethod* | 0 | >0.999 | 68.288 | >0.999 | 58.009 | >0.999 | 0 | >0.999 | 0 | >0.999 | 4469.4 | **<0.001** | 0 | >0.999 | 720.87 | **<0.001** |

Table 4.2: Summary of deviances and associated p values from a three-factor GLM Analysis of Deviance for citation proportions of sensory attributes on selected time slices by sipping method. Bold font represents significant terms (p<0.05).

| | | Sweetness | | Vanilla | | Creamy Flavour | | Creamy Mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip* (Df=4) | C | 272.42 | **<0.001** | 180.93 | **<0.001** | 184.75 | **<0.001** | 222.65 | **<0.001** | 286.39 | **<0.001** | 271.49 | **<0.001** | 208.08 | **<0.001** | 36.61 | **<0.001** |
| | S | 318.29 | **<0.001** | 252.84 | **<0.001** | 162.96 | **<0.001** | 202.46 | **<0.001** | 371.73 | **<0.001** | 291.76 | **<0.001** | 333.28 | **<0.001** | 38.113 | **<0.001** |
| *Sip* (Df=7) | C | 7.855 | 0.346 | 5.757 | 0.568 | 2.841 | 0.899 | 13.417 | 0.063 | 2.238 | 0.945 | 10.238 | 0.176 | 29.114 | **<0.001** | 9.858 | 0.197 |
| | S | 17.684 | **0.013** | 3.793 | 0.803 | 4.09 | 0.769 | 3.359 | 0.85 | 8.661 | 0.278 | 5.374 | 0.614 | 55.287 | **<0.001** | 3.882 | 0.793 |
| *Product* (Df=5) | C | 151.32 | **<0.001** | 34.868 | **<0.001** | 249.92 | **<0.001** | 706.35 | **<0.001** | 307.74 | **<0.001** | 275.73 | **<0.001** | 56.533 | **<0.001** | 211.31 | **<0.001** |
| | S | 63.61 | **<0.001** | 14.634 | **0.012** | 265.7 | **<0.001** | 781.55 | **<0.001** | 379.62 | **<0.001** | 238.03 | **<0.001** | 109.2 | **<0.001** | 440.99 | **<0.001** |
| *Within-sip:Sip* | C | 228.9 | **<0.001** | 199.57 | **<0.001** | 118.52 | **<0.001** | 114.5 | **<0.001** | 143.03 | **<0.001** | 306.68 | **<0.001** | 269.62 | **<0.001** | 59.857 | **<0.001** |
| | S | 264.42 | **<0.001** | 158 | **<0.001** | 102.36 | **<0.001** | 134.46 | **<0.001** | 146.38 | **<0.001** | 279.08 | **<0.001** | 361.65 | **<0.001** | 50.796 | **0.005** |
| *Within-sip:Product* | C | 30.586 | 0.061 | 22.645 | 0.307 | 17.597 | 0.614 | 13.258 | 0.866 | 33.206 | **0.032** | 60.921 | **<0.001** | 14.069 | 0.827 | 28.096 | 0.107 |
| | S | 11.982 | 0.917 | 27.704 | 0.117 | 27.569 | 0.12 | 23.939 | 0.245 | 44.468 | **0.001** | 30.115 | 0.068 | 16.284 | 0.699 | 15.821 | 0.728 |
| *Sip:Product* | C | 25.53 | 0.879 | 23.402 | 0.933 | 19.554 | 0.984 | 29.756 | 0.719 | 24.068 | 0.918 | 28.216 | 0.785 | 33.968 | 0.469 | 42.86 | 0.170 |
| | S | 19.347 | 0.985 | 17.314 | 0.995 | 13.503 | >0.999 | 21.922 | 0.958 | 21.294 | 0.967 | 24.524 | 0.907 | 18.429 | 0.99 | 43.051 | 0.165 |
| *Within-sip:Sip:Product* | C | 104.86 | 0.988 | 88.03 | >0.999 | 76.599 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 |
| | S | 102.21 | 0.993 | 78.102 | >0.999 | 71.328 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 | 0 | >0.999 |

C – cup sipping data, S – straw sipping data.

As expected, the only product with stevia P6 (LFLS*S*HT) was cited more often for liquorice and interestingly the panel cited liquorice increasingly more often through a straw and decreasing from a cup over multiple sips (Figure 4.1). Analysis of Deviance revealed significant effects of *sipping method* on citation of all attributes except thickness and mouthcoating (Table 4.1). *Sipping method* was involved in several significant *product-, sip-* and *within-sip:sipping method* interactions for all attributes indicating that the effects of *sipping method* were *product, sip* and *within-sip* dependent. Therefore, deeper investigations of these interaction effects were performed.

Significant *product:sipping method* interactions were evident for sweetness, vanilla, creamy flavour, creamy mouthfeel, mouthcoating and astringency (Table 4.1), emphasising that the sensory experience from a cup and a straw was product dependent. However, the effect sizes of the interactions were marginal. Flavour attributes; sweetness, vanilla and creamy flavour, were discriminated across products with relatively larger citation proportion differences from a cup than through a straw. For example in Figure 4.2 (sweetness), the straw still led to increased citations regardless of the minimal effect of *product:sipping method* interaction caused mainly by similar citations for P3 (LFHSLT).

Mouthfeel attributes; creamy mouthfeel and mouthcoating, showed virtually similar citation proportions from a cup and through a straw. For example, the interaction plot for mouthcoating in Figure 4.3 shows only minimal variation in citation differences for P1 (HFHSLT) and P5 (LFLSHT); slightly higher citations for P1 (HFHSLT) through a straw and lower for P5 (LFLSHT). However, astringency was generally cited more often through a straw with similar magnitude differences across products from both cup and through a straw, apart from P2 (HFLSLT) through a straw (Figure 4.4).

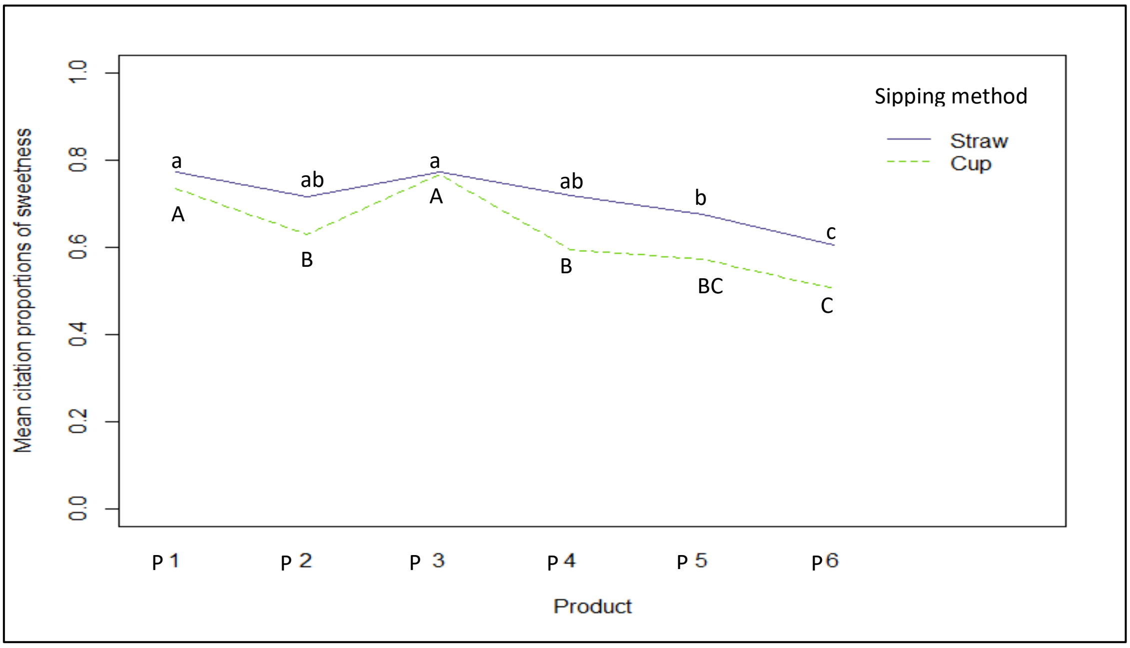


Figure 4.2: Interaction plot of *product:sipping method* for sweetness. Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT). Citation proportions 'ABC' from cup and 'abc' through straw with different letters are significantly different across products (*Holms*, p<0.01).

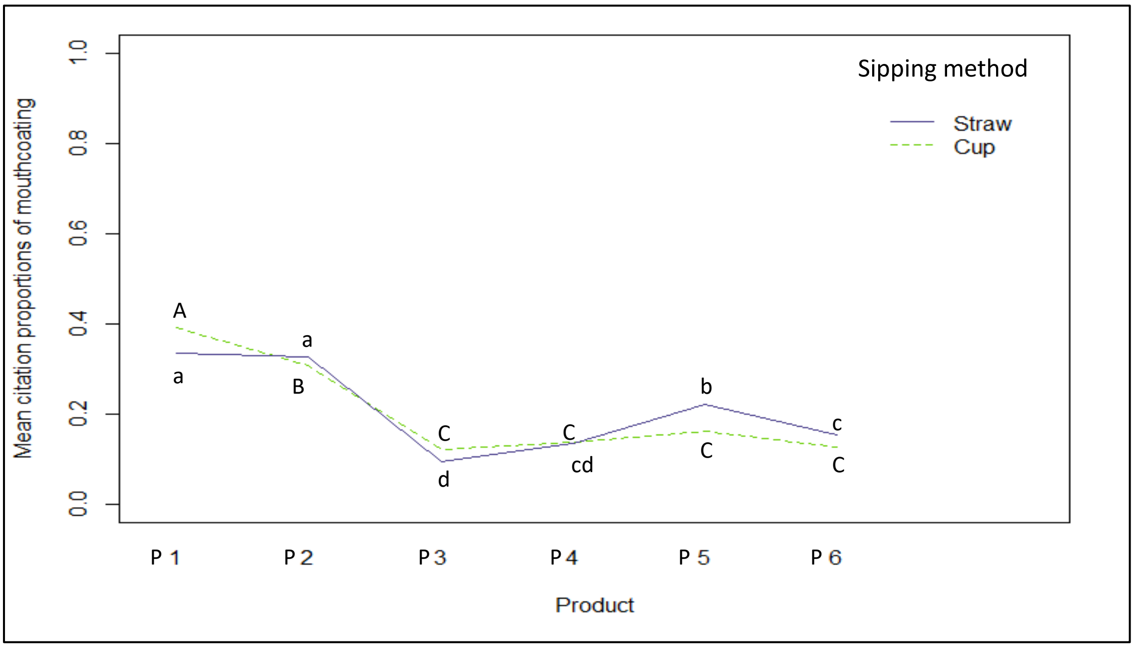


Figure 4.3: Interaction plot of *product:sipping method* for mouthcoating. Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLSSHT). Citation proportions 'ABC' from cup and 'abcd' through straw with different letters are significantly different across products (*Holms*, p<0.01).

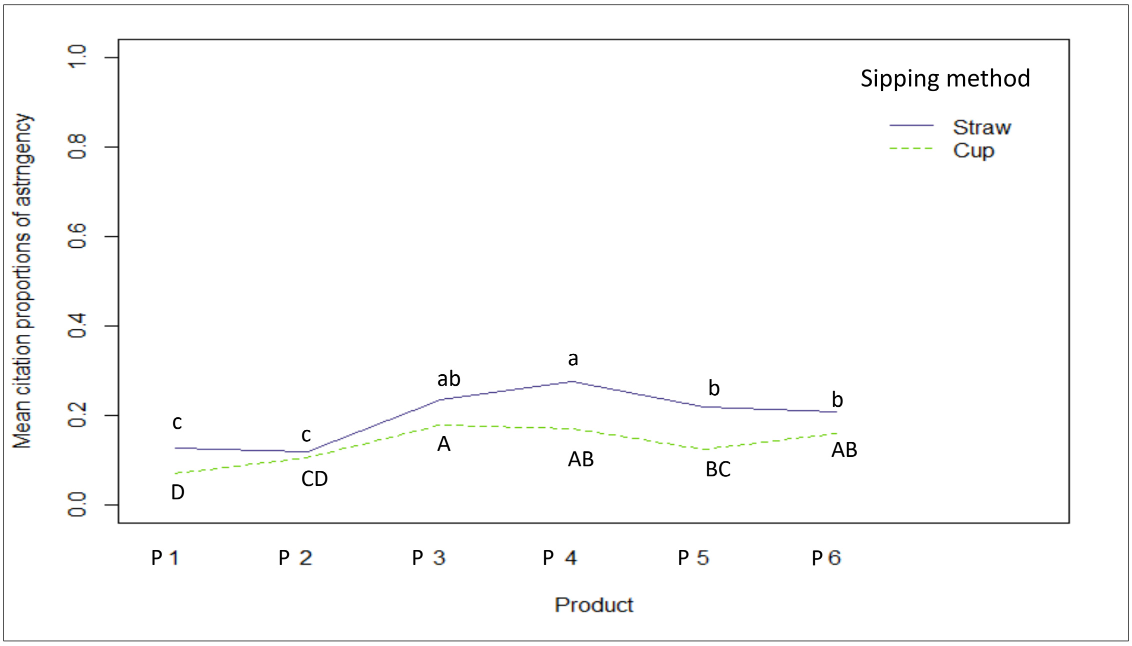



Figure 4.4: Interaction plot of *product:sipping method* for astringency. Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS<u>S</u>HT). Citation proportions 'ABCD' from cup and 'abc' through straw with different letters are significantly different across products (*Holms*, p<0.01).

In depth analysis of *product* effects for each sipping method was required to determine if levels of discrimination differed by sipping method. Analysis of Deviance showed significant *product* effects for sweetness, vanilla, creamy flavour, creamy mouthfeel, astringency and liquorice for both sipping methods (Table 4.2). Post-hoc testing on mean citation proportions of flavour attributes revealed sweetness and vanilla were able to be discriminated further across the six products when sipped from a cup (Figure 4.1). For example, sweetness of high sucrose versus low sucrose products within each fat levels were only differentiated from a cup (Figure 4.1). Similarly, higher citation proportions for vanilla of P3 (LFHSLT) was differentiated from the remaining products from a cup but not through a straw (Figure 4.1). Flavour release has been evident to vary depending on physical and physiological parameters in-mouth and oropharynx (Selway & Stokes, 2014) altering the fundamentals of mass transfer i.e. diffusion and convective surface transfer of aroma compounds at the food-air interface and taste compounds at the food-saliva interface (Salles et al., 2010). Physical changes in drinking behaviour such as sip time, flow rate (Lin et al., 2013), pressure, vibration and auditory cues (Hashimoto et al., 2008) have been reported to impact sensory perception, specifically flavour attributes (Akiyama et al., 2012) when sipped through straws with different diameters. In fact, these differences would have been perceived even broader between cup versus straw sipping, altering the fundamental mass transfer of flavour compounds and subsequent flavour release resulting in more discrimination of flavour attributes across products from a cup.

Sweetness and vanilla reporting more product discrimination from a cup was possibly an indication of perceptual interactions (Bertelsen et al., 2021; Sikorski, Pokorny, & Damodaran, 2007b). However, creamy flavour was discriminated into four product groups through a straw as opposed to two from a cup, indicating potential perceptual interactions (Gallardo-Escamilla et al., 2007) from a cup overriding the effects of sipping method diminishing product discrimination from a cup than through a straw. Differentiation of products on liquorice flavour was not impacted by sipping method but as it only characterised one product (P6 LFLS*S*HT) (Figure 4.1) this was not unexpected. These findings emphasise the impact of the opted sipping method on flavour perception and further variations depending on product formulation. Therefore, food technologists/ scientists will need to consider such impacts of flavour perception at the product concept and design phases depending on the intended retail packaging i.e. bottle versus single serving Tetra Pak® with a straw. Moreover, impacts of the findings also extend towards sensory scientists selecting appropriate sipping methods for sensory evaluations of the products to capture close insights into the actual product experience by consumers.

Post-hoc testing on mean citation proportions of mouthfeel attributes revealed that lower mean citation proportions of creamy mouthfeel of P4 (LFLSLT) were differentiated from the remaining products from a cup but not through a straw. Mouthcoating of high fat P1 (HFHSLT) was differentiated from lower citation proportions of high fat P2 (HFLSLT) only from a cup, however at high thickener level mouthcoating was cited more often for P5 (LFLSHT) than P6 (LFLS*S*HT) only through a straw (Figure 4.1). Astringency of low-fat low-sucrose products was further differentiated through a straw with higher citation proportions of P4 (LFLSLT) from lower citation proportions of P5 (LFLSHT) and P6 (LFLS*S*HT) (Figure 4.1). The findings of mouthfeel attributes indicated the significance of product formulation on the mouthfeel perception from a cup or through a straw. de Wijk, Kapper, Borsboom, and Prinz (2009) showed that mouthfeel of semi-solid desserts was dependent on product composition and oral movement before swallowing affecting the coating created in oral cavity. However, the differences of oral behaviour from a cup versus straw, oral coating and subsequent mouthfeel perhaps were downsized by the perceptual interactions resulting from simultaneous outcomes on mouthfeel perception of the milkshakes from a cup versus through a straw.

Additionally, panellists perhaps got distracted by the difference in flow rate, pressure, vibration and auditory cues through the straw (Hashimoto et al., 2008) resulting in citing attributes generally more often. However, using a cup with less drinking behaviour distractions panellists would have focused more on attribute differences across products and reported higher citation differences and product differentiations from the cup, which would have further varied across flavour and mouthfeel attributes as well as product formulation. In fact, different levels of product discrimination would be expected where a particular sipping method is chosen. This implies that during product development, or in consumer studies, tasting protocols for sensory evaluations should be adjusted to reflect product formats that are to be consumed using a cup, a bottle or through a straw.

### *4.3.2. Variations of sipping method effects across temporal factors*

Further analyses were performed to investigate whether the temporal factors had any impacts on the above (section 4.3.1) findings of sipping method. *Sipping method* had attribute specific significant interactions with temporal factors *sip, within-sip* and *within-sip:sip* (Table 4.1), emphasising that the dynamics of *within-sip* perception over multiple sips varied depending on the sipping method. Mouthfeel attributes, creamy mouthfeel, thickness, mouthcoating and astringency, varied over multiple sips differently from a cup and a straw (Table 4.1). Closer inspections revealed that these interactions were, as shown in Figure 4.5 for creamy mouthfeel, very minimal, a slight drop in citation (less than 5%) when sipping from the cup for sips 7 and 8. Lower citation proportions of creamy mouthfeel of sip 7 was discriminated from higher citation proportions of sip 1 from cup. In fact, the sipping method does not appear to influence mouthfeel over sips on average to any important level. Regardless, it is interesting that the expert panel was sensitive enough to capture slight differences of perception dynamics of some attributes across sips such as from sip 6 to 8 on creamy mouthfeel from a cup (Figure 4.5).

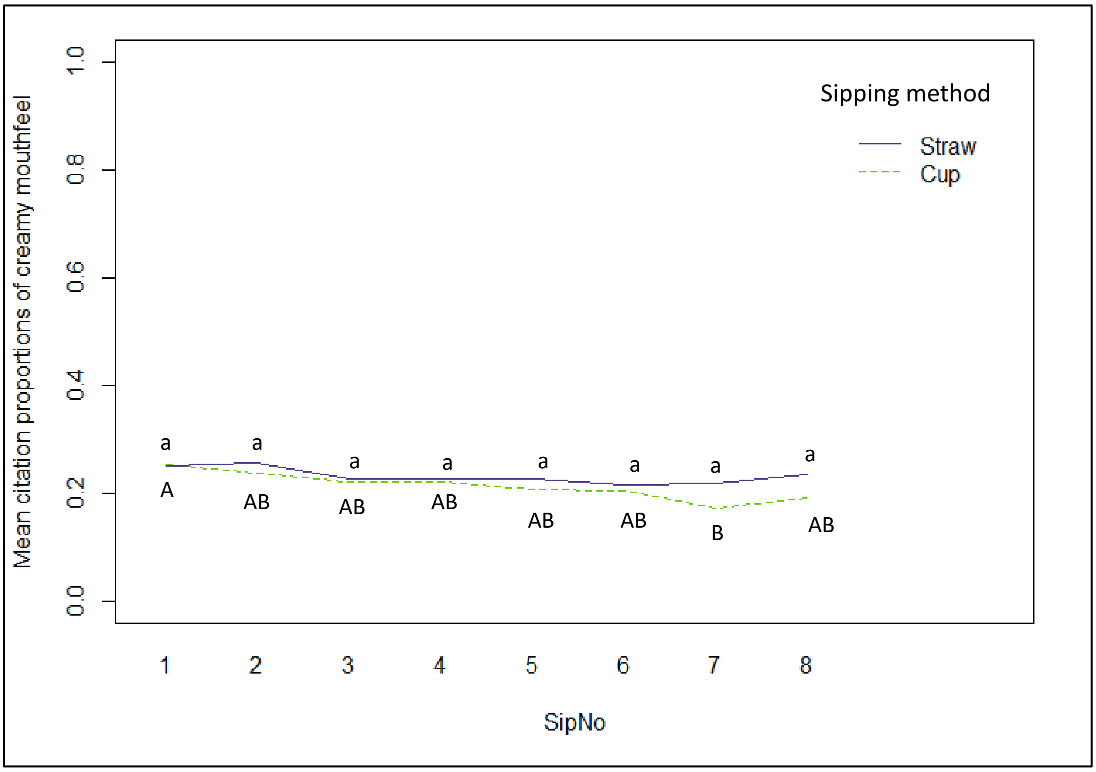



Figure 4.5: Interaction plot of *sipping method:sip* for creamy mouthfeel. Citation proportions 'AB' from cup and 'a' through straw with different letters are significantly different (*Holms*, p<0.01).

Perception of flavour attributes from a cup versus a straw did not vary over multiple sips however sweetness and liquorice were perceived differently from a cup versus a straw *within-sip* (Table 4.1). Sweetness was cited less often from a cup after-swallowing at 8 s than through a straw, but at similar rates in-mouth (Figure 4.6). Liquorice followed a similar pattern as sweetness but with a minimal, less than 5% citation proportion drop after-swallowing from the cup (data not shown). As explained earlier, physical (Hashimoto et al., 2008; Lin et al., 2013) and physiological (Selway & Stokes, 2014) changes of drinking behaviour perhaps resulted in higher citation proportions for flavour perception through the straw, the difference being enhanced after-swallowing with more tastants reaching taste receptors (Salles et al., 2010). However, *within-sip* experiences of the remaining attributes were not dependent on sipping method.

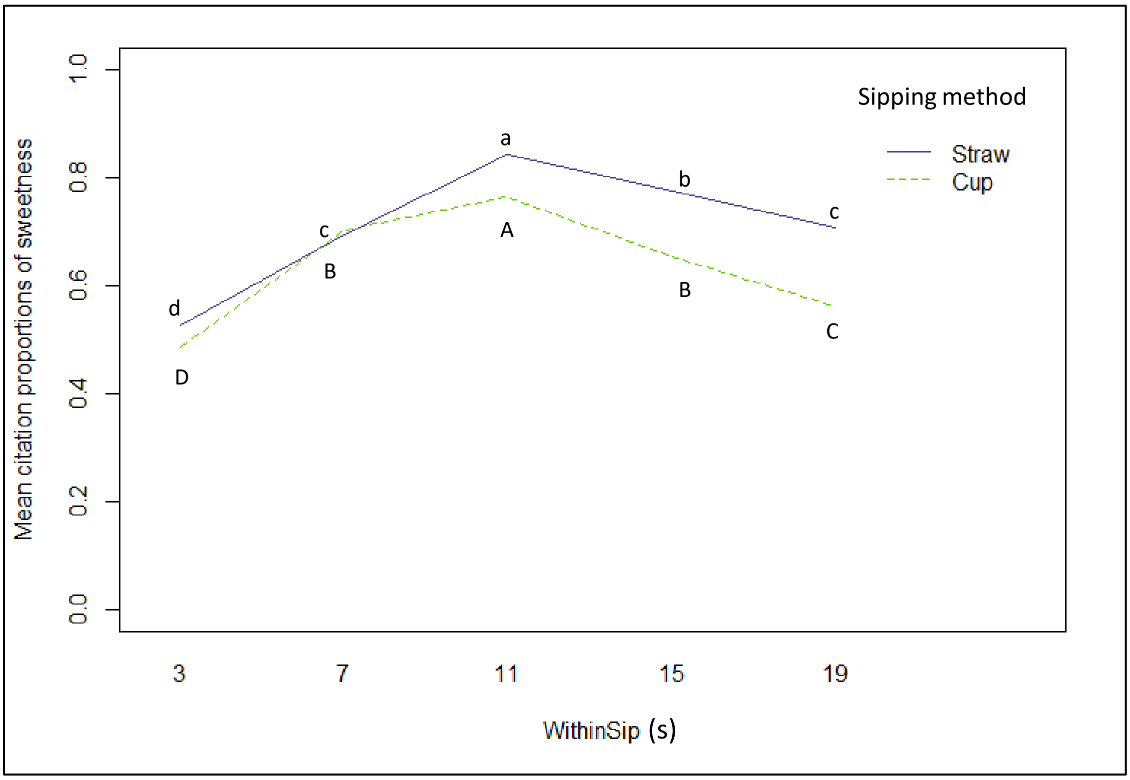



Figure 4.6: Interaction plot of *sipping method:within-sip* for sweetness. Citation proportions ‘ABCD’ from cup and ‘abcd’ through straw with different letters are significantly different (*Holms*, p<0.01).

Variation in the *within-sip* experience across *sips* was experienced differently from a cup versus through a straw (*within-sip:sip:sipping method* 3 way interaction) for mouthcoating and liquorice (Table 4.1) but the interactions only had small or barely noticeable effect sizes across sipping methods (mouthcoating for example in Figure 4.7), indicating in general *within-sip* experience did not change for each additional sip evaluated depending on the sipping method.

All attributes revealed significant *within-sip:sip* interactions (Table 4.1), emphasising the inconsistency of within-sip experience over multiple sips. Regardless the smaller size effects attributes were most discriminated generally at 7 s and showed decreasing citation proportions across sips (for example sweetness in Figure 4.8). Higher discrimination of attributes in-mouth at 7 s was perhaps due to an increase in tastants concentration reaching taste receptors with time (Selway & Stokes, 2014). Increasing tastants concentration over multiple sips may have led to adaptation (Bartoshuk et al., 2006; Keast & Roper, 2007) resulting in an overall decrease of citations across sips. Exceptionally, mouthcoating and astringency were discriminated slightly more at 3 s and showed increasing citation proportions across sips in-mouth at both 3 s and 7 s (astringency for example in Figure 4.9).

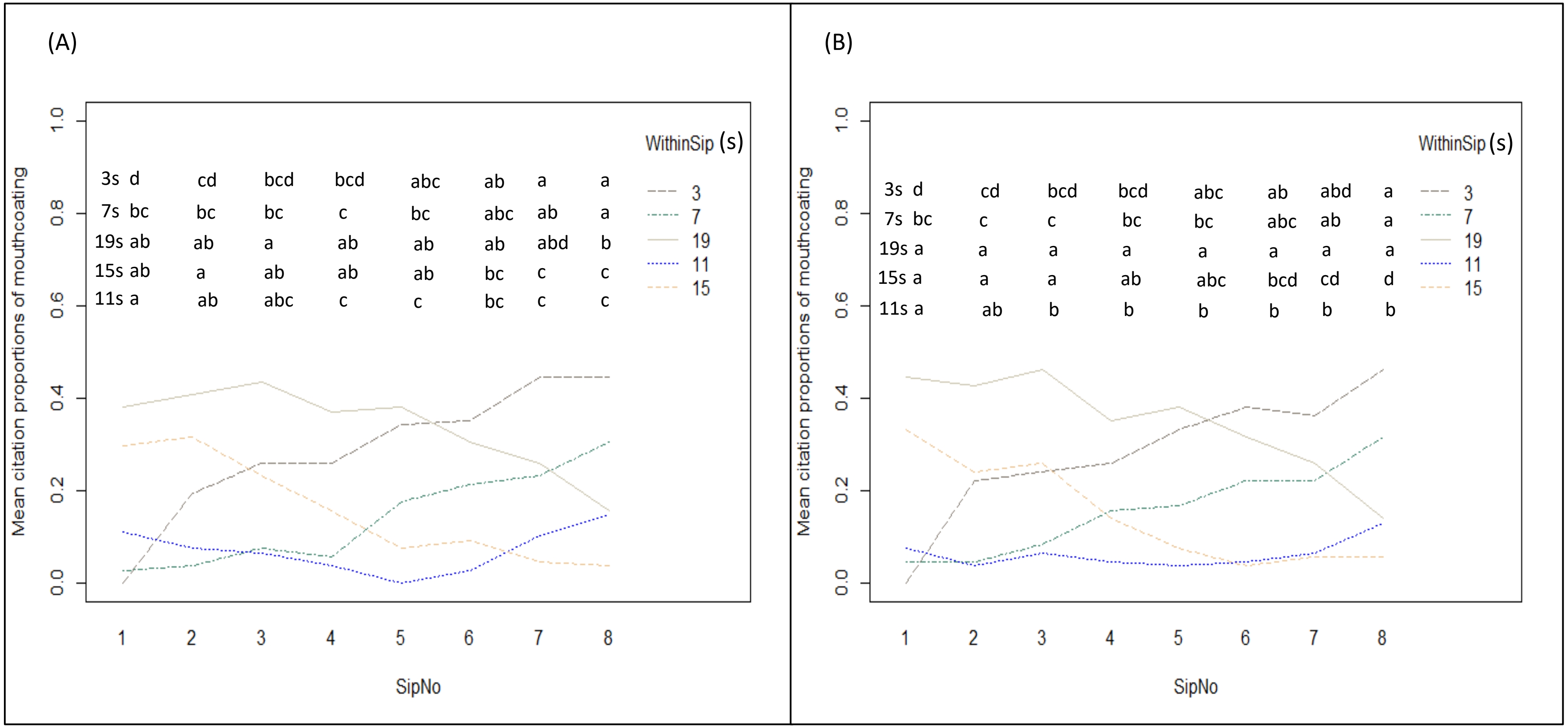



Figure 4.7: Interaction plots of *within-sip:sip* for mouthcoating (A) from cup and (B) through straw. Citation proportions 'abcd' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

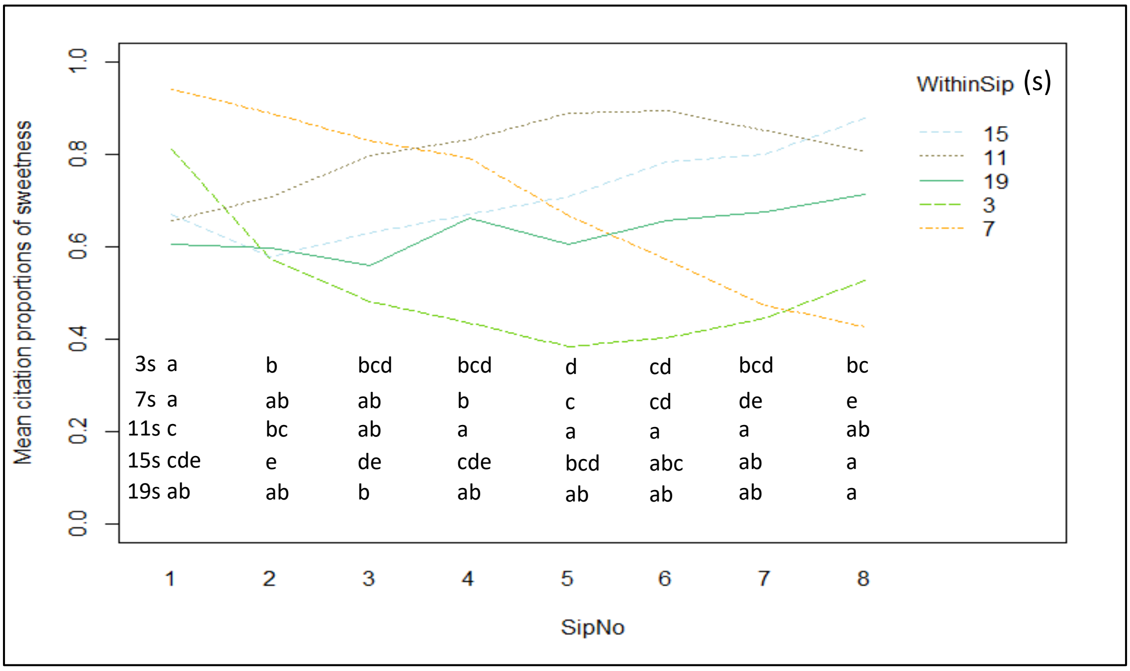



Figure 4.8: Interaction plot of *within-sip:sip* for sweetness. Citation proportions 'abcde' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

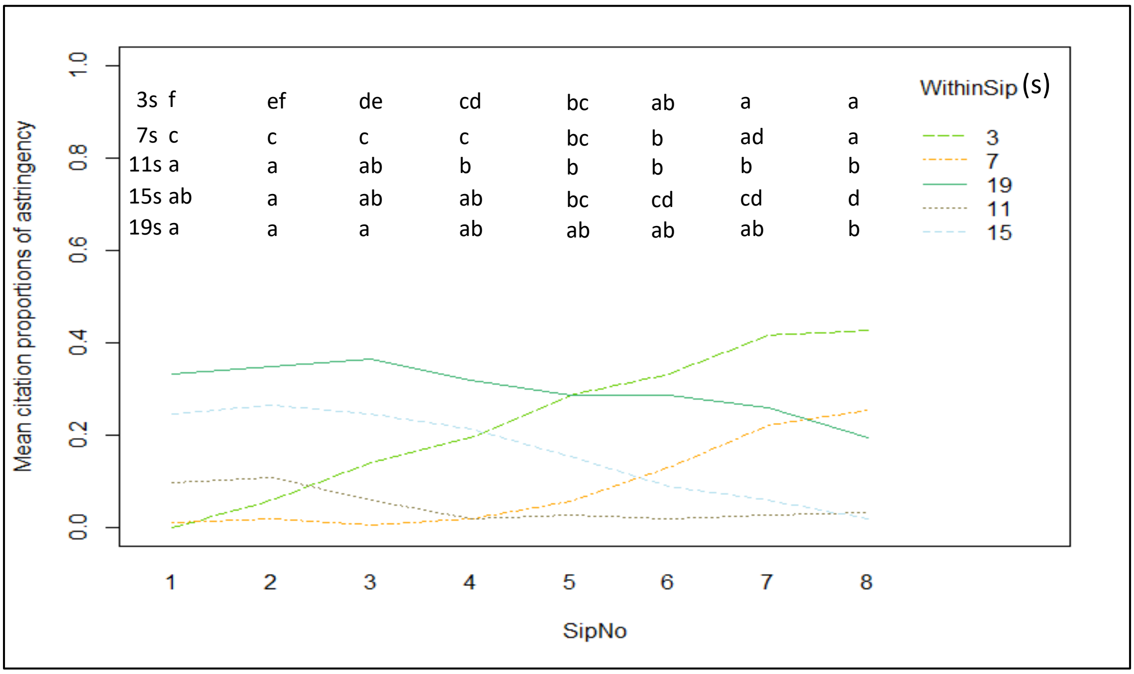



Figure 4.9: Interaction plot of *within-sip:sip* for astringency. Citation proportions 'abcdef' with different letters in a row for each *within-sip* time point are significantly different across sips (*Holms*, p<0.01).

Interestingly, after-swallowing at 15 s, sweetness citation proportions increased across sips (Figure 4.8) whereas astringency (Figure 4.9) and mouthcoating decreased. Sweet taste receptors are located on the tongue, soft palate and oropharyngeal areas (Breslin & Spector, 2008) and swallowing may have assisted build-up of sweet tastants in saliva over multiple sips to increasingly activate the taste receptors resulting in an increase of sweetness perception after-swallowing. Also, after-swallowing coatings in-mouth, resulting mouthcoating and astringency perceptions, perhaps undergo saliva dilution and breakdown with time (Chen & Engelen, 2012; Salles et al., 2010) and subsequent drop in the perceptions.

Overall, sensory experience from a cup versus through a straw varied depending on temporal factors. Flavour attributes were mostly varied within-sip across sipping methods and mouthfeel attributes over multiple sips. Generally, within-sip experience of products varied across multiple sips with smaller size effects which were attribute dependent. However, multiple sip evaluations, without using palate cleanser between sips of the same product, enabled the capture of adaptation and build-up effects providing closer insights into an actual product consumption occasion that consumers might experience. Therefore, it is important to adjust product evaluation protocols with appropriate sipping methods and over multiple sips where insights into an actual consumption occasion are required. However, the findings varied depending on attributes and hence more research will be required with different product/ beverage categories to understand the effects of multiple sip evaluations on cup and straw sipping experiences.

#### *4.3.3. Temporal differences of sensory perception across products*

In addition to *sipping method* effects, temporal differences in perception were observed between products. There were no significant *product:sip* interactions emphasising product differentiation was not affected by the number of sips evaluated. However, there were significant *product:within-sip* interactions on creamy flavour, thickness, mouthcoating and liquorice (Table 4.1) indicating evidence of variations in *within-sip* experience depending on the product. To further clarify, Analysis of Deviance on separate sipping method data showed significant *product:within-sip* interactions for mouthcoating from a cup (Table 4.2), highlighting that a cup particularly drives the effect of mouthcoating across products possibly due to more coverage of the oral cavity with the products leaving more coating effect than through straw. The interaction was due to higher discrimination of mouthcoating across products after-swallowing at 19 s (Figure 4.10). *Product:within-sip* interaction of thickness was significant for both sipping methods (Table 4.2). Overall, thickness did not show any significant differences across sipping methods (data not shown) indicating sipping from a cup versus a straw had no noticeable impact on *within-sip* experience of thickness across products.

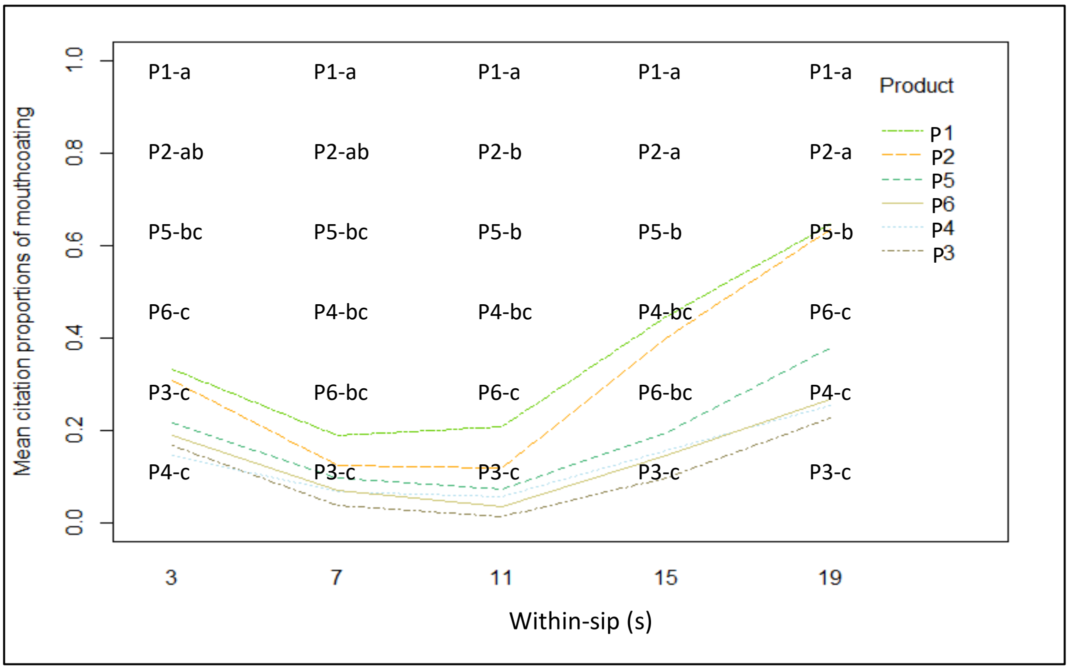



Figure 4.10: Interaction plot of *product:within-sip* for mouthcoating from cup. Citation proportions 'abcd' with different letters in a column for each *within-sip* time point are significantly different across products (*Holms*, p<0.01). Products: P1 (HFHSLT), P2 (HFLSLT), P3 (LFHSLT), P4 (LFLSLT), P5 (LFLSHT) and P6 (LFLS<u>S</u>HT).

TCATA data from the panel, whether from a cup or through a straw did not differentiate products across multiple sips for any attribute. This is possibly due to attribute training and consistency of the analytical approach of experts in product evaluation (Ares & Varela, 2017; Lawless & Heymann, 2013; Stone & Sidel, 2004) across sips overriding a holistic approach which could have captured dynamic interactions across sips. However, the expert panel were discriminating products within a sip and involved product and attribute specific interactions, indicating that the findings cannot be generalised hence more product and attribute specific studies are required. The panel showed significant *within-sip:sip* interactions highlighting the value of this novel multi sip TCATA approach on analysing *within-sip* temporal data. Explicitly investigating within-sip dynamics over multiple sips, rather than using averaged scores of within sip dynamics for each sip as employed by Dinnella et al. (2013) in TDS, provided more detailed insights into multiple sip product profiles on how each attribute evolved within a sip, i.e. in-mouth and after-swallowing, and subsequent variations across sips. Use of averaged time periods by Dinnella et al. (2013), i.e. total product evaluation time of 60 s split into two time periods (0 s to 30 s and 31 s to 60 s) and three time periods (0 s to 20 s, 21 s to 40 s and 41 s to 60 s) did not provide insights into the dynamics of perception with the details of in-mouth and after-swallowing variations across sips. Detailed dynamic product profiles will be useful in product development, specifically with the present trend of introducing alternative functional ingredients into foods, for example the development of functional plant based beverages replacing dairy whey protein ingredients with soy or pea proteins to capture closer insights into when any differences of product experiences occur with respect to the traditional product. Further, it was interesting that the panel was discriminating these *within-sip* changes over multiple sips and TCATA technique was sensitive enough to capture these dynamic differences based on cup and straw sipping. In fact, these findings emphasis the potential differences of temporal product profiles where a sipping method is chosen and thus the requirement of adjusting temporal product evaluation protocols depending on the end product usage whether it's from a cup, bottle or through a straw (i.e. retail packaging).

## 4.4. *Conclusions*

Insights from multiple sip TCATA vary depending on the sipping method. Sipping method influenced within-sip and across sips dynamics of sensory perceptions. Generally, the panel cited attributes more often when sipped through a straw, however products were discriminated with larger size effects when sipped from a cup. Therefore, multiple sip TCATA temporal profiles of some products and attributes will be affected by opting for a particular sipping method. Generally, the size effects of these sipping method interactions were smaller, and it was interesting that the panel was sensitive enough to capture such marginal differences. Explicit investigation of within-sip dynamics across multiple sips provided highly descriptive TCATA product profiles even reflecting smaller size effects depending on sipping method. However, these findings cannot be generalised as they are product and attribute specific. Therefore, wider studies with different product categories and different sensory lexicons will be required. Moreover, flavour release and consequent interactions of sipping method could also be a result of physical interactions within the product, however this is not presented in detail as it is out of scope of the experiment presented in this thesis. A key question is whether insights from an expert panel using multiple sips TCATA is similar to what is perceived by consumers and, although not covered in this thesis, it should be considered for future studies.

So far temporal data has been collected from expert panellists but in the next chapter the data collected from expert versus consumer panels is compared using TCATA method on milkshakes sipped from a cup.

# Chapter 5. Comparing temporal sensory product profile data from expert and consumer panels using multiple sip TCATA*

## 5.1 Introduction

Sensory evaluations are generally conducted to obtain attribute or affective information regarding products. Traditionally, expert panels are employed to objectively profile sensory characteristics of products with analytical techniques and consumers to evaluate product preferences using affective techniques (Kemp et al., 2009; Lawless & Heymann, 2013). The challenge for sensory scientists is to determine the extent to which product profiles from trained expert panels are representative of the perception of consumers of the product of interest (Ares & Varela, 2017). It is evident in the literature that expert and consumer panels approach product evaluation differently. Training develops an analytical versus holistic approach (Lawless & Heymann, 2013) and subsequently leads to different insights (Mello et al., 2019). In fact, employing consumers to obtain both analytical and affective responses, where applicable, may provide better insights into actual product experiences. However, until recently, the ability of consumers to analytically profile sensory characteristics of products was not thoroughly investigated and indeed it was thought consumers were not able to provide such information (Meilgaard et al., 2006; Stone & Sidel, 2004). With the recent developments in different alternative approaches to sensory characterisation, for example CATA (Adams et al., 2007; Jaeger et al., 2013) and TCATA (Castura et al., 2016), both expert (McMahon, Culver, Castura, & Ross, 2017; Rizo, Peña, Alarcon-Rojo, Fiszman, & Tarrega, 2018) and consumer panels (Jaeger et al., 2018; Ramsey et al., 2018; Reyes, Castura, & Hayes, 2017) have been employed to provide sensory profiles. Ares et al. (2016) compared insights from standard TCATA and TCATA fading

*The research presented in this chapter is published in *Food Quality and Preference* journal.
DRC-16 form on the Statement of Originality is attached at the end of this chapter.

variants from expert and consumer assessors using different product categories across assessor types, and TCATA fading improved discrimination from consumer data compared to TCATA with no fading.

Additionally, TCATA is usually used to evaluate one or two intakes (sips or bites) of a product (Esmerino et al., 2017; Harwood, Parker & Drake, 2020; Jaeger et al., 2018; Kemp et al., 2019; Mitchell, Castura, Thibodeau & Pickering, 2019; Ramsey et al., 2018). However, real consumption events usually occur over repeated ingestions of a portion or whole serving of a product. A variety of physiological and psychological factors (Hort, Hollowood, & Kemp, 2017b) and consumer habits during product usage such as sip volume, time between sips (Guinard, Pangborn, & Lewis, 1986) and total product volume consumed (Withers, Cook, Methven, Gosney, & Khutoryanskiy, 2013) affect temporal perception of a product. Therefore, it would be interesting to investigate the insights obtained from expert versus consumer panels, when using multiple sip TCATA, for which no published work was found to date.

The key objectives of the research presented in this chapter were to,

- investigate the general impact of panel type on TCATA product sensory profiles
- evaluate the impact of panel type on within-sip and multiple sips dynamics in TCATA
- investigate whether the observed panel and temporal effects were product dependent

## 5.2 Materials and methods

### 5.2.1 Products

Model vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) as detailed in Chapter 2, section 2.2.1 were evaluated for the purpose of this research.

### 5.2.2 Participants

Data obtained on the three milkshakes from the expert panel detailed in section 2.2.2 and the consumer panel detailed in section 2.2.6.2 were used in this chapter.

### 5.2.3 Methodology

Both the expert and the consumer panels used the sensory lexicon developed by the expert panel (section2.2.3) and profiled the three milkshakes using TCATA (section 2.2.5.2) over 8 sips of each product. The sensory lexicon was not technical, so it was deemed appropriate to use with consumers. The same lexicon was used with both the expert and the consumer panels to assist comparison of respective insights on TCATA product profiles.

### 5.2.4 Data analysis

Statistical analyses were performed using R software, version 4.0.0 (R Core Team, 2020) in RStudio (2019) with α=0.05, unless specified otherwise. The package `dplyr` (Wickham, François, Henry, & Müller, 2020) for data manipulation and the package `ggplot2` (Wickham, 2016) for data visualisation were used.

TCATA data were analysed as detailed in Chapter 3, section 3.2.4.2. Observed mean citation proportions and the standard error (SE) (pooled over panels) for all attributes were calculated for each product, sip no. and within sip. In addition, mean citation proportions and SE were calculated for each *panel* for each *product*, *sip* and *within-sip*.

Generalised linear models (GLM) with default functions (`function=glm, family="binomial", link=logit`) (Montgomery et al., 2012) were used to model the citation proportions of the four factors (*panel, product, sip* and *within-sip* ) with four-way interactions for each attribute to investigate their effects on temporal sensory perceptions. Analysis of Deviance (González Chapela, 2013; Montgomery et al., 2012) was used to determine which main and interaction effects were statistically significant. Associated interaction plots were created to visualise observed responses against time for relevant experimental and statistical effects. Post-hoc tests were used to make pairwise comparisons of citation proportions among experimental factors for which there was a significant main effect (Shaffer, 1995). Holm's adjusted significance levels (Holm, 1979; Wright, 1992) were used in these pairwise comparisons. As an objective of this study was to determine the effect of using different panel types on product perception over multiple sips, data from each panel was also considered separately in this analysis. Data was split by *panel* and Analysis of Deviance was performed using a three-factor (*product, sip* and *within-sip*) GLM with three-way interactions for each attribute.

## *5.3 Results and discussion*

Appendix L provides the pooled panel TCATA observed mean citation proportions and standard error (SE) for each attribute of each milkshake for each *product*, by *sip*, and each *within-sip* time point. Appendix H and M breaks this data down further separated by panel type.

Figure 5.1 presents the average panel TCATA curves by attribute for each product. Generally, the expert panel cited attributes more often than the consumer panel for all products (Figure 5.1). However, liquorice of P1 (HFHSLT), the consumer panel cited increasingly more often than the expert panel across sips. Additionally, citation portions by the consumer panel on liquorice of P4 (LFLSLT), creamy mouthfeel of P4 (LFLSLT) and P6 (LFLS*S*HT) and mouthcoating of P6 (LFLS*S*HT), increased in size effect across sips and recorded higher citation proportions towards the latter sips than the expert panel. Further analyses were conducted to identify the statistical significances of these differences. Table 5.1 presents the deviances and associated p values from the Analysis of Deviance for all attributes. Table 5.2 summarises the deviances and p values from the Analysis of Deviance using a three-factor GLM (*product, within-sip* and *sip*) with three-way interactions, for each *panel*.

### *5.3.1 Panel effects and interactions*

A key objective for this study was to understand how choice of panel type influenced TCATA product sensory profiles. Analysis of Deviance on pooled panel data indicated that significant panel main effects were evident for all attributes except creamy mouthfeel (Table 5.1).

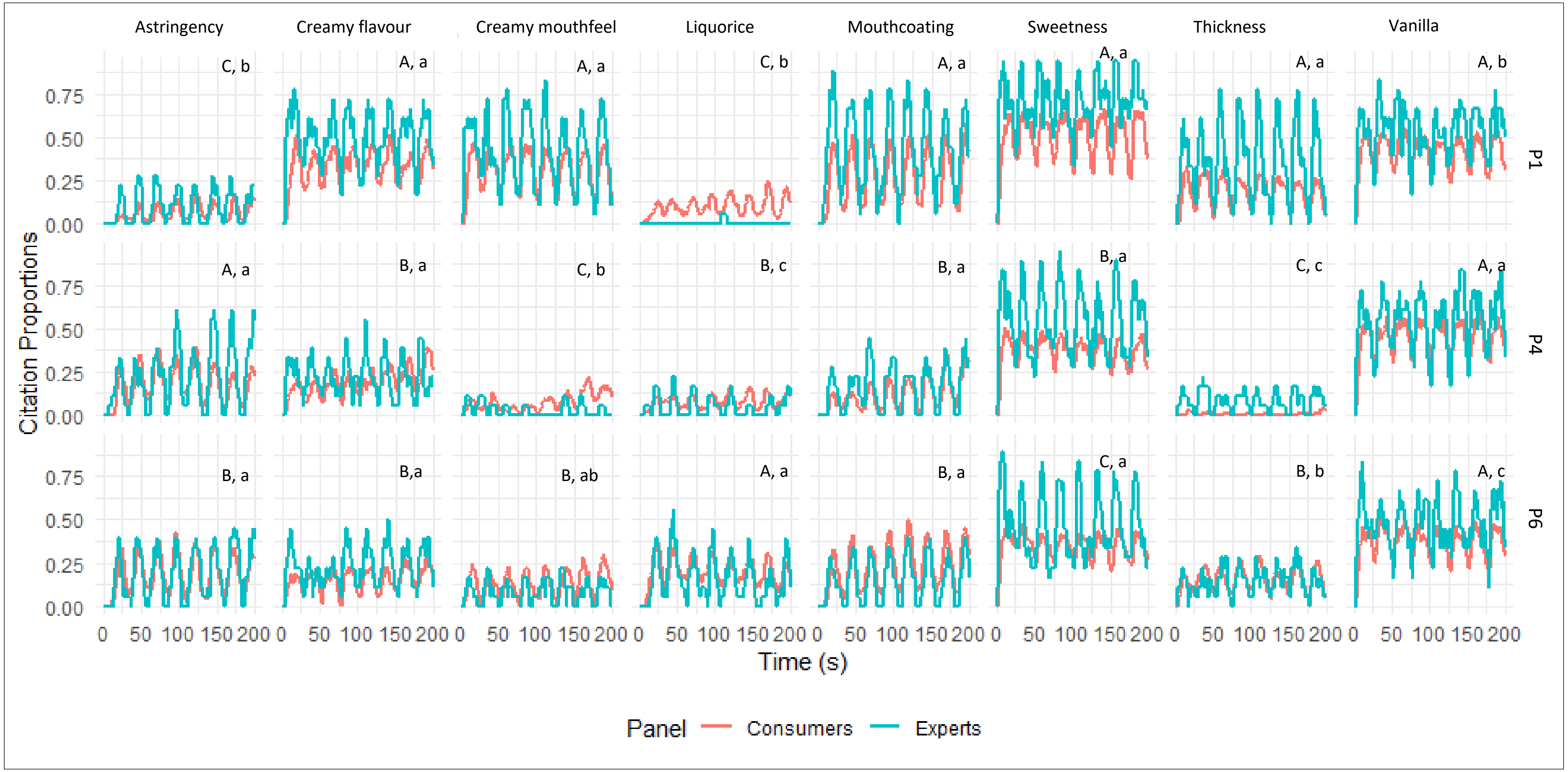



Figure 5.1: TCATA curves for sensory attributes of vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLSSHT) as evaluated by the expert versus consumer panels. Citation proportions 'ABC' by the expert panel and 'abc' by the consumer panel with different letters of each attribute are significantly different across products on average of sips (*Holms*, p<0.01).

Table 5.1: Summary of p values and deviances from a GLM four-factor Analysis of Deviance for citation proportions of sensory attributes on selected time slices for the expert and consumer panels. Bold font represents significant terms (p<0.05).

| | **Sweetness** | | **Vanilla** | | **Creamy Flavour** | | **Creamy Mouthfeel** | | **Thickness** | | **Mouthcoating** | | **Astringency** | | **Liquorice** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip (DF=4)* | 368.439 | **<0.001** | 382.581 | **<0.001** | 283.836 | **<0.001** | 481.028 | **<0.001** | 315.758 | **<0.001** | 553.699 | **<0.001** | 380.692 | **<0.001** | 121.838 | **<0.001** |
| *Sip (DF=7)* | 18.970 | **0.008** | 27.984 | **<0.001** | 22.747 | **0.002** | 4.642 | 0.704 | 17.559 | **0.014** | 66.151 | **<0.001** | 123.736 | **<0.001** | 56.798 | **<0.001** |
| *Product (DF=2)* | 289.908 | **<0.001** | 51.725 | **<0.001** | 524.834 | **<0.001** | 1386.213 | **<0.001** | 1208.601 | **<0.001** | 429.410 | **<0.001** | 343.731 | **<0.001** | 400.219 | **<0.001** |
| *Panel (DF=1)* | 282.565 | **<0.001** | 77.535 | **<0.001** | 121.535 | **<0.001** | 2.853 | 0.091 | 110.484 | **<0.001** | 14.881 | **<0.001** | 5.804 | **0.016** | 64.662 | **<0.001** |
| *Within-sip:Sip* | 180.123 | **<0.001** | 298.722 | **<0.001** | 188.828 | **<0.001** | 162.390 | **<0.001** | 117.358 | **<0.001** | 604.206 | **<0.001** | 355.439 | **<0.001** | 158.657 | **<0.001** |
| *Within-sip:Product* | 13.205 | 0.105 | 1.660 | 0.990 | 29.457 | **<0.001** | 24.034 | **0.002** | 5.608 | 0.691 | 1.214 | 0.997 | 7.944 | 0.439 | 2.616 | 0.956 |
| *Sip:Product* | 8.736 | 0.848 | 5.066 | 0.985 | 16.758 | 0.269 | 58.280 | **<0.001** | 20.983 | 0.102 | 42.709 | **<0.001** | 40.978 | **<0.001** | 11.704 | 0.630 |
| *Within-sip:Panel* | 42.445 | **<0.001** | 2.073 | 0.722 | 8.008 | 0.091 | 4.461 | 0.347 | 14.370 | **0.006** | 1.999 | 0.736 | 12.448 | **0.014** | 8.371 | 0.079 |
| *Sip:Panel* | 15.094 | **0.035** | 5.458 | 0.604 | 12.702 | 0.080 | 7.115 | 0.417 | 4.675 | 0.700 | 20.186 | **0.005** | 16.286 | **0.023** | 5.886 | 0.553 |
| *Product:Panel* | 10.800 | **0.005** | 1.814 | 0.404 | 8.687 | **0.013** | 74.517 | **<0.001** | 166.065 | **<0.001** | 80.161 | **<0.001** | 242790.049 | **<0.001** | 58.185 | **<0.001** |
| *Within-sip:Sip:Product* | 31.310 | 0.997 | 23.065 | >0.999 | 50.390 | 0.686 | 47.676 | 0.778 | 41.599 | 0.924 | 38.318 | 0.966 | 30.583 | 0.998 | 30.783 | 0.998 |
| *Within-sip:Sip:Panel* | 68.118 | **<0.001** | 26.450 | 0.548 | 30.491 | 0.340 | 29.238 | 0.401 | 32.576 | 0.252 | 26.862 | 0.526 | 0.000 | >0.999 | 23.431 | 0.711 |
| *Within-sip:Product:Panel* | 14.716 | 0.065 | 8.428 | 0.393 | 8.155 | 0.419 | 7.464 | 0.488 | 17.155 | **0.029** | 17.285 | **0.027** | 22491.240 | **<0.001** | 11.518 | 0.174 |
| *Sip:Product:Panel* | 6.992 | 0.935 | 9.716 | 0.783 | 13.344 | 0.500 | 11.772 | 0.625 | 13.165 | 0.514 | 9.205 | 0.818 | 0.000 | >0.999 | 12.997 | 0.527 |
| *Within-sip:Sip:Product:Panel* | 32.923 | 0.994 | 34.239 | 0.990 | 27.644 | 0.999 | 0.000 | >0.999 | 40.873 | 0.965 | 0.000 | >0.999 | 3316.016 | **<0.001** | 0.000 | >0.999 |

Table 5.2: Summary of p values and deviances from a GLM three-factor Analysis of Deviance for citation proportions of sensory attributes on selected time slices by panel. Bold font represents significant terms (p<0.05).

| | | **Sweetness** | | **Vanilla** | | **Creamy Flavour** | | **Creamy Mouthfeel** | | **Thickness** | | **Mouthcoating** | | **Astringency** | | **Liquorice** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p | Deviance | p |
| *Within-sip (DF=4)* | E | 126.936 | **<0.001** | 70.645 | **<0.001** | 79.633 | **<0.001** | 84.006 | **<0.001** | 118.956 | **<0.001** | 112.810 | **<0.001** | 111.300 | **<0.001** | 30.177 | **<0.001** |
| | C | 297.346 | **<0.001** | 319.337 | **<0.001** | 197.253 | **<0.001** | 370.377 | **<0.001** | 216.003 | **<0.001** | 386.061 | **<0.001** | 336.508 | **<0.001** | 105.811 | **<0.001** |
| *Sip (DF=7)* | E | 7.746 | 0.356 | 7.064 | 0.422 | 1.440 | 0.984 | 3.868 | 0.795 | 4.011 | 0.779 | 5.691 | 0.576 | 24.034 | >0.999 | 12.282 | 0.092 |
| | C | 29.043 | **<0.001** | 36.103 | **<0.001** | 41.462 | **<0.001** | 9.587 | 0.213 | 20.651 | 0.004 | 127.203 | **<0.001** | 149.577 | **<0.001** | 69.257 | **<0.001** |
| *Product (DF=2)* | E | 81.745 | **<0.001** | 3.858 | 0.145 | 147.330 | **<0.001** | 482.756 | **<0.001** | 212.258 | **<0.001** | 194.282 | **<0.001** | 43.582 | **<0.001** | 139.822 | **<0.001** |
| | C | 211.392 | **<0.001** | 41.988 | **<0.001** | 400.023 | **<0.001** | 910.448 | **<0.001** | 1172.673 | **<0.001** | 303.308 | **<0.001** | 319.256 | **<0.001** | 309.559 | **<0.001** |
| *Within-sip:Sip* | E | 95.513 | **<0.001** | 103.621 | **<0.001** | 70.340 | **<0.001** | 56.434 | **0.001** | 63.560 | **<0.001** | 153.148 | **<0.001** | 117.480 | **<0.001** | 41.651 | **0.047** |
| | C | 285.339 | **<0.001** | 324.941 | **<0.001** | 177.287 | **<0.001** | 177.446 | **<0.001** | 109.114 | **<0.001** | 497.302 | **<0.001** | 267.582 | **<0.001** | 163.764 | **<0.001** |
| *Within-sip:Product* | E | 10.233 | 0.249 | 7.231 | 0.512 | 9.117 | 0.333 | 4.376 | 0.822 | 15.469 | 0.051 | 18.420 | **0.018** | 0.000 | >0.999 | 10.856 | 0.210 |
| | C | 18.309 | **0.019** | 2.371 | 0.967 | 23.406 | **0.003** | 34.370 | **<0.001** | 9.529 | 0.300 | 4.360 | 0.823 | 9.307 | 0.317 | 3.135 | 0.926 |
| *Sip:Product* | E | 8.985 | 0.832 | 10.863 | 0.697 | 7.796 | 0.900 | 11.663 | 0.633 | 7.034 | 0.933 | 7.657 | 0.906 | 24994.623 | **<0.001** | 13.651 | 0.476 |
| | C | 7.216 | 0.926 | 3.367 | 0.998 | 22.843 | 0.063 | 61.377 | **<0.001** | 22.783 | 0.064 | 40.349 | **<0.001** | 34.726 | **0.002** | 11.597 | 0.639 |
| *Within-sip:sip:Product* | E | 43.388 | 0.891 | 35.737 | 0.984 | 22.447 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 | 0.000 | >0.999 |
| | C | 21.329 | >0.999 | 18.354 | >0.999 | 56.558 | 0.454 | 36.111 | 0.982 | 0.000 | >0.999 | 46.978 | 0.799 | 32.361 | 0.995 | 39.576 | 0.953 |

E – expert panel, C- consume panel.

However, apart from vanilla, the panel was involved in a considerable number of significant interactions with *product, sip* and *within-sip* indicating added complexity in the effects of panel type. The mean citation rate for vanilla was significantly higher for the experts than the consumers. The panel-specific Analysis of Deviance highlighted that vanilla citation did not differ significantly by *product* for the expert panel but did for the consumer panel (Table 5.2). The consumer panel differentiated all the three products from each other with vanilla cited most for P4 (LFLSLT) and least for P6 (LFLS*S*HT) (Figure 5.1).

Except for vanilla, significant *panel:product* interactions existed for all attributes (Table 5.1). In addition, interaction plots demonstrated a disparity in the size of difference in citation proportions for some attributes across panel types. The size of differences in citation proportion between P1 (HFHSLT) and P4 (LFLSLT) for sweetness, creamy flavour, creamy mouthfeel, thickness, mouthcoating, astringency and liquorice were larger for the expert panel than the consumer panel (Figure 5.1). However, the expert panel exhibited smaller citation proportion differences between P4 (LFLSLT) and P6 (LFLS*S*HT) for creamy flavour, creamy mouthfeel, thickness, mouthcoating and liquorice than the consumer panel (Figure 5.1). Table 5.2 shows only a few significant interactions involved the *product* term. However, the expert panel showed clear product differentiation (main effects) on more, and different attributes (sweetness, creamy flavour and mouthfeel, thickness and liquorice) than the consumer panel (vanilla, thickness and liquorice). In general, the expert panel gave higher attribute citation proportions, the consumer panel gave higher citation proportions for creamy mouthfeel, thickness, mouthcoating and liquorice on some products. For example, the consumer panel gave higher citations for mouthcoating on P6 (LFLS*S*HT) (Figure 5.1).

Generally, the expert panel gave higher citation proportions and larger differences for attribute citation proportions between products at the time points evaluated highlighting an increased sensitivity and/or increased competence in ability to recognise more attributes at a time compared to the consumer panel. In comparison to naïve consumers expert panels are purported to be more sensitive in sensory evaluations (Ares & Varela, 2017) as they are specifically selected based on their sensory acuity (Everitt, 2018; Kemp et al., 2009) and undergo training (Lawless & Heymann, 2013). Previously, trained assessors have been reported to be more discriminating of attributes in QDA compared to consumers performing rate-all-that-apply (RATA) (Mao, Sae-Eaw, Wongthahan, & Prinyawiwatkul, 2020) or check-all-that-apply (CATA) tasks, specifically for products with small formulation differences (Mello et al., 2019) and in complex products (Ares, Antúnez, et al., 2015). Furthermore, trained panels have shown more consensus and were more discriminating for texture attributes using unstructured intensity scales than consumers (Ares, Bruzzone, & Gimenez, 2011). The study highlights that differences observed in the above descriptive methods are also evident within TCATA data, and hence panel type is an important consideration when performing TCATA evaluations.

The expert panel revealed differences across more, and different, attributes in product characterisation than the consumer panel. The expert panel revealed differences in creamy flavour and creamy mouthfeel but not the differences the consumer panel revealed for vanilla. Except for thickness and liquorice attributes, the consumer panel demonstrated that consumers perceive products differently to the expert panel. This compares with Ares and Varela (2017) who reported that trained and consumer assessors selected different attributes to characterise samples in a QDA and CATA task. Expert panellists may also be more inclined to select attributes that are subtle in intensity which consumers may disregard. However, regardless of the above differences, both panels agreed on the order of product discrimination with respect to each attribute.

Consumers were not always less discriminating. It is hypothesised that the larger difference in citation proportions between P4 (LFLSLT) and P6 (LFLS*S*HT) for consumers was due to the stevia present in P6 (LFLS*S*HT), with an associated unusual sensation masking or dominating its selection over other attributes for the consumer panel, which might otherwise be reduced following the training the expert panel underwent. In addition, the main effect panel type was significant for vanilla perception. Although the same amount of vanilla was in each product formulation it was expected that it might be perceived differently across samples due to physicochemical or cross-modal effects considering the varying levels of fat, sucrose and thickener in the milkshakes impacting volatile release or perceptual interactions (Keast & Breslin, 2003; Kemp et al., 2009; Sikorski et al., 2007b; Stampanoni-Koeferli et al., 1996). However, only the consumer panel differentiated products by vanilla perception. It is possible that the expert panel were more analytical in their approach due to their training and less impacted by perceptual interactions associated with the observed changes in sweetness levels (Sikorski et al., 2007b), which the consumer panel are likely to integrate with vanilla perception. It is also important to note that panel differences did not follow a general pattern so, at least in the case of vanilla milkshakes, they are also product and attribute dependent.

#### *5.3.1.1 Impact of panel type on multiple sip TCATA product profiles*

Significant *panel:sip* interactions were also evident for sweetness, mouthcoating and astringency (Table 5.1) suggesting that citation differences across sip numbers were also dependent upon the type of panel employed. For example, in addition to citing mouthcoating more often, larger differences in citation proportions for mouthcoating over the multiple sips were usually reported by the expert panel than the consumer panel (Figure 5.2 (a)). Citations from the expert panel for mouthcoating fluctuated from sip 1 to 5 and stayed fairly constant afterwards but, for the consumer panel, citations increased considerably from sip 1 to 2 and then gradually continued to increase towards sip 8 (Figure 5.2 (a)). Further, in Figure 5.2 (b) consumer data resulted in a larger citation difference from sip 1 to sip 2 for astringency, but expert data resulted in larger differences in citation proportion from sip 5 to sip 8. Notably, for astringency the expert panel gave increasing citation proportions with each sip whereas the consumer panel citations remained constant after an initial increase between sip 1 and 2.

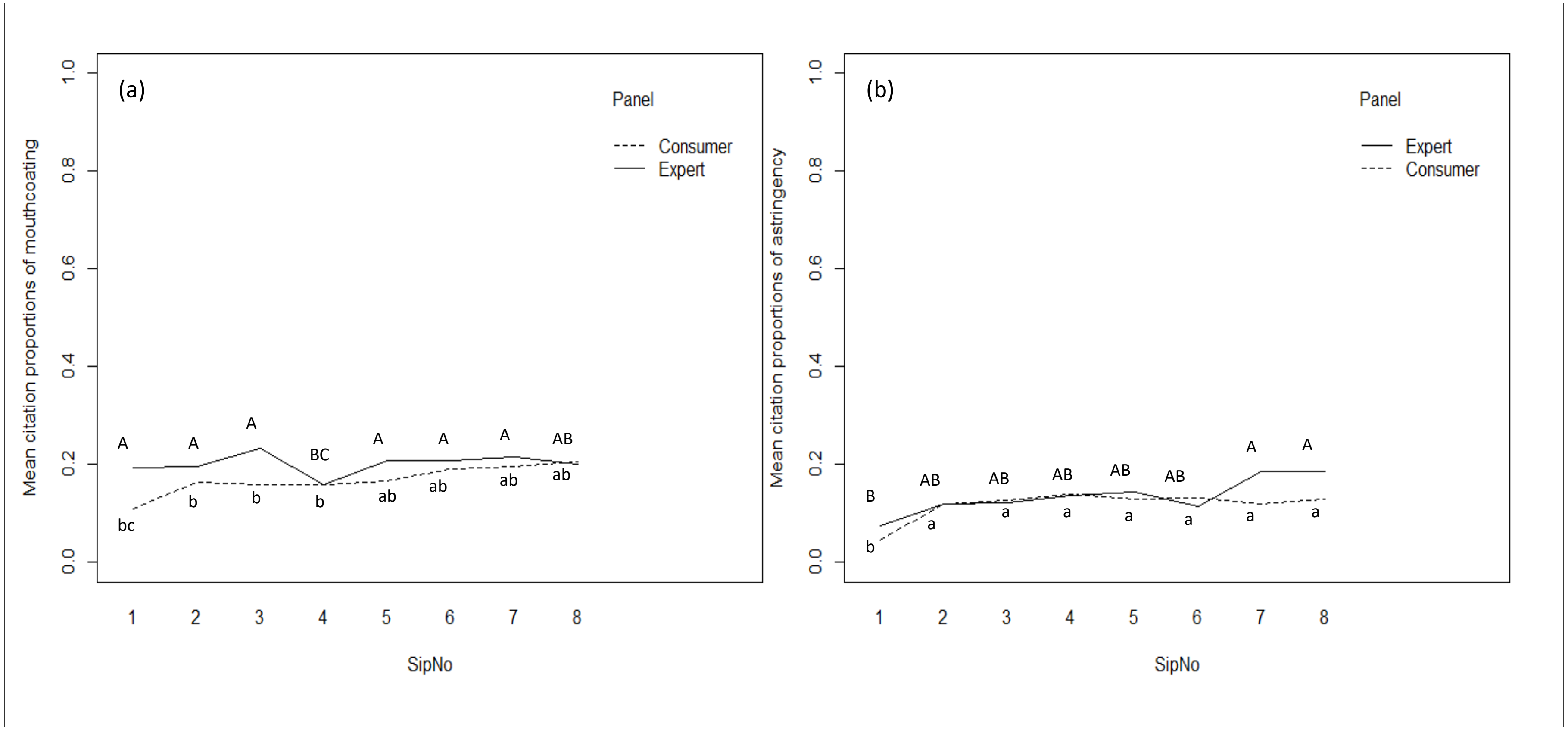



Figure 5.2: (a) Significant *panel:sip* interaction of mouthcoating and (b) astringency. Different citation proportions with letters 'AB' for experts and 'abc' for consumers on each attribute show significant differences (*Holms*, $p<0.01$).

This study also provides new evidence concerning the extension of TCATA to multiple sip evaluations. The build-up of mouthcoating reported over sips from consumers is postulated to be due to several factors, although more research is needed to confirm this. Mucosal adhesion of milk proteins such as casein and β-lactoglobulin (Withers et al., 2013) and thickening agents such as carboxy methyl cellulose (Cook et al., 2018) are reported to increase mouthcoating. Differences in oral processing, and hence shear viscosity, have also been shown to affect mouthcoating perception (He, Hort, & Wolf, 2016). It is also possible that individual differences in oral mucosa, and differences in oral processing of the sample affected the dynamics of mouthcoating (Stokes et al., 2013) across sips for the consumer panel. The experts, through training, may have been more consistent in their in-mouth manipulation of the samples. Furthermore, mouthcoating may have become more dominant for the consumer panel and hence more noticeable than other attributes, leading to increasing citations across sips at the expense of others. Training of the expert panel means they were likely to be more understanding of which attributes were present, to what extent, and were more able to select all perceived attributes.

In contrast, for astringency, the expert panel gave increasing numbers of citations across sips compared to the consumer panel where citations were stable. Astringency is a mouthfeel resulting from the interactions of salivary proline-rich proteins with astringent compounds (such as polyphenols) followed by complex precipitation (Jöbstl et al., 2004). Astringency in flavoured milkshakes is hypothesised to be a result of mucosal adhesion of dairy proteins (Withers et al., 2013) and dairy protein isolates (Vardhanabhuti, Cox, Norton, & Foegeding, 2011). Build-up of astringency over multiple sips as observed by the expert panel agrees with Methven et al. (2010) who used multiple ingestion of high protein beverages evaluated by a trained panel using sequential profiling. Astringency was one of the most difficult attributes for the expert panel to master during training, both in terms of definition, but also because astringency presented at a low intensity in the milkshakes. The naïve consumer panel may therefore have struggled to understand this complex attribute and/or distinguish its changing dynamics across sips. Individual differences in sensitivity to astringency are also likely to have impacted the individual responses. Furthermore, interactions and subsequent complex formation of astringent compounds with mucosal proteins would be hindered by increased mouthcoating with mucosal adhesion of dairy proteins and/or thickeners resulting in decreasing of astringency. Such cross-modal interactions would be more impactful for the consumer panel as the expert panel was trained on all attributes and hence would have an increased ability to discriminate the dynamics of each attribute.

#### *5.3.1.2 Impact of panel type on within-sip dynamics of attributes in TCATA*

Panel differentiation also extended to *within-sip* differences. There were significant *panel:within-sip* interactions for sweetness, thickness and astringency (Table 5.1). Differences in citation proportions between time slices within a sip were generally larger from the experts than the consumers on these attributes (for example thickness in Figure 5.3 (a)). Furthermore, the experts revealed differences in citation proportions for sweetness, thickness and astringency attributes just before and after-swallowing (after 7 s) that were not seen so clearly with the consumer panel data. Figure 5.3 (a) for example, shows the interaction plot of *panel:within-sip* for thickness (averaged over the 3 products) where the expert panel showed larger differences between time points after 7 s compared to the consumer panel. The expert panel recorded higher citation proportions for sweetness and thickness on all time slices within a sip. Sweetness citation increased from 3 s to 11 s for experts and until 15 s for consumers, followed by a decrease for both towards the end of a sip (Figure 5.3 (b)). A similar pattern was observed for thickness, but citation proportions increased until 15 s for both panels. Experts generally cited astringency more often but on average the pattern of astringency perception within a sip was similar excepting a larger change in citation proportion for experts before and after the swallow point (8 s).

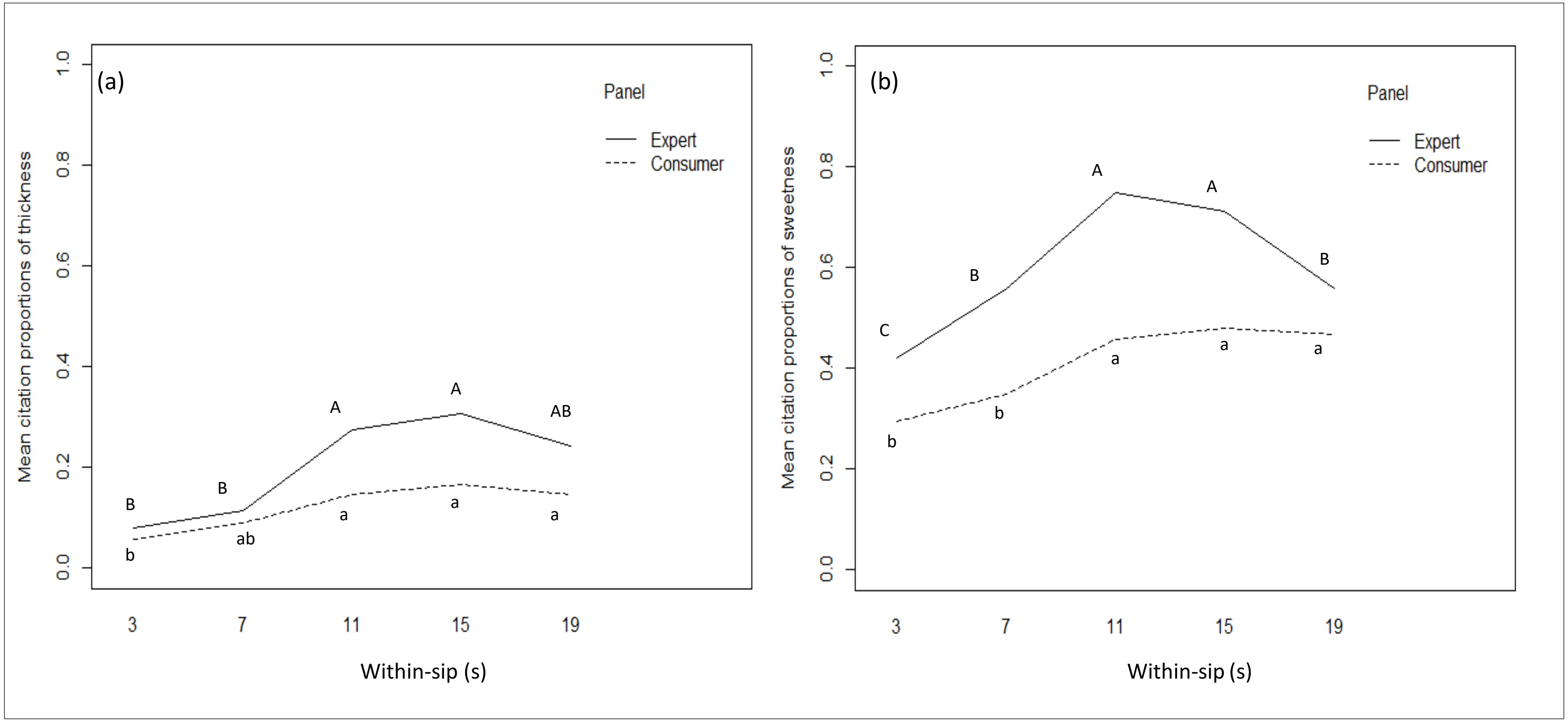



Figure 5.3: (a) Significant *panel:within-sip* interaction of thickness and (b) sweetness. Different citation proportions with letters 'ABC' for experts and 'ab' for consumers on each attribute show significant differences (*Holms*, p<0.01).

This study also provides evidence for the first time, that panel differences also extend to *within-sip* perception (*panel:within-sip* interactions). The expert panel revealed larger citation proportion differences between time points of sips, reflecting their increased ability to differentiate the presence or absence of some attributes temporally within the sip time frame compared to consumers. Notably however, both panels showed larger citation proportion differences between time points 7 s and 11 s, just before and immediately after-swallowing, highlighting a general effect of oral processing (swallowing) on the dynamics of attribute evolution. Several other studies have also shown the effects of oral processing (swallowing (Engelen, 2018)) in flavour release (Aprea, Biasioli, Gasperi, Märk, & van Ruth, 2006), texture (Chen & Stokes, 2012) and other sensory perceptions (Chen & Engelen, 2012). A significant panel-time interaction for sweetness revealed the effect of panel type on consistency of within sip variation of sweetness across sips. Higher citations proportions and larger differences across time points in within sip data from the expert panel again indicated a higher sensitivity to changes in sweetness compared to the consumer panel.

Findings based on expert panel data differed from those from the consumer data. Insights obtained from these different panels are not interchangeable. Such findings point to careful consideration concerning panel type when employing a TCATA approach. As is often the case this needs to be driven by the investigation objective. However, difficult or complex attributes, such as astringency in this study, may prove difficult with consumer panel data and hence an expert panel may be needed where such attributes are key preference drivers for the product category. Furthermore, increased sensitivity of the expert panel as observed in this study, would be preferable for understanding the more detailed impacts of formulation and process changes for example, on product sensory profiles, although it could not be assumed that consumers would perceive the products in the same way. Using an expert panel, could over-engineer the consumer experience of a product. In fact, where insights into actual product consumption are required a consumer panel should be employed. Selection of panel type in multiple sip TCATA evaluations must be compatible with the intended study objectives and technical complexity of the respective sensory lexicon.

Many consumer and sensory studies are conducted on individual sips or bites of products. The data here supports the view that a single sip does not automatically capture the true product experience with citation proportions different on the last sip compared to the first couple of sips for several attributes, whether it be expert or consumer panel data. Furthermore, within-sip changes observed in the first sip were not necessarily consistent across multiple sips. Consequently, it is important for researchers to consider analysing data from multiple sips unless there is evidence that subsequent sips match one sip/bite data. Costs will be a factor but where the objective is to understand how consumers perceive the product experience multiple sip TCATA would be more effective. Ultimately the project objective and budget will need to be considered. Several studies using other temporal techniques such as time intensity (Courregelongue et al., 1999; Guinard et al., 1986) and temporal dominance of sensation (TDS) (Corrêa Simioni et al., 2018; Silva et al., 2018) have supported this need.

#### *5.3.1.3 Impact of panel type on the variation of within-sip dynamics across multiple sips*

Panel type only affected variation in the *within-sip* experience across sips (*within-sip:sip*) for sweetness (Table 5.1). Generally, the expert panel gave higher citation proportions and larger differences between citation for sweetness at all *within-sip* time points across all eight sips, except that the consumer panel showed higher citation increments at 3 s from sip 1 to 2 (data not shown). This was possibly caused by the expert panel being more familiar with the task than the consumer panel resulting in differences in how rapidly the responses were cited once the evaluation began. Although there were significant *within-sip:sip* interactions on all the other attributes, these were not affected by the panel type (Table 5.1). Due to the complex nature of this data set the *within-sip:sip* interactions are not discussed in detail. However, the citation proportion dynamics of the attributes showed possible physicochemical and or cross modal interactions over multiple sips. For instance, there were similar dynamics in citation proportions for sweetness/vanilla, creamy flavour/creamy mouthfeel/thickness and mouthcoating/astringency /liquorice. For example, Figure 5.4 (a) and (b) show the *within-sip:sip* interactions of sweetness and vanilla and Figure 5.4 (c) and (d) show the interactions of mouthcoating and astringency. For sweetness and vanilla, citation proportions increased from sip 1 to 2 at 3 s and remained virtually the same across rest of the sips. However, at 7 and 11 s citations gradually decreased from sip 1 to 8 whilst at 15 and 19 s citations remained virtually the same across sips. In contrast, for mouthcoating and astringency, citation proportions increased at 3 and 7 s, decreased at 15 and 19 s and remained virtually the same at 11 s across sips. These patterns of response within attribute groups are likely to reflect the perceptual interactions also observed across multiple sips for these attributes. The within-sip observations again highlight the need to consider multiple sips/bites of a product when characterising the sensory profile of the product experience.

The work in this chapter has highlighted the importance of a multiple sip approach to capture the changing dynamics of attributes during consumption, and the deeper additional insights that can be obtained by looking at within sip attribute dynamics across sips. The outcomes will, nevertheless, be dependent on panel type. Multiple sip TCATA offers a reasonably efficient approach when capturing fuller insights into product experience is important.

### *5.3.2 Product-sip interactions*

Although the focus of this study was on the impact of panel type it was also relevant to investigate the effect of product on the dynamics of attributes to determine if panel effects were general or also product and attribute dependent. Analysis of Deviance showed *product:sip* and *product:within-sip* interactions, in addition to the *panel:product* interactions, indicating that variation across sips and within-sips was product dependent.

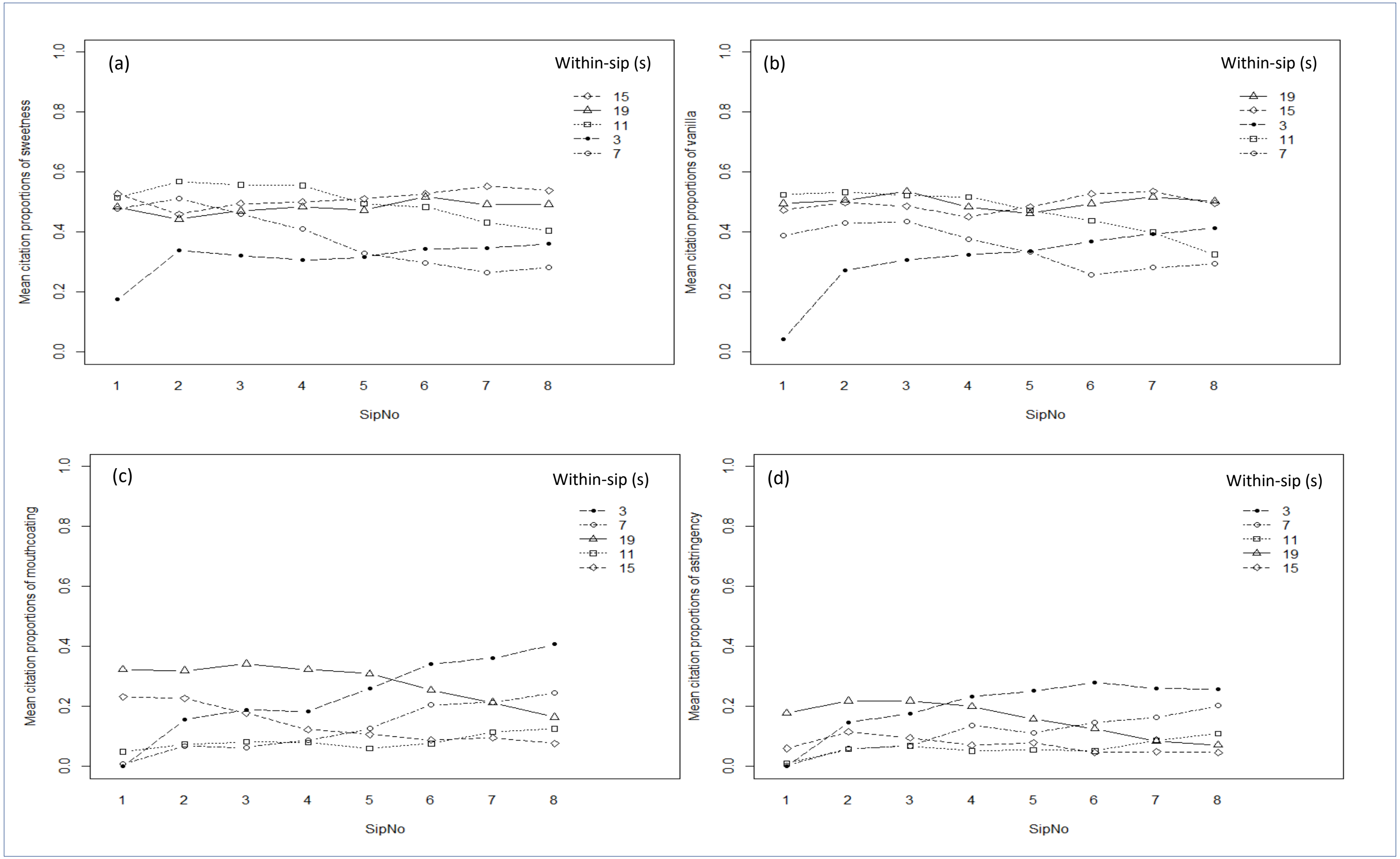



Figure 5.4: Significant interaction of *within-sip:sip* of (a) sweetness, (b) vanilla, (c) mouthcoating and (d) astringency.

#### *5.3.2.1 Impact of product on dynamics of multiple sip TCATA profiles*

Significant *product:sip* interactions for creamy mouthfeel, mouthcoating and astringency (Table 5.1) show that the size of citation differences across increasing sip number on these attributes was not only dependent upon the type of panel but also on the type of product. Generally, for all products, citation proportions for creamy mouthfeel remained virtually the same, whilst for mouthcoating and astringency they increased across sips. However, low fat P4 (LFLSLT) showed decreasing citations for astringency after sip 5 (Figure 5.5) which may be explained by the increase in creamy mouthfeel and mouthcoating from sip 4 onwards. Furthermore, low fat P4 (LFLSLT) and P6 (LFLS*S*HT) showed larger citation differences for astringency across sips whereas high fat P1 (HFHSLT) showed lower citation differences (Figure 5.5), indicating the build-up of astringency over sips at low fat levels. There were no significant 3-factor *product:sip:panel* interactions (Table 5.1), however the panel Analysis of Deviance showed significant *product:sip* interactions for creamy mouthfeel and mouthcoating in the consumer panel data, and significant *product:sip* interactions for astringency in both the expert and consumer panel data (Table 5.2). For astringency, the consumer panel data revealed relatively higher citation differences (about 10%) between the low fat P4 (LFLSLT) and P6 (LFLS*S*HT) from sip 1 to 2 compared to the expert panel (about 5%) (data not shown). This likely represents the better understanding of the expert panel of astringency enabling them to provide more discriminative insights across sips depending on products than the consumer panel.

Perceptual interactions (Karvchuk, Torley, & Stokes, 2012; Stokes et al., 2013) among increasing creamy mouthfeel and mouthcoating possibly supresses astringency perception over multiple sips. It is important to perform multiple sip TCATA evaluations to capture such dynamics in perceptual interactions. However, these dynamics do not follow a general pattern across multiple sips but are attribute and product dependent.

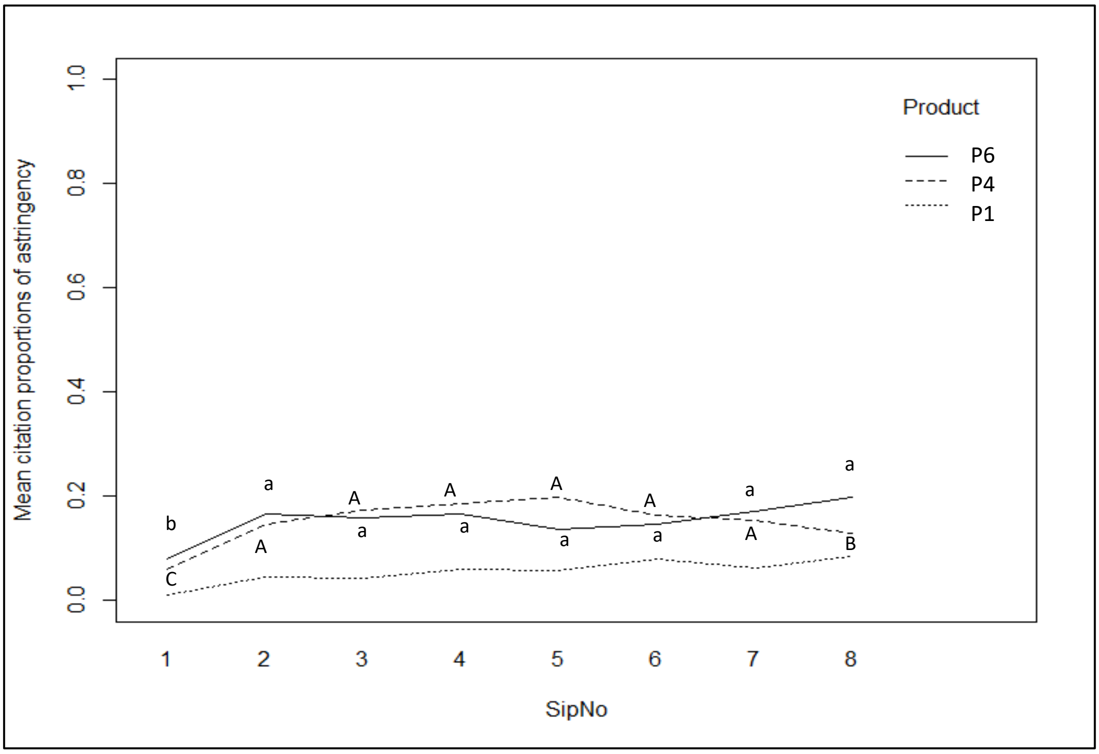



Figure 5.5: Significant *product:sip* interaction of astringency. Citation proportions with different letter 'ABC' for P4 (LFLSLT) and 'ab' for P6 (LFLS*S*HT) show significant differences across sips (*Holms*, p<0.01). P1 (HFHSLT) had no significant differences across sips.

#### *5.3.2.2 Impact of product on within-sip variations*

*Product* specific citation differences were also evident within a sip (*product:within-sip* interaction) and were significant for creamy flavour and creamy mouthfeel (Table 5.1). For example, high fat P1 (HFHSLT) showed higher citation differences just before swallowing and immediately after-swallowing (swallowed at 8 s) than the two low fat P4 (LFLSLT) and P6 (LFLS*S*HT). Among the latter two, high thickener P6 (LFLS*S*HT) showed larger citation differences than the low thickener P4 (LFLSLT) across time points and followed a similar pattern to high fat P1 (HFHSLT) (Figure 5.6). Furthermore, separate Analysis of Deviance on each panel dataset showed that both the expert and the consumer panels provided similar large citation differences for the high fat P1 (HFHSLT) compared to the two low fat P4 (LFLSLT) and P6 (LFLS*S*HT). The differences were more prominent after 7 s where *product:within-sip* interactions were significant for mouthcoating for the expert panel and for sweetness, creamy flavour and creamy mouthfeel for the consumer panel (Table 5.2). Also, the consumer panel discriminated low fat P4 (LFLSLT) from high thickener P6 (LFLSSHT) on creamy mouthfeel with higher citation increments after 7 s following similar dynamics as in high fat P1 (HFHSLT) (data not shown).

Like *product:sip* interactions, *product:within-sip* interactions also did not follow a general pattern but were product and attribute specific. General conclusions cannot be made concerning patterns in attribute response from the multiple sip TCATA data because they are panel and attribute dependent.

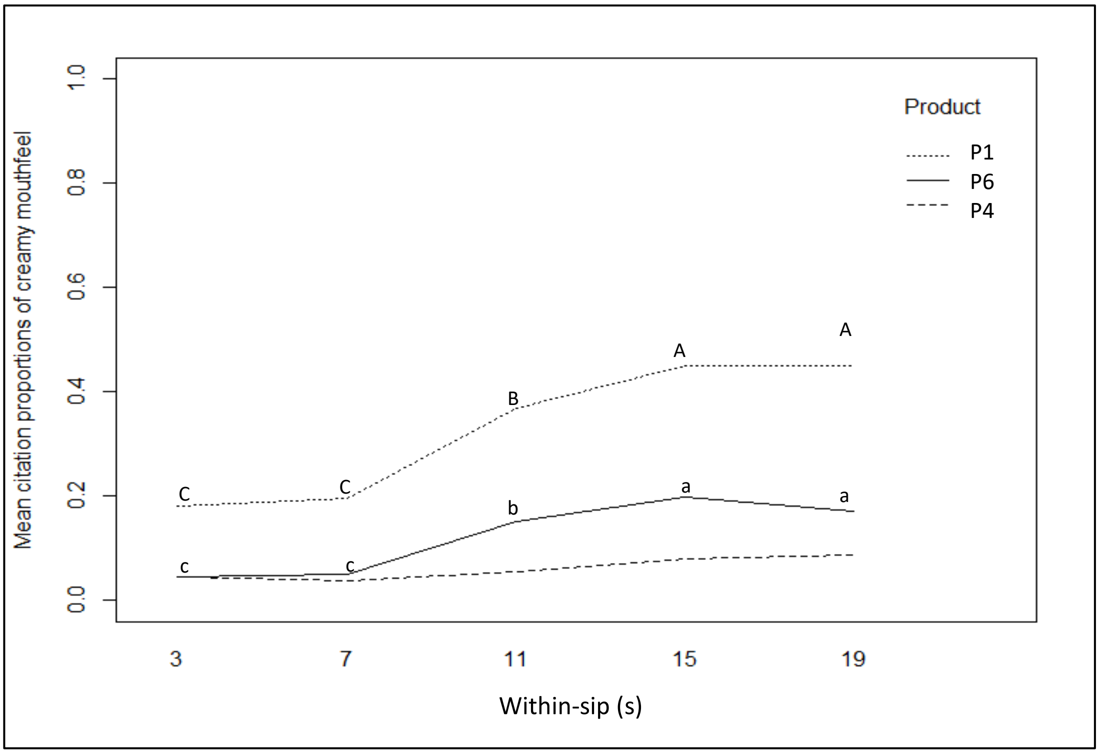



Figure 5.6: Significant *product:within-sip* interaction of creamy mouthfeel. Citation proportions with different letter 'ABC' for P1 (HFHSLT) and 'abc' for P6 (LFLSSHT) show significant differences *within-sip* (*Holms*, p<0.01). P4 (LFLSLT) had no significant *within-sip* differences.

## 5.4 Conclusions

Multiple sip TCATA evaluations provided different insights based the nature of the panel indicating that consumer and expert panels are not interchangeable for TCATA evaluations. The study highlights the importance of considering panel type in relation to the project objective. Where understanding consumer product experience is the focus, consumer panels will provide more representative data than an expert panel. However, for complex attributes or more detailed investigation of temporal sensory characteristics an expert panel appears more appropriate in order to provide the level of discrimination and attribute focus required, as is the case for many other sensory methodologies. Both may need to be employed for product optimisation. Panel effects did not follow a particular pattern so cannot be generalised to all attributes or product categories. Further specific research is needed to understand panel effects across specific attributes for different product categories.

Furthermore, this work emphasises the insightful contributions multiple sip, and within-sip, data obtained using multiple sip TCATA evaluations can provide, specifically based on panel types. Clearly single sip evaluations do not provide a representative sensory profile of how the product will be experienced in reality and, where this understanding is key to project objectives, multiple sip TCATA will be an effective tool to use with both expert or consumer panels accordingly.

This research signifies the importance of choosing panel type according to three key considerations. The first is the study objective, for example, product profiling with expert panels during product development/improvement stages as opposed to investigating the significance of formulation changes identified by expert panels on consumer product experience. In addition. the nature of the attributes under investigation may affect panel choice as more complex or unfamiliar attributes may be difficult for a consumer panel to evaluate. Finally, the complexity and nature of the product category may influence panel choice, for example cheese is likely to require more numerous and complex attributes to be evaluated compared to fresh milk. The findings also highlight the value of extending single sip TCATA evaluations to multiple intakes for research, both in academia and industry.

Having shown that consumers can provide differential sensory descriptions using TCATA, the next research question that arose was whether these changes in the dynamics of sensory perception could be drivers of affective consumer responses.

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| | |
|---|---|
| Name of candidate: | Maheeka Weerawarna N. R. P. |
| Name/title of Primary Supervisor: | Prof Joanne Hort |
| In which chapter is the manuscript /published work: | Chapter 5 |

Please select one of the following three options:

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| Primary Supervisor's Signature: | Joanne Hort Digitally signed by Joanne Hort DN: cn=Joanne Hort, c=NZ, o=Massey University, ou=Feast, email=j.hort@massey.ac.nz Date: 2021.01.20 14:02:36 +13'00' |
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# Chapter 6. Linking sensory and affective responses over multiple sips to identify consumer drivers of product acceptance and rejection

## *6.1 Introduction*

Consumer affective responses are often combined with descriptive sensory data to understand product performance and respective consumer experience (Kemp et al., 2009). However, competition in the food industry is increasing demand for better insights into consumer product experience beyond hedonic measurements (Ng & Hort, 2015). Particularly, measuring emotional response is becoming a prominent aspect in recent sensory and consumer research (Peltier, Visalli, & Thomas, 2019; Spinelli & Monteleone, 2018), where it has been shown to provide better product discrimination and insights in comparison to hedonic responses (Ng et al., 2013; Nijman et al., 2019). Further, emotions are reported to impact hedonic responses (Parker, Parker, & Brotchie, 2006), amount of food intake, food acceptance and rejection (Macht, 2008). Additionally, some sensory perceptions such as bitterness have clearly been shown to evoke the disgust emotion (Schienle et al., 2020). Adapting temporal sensory techniques to understand consumer affective response in terms of temporal hedonic and emotional reactions to understand temporal drivers of product acceptance and rejection presents as an obvious development opportunity. For example, Lorido, Pizarro, Estévez, and Ventanas (2019) applied temporal dominance of sensory and emotions techniques alongside overall liking on a single bite of ham. Extending temporal sensory and affective response measurements, specifically using a TCATA approach, to represent consumption of a single serving portion, could more closely represent an actual product consumption occasion and have the potential to provide closer insights into consumer product experience and subsequent drivers of product acceptance or rejection.

Consequently, the specific objectives of the research presented in this chapter were to:

- compare the ability of multiple sip TCATA emotion and temporal liking measures to discriminate between 3 vanilla milkshakes
- investigate if the dynamics of the emotional and liking response varies across multiple sips
- determine if patterns in sensory perception are related to patterns in emotional and liking response over time

## 6.2 Materials and methods

### 6.2.1 Products

Model vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) as detailed in Chapter 2, section 2.2.1 were evaluated for the research in this chapter.

### 6.2.2 Participants

Data was obtained using the consumer panel (n = 104) detailed in section 2.2.6.2.

### 6.2.3 Product evaluations over multiple sips

The consumer panel profiled 8 sips of each of the three milkshakes using TCATA for sensory (*T_Sensory*) and emotion (*T_Emotions*) responses, and temporal liking (*T_Liking*). *T_Sensory, T_Emotions* and *T_Liking* evaluations were performed in three separate sessions, where consumers attended one session per day. All the three milkshakes were evaluated in each session of *T_Sensory, T_Emotions* and *T_Liking.* Palate cleansing was not performed in between the 8 sips of the same product in order to better facilitate capture of an actual consumption experience.

#### 6.2.3.1 TCATA sensory (T_Sensory)

The consumer panel used the sensory lexicon developed by the expert panel (section 2.2.3) and profiled the three milkshakes using TCATA (section 2.2.5.2) over 8 sips of each product, the data which has been presented in chapter 5 in comparison to expert panel measures.

#### 6.2.3.2 TCATA emotion (T_Emotion)

Using the previously developed emotion lexicon (section 2.2.6.1), the consumer panel profiled the milkshakes over 8 sips of each product using a TCATA approach following the protocol detailed in section 2.2.5.2. However, instead of ‘attributes’ perceived, consumers were instructed to select any of the emotions they felt as a consequence of product consumption (Figure 6.1). Consumers were given the list of 12 emotion terms developed in section 2.2.6.1 and their definitions (Table 2.8). Each emotion term was explained with an imagined example (e.g. “Happy - as you would feel when you receive a gift”). Additionally, they were given the opportunity to further clarify any of the terms or definitions prior to product evaluation.

#### 6.2.3.3 Temporal liking (T_Liking)

The consumer panel profiled temporal liking for the milkshakes over 8 sips of each product using the same tasting protocol as detailed in section 2.2.5.2. Before the evaluation, it was explained to consumers that there were nine levels of liking such as like extremely, like very much, like moderately, like slightly, neither like nor dislike, dislike slightly, dislike moderately, dislike very much and dislike extremely. Consumers were asked to select the level of liking that best described their response at the start and, if that changed, select the new appropriate level and so on until the end of the evaluation period during the tasting time period (Figure 6.2).

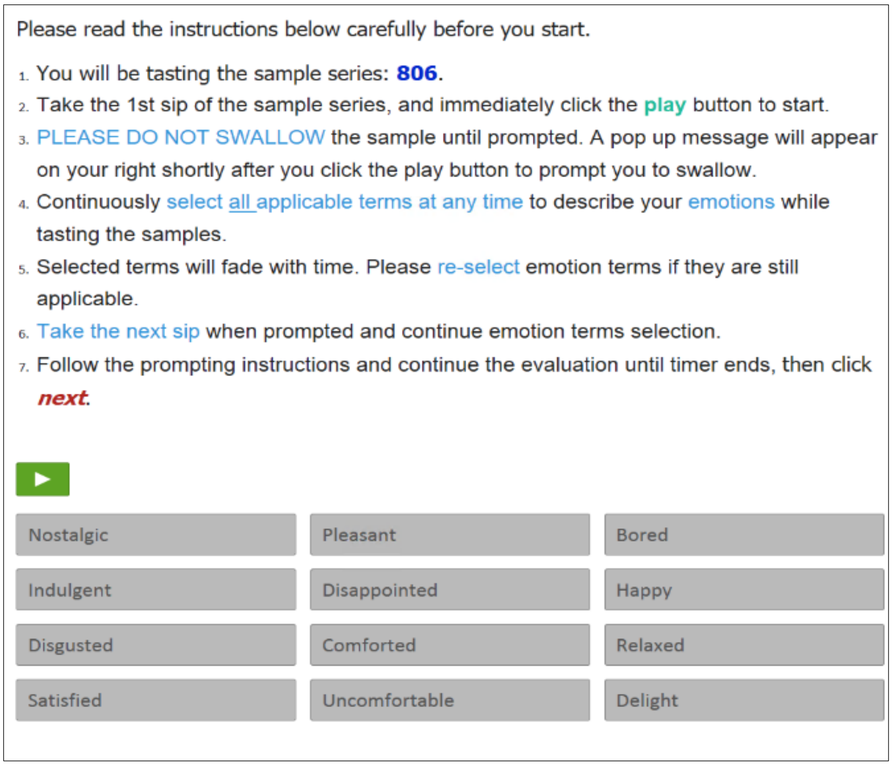


Figure 6.1: *T_Emotion* panellist instruction and data collection screen.

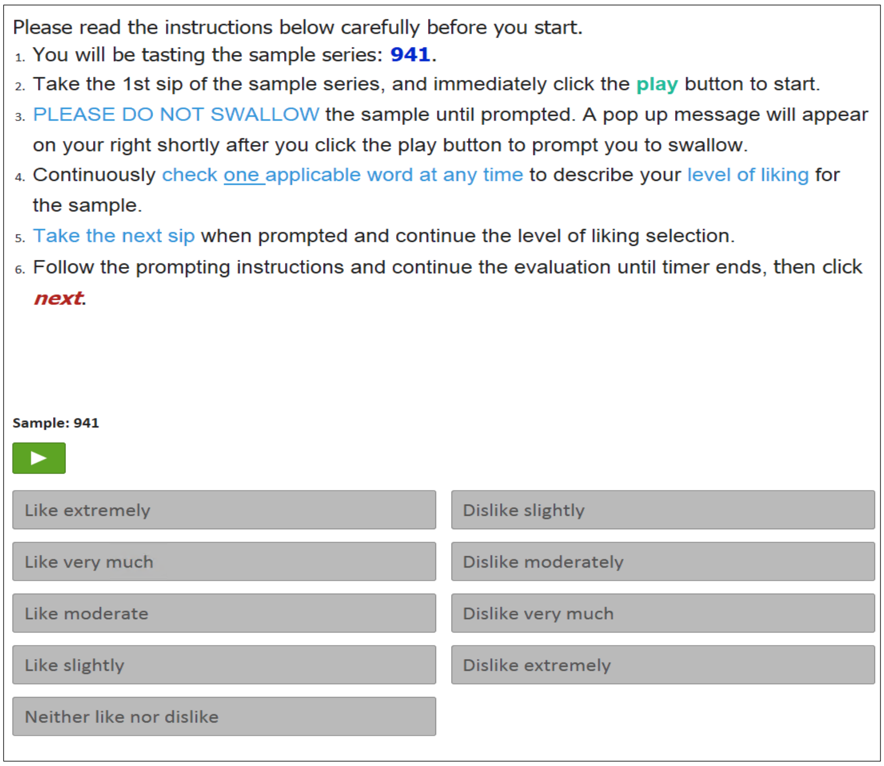


Figure 6.2: *T_Liking* panellist instruction and data collection screen.

### 6.2.4 Data analysis

Statistical analyses were performed using R software, version 4.0.0 (R Core Team, 2020) in RStudio (2019) with α=0.05. The packages `dplyr` (Wickham et al., 2020) and `ggplot2` (Wickham, 2016) were used for data manipulation and data visualisation respectively.

To investigate the association between level of *T_Liking* and *T_Sensory* or *T_Emotions* a Pearson Chi-square analysis was chosen following the initial modelling described below.

This analysis assumes nominal classifications (Agresti, 2018a) and so the original nine-point liking scale data were aggregated into three categories of like, dislike and neither like nor dislike (neither L/D) to focus only on associations of major differences in liking with *T_Sensory* and/or *T_Emotions*.

Temporal curves for *T_Sensory, T_Emotions* and *T_Liking* were constructed to visualise the dynamics of mean citation proportions for sensory, emotion and liking responses for each product for each of the 8 sips.

A key objective was to understand how patterns in the TCATA sensory data may influence the patterns observed in the TCATA emotional and temporal liking responses. Therefore, the frequency of selection for all possible combinations of *T_Sensory, T_Emotion* and *T_Liking* responses were calculated for each *product, each sip* and *within-sip* to create a new data matrix. Subsequently, a six-factor (*T_Sensory, T_Emotions, T_Liking*, *product, sip* and *within-sip*) GLM with default functions (`function=glm, family="poisson", link="log"`) (Agresti, 2018b; McCullagh & Nelder, 1989; Montgomery et al., 2012) was used to model the frequencies in this data matrix (i.e. frequencies in the data matrix were considered the response variable in the model). Next, an Analysis of Deviance (González Chapela, 2013; Montgomery et al., 2012) was used to determine which main and interaction effects were statistically significant in the model. Significant main effects and interaction terms were derived using the `step()` function and only significant terms were considered for analysis in this chapter. Associated interaction plots were created to visualise observed responses for relevant experimental and statistical effects.

To investigate the relationship between the different sensory attributes, emotions and levels of liking across sips all the two-way interactions were further analysed. This was done by aggregating the number of citations across the two factors and deriving the associated standardised residuals from the GLM model producing two-way contingency tables to which Pearson's Chi-squared tests for independence were applied. Bonferroni adjustment was used to obtain the critical value for each two-way interaction (Agresti, 2018a). Where there were three-way interactions including a *product* effect, similar two-way contingency tables were created for each *product* and analysed as detailed for two-way interactions.

## *6.3 Results and discussion*

### *6.3.1 T_Sensory across products and sips*

Multiple sip *T_Sensory* product profiles from the consumer panel were discussed in the previous chapter, a brief summary is presented here in box 1 for convenience.

**Box 1: Summary of consumer *T_Sensory* data**

- *Consumers differentiated the products on all attributes*
- *P1 (HFHSLT) on average was differentiated from P4 (LFLSLT) and P6 (LFLSSHT) by higher citation proportions for all attributes except astringency and liquorice.*
- *P4 (LFLSLT) was characterised by lower citation proportions for thickness, creamy mouthfeel, creamy flavour and higher citations for astringency.*
- *Creamy flavour, creamy mouthfeel and mouthcoating of P4 (LFLSLT) increased across sips, astringency increased up to sip 5 followed by a decrease.*
- *Higher citations for liquorice and thickness characterised the temporal sensory profile of P6 (LFLSSHT)*
- *Citation proportions for liquorice for P6 (LFLSSHT) decreased from sip 1 to 8 while thickness remained stable.*
- *Creamy flavour, creamy mouthfeel and mouthcoating of P6 (LFLSSHT) also increased from sip 1 to 8 however with less magnitude than P4 (LFLSLT).*
- *Astringency of P6 (LFLSSHT) increased from sip 1 to 4 followed by a lower magnitude of decrease towards sip 8 than of P4 (LFLSLT).*

Figure 6.3 presents the TCATA curves (8 sips) by sensory attribute for each *product*. Table 6.1 shows a summary of key statistics for significant main effects and significant interactions from the GLM six-factor Analysis of Deviance on the frequency of selecting all possible combination of temporal sensory, emotion and liking responses across 8 sips by *product*.

*T_Sensory* was a significant effect in the Analysis of Deviance (Table 6.1) showing that each product has a significantly different temporal sensory profile. However, the main effects were involved in significant interactions. There was no *T_Sensory:sip* interaction but there was a *T_Sensory:product* interaction (Table 6.1). This emphasised that although there was variation in counts across multiple sips for each sensory attribute, which was similar across the products, the size effects were different. For example, for mouthcoating (Figure 6.3), for all products, citation proportions increased from sip 1 to sip 8, however there was a higher effect size in P4 (LFLSLT) than in P1 (HFHSLT) and P6 (LFLS*S*HT). Moreover, *T_Sensory:product* was involved in a three-way interaction with *T_Liking* which is discussed later in the section 6.3.4.

### *6.3.2 T_Liking across products and sips*

Figure 6.4 presents the temporal liking curves of 8 sips for each product. Consumers differentiated the products on temporal liking. On average P1 (HFHSLT) had higher liking rates and P6 (LFLS*S*HT) had lower liking rates among the three products. This was also reflected in inverse patterns of dislike for products i.e. lower dislike rates of P1 (HFHSLT) versus higher liking rates of P6 (LFLS*S*HT). Consumers were also providing lower rates for neither like nor dislike for P1 (HFHSLT) and higher rates for P4 (LFLSLT). For P1 (HFHSLT) overall liking rates dropped from sip 1 to 8 with dramatic drops at sip 5 and 7. This was also reflected by overall increasing dislike rates towards sip 8. In comparison at P4 (LFLSLT), liking rates decreased about 15% from sip 1 to 3 and remained virtually the same across additional sips evaluated.

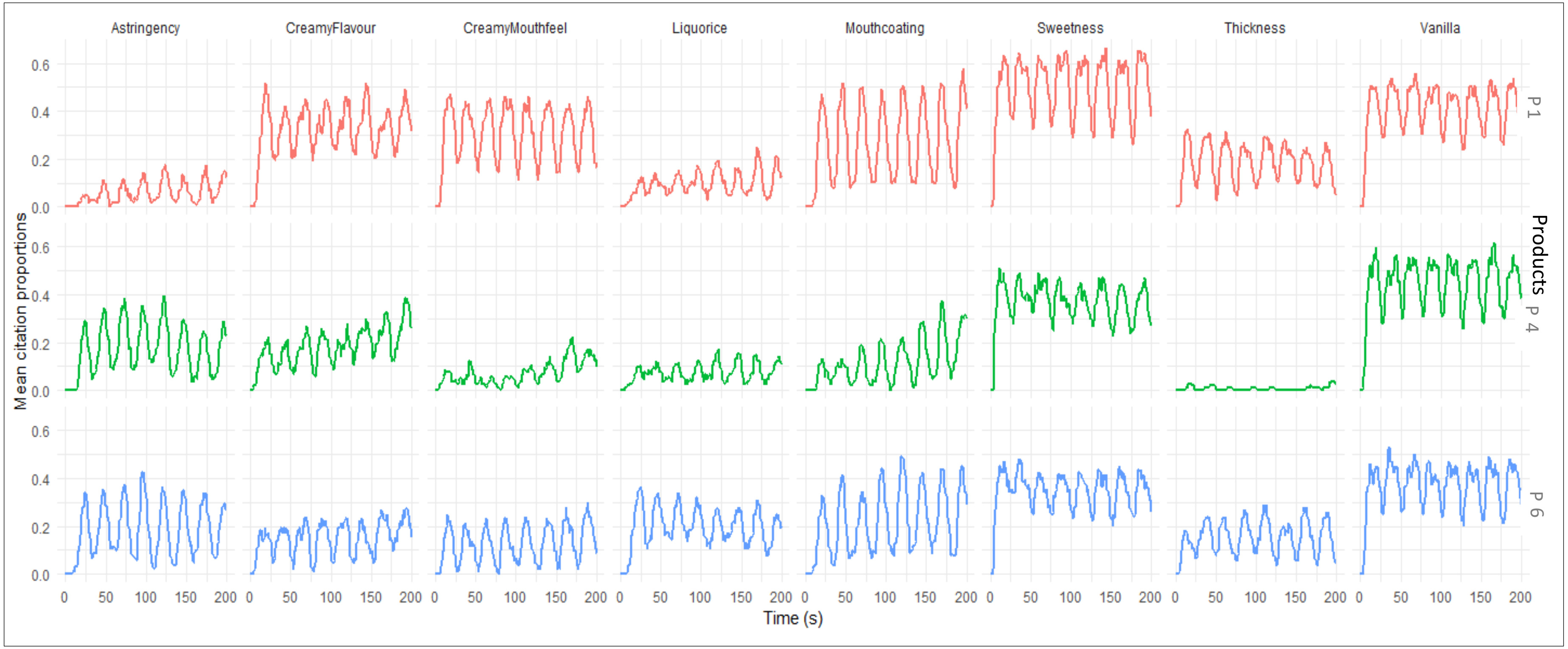


Figure 6.3: TCATA curves for sensory attributes of milkshakes over 8 sips. Products: P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLSSHT).

Table 6.1: Summary of deviances, p values and related key statistics from GLM six-factor Analysis of Deviance for citations of temporal sensory, emotions and liking responses on selected time slices over 8 sips for significant main effects and significant interactions (p<0.05).

| | Df | Deviance | Resid. Df | Resid. Dev | p value |
|---|---|---|---|---|---|
| *Product* | 2 | 895.791 | 28858 | 19830.734 | <0.001 |
| *Within-sip* | 4 | 37.289 | 28854 | 19793.445 | <0.001 |
| *Sip* | 7 | 109.738 | 28847 | 19683.708 | <0.001 |
| *T_Sensory* | 7 | 868.399 | 28839 | 18815.308 | <0.001 |
| *T_Emotions* | 11 | 745.329 | 28827 | 18069.979 | <0.001 |
| *T_Liking* | 2 | 1393.645 | 28818 | 16676.333 | <0.001 |
| *Product:T_Liking* | 4 | 2612.559 | 28800 | 14063.774 | <0.001 |
| *T_Emotions:T_Liking* | 22 | 1387.761 | 28693 | 12676.013 | <0.001 |
| *T_Sensory:T_Emotions* | 77 | 1143.393 | 28597 | 11532.620 | <0.001 |
| *Sip:T_Liking* | 14 | 942.210 | 28534 | 10590.410 | <0.001 |
| *Product:T_Sensory* | 14 | 388.371 | 28518 | 10202.039 | <0.001 |
| *Within-sip:T_Sensory* | 28 | 423.425 | 28486 | 9778.614 | <0.001 |
| *Product:T_Emotions* | 22 | 276.036 | 28462 | 9502.578 | <0.001 |
| *Within-sip:T_Emotions* | 44 | 198.621 | 28414 | 9303.957 | <0.001 |
| *Within-sip:Sip* | 28 | 130.438 | 28386 | 9173.519 | <0.001 |
| *Within-sip:T_Liking* | 8 | 117.820 | 28350 | 9055.699 | <0.001 |
| *T_Sensory:T_Liking* | 14 | 181.785 | 28278 | 8873.914 | <0.001 |
| *Sip:T_Emotions* | 77 | 187.546 | 28194 | 8686.367 | <0.001 |
| *Product:Sip* | 14 | 31.075 | 28180 | 8655.293 | 0.005 |
| *Product:T_Sensory:T_Liking* | 28 | 348.052 | 28049 | 8307.241 | <0.001 |
| *Product:Sip:T_Liking* | 28 | 329.548 | 27927 | 7977.693 | <0.001 |

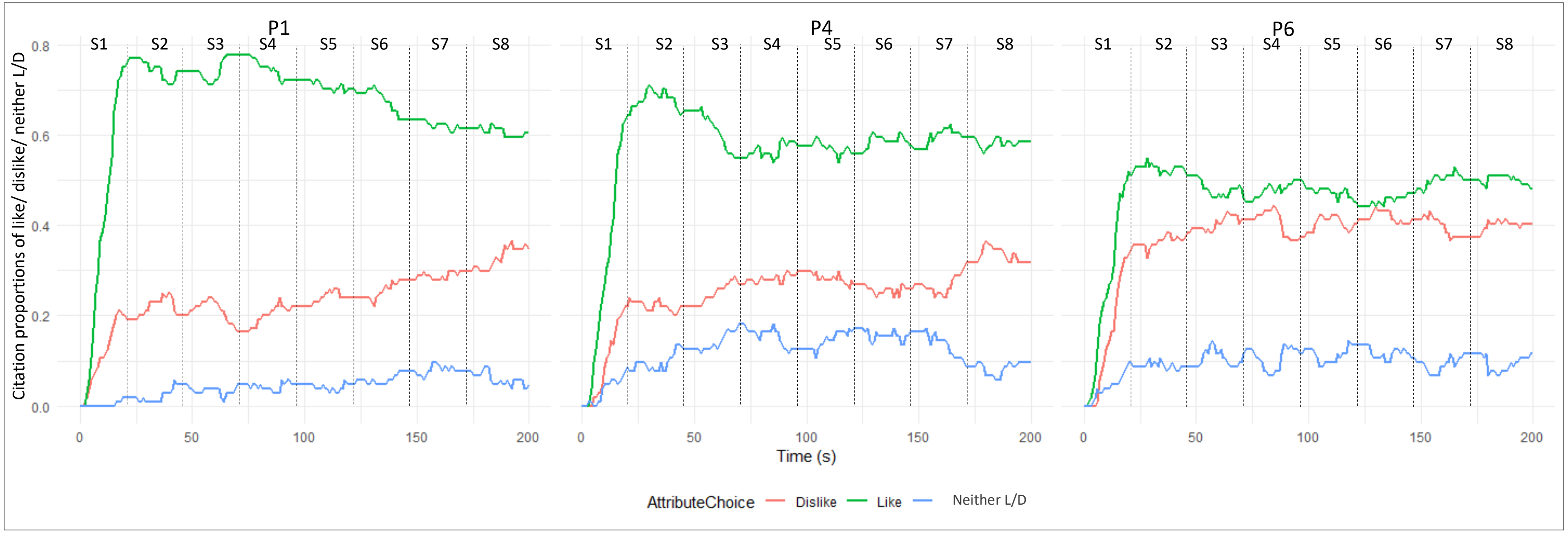


Figure 6.4: Temporal liking curves of milkshakes over 8 sips. Products: P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS<u>S</u>HT). S1 – S8: sip 1 – sip 8.

Overall dislike rates for P4 (LFLSLT) increased from sip 1 to 8. P6 (LFLS*S*HT) showed lower size effects for liking changes across multiple sips. Liking of P6 (LFLS*S*HT) decreased from sip 1 to 3 and in contrast dislike increased from sip 1 to 3. Thereafter from sip 4 to 8 both liking and dislike rates remained similar. Analysis of Deviance showed significant *product:T_Liking:sip* three-way interaction (Table 6.1) confirming the product specific variations of *T_Liking* across sips.

Chi-square test of the residuals on *T_Liking* across multiple sips from the model showed for P1 (HFHSLT), that significantly more panellists than expected by chance disliked the product at sip 1 and less panellists than expected by chance neither L/D (Table 6.2). By sip 3 and until sip 4 a larger number of panellists than the expected value liked the product indicating an association of increase of liking by sip 3 for P1 (HFHSLT). From sip 7 to 8 there was an increase of neither L/D response of the panellists than the expected value indicating the association of the decrease for liking by sip 7 and 8 for P1 (HFHSLT). Moreover, by sip 8, a higher number of panellists than expected disliked the product. For P4 (LFLSLT), by sip 1, more panellists than expected by chance both liked and disliked the product (Table 6.2). However, the number of panellists who liked the product was higher than the number who disliked it.

By sip 2 of P4 (LFLSLT) the number of panellists who liked the product was higher than the expected value by chance and a decrease was evident for dislikes. There was a reduction of liking towards sip 4 and 5 which was evidenced by the increased number of panellists for neither L/D than the expected value at sip 4 and an increase of both dislike and neither L/D by sip 5. In comparison, P6 (LFLS*S*HT) was liked more often than the expected value at sip 1 (Table 6.2). A reduction in liking was noticed at sip 3 with an increased number of panellists for neither L/D. By sip 4, panellists were significantly disliking the product more than the expected value. Again, by sip 8, a reduction of dislike was evident with the significant increase in of the number of panellists who recorded neither L/D. This explained the notable changes in liking around different sips in the temporal liking curves (Figure 6.4).

Table 6.2: Pearson's Chi-squared test for standardised residuals of *sip* and *T_Liking* by *product*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.077).

| *Sip* | P1 (HFHSLT) ($X^2$ = 2494.6, p<0.001) | | | P4 (LFLSLT) ($X^2$ = 2201.6, p<0.001) | | | P6 (LFLSSHT) ($X^2$= 1772.7, p<0.001) | | |
|---|---|---|---|---|---|---|---|---|---|
| | *T_Liking* | | | | | | | | |
| | Dislike | Like | Neither L/D | Dislike | Like | Neither L/D | Dislike | Like | Neither L/D |
| 1 | **5.122** | -2.394 | **-6.250** | **4.761** | **7.343** | **-4.525** | **-4.408** | **6.260** | **-3.356** |
| 2 | 0.275 | 1.525 | **-4.537** | **-3.320** | **5.621** | **-3.904** | -0.487 | 0.979 | -0.904 |
| 3 | -1.857 | **3.282** | **-3.873** | -0.758 | 1.294 | -0.908 | 1.795 | **-3.571** | **3.268** |
| 4 | **-3.372** | **4.361** | -2.966 | 1.852 | **-3.867** | **3.270** | **4.183** | -2.880 | -2.506 |
| 5 | -1.735 | 2.623 | -2.490 | **3.447** | **-7.118** | **5.969** | -0.234 | 1.622 | -2.577 |
| 6 | **-3.620** | 2.828 | 1.529 | -0.065 | -1.261 | 1.973 | -0.555 | -0.796 | 2.522 |
| 7 | 2.351 | **-5.982** | **9.547** | -0.507 | -0.260 | 1.075 | 1.782 | -1.557 | -0.455 |
| 8 | **4.658** | **-6.981** | **9.073** | 2.535 | 0.576 | **-4.292** | **-3.338** | 1.625 | **3.250** |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

The findings indicate that evaluation of at least 7 sips were required to capture the significant drop in liking of P1 (HFHSLT), however, such drop offs in liking were noticed at earlier sips for the other two products. Silva et al. (2018, 2019) also showed the dynamics of temporal liking over four sips which varied across different beer samples. However, evaluating a few sips will not capture the dynamics of hedonic responses that consumers would experience in a realistic occasion. Therefore, recording temporal liking over eight sips provides an effective approach to fully understand the evolution of liking for consumption of a full product serving (of milkshake).

### *6.3.3 T_Emotions across products and sips*

Figure 6.5 shows TCATA emotion curves for the products (8 sips). According to the Analysis of Deviance each product has different temporal emotion profiles (significant *T_Emotions:product* interaction) (Table 6.1). On average, positive emotions such as 'comforted', 'delighted', 'happy', 'indulgent', 'nostalgic', 'pleasant', 'relaxed' and 'satisfied' were cited more often than the expected value for P1 (HFHSLT) and the negative or neutral emotions such as 'bored', 'disappointed', 'disgusted' and 'uncomfortable' were cited less often, and vice versa for P6 (LFLS*S*HT) (Figure 6.6, Table 6.3). Noticeably, citation proportions for 'comforted', 'delighted', 'happy' and 'pleasant' for P1 (HFHSLT) decreased across multiple sips while 'bored', 'disgust', 'relaxed', 'satisfied', 'uncomfortable' increased. Generally, for P4 (LFLSLT) and P6 (LFLS*S*HT) citation proportions of negative emotions decreased across each additional sip evaluated while citation proportions of positive emotions increased (Figure 6.5). Citation proportions for 'disappointed' remained stable across multiple sips for P1 (HFHSLT) and P6 (LFLS*S*HT), however citation proportions were less than 10% for P1 (HFHSLT) and about 25% for P6 (LFLS*S*HT). In comparison, citations for 'disappointed' of P4 (LFLSLT) and 'disgusted' of P6 (LFLS*S*HT) decreased noticeably from sip 3 to sip 8 (Figure 6.5).

The findings indicate variation in temporal emotion profiles over multiple sips with respect to changes in product formulation. Product development technologists closely match the sensory profiles of a product with non-caloric sweeteners like stevia with a product with sucrose as the sweetener. However, consumer emotional responses would still discriminate between two products with stevia versus sucrose with potential consequences for product acceptance or rejection. Additionally, boredom with the products and or the task could be a consideration in multiple sip product profiling approaches. However, the *T_Emotion* findings showed product specific dynamics of 'bored' emotion across multiple sips, indicating the feeling of 'bored' could be related to products but not with the product evaluation task.

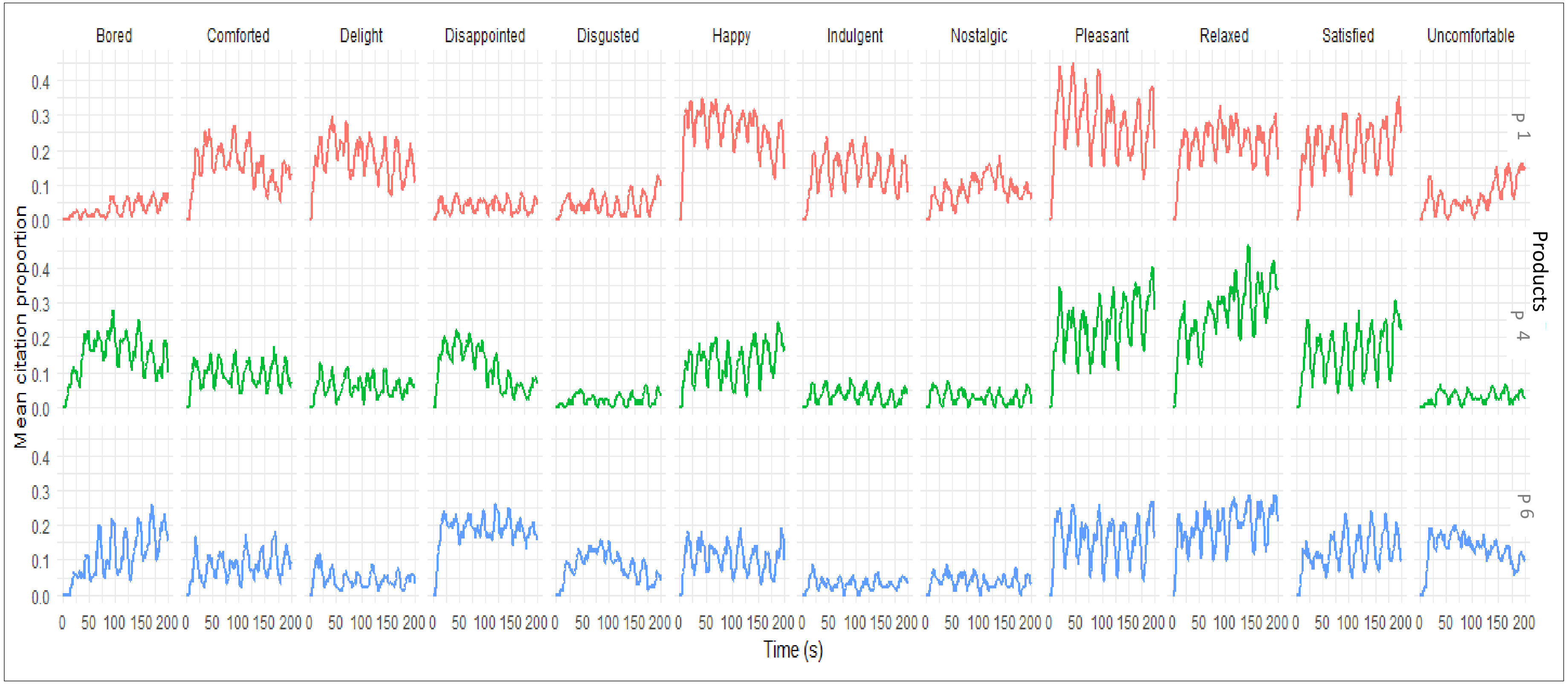


Figure 6.5: TCATA curves for emotion terms of milkshakes over 8 sips. Products: P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLSSHT).

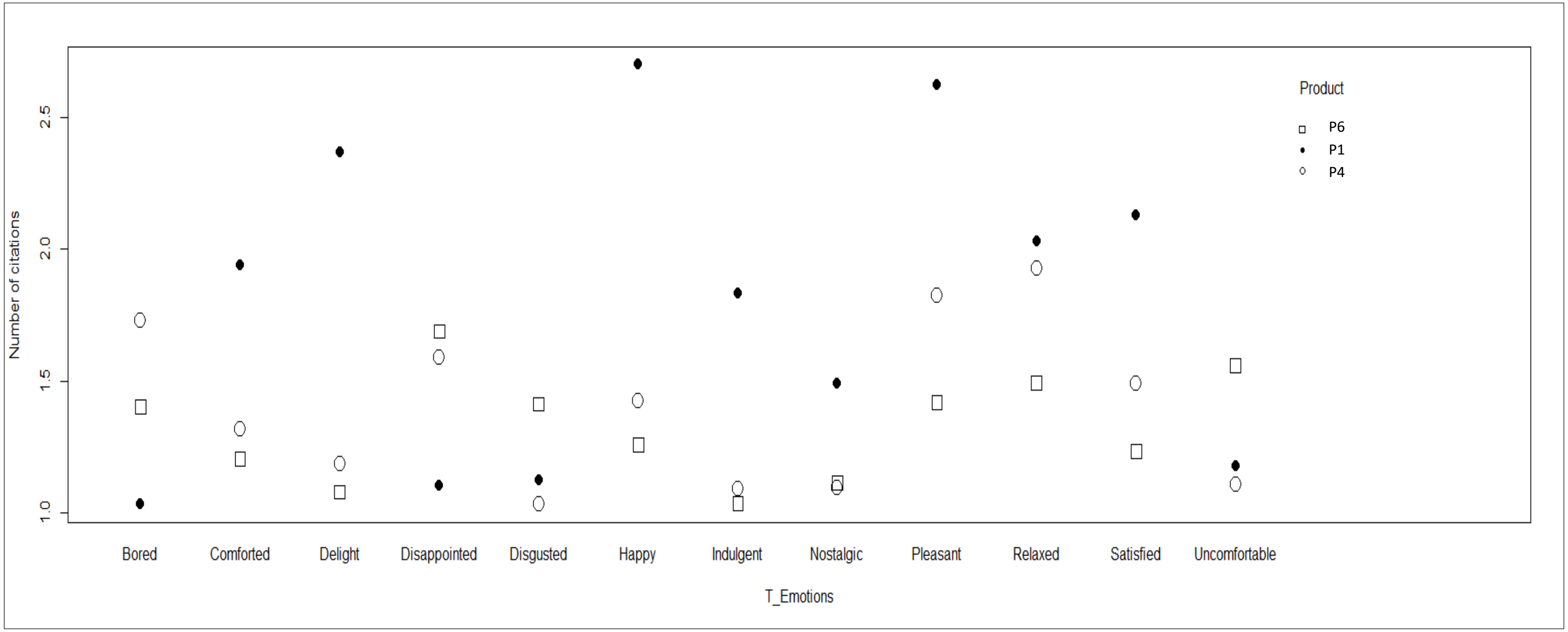


Figure 6.6: Interaction plot of *T_Emotions:product*.

Table 6.3: Pearson's Chi-squared test for standardised residuals of *product* and *T_Emotions*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.197).

| Product | *T_Emotions* ($X^2$ = 9910.7, p<0.001) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
| P1 | **-39.467** | **14.901** | **30.216** | **-44.608** | **-14.980** | **23.265** | **29.082** | **14.997** | **7.229** | **-11.434** | **9.540** | **-21.581** |
| P4 | **31.186** | **-4.764** | **-11.589** | **4.017** | **-14.022** | **-8.566** | **-14.491** | **-11.549** | **8.826** | **19.790** | 0.283 | **-17.850** |
| P6 | **14.409** | **-11.994** | **-22.519** | **45.486** | **29.645** | **-17.673** | **-18.554** | **-5.757** | **-16.231** | **-5.881** | **-10.796** | **40.511** |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

Analysis of Deviance also showed significant variations of *T_Emotions* across sips (Table 6.1), emphasising that the consumer emotional responses also varied across multiple sips. However, there was no significant three-way interaction of *T_Emotions:product:sip*, indicating that the variation of the frequency of selected emotion terms across sips mostly differed in terms of a size effects across products.

Generally, the frequency of selecting 'nostalgic' and 'indulgent' increased over sips followed by a reduction towards the latter 2 to 3 sips (Figure 6.7). According to the analysis if standardised residuals from the model at sip 6 'nostalgic' was cited more frequently than the expected value indicating the increase in citation of 'nostalgic' by sip 6 (Table 6.4). By sip 8, indulgence was cited less frequently than expected, indicating a reduction in citation proportion for indulgence by sip 8 (Table 6.4). Furthermore, selection frequency for 'delight' increased up to sip 3 and decreased afterwards (Figure 6.7). Further analysis showed that 'delight' was cited more often than the expected value at sip 1 and citation reduced toward sip 8 resulting in less citations than expected by sip 8 (Table 6.4). 'Happy' and 'pleasant' emotion clicking frequencies generally decreased over 8 sips on average of products (Figure 6.7). In comparison, 'disgusted' followed a similar pattern to happy on average of product (Figure 6.7). Residual analysis showed a decrease of citation frequency and lower values than expected for 'pleasant' at sip 4 and for 'happy' and 'disgusted' towards the latter two sips (Table 6.4).

Silva et al. (2018, 2019) also showed variations of the dominance of emotions over a maximum of four sips. However, as explained earlier for *T_Liking:sip* interactions, evaluations over 8 sips provided additional insights closer to the experience of a whole serving portion of a product. Additionally, use of TCATA, as opposed to TDS, provides a more holistic profile of the emotion dynamics over sips, and such investigations are not published to date.

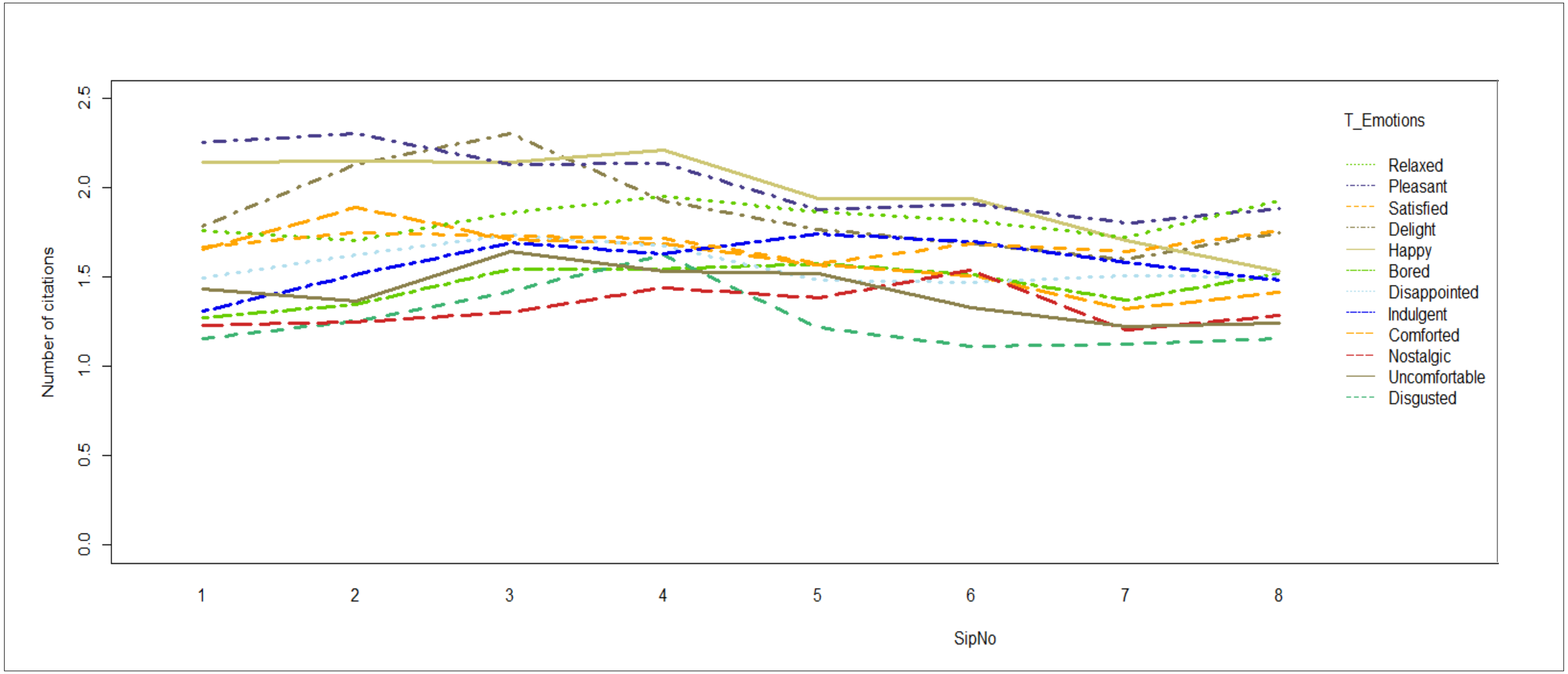


Figure 6.7: Interaction plot of *T_Emotion:sip*.

Table 6.4: Pearson's Chi-squared test for standardised residuals of *sip* and *T_Emotions*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.470).

| Sip | *T_Emotions* ($X^2$ = 894.58, p<0.001) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
| 1 | **-11.239** | 1.325 | **5.171** | -1.057 | -3.401 | **6.278** | -1.071 | 0.238 | **7.870** | **-3.613** | -2.286 | -2.678 |
| 2 | **-7.057** | 2.298 | 2.996 | 3.117 | -0.516 | 3.347 | 1.401 | 0.210 | 2.905 | **-6.054** | -2.935 | 0.980 |
| 3 | -1.541 | 1.837 | 1.440 | 1.073 | **4.942** | 0.707 | 2.681 | -2.504 | 0.982 | **-3.951** | -2.082 | -1.265 |
| 4 | -0.793 | 1.949 | -1.033 | 1.494 | **5.442** | -0.531 | 2.010 | -0.700 | **-3.645** | -0.372 | -0.632 | -0.005 |
| 5 | 0.901 | 2.716 | 1.198 | -0.192 | 0.011 | -1.330 | 0.427 | 2.628 | -3.326 | 2.233 | -1.628 | -2.161 |
| 6 | **4.682** | -1.964 | -3.261 | -1.301 | -2.930 | -0.285 | 0.081 | **3.799** | -2.090 | 2.431 | 1.202 | -0.232 |
| 7 | **6.104** | **-4.100** | -2.701 | -0.676 | **-3.852** | -1.925 | -2.454 | -1.540 | -1.171 | 2.417 | 2.550 | **4.777** |
| 8 | **7.699** | **-4.211** | **-3.721** | -2.825 | -2.180 | **-5.530** | **-3.547** | -2.121 | -0.286 | **6.780** | **5.797** | 0.319 |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

### *6.3.4 Sensory responses and drivers of product acceptance or rejection*

A key objective of the research presented in this chapter was to investigate the relationships between temporal sensory and affective responses, and whether the relationships in the data were observed over multiple sip evaluations. To that end, the frequency of selection of each temporal response combination was analysed to highlight any significant associations between temporal sensory and affective responses.

#### *6.3.4.1 Interaction of T_Sensory and T_Liking responses*

On average, consumers cited sweetness, vanilla, mouthcoating, thickness, creamy flavour and creamy mouthfeel more often for P1 (HFHSLT) than the remaining two products (Figure 6.3). Consumers also provided higher citation for liking of P1 (HFHSLT) (Figure 6.4). Both low fat P4 (LFLSLT) and P6 (LFLS*S*HT) were cited more often for astringency and additionally the latter product for liquorice (Figure 6.3). P4 (LFLSLT) and P6 (LFLS*S*HT) were also given low citations for liking (Figure 6.4). Analysis of Deviance showed the number of citations for *T_Sensory* responses of the consumers were affected by *T_Liking* (Table 6.1), indicating the influence of the dynamics of sensory perception on the dynamics of liking. Therefore, for P1 (HFHSLT) the attributes sweetness, vanilla, mouthcoating, thickness, creamy flavour and creamy mouthfeel possibly act as drivers of liking and for P4 (LFLSLT) and P6 (LFLS*S*HT) astringency and liquorice likely caused disliking. Furthermore, the significant interaction of *T_Sensory:T_Liking* varied depending on *product* (three-way interaction) (Table 6.1). Analysis of standardised residuals for *T_Sensory* and *T_Liking* on each product from the model showed the panel was selecting dislike for liquorice more than expected and vanilla less than expected for P1 (HFHSLT) (Table 6.5). On P4 (LFLSLT), the panel was selecting dislike for astringency, sweetness and vanilla and like for creamy mouthfeel more than expected value and dislike for creamy flavour and liquorice less than expected value.

Table 6.5: Pearson's Chi-squared test for standardised residuals of *T_Sensory* and *T_Liking* by *product*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.078).

| *T_Sensory* | P1 (HFHSLT) ($X^2$ = 199.28, p<0.001) | | | P4 (LFLSLT) ($X^2$ = 291.8, p<0.001) | | | P6 (LFLSSHT) ($X^2$ = 369.29, p<0.001) | | |
|---|---|---|---|---|---|---|---|---|---|
| | *T_Liking* | | | | | | | | |
| | Dislike | Like | Neither L/D | Dislike | Like | Neither L/D | Dislike | Like | Neither L/D |
| Astringency | 1.432 | -2.117 | 2.021 | **3.084** | -2.210 | -0.886 | -0.300 | -1.038 | 2.571 |
| Creamy flavour | -1.106 | 2.155 | -2.951 | **-5.054** | 2.151 | **3.621** | **-9.592** | **9.584** | 0.462 |
| Creamy mouthfeel | -0.789 | 1.173 | -1.132 | -1.940 | **3.670** | -2.803 | **-11.719** | **9.537** | 4.718 |
| Liquorice | **10.691** | **-10.757** | 1.606 | **-3.375** | 2.949 | 0.189 | **4.795** | **-4.649** | -0.501 |
| Mouthcoating | 1.186 | -0.763 | -0.973 | 1.545 | 0.248 | -2.442 | 2.286 | -1.942 | -0.763 |
| Sweetness | 0.507 | -1.754 | 3.399 | **3.238** | -2.355 | 0.464 | **6.164** | **-5.334** | -1.874 |
| Thickness | -1.092 | 1.650 | -1.637 | -2.699 | 2.185 | 0.407 | **3.575** | -2.316 | -2.574 |
| Vanilla | **-3.346** | 2.810 | 0.986 | **4.303** | -1.244 | 0.082 | -0.030 | 0.213 | -0.347 |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

The panel selected dislike for liquorice, sweetness and thickness and like for creamy flavour and creamy mouthfeel more often than the expected value (Table 6.5) for P6 (LFLS*S*HT). Therefore, it was evident that higher citations for creamy mouthfeel, mouthcoating and thickness act as drivers of liking for the product. In both low fat products P4 (LFLSLT) and P6 (LFLS*S*HT), higher citations for astringency and lower creamy flavour were drivers of dislike for the products.

There was an association between dislike and liquorice for P1 (HFHSLT) (Table 6.5), however, only P6 (LFLS*S*HT) contained stevia which was the stimulus for liquorice flavour. In fact, it is possible that consumers had a lack of understanding concerning the liquorice attribute and were using it to express their dislike of high sweetness. However, this is supposition and would require further research with consumers to understand the phenomenon. This pattern was inversely reflected by disliking liquorice less than expected for P4 (LFLSLT) and disliking sweetness more than expected for P4 (LFLSLT) and P6 (LFLS*S*HT) (Table 6.5), which contained low sucrose and hence low sweetness. In fact, interpreting future consumer data to investigate associations between temporal sensory and liking responses will need specific considerations where ambiguous sensory attributes/lexicons are used, as will depth of prior attribute explanations. Thomas et al. (2015) previously showed relationships between the dynamics of dominant sensations with the dynamics of liking or disliking a product. Ramsey et al. (2018), using TCATA to profile sensory attributes combined with temporal liking also demonstrated relationships between dynamics of sensory perception and liking. Findings from the both research groups supported the current research findings. However, these studies were not conducted over multiple sips/ bites evaluations. Silva et al. (2018, 2019) used TDS and temporal liking up to four sips and captured additional insights into the dynamics of perception and liking changes, however the use of TDS limited the information on holistic dynamics of the attributes. Interestingly, the present study using multiple sip evaluations, representing consumption of a whole serving of a milkshake, to characterise temporal liking profiles and temporal sensory profiles provided an overview of an actual consumer experience. Furthermore, the use of TCATA in capturing temporal sensory profiles added insights into the holistic perceptual dynamics which could occur during an actual product experience.

#### *6.3.4.2 Interaction of T_Sensory and T_Emotions*

Analysis of Deviance also showed significant effects on selection frequencies of *T_Sensory* and *T_Emotions* (Table 6.1). Generally, lower citations of astringency and liquorice were reported with higher citations of positive emotions, for example 'comforted', 'happy', 'delighted', 'indulgent', 'relaxed' and 'satisfied' (Figure 6.8). Moreover, higher selection frequencies of sweetness, astringency and liquorice were associated with negative emotions 'disgusted', 'disappointed' and 'uncomfortable' (Figure 6.8). Further analysis on standardised residuals from the model showed that both astringency and liquorice were selected more than the expected values for the negative emotions 'disgusted', 'disappointed' and 'uncomfortable' and additionally astringency for 'bored' emotion (Table 6.6). Liquorice was cited less often than the expected value for positive emotions (Table 6.6). Moreover, sweetness was cited more than expected for 'bored' and 'disappointed' and vanilla was cited more than the expected for 'bored' (Table 6.6). Both creamy flavour and creamy mouthfeel were generally cited more often than the expected value on positive emotions and vice versa for negative emotions (Table 6.6). The results indicated that negative emotions were mainly driven by higher selections of astringency and liquorice of the milkshakes. Additionally, sweetness and vanilla were associated to some extent with boredom of the milkshakes. Generally, creamy flavour and creamy mouthfeel were drivers for positive feelings for the milkshakes. Interestingly, the results did not show any associations of mouthcoating of the milkshakes with either negative or positive emotions.

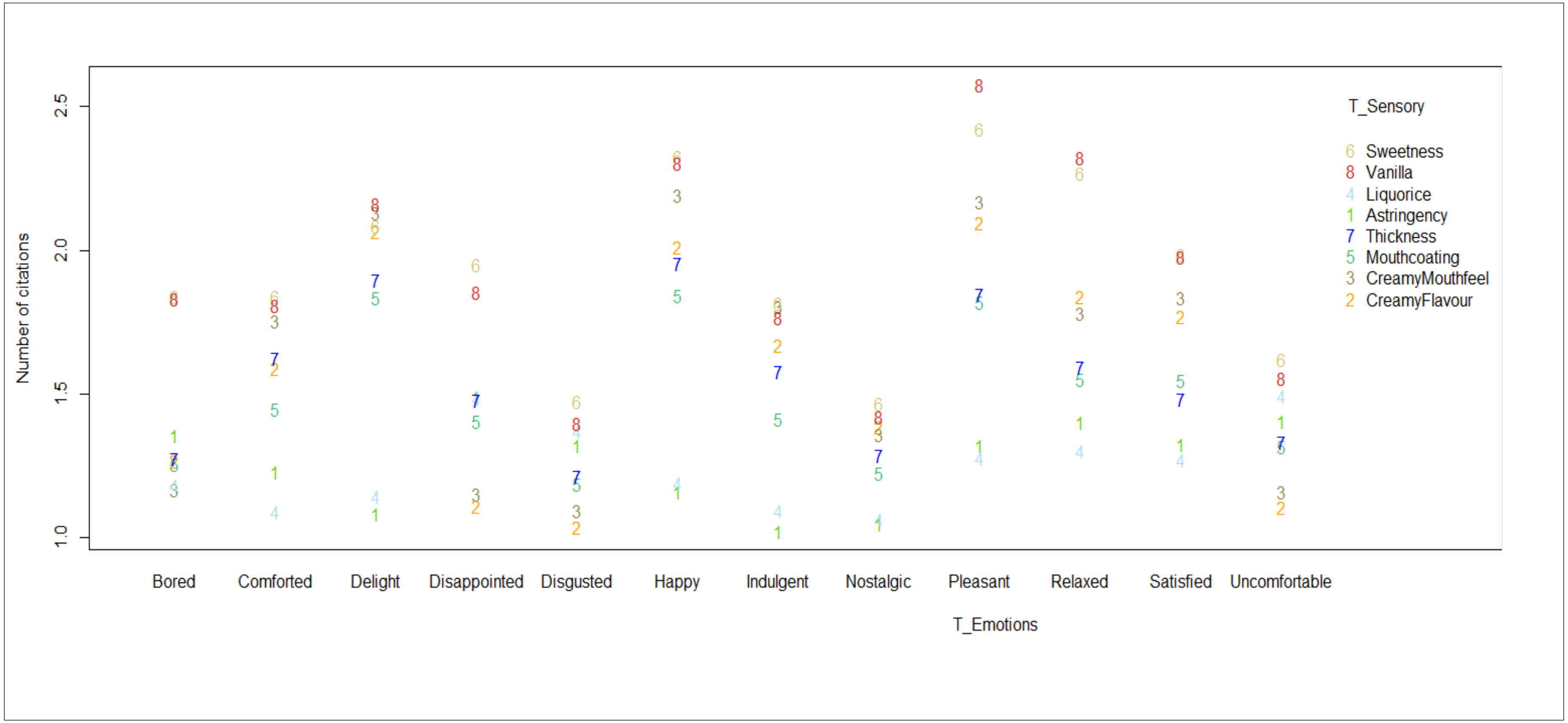


Figure 6.8: Citation frequencies of sensory attributes for each emotion term.

Table 6.6: Pearson's Chi-squared test for standardised residuals of *T_Sensory* and *T_Emotions*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.470).

| *T_Sensory* | *T_Emotions* ($X^2$ = 4484.1, p<0.001) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
| Astringency | **9.938** | -3.378 | **-6.471** | **11.090** | **6.144** | **-6.479** | **-7.103** | **-4.997** | **-5.222** | 1.396 | 2.119 | **5.411** |
| Creamy flavour | **-5.259** | **4.873** | **4.014** | **-14.475** | **-5.972** | **4.132** | **4.514** | 1.950 | **5.795** | 1.586 | 3.062 | **-9.401** |
| Creamy mouthfeel | **-8.771** | **4.114** | **4.563** | **-13.329** | **-5.112** | **4.865** | **3.932** | 2.427 | **6.181** | -0.034 | **3.651** | **-7.261** |
| Liquorice | 1.722 | **-4.354** | **-5.623** | **11.968** | **9.158** | **-5.119** | **-4.149** | **-3.961** | **-4.781** | -0.901 | -1.445 | **12.588** |
| Mouthcoating | -2.480 | 0.921 | 0.034 | 0.140 | 1.689 | -0.568 | 1.695 | 2.064 | -2.434 | -1.068 | 1.877 | 0.323 |
| Sweetness | **4.993** | -3.212 | -0.494 | **4.606** | 0.068 | 0.268 | -2.145 | -0.016 | -1.089 | -0.373 | -2.963 | 1.327 |
| Thickness | **-5.731** | 1.742 | 2.552 | 2.582 | 0.605 | 1.249 | 2.443 | 2.673 | -2.492 | **-5.122** | -1.280 | **4.655** |
| Vanilla | **4.966** | -1.389 | -1.263 | 2.652 | -1.382 | -1.319 | -1.127 | -1.751 | 0.667 | 2.985 | -3.127 | -1.390 |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

Jager et al. (2014); Lorido et al. (2019); Silva et al. (2018, 2019) also showed associations between the dynamics of emotions and sensory responses using TDE and TDS approaches in respective product categories. However, the use of the dominance concept in TDE and TDS limited the information on evolution of all applicable sensory and emotional responses over time. Additionally, Jager et al. (2014) and Lorido et al. (2019) only used single intake product evaluations, which the approach was extended up to four sips by Silva et al. (2018, 2019). Therefore, none of these works has highlighted the variation in the dynamics of sensory perception alongside emotional responses that would occur in an actual product experience by a consumer. To date there is no published research investigating the impact of temporal sensory and emotion responses using a multiple sip TCATA approach which represents the consumer experience during consumption of a whole portion of a product. In fact, the findings of this research are novel and add to the current knowledge in the field. Nevertheless, as mentioned earlier, wider experiments with more product categories will be required to enable extrapolation of these findings.

Overall, when measuring *T_Emotions,* more sensory attributes were associated with characterisation of products (Table 6.6) than with *T_Liking* (Table 6.5). In fact, this data adds to evidence from static measures from others (Ng et al. (2013); Ng and Hort (2015) that measuring *T_Emotions* or both *T_Emotions* and *T_Liking* alongside temporal sensory profiles of products discriminates products more than only *T_Liking.* Measuring temporal emotions using multiple sip TCATA enabled the dynamics of emotional response representing actual consumer experience to be captured. However, a key limitation of using a TCATA (or TDE) approach to measure emotions is that the number of emotion terms that can be used in the experiment is limited. A maximum of 10 attributes was recommended for TCATA (Castura et al., 2016), complying with the recommendation for TDS (Pineau et al., 2012). However, researchers often measure emotional responses with larger lexicons e.g. EsSense profile with 39 emotion terms (King & Meiselman, 2010) with rate all that apply (RATA) or check all that apply (CATA) (Ng et al., 2013). The use of the EsSense profile with a longer list of emotions provides descriptive emotion profiles of products, however, at the cost of understanding temporal aspects.

In comparison, Nijman et al. (2019) used a product specific emotion lexicon with 10 emotion categories and RATA after consumption of the product, complying to the recommendations of Eaton et al. (2018). Silva et al. (2018, 2019) used a temporal dominance of emotions (TDE) approach with the most representative 10 emotion terms (reduced from a lexicon of 25 terms) related to the product and captured the dynamics of dominance of emotions. A similar approach was followed in this research to reduce the number of emotion terms generated with focus groups to develop the emotion lexicon of 12 terms related to the model milkshake system. In fact, application of longer lists of emotions with static emotion measurements will be useful to obtain an overview of the emotion profiles of the product to capture insights at early stages of product concept development or to obtain insights when using ingredient substitutes. However, investigations of temporal emotions with reduced lexicons using a multiple sip TCATA approach representing consumption of a whole serving of a product will be useful towards the end of product development or improvement stages or to descriptively match competitor's products in the market.

#### *6.3.4.3 Interaction of T_Emotions and T_Liking*

Analysis of Deviance showed interactions between the clicking frequencies of *T_Emotions* and *T_Liking* (Table 6.1). Generally, the selection frequency of the positive emotions were highly associated with liking and negative emotions with dislike (Figure 6.9, Table 6.7). Not surprisingly, consumers shifted to like products more where positive emotions were perceived and vice versa. Similar findings were reported by Ng et al. (2013); Nijman et al. (2019) for static emotions and overall liking responses and Lorido et al. (2019); Silva et al. (2018, 2019) for dynamics of dominant emotions and temporal liking responses.

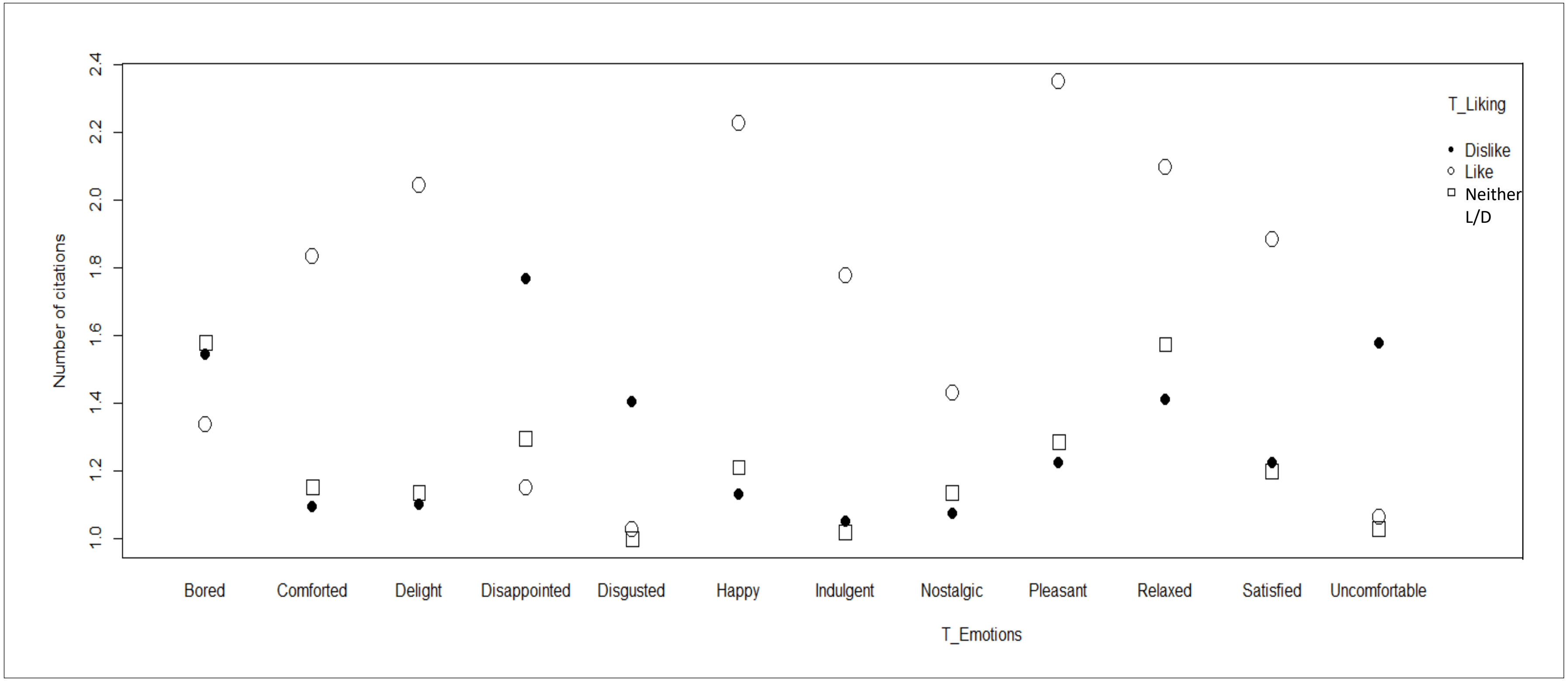


Figure 6.9: Interaction plot of *T_Emotions:T_Liking*.

Table 6.7: Pearson's Chi-squared correlation of standardised residuals of *T_Liking* and *T_Emotions*. Bold font represents significant associations (>Bonferroni adjusted critical value 3.198).

| *T_Liking* | *T_Emotions* ($X^2$ = 14895, p<0.001) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
| Dislike | **30.779** | **-16.066** | **-24.875** | **64.362** | **39.821** | **-30.111** | **-17.961** | **-8.709** | **-29.474** | **-8.396** | **-19.009** | **53.681** |
| Like | **-43.577** | **16.602** | **27.939** | **-62.148** | **-34.176** | **32.220** | **20.295** | **10.204** | **29.655** | 2.674 | **19.330** | **-49.746** |
| Neither | **29.468** | -2.644 | **-8.724** | **1.548** | **-7.905** | **-7.245** | **-6.552** | **-3.930** | -3.186 | **11.064** | -2.478 | -3.039 |

Positive values = observed value – expected value, where observed > expected value.

Negative values = observed value – expected value, where observed < expected value.

As discussed in sections 6.3.4.1 and 6.3.4.2 *T_Liking* and *T_Emotions* varied depending on *T_Sensory*, indicating drivers of emotions and liking are based on sensory perception. For example, lower citations of astringency and liquorice were associated with higher citations of positive emotions and higher citations of sweetness, astringency and liquorice were highly associated with negative emotions (Figure 6.8). Findings presented in section 6.3.4.3 emphasised that *T_Emotions* and *T_Liking* were also linked, higher citations of liking with positive emotions and vice versa. Therefore, it is evident that the drivers of liking were associated with positive emotion responses which in turn associated specific sensory perceptions, for example lower citation of astringency and liquorice. Product evaluation over multiple sips enabled the capture of these associations as they varied across multiple sips.

#### *6.3.4.4 Interactions of within-sip with temporal sensory and affective responses*

*T_Emotions*, *T_Liking* and *T_Sensory* had significant interactions with *within-sip* (Table 6.1). There were no three-way interactions of temporal affective responses with *sip:within-sip* (Table 6.1), indicating that the variation of *within-sip* temporal affective experience across sips was constant, however, it varied with different size effects. Due to the complexity of this data set effects of *within-sip* on temporal affective and sensory responses were not discussed but the emphasis was given to the variations occurred across sips. However, if a product undergoes dramatic perceptual changes during evaluation, for example, a dramatic change of texture of cheese with each chewing stroke (Jack et al., 1994), it will be important to consider within-sip variations and respective emotional responses and liking. Specifically, investigation of within-sip dynamics in relation to emotional and liking responses will be beneficial if the product evaluations are only performed using a single sip or a bite due to time or cost constraints or in relation to any other respective project objectives.

## *6.4 Conclusions*

Consumer temporal liking and emotional responses appear to be driven by temporal sensory perception and hence indicate temporal drivers of product acceptance and/or rejection. Temporal measurement of emotional response provided detailed insights into associations with the dynamics of sensory perception beyond measuring temporal liking responses.

Use of TCATA to capture temporal sensory and emotional responses also provided insights into their respective interaction effects even with the limited number of emotion terms that can be employed, even if they are preselected carefully as was the case for this research. Temporal responses varied over multiple sips highlighting that product evaluations with consumers across multiple sips are essential when the objective is to capture closer insights into actual product experiences. Moreover, the findings varied depending on the product. Having used three products in this experiment due to cost and time constraints, the findings cannot be generalised to all milkshakes or all product categories and further research will be required to understand the applicability of the findings with respect to other product categories.

When sensory perception is the driver for product preference, it may also be important to consider whether individual differences in taste perception impact consumer affective responses. This was the subject of investigation in the final experimental chapter in this thesis.

# Chapter 7. Investigating dominant emotions over multiple sips and the impact of individual variation

## 7.1 Introduction

Individual differences in taste phenotypes including PROP taster status (PTS) (Fox, 1932) and sweet liker status (SLS) (Pangborn, 1970), and their interactions are known to impact sensory and hedonic responses to food (Hayes & Duffy, 2008; Hayes & Keast, 2011; Kim et al., 2014; Yang et al., 2020; Yeomans et al., 2007). Some researchers have not found a relationship between PTS and hedonic responses or food preference data collected using static rating scales after product tasting (Catanzaro et al., 2013; Deshaware & Singhal, 2017; Drewnowski et al., 1997; Feeney et al., 2014). As presented in chapter 6, relatively recently, researchers have revealed increased discrimination between products by evaluating consumer emotional responses beyond measuring hedonic responses (Ng et al., 2013) and Lorido et al. (2019); Silva et al. (2018, 2019) have demonstrated the impact of sensory perception on consumer emotion and hedonic responses. Consequently, as sensory perception is impacted by individual differences, an individual's taste phenotype may also impact emotional responses to food. In fact, Yang et al. (2018) and Yang et al. (2019) have reported effects of PTS and SLS on emotional responses to beverages when consumers rated felt emotion intensities after consumption. PROP super tasters provided higher ratings on some emotion categories than PROP non-tasters for beer (Yang et al., 2018). Yang et al. (2019) revealed associations of liking of sweetened beverages and higher ratings for positive emotions and vice versa for negative emotions among high sweet likers and the opposite for low sweet likers. Additionally, the effect of SLS on emotion responses was more pronounced in PROP super tasters and PROP non-taster categories. However, to date, the impact of taste phenotypes on dynamic sensory profiles and hence dynamic emotional profiles has not been investigated.

Measuring static emotion responses at the end of tasting a product is likely to provide either an averaged response, or a representation of the latter feelings associated with the dynamic emotion experience during the whole evaluation period. Jager et al. (2014) and van Bommel, Stieger, Schlich, and Jager (2019) adapted the TDS technique to measure temporal dominance of emotions (TDE) by replacing sensory attributes with emotion terms enabling the dynamic aspect of emotional response to be captured during single intake product evaluations. Silva et al. (2018) extended TDE evaluation up to four sips and hence provided additional insights into the dynamics of emotions, to represent actual product experience. However, to date, the impact of individual differences in taste phenotypes on temporal dominance of emotions over multiple sips (representing a whole serving portion of a beverage) has not been published and is the subject of the final chapter of this thesis.

The key objectives of the research presented in this chapter were to investigate,

- if dominant emotions vary across multiple sips of vanilla milkshakes.
- the impact of SLS and PTS on the dominant emotion profiles of the milkshakes.
- the impact of SLS and PTS on the dominant emotion profiles across multiple sips of milkshakes.

## *7.2 Materials and methods*

### *7.2.1 Products*

Model vanilla milkshakes P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) as detailed in Chapter 2, section 2.2.1 were evaluated for this research.

### *7.2.2 Participants*

The consumer panel, as detailed in section 2.2.6.2, which evaluated the milkshake products, attended the taste phenotyping sessions.

### 7.2.3 Methodology

#### 7.2.3.1 TDE profiles of milkshakes

The dominant emotions experienced by consumers were hypothesised to vary over multiple sips of milkshakes, based on the observations of temporal emotions over multiple sips presented in chapter 6. The consumer panel was employed to profile their emotional response to the milkshakes using the TDE technique over 8 sips of each product as detailed in section 2.2.5.3. The consumers were asked to select the dominant emotions they felt over time as opposed to the dominant sensory attribute. The consumers were given the list of 12 emotion terms presented in section 2.2.6.1 and their associated definitions (Table 2.8). Each emotion term was explained with examples as described for TCATA emotions in chapter 6, section 2.2.3. Additionally, the consumers were given the opportunity to further clarify any of the terms or definitions prior to product evaluation.

#### 7.2.3.2 Phenotyping

A key objective of this aspect of the research was to investigate whether experienced dominant emotions were related to taste phenotypes. All consumers were phenotyped for their PTS and SLS taste phenotypes as outlined below.

##### 7.2.3.2.1 General Labelled Magnitude Scale (gLMS) training

During phenotyping, perceived taste intensity was recorded using a gLMS scale (Bartoshuk et al., 2004) (Figure 7.1). Consumers were trained on the scale use prior to data collection for each phenotyping method. Initially, consumers were asked to explain the strongest sensation they had experienced, or the strongest sensation they could imagine experiencing, to represent the top end of the scale, and barely detectable sensations to represent the bottom end of the scale. They were then asked to rate remembered or imaginable intensities of six other sensations (staring at the sun or hearing a nearby jet plane take off, biting into a sour lemon, loudness of a whisper, bitterness of black coffee, brightness of a dimly candle lit restaurant and sweetness of cola) on the gLMS (Compusense® Cloud) scale with respect to their strongest sensation (Bartoshuk et al., 2002) . As PTS and SLS phenotyping sessions were randomised across the consumers, the full gLMS scale training was given at the first phenotyping session and only repeated as a practice activity in the second phenotyping session.

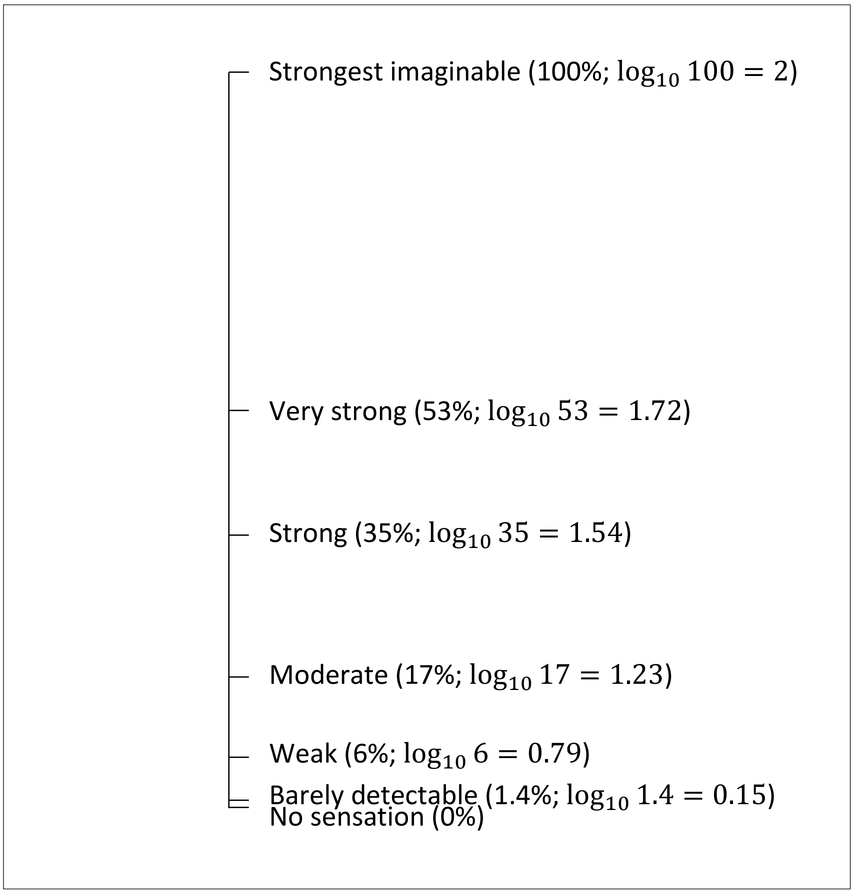


Figure 7.1: gLMS scale and labelled anchor points (Bartoshuk et al., 2002). Numeric percentage and log value labels are for illustration only and were not presented on the scales used by consumers. The gLMS scale with a length of 470 pixels was presented to consumers on a 9.7” iPad display (diagonal length) with 2048 x 1536 resolution.

###### 7.2.3.2.2 PROP taster status (PTS)

PROP solution (0.32 mM) was prepared by dissolving 6-n-propylthiouracil (Sigma Aldrich, New Zealand) in filtered water on a stirring hot plate (Thermo Scientific, USA) at 40±1 °C. At the beginning of the session consumers were given an explanation about the procedure and use of the gLMS scale followed by a gLMS scale practice activity as detailed above. Consumers were instructed to roll a cotton bud saturated with the PROP solution at room temperature (21±1°C) on the anterior tip of the tongue for about 3 s. The consumers were requested to rate maximum bitterness intensity on the gLMS scale as detailed in Yang et al. (2019). The test was repeated after cleansing the palate using filtered water and water crackers followed by a 3 min break (Yang et al., 2019).

###### 7.2.3.2.3 Sweet liker status (SLS)

The use of the Labelled Magnitude Scale (LAM) (Figure 7.2) was explained to consumers by asking them to provide examples for greatest imaginable like and dislike to represent the two ends of the scale. Five sucrose solutions 3%, 6%, 12%, 24% and 36% (w/v) (Yang et al., 2019) were used in the sweet liker status screening. Sucrose concentrations in the milkshakes were within the range of the sucrose solutions used for SLS phenotyping. A1 sucrose (Davis Food Ingredients, New Zealand) was fully dissolved in filtered water using a stirring plate (Thermo Scientific, USA). Aliquots (10 mL) of each sucrose sample (at 21±1°C) were served and participants were instructed to consume the whole volume of each sample upon evaluation. They were asked to rate their level of liking for the sweetness of each sample on a LAM scale (Schutz & Cardello, 2001) followed by its respective sweetness intensity on a gLMS scale (Bartoshuk et al., 2002) as detailed in Yang et al. (2019).

A blank sample (0% sucrose) was served first followed by the five sucrose samples for all the consumers. Serving order of the five sucrose samples was semi-randomised avoiding the weakest (3% sucrose) and the strongest (36% sucrose) samples following each other. Oneminute breaks were given in between each sample and consumers were instructed to cleanse their palate using filtered water and water crackers. Data was collected in duplicate using Compusense® Cloud.

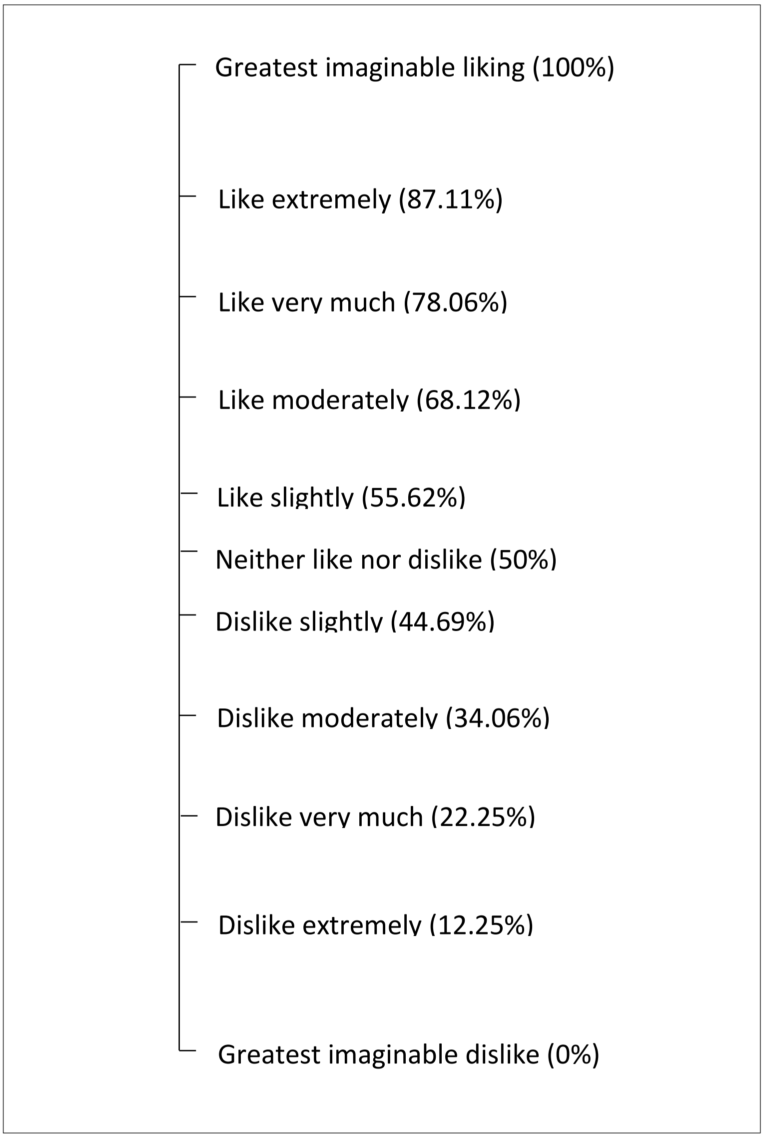


Figure 7.2: Labelled magnitude (LAM) scale (Schutz & Cardello, 2001). Numeric percentage labels are for illustration only and were not presented on the scales used with consumers. LAM scale with a length of 470 pixels was presented to consumers on a 9.7” iPad display (diagonal length) with 2048 x 1536 resolution.

### 7.2.4 Data analysis

Statistical analyses were performed using R software, version 4.0.0 (R Core Team, 2020) in RStudio (2019).

#### 7.2.4.1 PTS classification

PTS was classified following Lim et al. (2008); Yang et al. (2019) based on mean PROP bitterness intensity ratings (Table 7.1). Those rating below “barely detectable” were categorised as PROP non tasters (PNT), those rating in between “barely detectable” and “moderate” as PROP medium tasters (PMT) and those rating above “moderate” as PROP super tasters (PST) (Lim et al., 2008).

Table 7.1: PROP taster status classification.

| PROP taster status | Ratings on the LAM scale | Logged intensity |
| --- | --- | --- |
| PROP non tasters (PNT) | < barely detectable | <0.15 |
| PROP medium tasters (PMT) | barely detectable - moderate | 0.15 – 1.23 |
| PROP super tasters (PST) | > moderate | >1.23 |

A count of consumers in each PTS and SLS phenotype combination, using `tapply()` function, (data not shown) revealed phenotype combination groups with less than five consumers, the minimum number of counts required to make statistically valid data (Box et al., 2005). To facilitate data analysis, PST and PMT groups were therefore merged into one group of PROP tasters (PT), making only two classifications for PTS as PT and PNT

#### 7.2.4.2 SLS classification

Sweet liker status classification was performed using agglomerative hierarchical clustering (AHC) (Ward’s method using a Euclidean dissimilarity measure) on liking of the sucrose solutions. Thereafter, Pearson correlation coefficient tests were used between individual consumer data and cluster means to validate membership of the cluster groups (Yang et al., 2019). Unclassified participants were removed from this analysis. Thereafter, three categories of SLS were identified named sweet likers (SL), sweet ideal pointers (SIP) and sweet dislikers (SD) based on their patterns of response to the solutions. Data analyses of AHC were performed using the `dist()` function, `method=”euclidean”` and `hclust()` function, `method=”ward”` and Pearson correlation at α=0.05.

*7.2.4.3 Investigating impacts of PTS and SLS on TDE*

TDE data were analysed as detailed in Chapter 3, section 3.2.4.2 for TDS. Observed mean dominance rates and standard errors (SE) were calculated for each *product, sip, within-sip, PTS* and *SLS* for all emotion terms and respective TDE curves were produced to visualise the data. The significant dominance rate for emotions at p=0.05 was calculated using the `gamlss::getQuantile()` function (Rigby et al., 2019) to identify the dynamics of emotinos dominating the each product experience over 8 sips. The packages `dplyr` (Wickham et al., 2020) and `ggplot2` (Wickham, 2016) were used for data manipulation and data visualisation respectively.

Generalised linear models (GLM) with default functions (`function=glm, family=”binomial”, link=logit`) (Agresti, 2018b; Montgomery et al., 2012) were used to model the dominance rates of the five factors (*product, sip, within-sip, PTS* and *SLS*) with four-way interactions for each emotion to investigate their effects on temporal dominant emotion responses. Analysis of Deviance (Agresti, 2018b; González Chapela, 2013; Montgomery et al., 2012) was used to determine which main and interaction effects were statistically significant. Associated interaction plots were created to visualise observed responses against time for relevant experimental and statistical effects. Post-hoc tests were used to make pairwise comparisons of citation proportions among experimental factors for which there was a significant main effect (Shaffer, 1995). Holm’s adjusted significance levels (Holm, 1979; Wright, 1992) were used to analyse the pair-wise comparisons.

Note that as the key objective here was to investigate whether the dominant emotions varied across multiple sips, and the impact of individual variation in taste perception, the main effect *within-sip* and its interaction with non-temporal main effects (*product, SLS* and *PTS)* were summed together as *within-sip:non-temporal* effects and *within-sip:sip:non-temporal* effects and were not interpreted further. Summation of p values for the latter two interaction effects were calculated using the `pchisq()` function.

## *7.3 Results and discussion*

One hundred and four consumers who took part in the TDE profiling attended phenotype screening. After removing unclassified participants from the phenotyping, data from 97 remained (Table 7.2.)

Table 7.2: Phenotype categorisation of consumers (n = 97).

| Phenotype category | % of the consumers |
|---|---|
| SL and PT | 21 |
| SL and PNT | 4 |
| SIP and PT | 26 |
| SIP and PNT | 6 |
| SD and PT | 38 |
| SD and PNT | 5 |

Appendix N provides the TDE observed mean dominance rates and standard error (SE) for each emotion response, for each product, by sip number and at each time point within a sip, for each PTS and SLS phenotype classification. Figure 7.3 presents the TDE curves for each milkshake over 8 sips, averaged over taste phenotypes.

Combined phenotype data showed that the product experience was mainly dominated by the 'pleasant' emotion for all products, but with variations over sips (Figure 7.3). Additionally, ‘satisfied’ approached significance for P1 (HFHSLT) and P4 (LFLSLT) over multiple sips. Interestingly, by sip 8 of P1 (HFHSLT) both ‘uncomfortable’ and ‘pleasant’ (Figure 7.3) were dominant, indicating the evolution of emotions as captured by multiple sip evaluation. Moreover, this could be a consequence of ‘uncomfortable’ emotion becoming dominant towards sip 8 for some consumers. P4 (LFLSLT) was also dominated by ‘relaxed’ and ‘bored’ towards latter sips. However, P6 (LFLS*S*HT) was only significantly dominated by ‘relaxed’ at sip 8 and ‘relaxed’ was the only other significant emotion dominating the product experience in addition to ‘pleasant’ (Figure 7.3). The results showed that in addition to ‘pleasant’, some emotions were marginally product specific and to some extent the dominant emotion discriminated the products. Interestingly, the number of emotions that dominated the multiple sip product experience was very low, emphasising that the consumers were not selecting any particular emotion but rather had selected across the range of 12 emotions presented. The emotion lexicon was developed using focus groups where milkshake consumers selected the most discriminating 12 emotions related to the products. Therefore, consumers perhaps still discriminated the emotions across products, but one specific emotion was not dominant.

Table 7.3 and Table 7.4 summarise the p values and deviances from the Analysis of Deviance using a five-factor (*within-sip, sip, product, SLS* and *PTS*) GLM with four-way interactions for all emotion terms. The analyses revealed significant *product:sip* interactions for emotions other than ‘comforted’ and ‘uncomfortable’, indicating the variation of evolving emotions across multiple sips which further varied depending on the product. The *product:sip* interaction was further involved in a three-way interaction with taste phenotypes (Table 7.3), highlighting the impact of individual differences on feeling of product specific emotions across multiple sips.

These data analyses gave a general view however that the effect of phenotype was of particular interest. The next section highlights the findings when the data was split according to taste phenotypes. .

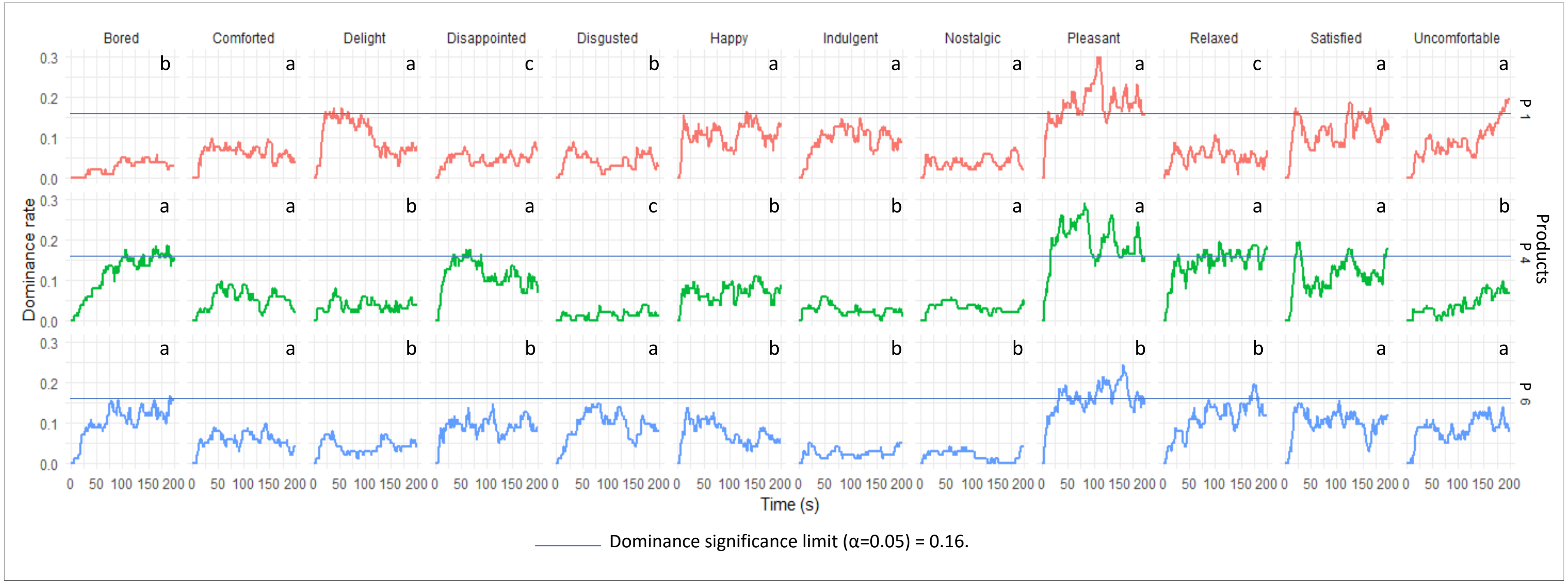


Figure 7.3: TDE curves for emotional responses for milkshakes over 8 sips, averaged over taste phenotypes. Dominance rates with different letters 'abc' within each emotion across products are significantly different on average of 8 sips (*Holms*, p<0.01). Products: P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS<u>S</u>HT).

Table 7.3: Summary of p values from a GLM five-factor Analysis of Deviance for dominance rates of emotion terms on selected time slices for the consumer panel. Bold font represents significant terms (p<0.05).

| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sip* (Df=7) | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **0.047** | **<0.001** | **0.022** | **<0.001** | **<0.001** | **<0.001** | **<0.001** |
| *SLS* (Df=2) | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **0.005** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | 0.098 |
| *PTS* (Df=1) | 0.081 | **<0.001** | 0.250 | **<0.001** | **<0.001** | **0.001** | 0.646 | **<0.001** | 0.906 | 0.390 | 0.313 | **<0.001** |
| *Product* (Df=2) | **<0.001** | 0.100 | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | 0.406 | 0.952 |
| *Within-sip** (Df=4) | 0.304 | 0.996 | 0.644 | 0.420 | 0.788 | 0.428 | 0.914 | 0.902 | 0.002 | 0.643 | 0.816 | 0.083 |
| *Within-sip:Non-temporal** | ***<0.001*** | ***<0.001*** | *>0.999* | ***<0.001*** | ***<0.001*** | ***<0.001*** | ***<0.001*** | ***<0.001*** | *>0.999* | *>0.999* | ***<0.001*** | ***<0.001*** |
| *Within-sip:Sip:Non-temporal** | ***<0.001*** | *>0.999* | ***<0.001*** | ***<0.001*** | ***<0.001*** | ***<0.001*** | ***<0.001*** | ***<0.001*** | *>0.999* | ***<0.001*** | ***<0.001*** | *>0.999* |
| *Sip:SLS* | 0.296 | **<0.001** | **0.003** | 0.403 | 0.058 | **<0.001** | **<0.001** | **<0.001** | 0.145 | **0.040** | **0.005** | 0.901 |
| *Sip:PTS* | 0.152 | **<0.001** | **<0.001** | **<0.001** | **0.035** | 0.167 | **0.002** | >0.999 | **<0.001** | 0.107 | 0.089 | 0.997 |
| *SLS:PTS* | **<0.001** | **<0.001** | 0.214 | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **0.048** | **<0.001** | **<0.001** | **<0.001** |
| *Sip:Product* | **0.025** | 0.101 | **0.001** | **0.002** | **<0.001** | **0.001** | **<0.001** | >0.999 | **<0.001** | **0.008** | **0.002** | 0.999 |
| *SLS:Product* | **<0.001** | **0.002** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **0.006** | >0.999 | **<0.001** | 0.321 | **<0.001** | 0.997 |
| *PTS:Product* | 0.236 | **<0.001** | 0.157 | **<0.001** | >0.999 | **<0.001** | **0.009** | >0.999 | **0.039** | 0.194 | **<0.001** | **<0.001** |
| *Sip:SLS:PTS* | **<0.001** | **<0.001** | **<0.001** | 0.054 | >0.999 | **0.006** | **<0.001** | >0.999 | **<0.001** | **<0.001** | **<0.001** | **<0.001** |
| *Sip:SLS:Product* | **<0.001** | **<0.001** | **<0.001** | **<0.001** | >0.999 | **<0.001** | **<0.001** | >0.999 | **0.002** | **0.013** | **<0.001** | 0.534 |
| *Sip:PTS:Product* | >0.999 | **<0.001** | >0.999 | >0.999 | **<0.001** | >0.999 | **<0.001** | **<0.001** | **0.004** | >0.999 | **<0.001** | **<0.001** |
| *SLS:PTS:Product* | >0.999 | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | >0.999 | 0.098 |
| *Sip:SLS:PTS:Product* | >0.999 | >0.999 | **<0.001** | >0.999 | **<0.001** | >0.999 | >0.999 | >0.999 | **<0.001** | **<0.001** | **<0.001** | 0.952 |

*Effects are not discussed in this analysis. Non-temporal = SLS+PTS+Product.

Table 7.4: Summary of deviances from a GLM five-factor Analysis of Deviance for dominance rates of emotion terms on selected time slices for the consumer panel.

| | Bored | Comforted | Delight | Disappointed | Disgusted | Happy | Indulgent | Nostalgic | Pleasant | Relaxed | Satisfied | Uncomfortable |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sip* | 211.864 | 57.754 | 57.663 | 64.03 | 42.251 | 14.247 | 39.992 | 16.373 | 114.183 | 115.418 | 61.698 | 146.647 |
| *SLS* | 42.161 | 74.633 | 35.899 | 23.305 | 41.541 | 106.188 | 10.457 | 58.303 | 44.675 | 19.422 | 19.709 | 2.741 |
| *PTS* | 3.036 | 40.946 | 1.322 | 17.878 | 15.193 | 11.666 | 0.211 | 55.051 | 0.014 | 0.738 | 1.018 | 116.632 |
| *Product* | 264.406 | 4.603 | 182.062 | 114.177 | 288.02 | 34.472 | 290.658 | 35.054 | 22.514 | 218.574 | 1.804 | 2.686 |
| *Within-sip** | 4.844 | 0.175 | 2.505 | 3.901 | 1.714 | 3.843 | 0.970 | 1.051 | 17.378 | 2.507 | 1.558 | 8.259 |
| *Within-sip:Non-temporal** | 17959.17 | 6286.078 | 17.285 | 5855.43 | 21129.16 | 14939.96 | 1235.478 | 189641.9 | 38.664 | 12.883 | 28057.28 | 231.493 |
| *Within-sip:Sip:Non-temporal** | 31122.03 | 109.38 | 5163.443 | 4285.023 | 2729.656 | 7272.36 | 6887.004 | 158039.5 | 240.792 | 39911.22 | 1401.733 | 334.322 |
| *Sip:SLS* | 16.296 | 39.804 | 33.026 | 14.636 | 23.131 | 69.877 | 63.202 | 76.677 | 19.537 | 24.467 | 31.396 | 1.057 |
| *Sip:PTS* | 10.711 | 26.781 | 29.125 | 36.788 | 15.062 | 10.395 | 22.097 | 0 | 45.814 | 11.797 | 12.375 | 1.112 |
| *SLS:PTS* | 21.782 | 106.566 | 3.081 | 45.381 | 120.003 | 53.014 | 19.139 | 1658.008 | 6.053 | 76.26 | 18.125 | 102.654 |
| *Sip:Product* | 26.134 | 21.02 | 35.682 | 34.834 | 43.844 | 37.352 | 41.447 | 0 | 58.429 | 30.028 | 34.124 | 0.893 |
| *SLS:Product* | 214.594 | 17.219 | 98.741 | 137.054 | 432.524 | 30.838 | 14.387 | 0 | 79.025 | 4.688 | 59.295 | 4.641 |
| *PTS:Product* | 2.889 | 22.418 | 3.7 | 54.557 | 0 | 17.125 | 9.525 | 0 | 6.498 | 3.282 | 61.192 | 61.29 |
| *Sip:SLS:PTS* | 73.13 | 51.848 | 56.258 | 23.436 | 0 | 30.845 | 38.915 | 0 | 74.989 | 43.297 | 75.91 | 62.718 |
| *Sip:SLS:Product* | 64.22 | 103.446 | 92.974 | 75.368 | 0 | 91.115 | 130.358 | 0 | 55.128 | 47.064 | 140.055 | 26.71 |
| *Sip:PTS:Product* | 0 | 865.048 | 0 | 0 | 4685.675 | 0 | 12615.28 | 2306.794 | 32.377 | 0 | 8794.651 | 146.647 |
| *SLS:PTS:Product* | 0 | 1297.572 | 1946.357 | 144.175 | 216.262 | 7497.08 | 2378.881 | 1874.27 | 37.419 | 28402.4 | 0 | 2.741 |
| *Sip:SLS:PTS:Product* | 0 | 0 | 3892.715 | 0 | 2595.143 | 0 | 0 | 0 | 79.754 | 3388.103 | 216.262 | 2.686 |

*Effects are not discussed in this analysis. Non-temporal = SLS+PTS+Product.

### *7.3.1 Variation of individual differences in dominant emotions across multiple sips*

Figure 7.4 - Figure 7.6 present the TDE curves for P1 (HFHSLT), P4 (LFLSLT) and P6 (LFLS*S*HT) respectively by taste phenotype category. They indicate the three-way *product:sip:phenotype* interaction was significant only for the PT group for 'pleasant' for all products, indicating PT experienced product specific variations of emotions across multiple sips. It is evident that large variation in selection of dominant emotions by consumers led to no significant dominant emotions being highlighted other than 'pleasant'. Analysis of Deviance also revealed a *product:sip:PTS* three-way interaction for the 'pleasant' emotion (Table 7.1 and Table 7.2). Dominance rates for pleasant' increased towards sip 5 for P1 (HFHSLT) followed by a decrease over further sips (Figure 7.7). The size of the change in dominance rates for 'pleasant' for P4 (LFLSLT) was higher than that of P1 (HFHSLT) up to sip 4 followed by a decrease at sip 5 (Figure 7.7). In comparison, for P6 (LFLS*S*HT), the dominance rate of 'pleasant' gradually increased over sip 1 to sip 7 followed by a decrease at sip 8 (Figure 7.7), highlighting the impact of product on feeling dominance of emotions across multiple sips.

Herbert et al. (2014) showed significant differences between PT and PNT on emotion induced startle eye blink responses. Yang et al. (2018) reported a significant difference between PT and PNT and rating of some emotion categories for beer, i.e. PT (PST and PMT) rated higher for 'content' and 'excited' emotions and lower for 'bored' than PNT. Moreover, PST has shown a higher variation in hedonic response than PMT and PNT (Piochi et al., 2020) and hence possible variations of emotion responses subsequently (Yang et al., 2019). The findings of these researchers support the differences of emotion responses between PT and PNT. PT report higher sensitivity to basic tastes such as bitter, sweet, salty and sour than PNT (Bajec & Pickering, 2008; Yang et al., 2014; Yeomans et al., 2009). Tepper and Nurse (1998) showed preference for high fat salad dressings by PNT compared to PMT or PST.

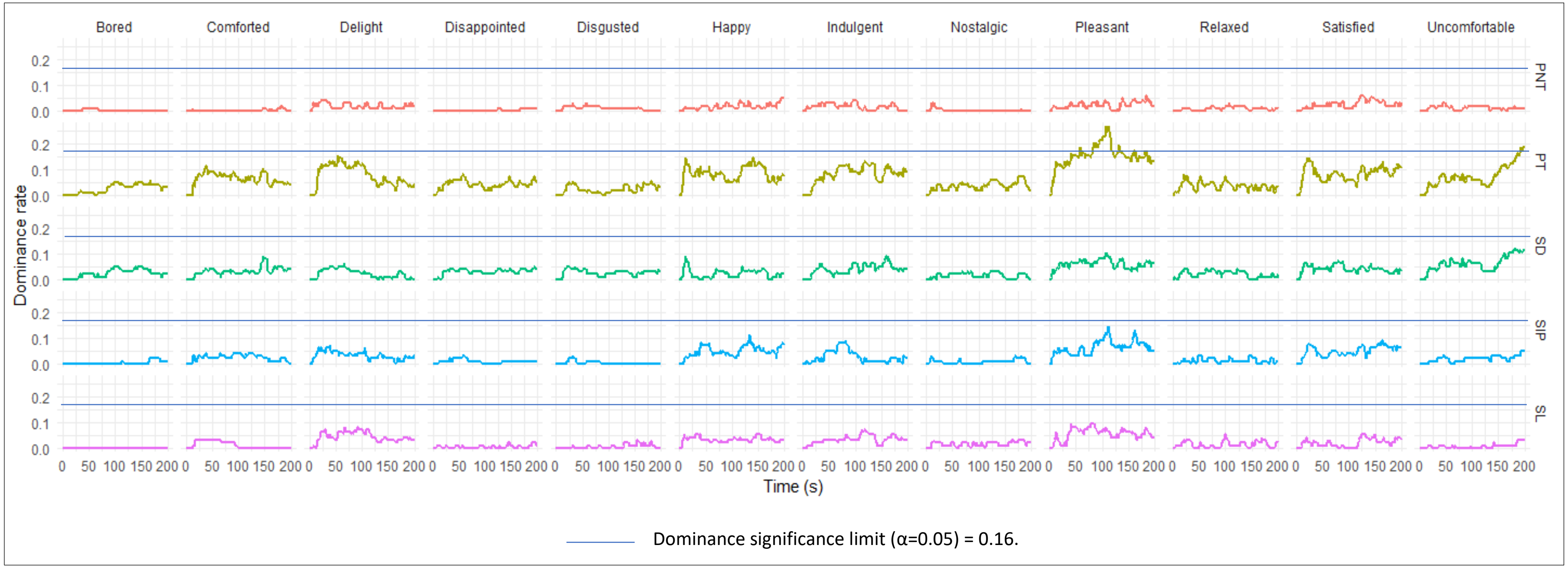


Figure 7.4: TDE curves of emotional responses for P1 (HFHSLT) over 8 sips by each taste phenotype classification. Taste phenotype classifications: PNT- PROP non taster, PT- PROP taster, SD- sweet disliker, SIP- sweet ideal pointer, SL- sweet liker.

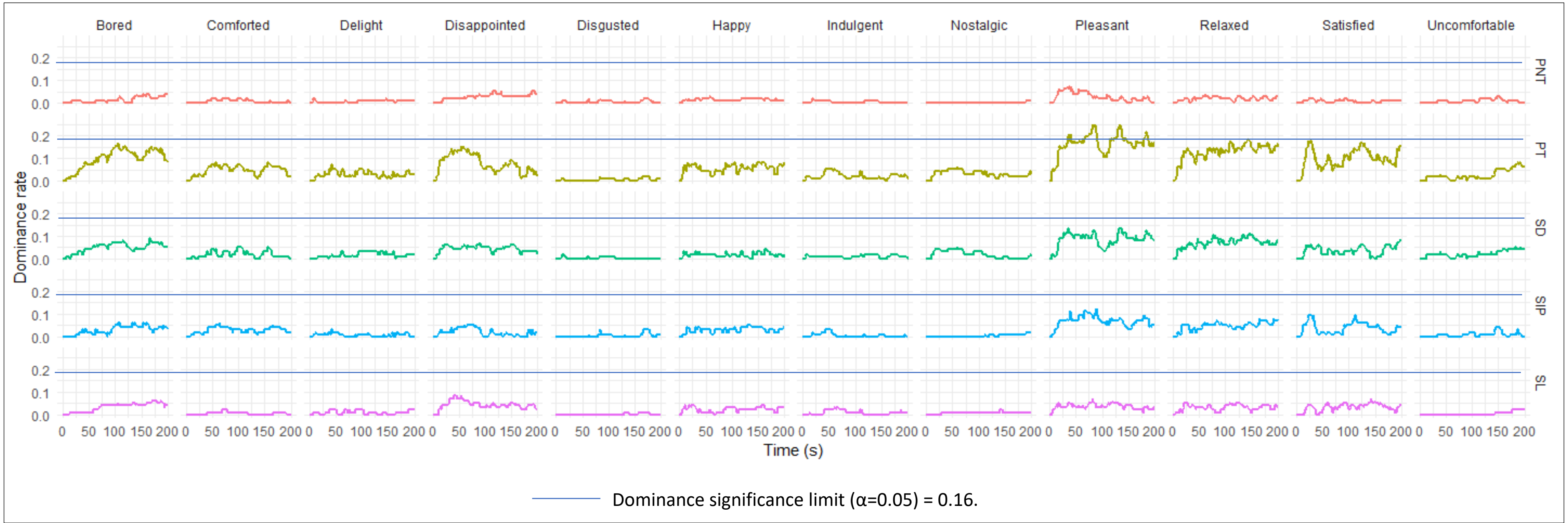


Figure 7.5: TDE curves of emotional responses for P4 (LFLSLT) over 8 sips by each taste phenotype classification. Taste phenotype classifications: PNT- PROP non taster, PT- PROP taster, SD- sweet disliker, SIP- sweet ideal pointer, SL- sweet liker.

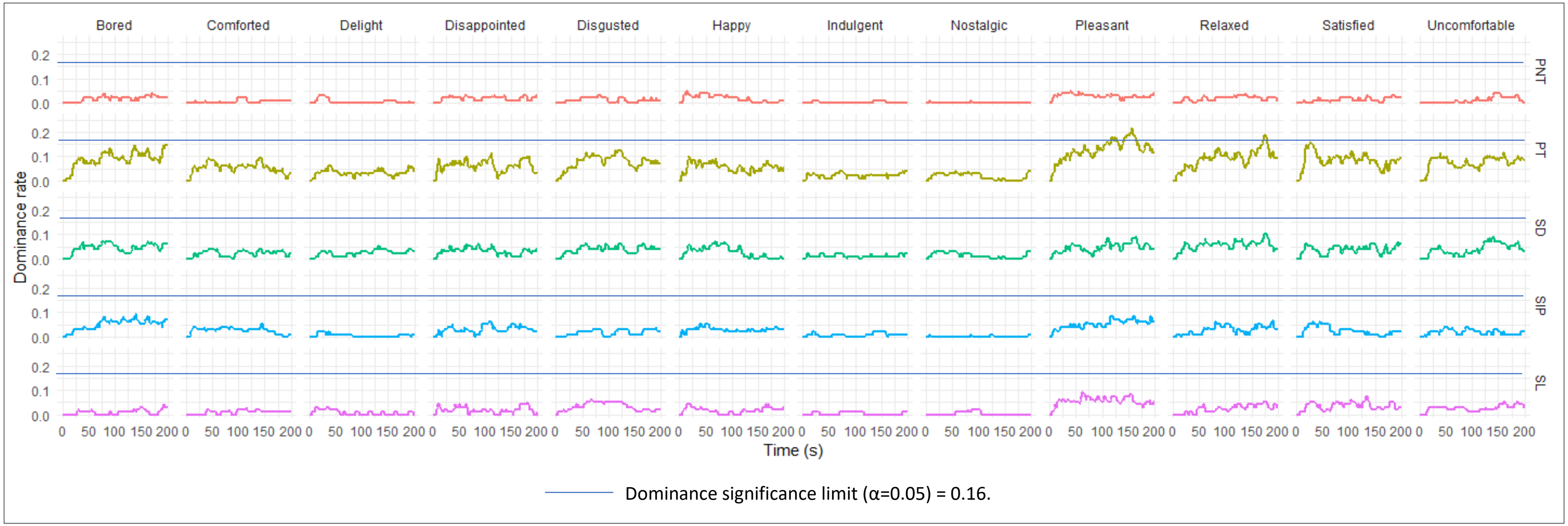


Figure 7.6: TDE curves of emotional responses of P6 (LFLS<u>S</u>HT) over 8 sips by each taste phenotype classification. Taste phenotype classifications: PNT- PROP non taster, PT- PROP taster, SD- sweet disliker, SIP- sweet ideal pointer, SL- sweet liker.

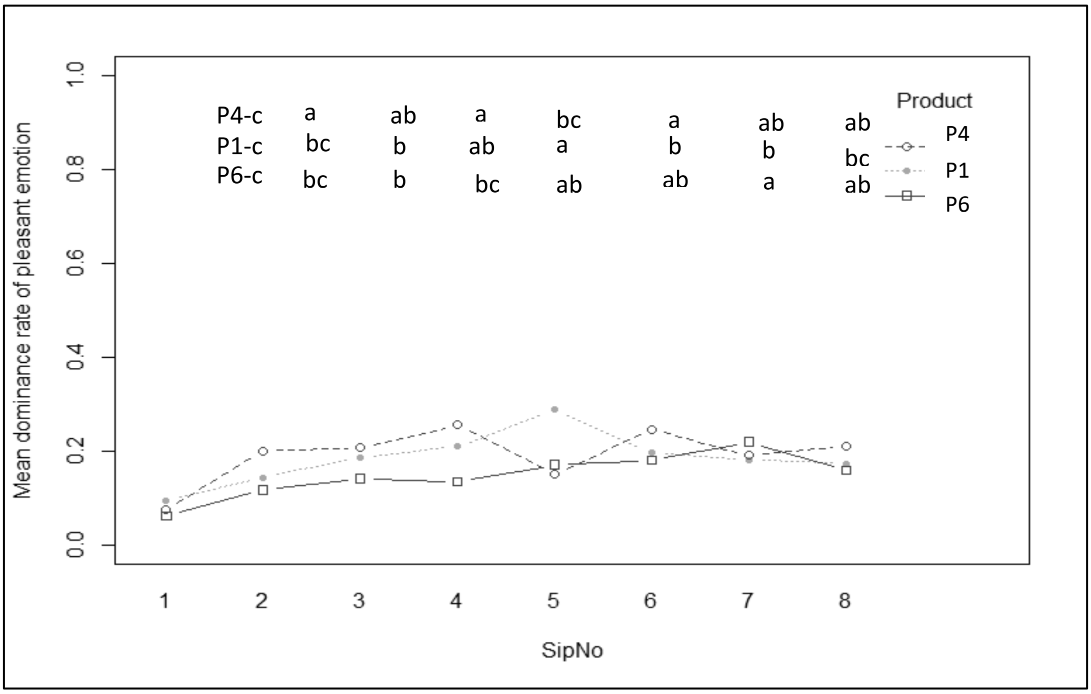

Figure 7.7: Interaction plot of *sip:product* of 'pleasant' emotion of PT category. Dominance rates 'abc' with different letters in a row are significantly different across sips for each product (*Holms*, $p<0.01$).

In fact, product specific emotional responses were likely based on differences in sensory perception related to each product. Specifically, the high sensitivity of PT for taste perception perhaps led them to feel the dominance of 'pleasant' emotion significantly more often than PNT. Therefore, TDE data presented in this chapter indicates potential drivers of product acceptance/rejection based on emotion perception of PT rather than that of PNT. PT, on average, showed increasing dominance rates over sips for 'pleasant' (Figure 7.8) which likely accounts for decreasing dominance rates, although not significant, for the negative emotion 'disappointed' (Figure 7.9). The findings indicate that product evaluations over multiple sips capture insights into the dynamics of dominant emotions and the likely relationships between emotions as observed with 'pleasant' and 'disappointed' for PT. Moreover, this indicates that the general data analysis was appeared to be the data from PT that was driving the observed effects.

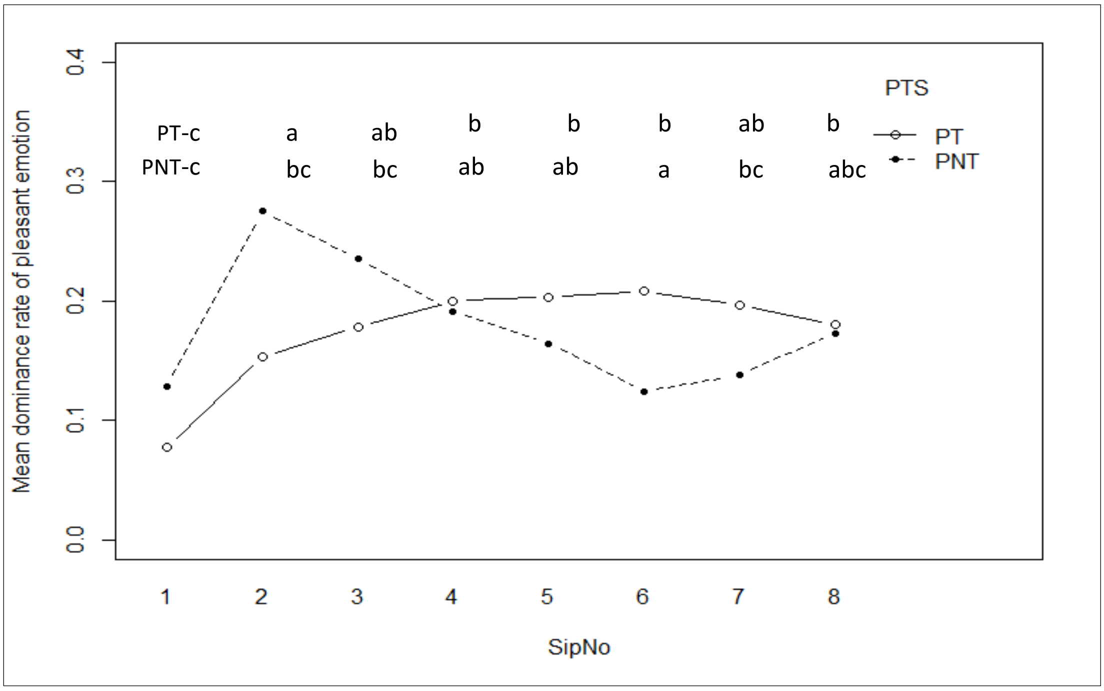


Figure 7.8: Interaction plot of *sip:PTS* for 'pleasant' emotion. PTS – PROP taster status, PT – PORP tasters and PNT – PROP non tasters. Dominance rates 'abc' with different letters in a row are significantly different across sips for each PTS group (*Holms*, p<0.01).

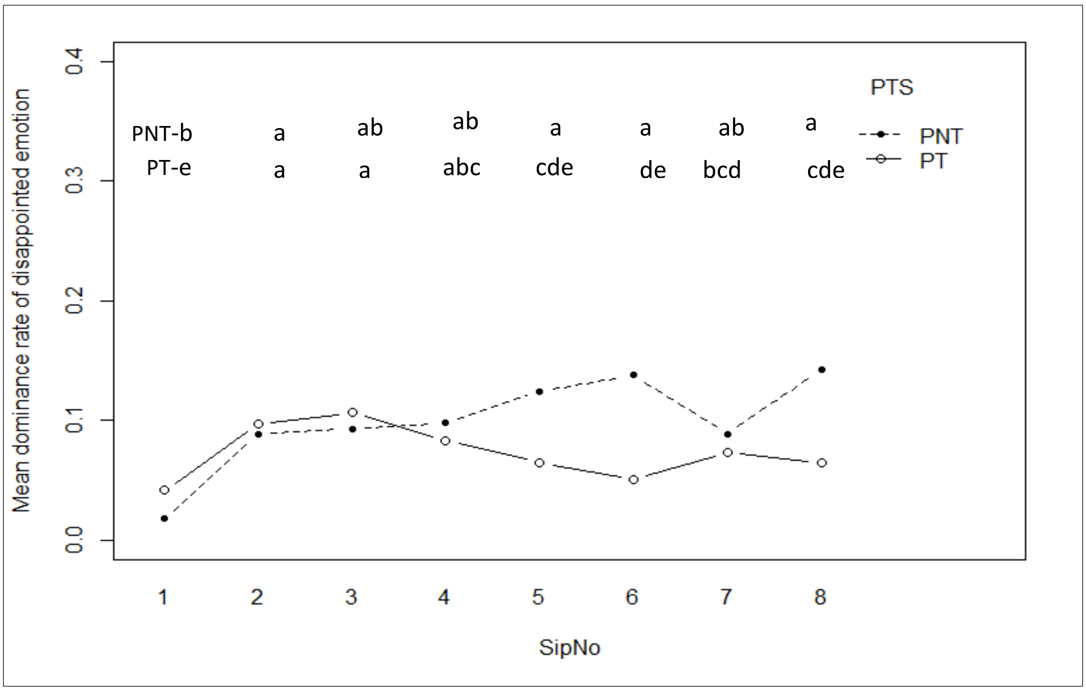


Figure 7.9: Interaction plot of *sip:PTS* for 'disappointed' emotion. PTS – PROP taster status, PT – PORP tasters and PNT – PROP non tasters. Dominance rates 'abc' with different letters in a row are significantly different across sips for each PTS group (*Holms*, p<0.01).

However, with the lack of dominant emotions, further research using TCATA over a multiple sips approach, i.e. opportunity to indicate all emotions evoked, may provide more detailed insights into such interactions across more emotions and phenotype categories.

### *7.4 Conclusions*

Somewhat surprisingly dominance rates did not reach significance for most emotions either on the whole or for the individual phenotypes. 'Pleasant' was the only emotion to dominate the experience of all the three products, and only at certain sips, emphasising wider variation in dominant emotion response across consumers. Only the PT phenotype demonstrated a differential effect on the perception of a dominant emotion, and this depended on the product and number of sips evaluated. In fact, the findings suggest that taste phenotype had little effect on dominant emotions. Therefore, measuring temporal emotions over multiple sips using the TCATA technique perhaps provide deeper insights into the impacts of individual differences on temporal emotions. Moreover, where possible, reducing the number of emotion terms by grouping synonymous terms into emotion groups and using few but highly discriminative emotion terms in temporal methodologies with consumers is advisable to obtain high resolution of data. Additionally, more studies with a wider range of product categories and a larger number of consumers will be required to broaden the understanding of the value of multiple sip TDE to explore the associations with individual differences.  Even though TDE was not successful in identifying detailed associations between individual differences and temporal dominance of emotions for milkshakes, it could possibly be useful to measure temporal emotions of products where emotion responses are likely to evolve rapidly during product evaluations, for example alcoholic beverages.

# Chapter 8. General discussion

The key objective of the research presented in this thesis was to compare insights from single versus multiple sip evaluations from different sensory and consumer techniques. First, the different insights from static and temporal methods (TCATA and TDS) were studied. Then, the impacts of sipping method and chosen panel type on variations in temporal sensory profiles of the milkshakes were investigated. Thirdly, temporal sensory and affective responses (emotions and liking) of consumers were explored to identify the drivers of product preference. Finally, the impact of individual differences on temporal dominance of emotions of consumers was considered.

Novel findings concerning the relative benefits of evaluating multiple sips, compared to a single sip, when measuring sensory and affective (hedonic and emotion) responses using temporal methodologies have been highlighted, especially where the goal is to capture actual consumer experiences. This chapter discusses the key findings of the research presented in the thesis, comments on some directions for future work and provides an overall conclusion.

## *8.1. Key findings*

### *8.1.1. Insights from static and temporal sensory techniques over multiple sips*

Chapter 3 was focused on comparing different insights from static versus temporal (TCATA and TDS) techniques regarding product profiles and differences during single sip evolution. A key objective of the chapter was to investigate how sensory insights vary from single sip versus multiple sips evaluations, and to employ a more discrete approach to the analysis of within-sip dynamics in temporal data with lack of independency.

At sip 1, the three sensory techniques, QDA, TCATA and TDS, obviously provided different sensory information, i.e. attribute intensity, attribute evolution and attribute dominance respectively. TCATA at sip 1 discriminated products on fewer attributes than QDA, as has been shown for CATA by Mello et al. (2019), Dos Santos et al. (2015) and (Cruz et al., 2013). TDS was discriminating only three attributes across products and hence a lesser product discrimination than QDA and TCATA. However, when an attribute was significantly dominant, TDS discriminated the products more than TCATA. Use of QDA to obtain attribute intensities will be required where a higher level of product differentiation is essential. For example, QDA product profiling at the early stages of product /concept development to discriminate and select a few product formulations to continue with the product development process. Combined use of TCATA and TDS in product evaluation by other researchers provided holistic temporal sensory profiles of products emphasising the evolution of attribute perception alongside which ones dominated the experience (Kawasaki et al., 2019). Therefore, it is important to consider QDA, TCATA and TDS as complementary methods rather than alternative measures in product characterisation to obtain holistic sensory profiles. The selection of a method should be aligned with the respective study objectives.

Research presented in this chapter 3 extended the traditional single or few sips evaluations of QDA, TCATA and TDS methodologies across eight sips to represent the consumption of a whole serving of a milkshake. By sip 8 in QDA, the expert panel indicated an increase of attribute discrimination across products. Moreover, product evaluation over eight sips provided insights into perceptual interactions and hence attribute build-up or adaptations. It is important to note that the expert panel only recorded evaluations on sip 1 and 8 of each product using QDA, emphasising that when using an expert panel evaluating the first and the last sips is sufficient to identify any differences evolved in the sensory profile of a product. Insights from multiple sip QDA only showed a few product specific variations. This possibly reflects the analytical approach of the trained expert panels in product evaluation (Lawless & Heymann, 2013) which may have over engineered their responses over multiple sips. Notably attributes were more discriminated across products with TCATA and TDS across multiple sips. The expert panel showed increases or decreases of citation proportions on some attributes in TCATA and hence the dynamics of build-up or adaptation effects. The findings likely suggest different approaches of the panellists when using these three methodologies, i.e. a quantitative approach in QDA versus a qualitative approach in TCATA and TDS.

Specifically, when the product formulation contained stevia, multiple sip TDS profiles showed an increase of dominance rate of liquorice across sips and loss of sweetness dominance towards later sips. However, in TCATA profiles, citation proportions decreased across sips for both liquorice and sweetness. In fact, the findings from multiple sip TCATA and TDS provided closer insights into what a consumer would experience during an actual consumption occasion, as found in chapter 5 related to TCATA product profiles, the research outcomes can be applied specifically where formulation changes are performed by replacing ingredients with alternatives for example stevia for sucrose in this milkshake system (Weerawarna N. R. P., Godfrey, Ellis, & Hort, 2021).

An additional novel contribution aspect that this work brings to the literature is the application of GLM models and Analysis of Deviance (Agresti, 2018b; Montgomery et al., 2012) for analysing proportions based, naturally correlated temporal sensory data (TCATA and TDS). To date, data from TCATA and TDS are not used in statistical models previously enabling the analyses of within-sip time points, which was achieved using GLM and Analysis of Deviance in this analysis. Investigations of within-sip effects (five selected timepoints within each sip) in TCATA and TDS differentiated whether an attribute significantly evolved in-mouth or after-swallowing of a product. Moreover, at sip 1, within-sip effects did not vary depending on the product and hence within-sip dynamics are more likely to be attribute specific. Therefore, if the oral processing of the panel (i.e. swallowing at 8 s in this study) was not controlled in an experiment with TCATA or TDS (or with other temporal methods) it would possibly show up as more deviation from the expected values when modelling temporal data using GLM and Analysis of Deviance. Therefore, the findings emphasised the importance of when a panellist reflected on an attribute in QDA. QDA does not capture within-sip dynamics by design. Therefore, the attribute intensity ratings obtained by QDA possibly reflect the highest perceived intensity or an overall perception for the whole within-sip dynamics. Moreover, within-sip dynamics showed variations across each additional sip evaluated and this effect was attribute and product specific. Specifically, within-sip analysis across multiple sips will be useful where specific detailed sensory product profiles are required, For example, insights from within-sip variations across multiple sips could be used in matching the sensory profile of a product with a competitors product or matching product profiles with alternative ingredients like stevia and sucrose as sweeteners.

Primarily, the findings from both single and multiple sips evaluations were attribute dependent and hence cannot be generalised to all product categories, or product formats. Application of GLM and Analysis of Deviance enable to analyse within-sip dynamics across multiple sips in temporal data, avoiding the issue of lack of independency in temporal data by nature. Therefore, temporal responses from adjacent time slices can be modelled for analysis. Milkshakes were used as the model product in this research. Beverages are often sold in individual packs with a straw or in a bottle and so the application of temporal methods to understand the impact of consumption method was deemed worthy of further investigation.

### *8.1.2. Impact of sipping method on multiple sip TCATA product profiles*

As detailed in chapter 4, the effects of cup versus straw sipping on multiple sip TCATA sensory profiles of the vanilla milkshake, and whether sipping method impacts the extent of product discrimination were explored.

Generally, higher citation proportions for attributes were obtained when sipping through a straw. Effects of sipping method varied depending on attribute, product, within-sip and for each additional sip evaluated. In comparison, flavour perception across sips was not affected by the sipping method. However, within-sip perceptions of sweetness and liquorice flavour were affected by the sipping method, i.e. the two flavour attributes were cited less frequently from a cup after-swallowing. Generally, the within-sip experience changed for each additional sip evaluated however the changes were not impacted by the sipping method. Even though the sipping method effects were marginal, it is important to note that the expert panel was sensitive enough to capture slight differences of attributes perception when sipped from a cup versus through a straw over multiple sips.

Moreover, the panel was discriminating products more when sipped from a cup. Flavour and mouthfeel attributes were more discriminated from a cup possibly owing to differences in flavour release and mouthcoating effects (Hashimoto et al., 2008; Lin et al., 2013; Salles et al., 2010; Selway & Stokes, 2014) from the two sipping methods. However, some flavour attributes, for example creamy flavour, were purported to be affected by perceptual interactions and hence resulted in higher product discriminations when sipped through a straw. In fact, the findings emphasised product specific perceptual differences depending on the chosen sipping method.

The research findings provide indications on potential perceptual differences of dairy beverages sold in the market in bottles, possibly intended to be drunk directly from the bottle or from a cup, and ‘on the go’ packs with a straw which are designed to be drunk through the straw. Specifically, these perceptual differences would be important to match sensory profiles of products over multiple sips, closely representing the actual consumer experience. Therefore, adjusting sensory evaluation protocols based on retail package design or product usage, i.e. to drink from a cup or through a straw, needs more emphasis. In chapters 3 and 4 the expert panel demonstrated they were sensitive to picking up differences between product and indeed the same product across different consumption methods. This led to the question as to how representative their data would be of consumers and the subsequent research reported in chapter 5.

*8.1.3. Impact of panel type on multiple sip TCATA product profiles*

The key question in chapter 5 was whether multiple sip TCATA product profiles would vary if different panel types were employed for product evaluation. Considerable differences were observed in the data obtained from the two panels in terms of product differentiation both within and across multiple sips. Generally, the expert panel gave higher citation proportions and larger differences in attribute citation proportions between products across time than the consumer panel. Additionally, the expert panel revealed differences across more, and different, attributes in product evaluation than the consumer panel. However, the consumer panel was not always less discriminating. An expert panel is required to closely match product profiles if replacing ingredients from an existing formulation to create low calorie formulations, for example partially replacing sucrose with stevia in product 6 (LFLS*S*HT), the findings emphasise the importance of investigating how such changes would be perceived by consumers. Similarly, only the consumer panel differentiated vanilla across products (even though the same amount was added in all the product formulations). The findings emphasis how consumers would be affected by perceptual interactions (Ares, Jaeger, et al., 2015; Barton, Hayward, Richardson, & McSweeney, 2020), and hence these are key considerations during product formulation development or changes.

Specifically, over multiple sips, consumers were reporting an increase or decrease of citation proportions likely owing to build-up, adaptation or both effects on attribute perception. Moreover, consumers were not able to differentiate dynamic patterns of attributes like astringency over multiple sips. This is possibly because astringency is a term that is not familiar to naïve consumers to an extent that they can differentiate across multiple sips in a product like a milkshake where astringency perception is very subtle with respect to the distinct perception of astringency of red wine or black tea. In fact, it is important to design the product evaluation experiments and subsequent decisions on product development or formulation changes after reflecting how consumers would perceive the product in an actual consumption occasion, i.e. over multiple sips using a single serving of a beverage (or multiple intakes of a product).

Also, in this research the sensory lexicon was not overly technical (except the two terms astringency and liquorice). Hence the same lexicon was used for both the expert and consumer panel TCATA evaluations in order to assist comparisons of the insights. If the sensory lexicon of the product or product category of interest contains difficult technical terms which are not familiar to consumers it is advisable to simplify the lexicon so that consumers understand easily. Specifically, with consumers if the lexicon is technically difficult, when using multiple sip TCATA where the responses are recoded with time, the consumer response time for evolving attributes could be slower resulting in lower citation proportions and low product discriminations. In fact, careful selection of a sensory lexicon is essential when using multiple sip TCATA with consumers. However, with expert panels the significance of complexity of a lexicon can be managed by training prior to product evaluations which is the standard.

Overall, results from chapter 5 revealed that the insights obtained from multiple sips TCATA vary depending on the type of panel employed and the insights are not interchangeable (Weerawarna N. R. P. et al., 2021). Therefore, selection of a panel must be related to the study objectives. In addition, the use of multiple sip evaluations with TCATA enable the capture of the different insights consumers would experience in an actual consumption occasion. Therefore, it is important to conduct TCATA evaluations with consumers where such consumer experience related information is required. Also, it is notable that these different insights obtained from the expert versus consumer panels were products and attribute specific. Therefore, more research is required with different product matrices to explore the applicability of these findings in other product categories.

Having discovered that consumers provide different sensory descriptions to experts using TCATA, the next question that arose was whether the observed changes in the dynamics of sensory perception could be linked to affective response.

### *8.1.4. Drivers of product acceptance and rejection over multiple sips*

Chapter 6 was focused on the interrelationships between temporal sensory, emotion and liking data. Consumers reported different temporal liking and temporal emotion profiles for each product. Variations of temporal liking and temporal emotions across multiple sips were product dependent. These associations were further confirmed by analysing standardised residuals from the GLM model across sips for each product. One of the highlights from the findings was that evaluation of at least 7 sips were required to capture the significant change in liking that occurred for products and emphasised the importance of measuring temporal liking of products over multiple sips, rather than overall static liking on one or few sips, to capture insights close to what the consumer would experience. In comparison, temporal emotion measures over multiple sips discriminated the products even more than temporal liking. Increased discrimination of products based on emotional responses compared to liking has been previously reported by Ng et al. (2013) using static techniques. Use of TCATA in this experiment was advantageous as it allowed recording emotions as they evolved during the consumption experience. In comparison to static RATA (Eaton et al., 2018), use of TCATA limits the number of emotion terms that can be used in respective lexicons. However, using a lower number of terms with TCATA (maximum of 10 terms as recommended by Castura et al. (2016) and Pineau et al. (2012)) could also be helpful in consumer studies if consumers' understanding of a wider range of emotions are not well established. Silva et al. (2018, 2019) emphasised the importance of multiple sip evaluation on temporal liking and temporal emotions (on temporal dominance of emotions) based on their findings over four sips of beer. Therefore, measuring temporal emotions alongside temporal liking and over multiple sips (to represent a whole serving of a product) enable the capture of the more specific product experience of the consumers. Further, the use of TCATA to measure temporal emotions provided insights beyond the dominance of emotions, which is useful in understanding the broader temporal emotion product profiles and their associations with temporal sensory perception.

Thereafter, associations of temporal liking and temporal emotions with temporal sensory responses were investigated to identify the drivers of product preference over multiple sips of milkshakes. Temporal emotion responses over multiple sips showed more associations with temporal sensory responses than temporal liking over multiple sips. Not surprisingly, temporal emotion responses were also associated with temporal liking, i.e. a higher number of citations for positive emotions with a higher number of citations of liking and vice versa for negative or neutral emotions. Identifying the temporal drivers of product preference is essential for food manufacturers when making decisions on product formulations, the use of substitute ingredients and retail size packaging. For example, liquorice flavour, caused by stevia used as a sucrose substitute, was highly associated with negative emotions and negative emotions were associated with higher dislike rates. Therefore, required formulation changes can be made to reduce the drivers for product dislike and rejection while uplifting the drivers for product liking and acceptance based on the associations of temporal sensory perception, emotions and liking with the number of sips evaluated.

In summary, the findings of this chapter add to knowledge on the use of emotional responses alongside liking where higher product discriminations and deeper insights into the drivers of product preference are required. Further, the findings specifically highlighted the superior use of temporal measures from multiple sips compared to static techniques on one or a few sips to obtain closer insights into consumer product consumption experiences. However, the selection of affective response measures will depend on the project objectives. For example, obtaining temporal dynamic evolutions of sensory and affective responses using temporal techniques during later product development/ product improvement stages and obtaining an overview of the whole tasting experience using static techniques for product concept/ design development would be beneficial. The evidence on associations of consumers dynamics of sensory and affective responses directed the final research question as to whether affective responses are further impacted depending on individual differences in taste response.

### *8.1.5. Impact of individual differences and temporal dominance of emotions over multiple sips*

In chapter 7 the influence of SLS and PTS on consumer response was investigated. Generally, only the 'pleasant' emotion was reported as significantly dominant and that was also only for the PT group. Individual TDE product profiles showed differences across sips where the 'pleasant' emotion became significant for each product towards the later sips. Overall, low dominance rates of emotion terms were likely indicating the spread of dominance across individuals, possibly a consequence of having a higher number of emotion terms in the TDE test. Additionally, the use of the concept of dominance, the TDE methodology did not provided detailed descriptions of how the emotions evolved over the time for each product. The emotion lexicon used in this research was developed using focus group studies to make sure the most discriminative terms related to the milkshakes were selected. Nevertheless, in the TDE analysis the consumer panel was citing low dominance rates for each emotion. Overall, the research findings of chapter 7 showed potential relationships of temporal emotions with PTS and SLS. Yang et al. (2018); Yang et al. (2019); Yang et al. (2020) showed relationships between individual differences and emotional responses using static techniques. However, the use of TDE to understand relationships between temporal emotions and individual differences was not satisfactory, emphasising the need to use TCATA instead of TDE in this investigation. In fact, individual differences are a key aspect to consider on top of temporal emotions or liking responses to identify the drivers of product preference and hence a consideration for food technologists/ sensory scientist during product development.

### *8.1.6. Overall summary*

The findings of this research added to the knowledge on using temporal measures over multiple intakes to represent the consumption of a whole product serving. Initially, with expert panels, performing QDA over multiple sips was advantageous to obtain better product discrimination. Interestingly, expert panels do not need to perform QDA on each sip but the first and the last sips of each product to capture these different insights. Multiple sip QDA along with multiple sip TCATA and TDS provided complementary insights in obtaining complete sensory profiles of products, i.e. attribute intensity, dynamics of attribute evolution and dynamics of attribute dominance.

For the first time, this thesis presents a more appropriate GLM and Analysis of Deviance approach to analyse temporal data which are naturally correlated and processed as proportions. This approach also enabled the analysis of the within-sip dynamics of attribute evolution, and another novel addition to knowledge on existing temporal data analysis approaches.

The dynamics of sensory perception over multiple sips varied depending on the attribute and product sipping method, i.e. whether sipped from a cup or through a straw. These findings emphasised the requirement to adjust product tasting protocols according to the intended use (sipping method) of the product.

Moreover, insights from multiple sip TCATA varied with respect to the chosen panel type, i.e. expert or consumer panels. Insights obtained from the two panel types were not interchangeable and the selection of panel type will be aligned with respective project objectives. Moreover, consumers responses on the dynamics of sensory perception were associated with their affective responses (i.e. emotional liking responses). Furthermore, these dynamics of sensory, emotions and liking responses were also associated with each additional sip evaluated. Additionally, consumer emotional responses also varied with individual differences. The use of the TDE approach to measure consumer emotional responses only showed significant interactions with the PT phenotype group. Therefore, emotional responses obtained using a TCATA approach will be more suitable to broadly identify any existing associations of temporal emotions with PTS and SLS. Additionally, other individual differences such as TTS and fatty acid taster status could be used with SLS and PTS to widen the understanding on the impacts of individual differences on consumer affective responses over multiple sips, however, they will require screening of a greater number of consumers.

The research highlighted many advantages of using multiple sips measure in temporal techniques to capture closer insights into consumers actual product experience. However, cost and the number of samples which can be evaluated in a session due to the consumption of a high volume of each product become limiting factors in multiple sip evaluation experiments. Moreover, most of the research findings showed attribute and product specific variations. Therefore, wider research using a greater number of products and different food matrices is required to understand the applicability of these research findings to other food matrices. Additionally, it is important to mention the recognition of time and cost limitations in industry or research sectors and consequent weighing up of the project budget, objectives and value of multiple sips and combined method evaluation approaches.

### *8.1.7 Limitations*

Despite the novel findings on the use of temporal techniques over multiple sips, this research did have some limitations. For example, due to cost and time constraints, the experiments in this research were conducted using only one product category (milkshakes) and six formulations. Furthermore, consumer studies were conducted only on three products selected from the above six products. Generally, these findings were product and attribute specific. Therefore, results cannot necessarily be validated against other food matrices. Additionally, the comparison of insights from different panel types and sipping methods were only based on

TCATA data and there is a need to explore the applicability of the findings with respect to TDS and other temporal methods.

Temporal liking responses were merged from nine levels to three levels in order to focus on the key interrelationships with temporal sensory and emotional responses, which may have caused the loss of detailed insights into the evolution of temporal liking. Further, this research was lacking a static affective response data set (i.e. static liking and emotional responses) to compare against the temporal affective response data. Another limitation of consumer studies with multiple sip product evaluations is that all participants are required to consume all sips regardless their liking for the product. However, consumers who generally liked and consumed milkshake more often were recruited to minimise this limitation.

Temporal sensory and affective responses were measure in three different days. As the research findings revealed that the temporal sensory perception, temporal emotional and liking responses having impacts on each other it would be ideal to collect all the sensory and affective responses on the same day. However, this ideal experimental design was compromised to minimise information overloading for naïve consumers during familiarisation sessions explaining each sensory, emotions and liking lexicons and TCATA method.

Consumer studies were conducted using 104 consumers, which caused to merge PTS classification into two categories to obtain a sufficient number of consumers in each phenotype combination group. The current work was also limited to exploring the relationships of only two taste phenotypes, SLS and PTS, with affective responses, which could have provided in depth insights if performed using more taste phenotypes and a larger group of consumers. Additionally, as mentioned earlier, the use of TDE to explore the relationship of temporal emotions and individual differences was not successful. Alternatively, the use of a TCATA approach in recording temporal emotions is suggested.

## 8.2. *Future work*

Generally, findings from this research were attribute and product specific. Therefore, investigating more products and extending similar multiple intake experiments to other product categories (i.e. primarily to other liquid foods/ beverages and then semi-solid and solid food matrices) will be required to validate and add to these findings.

Specific future work required related to different experiments presented in this thesis are presented below.

### 8.2.1. *Use of GLM and Analysis of Deviance for temporal data analysis*

The use of GLM and Analysis of Deviance, provides the opportunity to select time slices more frequently than five time slices per within-sip if thorough investigations on the evolution of attributes are required. Therefore, as the next step, selecting time slices at a higher frequency for the same experiments would be beneficial to explore what extra insights could be obtained.

### 8.2.2. *Static **and** temporal sensory techniques rather than static **versus** temporal techniques*

QDA, TCATA and TDS have their unique applications by themselves, however using the three techniques as complementary approaches rather than alternative approaches would provide holistic understanding to product profiles. In fact, future work with expert panels could be adjusted to perform with QDA, TCATA and TDS, where obtaining insights into whole sensory product profiles are required. The experiment presented in this research with the expert panel was only conducted using two replicates. However, if there are no or less cost and time constrains it will be useful to perform these experiments with three or more replicates to further validate the insights from the expert panel. Although out of scope for this research temporal methodologies also provide a new way of looking at the effect of composition on products in future work.

### 8.2.3. Panel type selection and adjusting tasting protocols

Findings from chapter 5 showed that the insights from multiple sip TCATA varied depending on the chosen panel type and the insights from the two panels were not interchangeable. Insights from multiple sip TCATA using an expert panel further varied depending on the sipping method. Therefore, the next research question would be to investigate how sipping method impacts on the dynamics of sensory perception if a consumer panel was employed. Consequently, there may be a need to adjust tasting protocols to match the intended consumption method for the product format/ usage. Drivers of consumer product preference and individual differences

Sensory perception was associated with consumer emotions and liking over time and hence indicate drivers of product acceptance or rejection. Therefore, investigating both temporal emotions and liking alongside temporal sensory responses over multiple sips by consumers will provide an in depth understanding into consumer product preferences. Moreover, consumers temporal emotional responses were affected by individual differences. However, the next set of research will be required to use a multiple sip TCATA approach to capture dynamics of emotions to investigate associations of temporal emotions and individual differences. Additionally, extending this experiment to incorporate taste phenotypes TTS (Hort et al., 2016; Yang et al., 2018) and fatty acid taster status (Nasser, Kissileff, Boozer, Chou, & Pi-Sunyer, 2001; Stewart, Feinle-Bisset, & Keast, 2011), other than SLS and PTS, personality traits and food choice behaviours (Eertmans, Victoir, Vansant, & Van den Bergh, 2005; Gibson, 2006; Machado-Oliveira, Nezlek, Rodrigues, & Sant'Ana, 2020), and demographic variables (Yang et al., 2020) employing a larger number of consumers will be advantageous.

## 8.3. Conclusions

In conclusion, multiple sips were found to be more discriminative in product evaluations than only a single sip in sensory and consumer methodologies presented in this research.

It was shown that the use of static QDA techniques alongside TCATA and TDS techniques provided deeper insights into the sensory profiles of products and hence should be considered as complementary methods rather than alternative approaches where project budget allows.

Temporal sensory perception also varied depending on the chosen sipping method. Generally, sipping through a straw provided higher citation proportions for attributes while sipping from a cup discriminated more attributes across the products. Moreover, temporal sensory profiles of the products varied by the panel type, i.e. expert versus consumer panels, employed for product evaluation. Expert panels were less affected by perceptual interactions whereas consumer responses reflected that they were affected by perceptual interactions. Temporal product profiles by the expert panel showed their analytical approach in product evaluation versus holistic approach by the consumers.

Consumer temporal emotion responses discriminated products more than with temporal liking. The consumer panel showed associations between temporal sensory and temporal emotional responses. Temporal emotional responses were additionally associated with temporal liking, i.e. positive emotions with higher liking rates and negative emotions with higher dislike rates for products. The associations between temporal sensory, emotions and liking responses showed drivers of consumer product preferences.

In addition, consumer temporal emotions were affected by individual differences in taste phenotypes. In fact, it is important to consider capturing holistic insights, i.e. with temporal sensory, emotions, liking responses and individual differences, into consumer product experience when designing consumer research.

Overall, the key aspect of all the findings was that they varied depending on the product and attributes. In fact, it is essential to conduct more research using a wider range of products and product categories to investigate the potential applicability of this research into broader research areas in sensory and consumer sciences.

Furthermore, it is important to note that at the present with increasingly evolving demand for food and hence a competitive food industry, evaluating product profiles using sensory and consumer methodologies beyond a single sip, i.e. over multiple sips representing consumption of a whole serving, is essential to ensure sensory investigations meet ever widening consumer wants and novel food trends. This thesis presents novel evidence for industry and academic researchers that perception of products across multiple sip evaluations should be more widely considered. It provides a way forward for sensory and consumer scientists to adapt their product profiling approaches over multiple intakes using appropriate panel types with respect to product usage using a range of temporal measure alongside static techniques.

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# Appendices

Appendix A: Pre-screening questionnaire

## Personal Details

Name:

Date of Birth:

Phone:

Email:

Gender:

For females, are you currently pregnant or lactating?

## Time

Are you regularly available for the follow times? Please mark preference next to the time slots.

| **Monday**: | **Tuesday**: | **Wednesday**: |
|---|---|---|
| 9:30am – 11:30am | 9:30am – 11:30am | 9:30am – 11:30am |
| 12:30pm – 2:30pm | 12:30pm – 2:30pm | 12:30pm – 2:30pm |
| **Thursday**: | **Friday:** | |
| 9:30am – 11:30am | 9:30am – 11:30am | |
| 12:30pm – 2:30pm | 12:30pm – 2:30pm | |

How often do you go away on holiday?

Do you have any holidays booked for 2018 (Please specify dates)?

Will you live in Palmerston North (or surrounding areas) in the next 5 years?

Do you have previous or current experience as a sensory trained panellist?

If yes, are you currently a trained panellist?

How many days per week do you currently work as a trained panellist?

**Health**

Please indicate if you have any of the following:

- ☐ Dentures
- ☐ Diabetes
- ☐ Oral or gum disease
- ☐ Hypoglycemia
- ☐ Hypertension
- ☐ Food allergies:
  - ☐ Alcohol in small quantities
  - ☐ Aspartame
  - ☐ Quinine
  - ☐ Caffeine
  - ☐ Gluten
  - ☐ Crustacean and crustacean derivatives
  - ☐ Molluscs and mollusc derivatives
  - ☐ Fish and Fish derivatives
  - ☐ Milk and milk derivatives including lactose
  - ☐ Egg and egg derivatives
  - ☐ Nuts and sesame seed and peanuts and derivatives
  - ☐ Soya
  - ☐ Added Sulphites
  - ☐ Royal jelly or Bee pollen or Propolis

- ☐ Micronutrients such as Folic Acid, selenium etc.
- ☐ Animal Protein
- ☐ Animal Fats
- ☐ Preservatives
- ☐ Kiwi Fruit
- ☐ Lupins
- ☐ Celery
- ☐ Mustard
- ☐ Other (Please specify):

Are you on any medications?

**<u>Food Habits</u>**

1. Are you currently on a restricted diet? *e.g*: Vegan, Vegetarian, Atkins, Reduced Calorie *etc*.
2. How often do you eat out in a month?
3. When you eat out, where are you likely to go?
4. What is your favourite food(s)?
5. What are your least liked foods?

Are there any foods you *cannot* eat?

**<u>Living Habits</u>**

1. Do you regularly wear a fragrance or after-shave?
2. Do you prefer perfumed or non-perfumed soap and detergents?
3. What are some odours you find appealing?
4. Do you smoke? If yes, how frequently?

**Flavour Quiz**

1. How would you describe the difference between flavour and aroma?
2. How would you describe the difference between flavour and texture?
3. What are some words you would use to describe the flavours of cola?
4. Describe some of the noticeable flavours in mayonnaise.
5. What are some textural properties of peanut butter?
6. What are some textural properties of steak?
7. If a recipe calls for yogurt and you are out what would you replace it with?
8. What are some products that have a herbal smell?
9. Describe some noticeable aromas in cheese.

How did you find out about this opportunity?

Appendix B: Panellist screening session overview

1. Screening session 01
    - Scaling test – shaded symbol scale evaluation
    - Taste recognition; sweet, sour, salty, bitter, metallic and umami (ISO3972:2011(E))
    - Flavour recognition; lemon, almond, rancid milk/ cheese, cloves, mashed potato, mushroom and tainted meat, (ISO5496:2006(E))
    - Descriptor development - five unsweetened yoghurts and four strawberry yoghurts
2. Screening session 02
    - Taste recognition – repeat as in screening 01
    - Triangle tests; Calcium-trim *versus* trim milk, full cream *versus* semi-skimmed milk, plain yoghurt *versus* plain yoghurt with added sugar
    - Ishihari test for colour blindness
    - Taste recognition and ranking bitter and metallic solutions, three levels each
    - Ranking; milk - overall flavour and viscosity, yoghurt – sweetness; four levels each
3. Screening session 03
    - Triangle tests; metallic versus water, oxidised versus unoxidised milk
    - Texture related descriptor development using chia seed pudding
    - Ranking textures; thickness – yoghurt (4 levels), firmness – cheese (5 levels), graininess – peanut butter (4 levels)
    - Descriptor development for meat (steak rump; steamed versus pan fried) aroma, taste, texture and aftertaste

Screening data were collected using Compusense® Cloud.

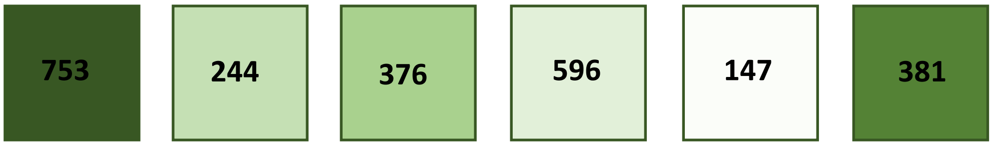
Appendix C: Shaded symbol activity for practicing rank-rating method

Panellist ID:…………………

**Coloured Squares Activity for Rank Rating**

**Ranking – colour intensity**

1. Please rank the colour intensity of squares below.
2. Place the squares in increasing colour intensity in front of you from left to right for the next activity.
3. Write the three-digit codes to indicate your perceived rank order for colour intensity, 1st being the lightest colour and 6th the darkest.




1st:…………… 2nd:……………. 3rd:…………… 4th:…………... 5th:……………. 6th:……………

**Rating – colour intensity**

1. You have ranked the colour intensity of the squares in increasing order.
2. Please rate the relative colour intensity of the squares on the line scale below.
3. Use your 1st and the 6th rank orders as your starting and ending anchor points, respectively on the rating scale.

Lightest Darkes

Appendix D: Mean attribute intensity ratings and standard deviation (SD) of vanilla milkshakes using rank rating after training round 3.

| Product | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 1 | 14.8[a] | 0.6 | 13.8 | 2.0 | 13.2[a] | 2.1 | 14.2[a] | 1.8 | 14.2[a] | 1.1 | 13.7 | 2.7 | 0.8 | 2.2 | 0.6 | 0.8 |
| 2 | 8.3[c] | 2.7 | 8.8 | 3.9 | 14.4[a] | 1.1 | 13.4[a] | 1.6 | 12.9[a] | 3.0 | 13.0 | 2.0 | 3.3 | 4.7 | 0.2 | 0.3 |
| 3 | 12.2[b] | 1.9 | 8.6 | 5.7 | 1.6[c] | 2.5 | 1.5[c] | 1.6 | 0.7[c] | 0.8 | 2.0 | 2.7 | 8.1 | 4.8 | 1.9 | 2.2 |
| 4 | 2.5[d] | 2.0 | 3.5 | 3.8 | 1.1[c] | 1.4 | 1.0[c] | 1.5 | 0.8[c] | 1.2 | 0.7 | 1.9 | 11.1 | 4.8 | 4.0 | 3.8 |
| 5 | 1.3[d] | 1.7 | 2.1 | 3.7 | 5.4[b] | 2.9 | 4.3[b] | 3.0 | 6.5[b] | 2.0 | 6.5 | 3.3 | 8.9 | 4.6 | 4.7 | 4.0 |
| 6 | 1.3[d] | 2.1 | 3.1 | 2.7 | 4.5[b] | 3.3 | 4.1[b] | 2.2 | 7.3[b] | 3.3 | 5.8 | 2.5 | 9.3 | 3.8 | 13.3 | 4.8 |

Data are means of nine panellists and SD of replicates (n=2).

[abcd] Products within a column with different lowercase letter codes, are significantly different from each other (Tukey's HSD, $p<0.05$).

Appendix E: Summary of p values from two-factor ANOVA for attribute intensity ratings on the milkshakes, from training round 3. Bold font represents significant terms ($p < 0.05$).

| | Sweetness | Vanilla | Creamy flavour | Creamy mouthfeel | Thickness | Mouthcoating | Astringency | Liquorice |
|---|---|---|---|---|---|---|---|---|
| *Panellist* | 0.201 | 0.972 | 0.947 | 0.928 | 0.754 | 0.899 | 0.913 | 0.588 |
| *Product* | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** | **<0.001** |
| *Panellist:Product* | 0.092 | **0.009** | 0.291 | 0.053 | 0.719 | **0.008** | **<0.001** | **<0.001** |

Appendix F: Published emotion terms and their definitions based on thesaurus (Microsoft Word for Office 365).

| Emotions | | Definition: I feels…… |
|---|---|---|
| 1 | Active | Energetic activity or could be engaged in continuous activity |
| 2 | Accomplished | Highly skilled |
| 3 | Adventurous | Willing to undertake or seek out new and daring enterprises |
| 4 | Affectionate | Wants to show caring side/ love for somebody |
| 5 | Aggressive | Confrontational |
| 6 | Amused | Pleasantly occupied |
| 7 | Angry | Anger |
| 8 | Bored | Feel not interested in somebody/something |
| 9 | Calm | Steadiness of mind (under stress) |
| 10 | Caring | A loving feeling |
| 11 | Cheeky | Being rude in an annoying way |
| 12 | Comforted | Made comfortable (in a time of distress) |
| 13 | Contempt | Lack of respect accompanied by a feeling of intense dislike |
| 14 | Daring | Challenged to do something dangerous |
| 15 | Deceived | Has been given false information/experience |
| 16 | Determined | Strong determination |
| 17 | Delight | Extreme pleasure or satisfaction |
| 18 | Desire | Left wanting more |
| 19 | Detached | No emotional involvement |
| 20 | Disgusted | Repulsed |
| 21 | Discontented | Dissatisfaction or restless longing |
| 22 | Dissatisfied | No satisfaction |

Appendix F continued.

| Emotions | | Definition: I feels… |
|---|---|---|
| 23 | Disappointed | My hopes or expectations are not met |
| 24 | Enthusiastic | Great excitement and interest |
| 25 | Excited | Very enthusiastic |
| 26 | Fearful | Fear |
| 27 | Free | Unrestricted or uncontrolled |
| 28 | Friendly | Relaxed as though you are among friends |
| 29 | Full of life | Energetic, full of spirit |
| 30 | Glad | Joy or pleasure |
| 31 | Good | Pleasant, that you enjoy or want |
| 32 | Good natured | Kind, friendly and patient when dealing with people |
| 33 | Guilty | Ashamed of something you have done that you know is wrong |
| 34 | Gentle | Soft and mild |
| 35 | Happy | Enjoyment, joy or pleasure |
| 36 | Interested | Curiosity or fascination or concern |
| 37 | In harmony | Agreeable |
| 38 | Indulgent | I'm doing something I enjoy |
| 39 | Judgmental | I'm judging something/someone |
| 40 | Loving | Love and affection |
| 41 | Mild | Nothing extreme |
| 42 | Nervous | Easily agitated |
| 43 | Nice | Pleasant or pleasing or agreeable in nature |
| 44 | Nostalgic | Happily reminded of familiar things or persons |
| 45 | Pleasant | Happy |

Appendix F continued.

| Emotions | Definition: I feels… | |
|---|---|---|
| 46 | Playful | Full of fun and high spirit |
| 47 | Raging | Violent/angry/very intense |
| 48 | Rational | Consistent, that I'm using reason |
| 49 | Relaxed | No strain or anxiety |
| 50 | Romantic | Soulful or amorous |
| 51 | Sad | Sorrow or unhappiness |
| 52 | Satisfied | Filled with satisfaction |
| 53 | Secure | Free from doubt; easy in mind |
| 54 | Sentimental | Tender, romantic or nostalgic feeling |
| 55 | Stressed | Distress |
| 56 | Surprised | Taken unaware or suddenly and feeling wonder or astonishment |
| 57 | Tame | Willing to do what other people ask; uninspiring |
| 58 | Troubled | Distressed in possible danger |
| 59 | Trustworthy | Worthy of trust or belief |
| 60 | Usual | Different to my usual self |
| 61 | Unusual | Not usual or common or ordinary |
| 62 | Uncomfortable | Discomfort |
| 63 | Unpleasant surprise | Disagreeable surprise |
| 64 | Warm | Enthusiasm and/or affection; friendly |
| 65 | Worried | Anxious/uneasiness or trouble or grief |
| 66 | Wild | A lack of discipline or control; full of very strong feeling |

Appendix G: Advertisement used in consumer panel recruitment

Appendix H: TCATA observed mean citation proportions and standard error (SE) of sensory attributes of vanilla milkshake (sipping from a cup) by the expert panel.

| *Product* | *Sip* | *Within-sip* | Observed mean citation proportions and SE of attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.83 | 0.09 | 0.39 | 0.12 | 0.39 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.94 | 0.06 | 0.67 | 0.11 | 0.61 | 0.12 | 0.56 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | 0.67 | 0.11 | 0.56 | 0.12 | 0.56 | 0.12 | 0.56 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 15 | 0.72 | 0.11 | 0.50 | 0.12 | 0.78 | 0.10 | 0.56 | 0.12 | 0.50 | 0.12 | 0.72 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 1 | 19 | 0.72 | 0.11 | 0.56 | 0.12 | 0.67 | 0.11 | 0.44 | 0.12 | 0.33 | 0.11 | 0.89 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 2 | 3 | 0.72 | 0.11 | 0.50 | 0.12 | 0.33 | 0.11 | 0.28 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 2 | 7 | 0.94 | 0.06 | 0.78 | 0.10 | 0.50 | 0.12 | 0.67 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 11 | 0.61 | 0.12 | 0.67 | 0.11 | 0.61 | 0.12 | 0.72 | 0.11 | 0.39 | 0.12 | 0.50 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 15 | 0.56 | 0.12 | 0.61 | 0.12 | 0.56 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.67 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 2 | 19 | 0.67 | 0.11 | 0.61 | 0.12 | 0.56 | 0.12 | 0.33 | 0.11 | 0.33 | 0.11 | 0.67 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 3 | 3 | 0.72 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 7 | 0.94 | 0.06 | 0.72 | 0.11 | 0.50 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 11 | 0.61 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.78 | 0.10 | 0.78 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 15 | 0.78 | 0.10 | 0.56 | 0.12 | 0.61 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 | 0.72 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 3 | 19 | 0.83 | 0.09 | 0.61 | 0.12 | 0.72 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.78 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 4 | 3 | 0.56 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 4 | 7 | 0.94 | 0.06 | 0.61 | 0.12 | 0.39 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | 0.72 | 0.11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.72 | 0.11 | 0.72 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 4 | 15 | 0.67 | 0.11 | 0.50 | 0.12 | 0.72 | 0.11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 19 | 0.78 | 0.10 | 0.44 | 0.12 | 0.61 | 0.12 | 0.56 | 0.12 | 0.44 | 0.12 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 5 | 3 | 0.39 | 0.12 | 0.39 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 5 | 7 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 11 | 0.89 | 0.08 | 0.67 | 0.11 | 0.50 | 0.12 | 0.72 | 0.11 | 0.78 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 |
| 1 | 5 | 15 | 0.72 | 0.11 | 0.50 | 0.12 | 0.67 | 0.11 | 0.83 | 0.09 | 0.61 | 0.12 | 0.50 | 0.12 | 0.00 | 0.00 | 0.06 | 0.06 |
| 1 | 5 | 19 | 0.61 | 0.12 | 0.50 | 0.12 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.67 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 6 | 3 | 0.50 | 0.12 | 0.39 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.50 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 6 | 7 | 0.78 | 0.10 | 0.39 | 0.12 | 0.39 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 11 | 0.89 | 0.08 | 0.61 | 0.12 | 0.44 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 15 | 0.72 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.44 | 0.12 | 0.72 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 19 | 0.78 | 0.10 | 0.72 | 0.11 | 0.72 | 0.11 | 0.44 | 0.12 | 0.44 | 0.12 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 7 | 3 | 0.61 | 0.12 | 0.50 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 7 | 7 | 0.44 | 0.12 | 0.39 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 11 | 0.94 | 0.06 | 0.61 | 0.12 | 0.50 | 0.12 | 0.56 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 15 | 0.83 | 0.09 | 0.67 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.72 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 19 | 0.67 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 8 | 3 | 0.72 | 0.11 | 0.44 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 8 | 7 | 0.67 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.44 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 8 | 11 | 0.89 | 0.08 | 0.61 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 15 | 0.94 | 0.06 | 0.67 | 0.11 | 0.56 | 0.12 | 0.67 | 0.11 | 0.72 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 19 | 0.72 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.67 | 0.11 | 0.56 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 1 | 3 | 0.72 | 0.11 | 0.50 | 0.12 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 7 | 0.94 | 0.06 | 0.67 | 0.11 | 0.56 | 0.12 | 0.67 | 0.11 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 11 | 0.56 | 0.12 | 0.56 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 15 | 0.50 | 0.12 | 0.50 | 0.12 | 0.67 | 0.11 | 0.61 | 0.12 | 0.44 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 1 | 19 | 0.50 | 0.12 | 0.61 | 0.12 | 0.50 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 | 0.50 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 2 | 3 | 0.44 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 7 | 0.94 | 0.06 | 0.78 | 0.10 | 0.50 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 2 | 11 | 0.67 | 0.11 | 0.72 | 0.11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 2 | 15 | 0.56 | 0.12 | 0.50 | 0.12 | 0.67 | 0.11 | 0.56 | 0.12 | 0.56 | 0.12 | 0.78 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 2 | 19 | 0.50 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.78 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 3 | 3 | 0.50 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 3 | 7 | 0.94 | 0.06 | 0.72 | 0.11 | 0.28 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.78 | 0.10 | 0.61 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 3 | 15 | 0.44 | 0.12 | 0.56 | 0.12 | 0.83 | 0.09 | 0.67 | 0.11 | 0.44 | 0.12 | 0.61 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 3 | 19 | 0.56 | 0.12 | 0.72 | 0.11 | 0.67 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.67 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 4 | 3 | 0.44 | 0.12 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 4 | 7 | 0.78 | 0.10 | 0.61 | 0.12 | 0.33 | 0.11 | 0.28 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 4 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 15 | 0.56 | 0.12 | 0.61 | 0.12 | 0.78 | 0.10 | 0.72 | 0.11 | 0.50 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 4 | 19 | 0.61 | 0.12 | 0.67 | 0.11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.33 | 0.11 | 0.72 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 5 | 3 | 0.22 | 0.10 | 0.22 | 0.10 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 |
| 2 | 5 | 7 | 0.72 | 0.11 | 0.44 | 0.12 | 0.33 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 2 | 5 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.61 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 5 | 15 | 0.67 | 0.11 | 0.56 | 0.12 | 0.61 | 0.12 | 0.44 | 0.12 | 0.56 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 5 | 19 | 0.44 | 0.12 | 0.61 | 0.12 | 0.67 | 0.11 | 0.50 | 0.12 | 0.50 | 0.12 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 6 | 3 | 0.33 | 0.11 | 0.33 | 0.11 | 0.56 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 6 | 7 | 0.83 | 0.09 | 0.33 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.50 | 0.12 | 0.44 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 6 | 15 | 0.56 | 0.12 | 0.67 | 0.11 | 0.56 | 0.12 | 0.72 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 19 | 0.44 | 0.12 | 0.44 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.72 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 7 | 3 | 0.44 | 0.12 | 0.50 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 |
| 2 | 7 | 7 | 0.44 | 0.12 | 0.33 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 |
| 2 | 7 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.50 | 0.12 | 0.44 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 7 | 15 | 0.67 | 0.11 | 0.56 | 0.12 | 0.61 | 0.12 | 0.56 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 7 | 19 | 0.61 | 0.12 | 0.72 | 0.11 | 0.83 | 0.09 | 0.39 | 0.12 | 0.39 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 8 | 3 | 0.44 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.44 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 |
| 2 | 8 | 7 | 0.44 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 |
| 2 | 8 | 11 | 0.94 | 0.06 | 0.67 | 0.11 | 0.33 | 0.11 | 0.39 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 15 | 0.89 | 0.08 | 0.72 | 0.11 | 0.61 | 0.12 | 0.67 | 0.11 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 19 | 0.72 | 0.11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.56 | 0.12 | 0.39 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 1 | 3 | 0.78 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 1 | 7 | 1.00 | 0.00 | 0.83 | 0.09 | 0.39 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 1 | 11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 1 | 15 | 0.67 | 0.11 | 0.56 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.28 | 0.11 | 0.06 | 0.06 |
| 3 | 1 | 19 | 0.78 | 0.10 | 0.67 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.17 | 0.09 | 0.33 | 0.11 | 0.11 | 0.08 |
| 3 | 2 | 3 | 0.78 | 0.10 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 2 | 7 | 1.00 | 0.00 | 0.72 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 2 | 11 | 0.83 | 0.09 | 0.78 | 0.10 | 0.56 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 2 | 15 | 0.61 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.22 | 0.10 | 0.22 | 0.10 | 0.39 | 0.12 | 0.11 | 0.08 |
| 3 | 2 | 19 | 0.61 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.11 | 0.08 | 0.39 | 0.12 | 0.44 | 0.12 | 0.11 | 0.08 |
| 3 | 3 | 3 | 0.61 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 3 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 3 | 11 | 0.94 | 0.06 | 0.89 | 0.08 | 0.39 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 3 | 15 | 0.78 | 0.10 | 0.61 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 |
| 3 | 3 | 19 | 0.50 | 0.12 | 0.67 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.39 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 |
| 3 | 4 | 3 | 0.50 | 0.12 | 0.44 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 |
| 3 | 4 | 7 | 0.78 | 0.10 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 4 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.33 | 0.11 | 0.11 | 0.08 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 4 | 15 | 0.83 | 0.09 | 0.83 | 0.09 | 0.28 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 4 | 19 | 0.83 | 0.09 | 0.83 | 0.09 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.39 | 0.12 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 5 | 3 | 0.50 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 |
| 3 | 5 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 5 | 11 | 1.00 | 0.00 | 0.94 | 0.06 | 0.44 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 5 | 15 | 0.83 | 0.09 | 0.78 | 0.10 | 0.61 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 5 | 19 | 0.83 | 0.09 | 0.67 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 6 | 3 | 0.44 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 |
| 3 | 6 | 7 | 0.67 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 6 | 11 | 1.00 | 0.00 | 0.72 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 6 | 15 | 0.89 | 0.08 | 0.72 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 6 | 19 | 0.72 | 0.11 | 0.72 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.33 | 0.11 | 0.00 | 0.00 |
| 3 | 7 | 3 | 0.61 | 0.12 | 0.44 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.44 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 |
| 3 | 7 | 7 | 0.72 | 0.11 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 |
| 3 | 7 | 11 | 0.89 | 0.08 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 7 | 15 | 0.83 | 0.09 | 0.89 | 0.08 | 0.56 | 0.12 | 0.22 | 0.10 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 7 | 19 | 0.89 | 0.08 | 0.83 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.28 | 0.11 | 0.22 | 0.10 | 0.33 | 0.11 | 0.00 | 0.00 |
| 3 | 8 | 3 | 0.67 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.56 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 |
| 3 | 8 | 7 | 0.50 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 |
| 3 | 8 | 11 | 0.94 | 0.06 | 0.67 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 15 | 0.89 | 0.08 | 0.94 | 0.06 | 0.56 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 19 | 0.78 | 0.10 | 0.78 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.22 | 0.10 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 1 | 3 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 |
| 4 | 1 | 11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 |
| 4 | 1 | 15 | 0.72 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 1 | 19 | 0.50 | 0.12 | 0.56 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 | 0.33 | 0.11 | 0.17 | 0.09 |
| 4 | 2 | 3 | 0.44 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 2 | 7 | 0.78 | 0.10 | 0.56 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 11 | 0.78 | 0.10 | 0.67 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 4 | 2 | 15 | 0.44 | 0.12 | 0.67 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.17 | 0.09 | 0.17 | 0.09 | 0.28 | 0.11 | 0.11 | 0.08 |
| 4 | 2 | 19 | 0.33 | 0.11 | 0.56 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.22 | 0.10 |
| 4 | 3 | 3 | 0.50 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 3 | 7 | 0.78 | 0.10 | 0.61 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 11 | 0.78 | 0.10 | 0.67 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 15 | 0.61 | 0.12 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 3 | 19 | 0.44 | 0.12 | 0.67 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.44 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 |
| 4 | 4 | 3 | 0.44 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 4 | 7 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 4 | 11 | 0.83 | 0.09 | 0.67 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 15 | 0.67 | 0.11 | 0.72 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 4 | 19 | 0.44 | 0.12 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.22 | 0.10 | 0.33 | 0.11 | 0.11 | 0.08 |
| 4 | 5 | 3 | 0.39 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 |
| 4 | 5 | 7 | 0.50 | 0.12 | 0.39 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 |
| 4 | 5 | 11 | 0.83 | 0.09 | 0.61 | 0.12 | 0.50 | 0.12 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 5 | 15 | 0.72 | 0.11 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 5 | 19 | 0.56 | 0.12 | 0.67 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 |
| 4 | 6 | 3 | 0.28 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.22 | 0.10 | 0.11 | 0.08 |
| 4 | 6 | 7 | 0.50 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 4 | 6 | 11 | 0.78 | 0.10 | 0.72 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 15 | 0.67 | 0.11 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 19 | 0.44 | 0.12 | 0.83 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 |
| 4 | 7 | 3 | 0.28 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.50 | 0.12 | 0.06 | 0.06 |
| 4 | 7 | 7 | 0.56 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 7 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 15 | 0.67 | 0.11 | 0.72 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 7 | 19 | 0.56 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 |
| 4 | 8 | 3 | 0.33 | 0.11 | 0.44 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 |
| 4 | 8 | 7 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 |
| 4 | 8 | 11 | 0.72 | 0.11 | 0.67 | 0.11 | 0.44 | 0.12 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 15 | 0.78 | 0.10 | 0.61 | 0.12 | 0.44 | 0.12 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 4 | 8 | 19 | 0.56 | 0.12 | 0.67 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.28 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 1 | 3 | 0.94 | 0.06 | 0.50 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 7 | 0.94 | 0.06 | 0.72 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 11 | 0.56 | 0.12 | 0.50 | 0.12 | 0.28 | 0.11 | 0.28 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 15 | 0.56 | 0.12 | 0.56 | 0.12 | 0.50 | 0.12 | 0.28 | 0.11 | 0.28 | 0.11 | 0.28 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 |
| 5 | 1 | 19 | 0.33 | 0.11 | 0.50 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.28 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 |
| 5 | 2 | 3 | 0.56 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 5 | 2 | 7 | 0.78 | 0.10 | 0.61 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 2 | 11 | 0.50 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.33 | 0.11 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 2 | 15 | 0.39 | 0.12 | 0.67 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 2 | 19 | 0.56 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 5 | 3 | 3 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 5 | 3 | 7 | 0.78 | 0.10 | 0.67 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 3 | 11 | 0.72 | 0.11 | 0.72 | 0.11 | 0.33 | 0.11 | 0.28 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 3 | 15 | 0.61 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 |
| 5 | 3 | 19 | 0.61 | 0.12 | 0.56 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.39 | 0.12 | 0.44 | 0.12 | 0.06 | 0.06 |
| 5 | 4 | 3 | 0.39 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 4 | 7 | 0.72 | 0.11 | 0.56 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4 | 11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4 | 15 | 0.61 | 0.12 | 0.67 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 4 | 19 | 0.44 | 0.12 | 0.67 | 0.11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 |
| 5 | 5 | 3 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 7 | 0.61 | 0.12 | 0.39 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 5 | 11 | 0.78 | 0.10 | 0.72 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 5 | 15 | 0.56 | 0.12 | 0.56 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.39 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 5 | 19 | 0.39 | 0.12 | 0.67 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.39 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 |
| 5 | 6 | 3 | 0.28 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.33 | 0.11 | 0.00 | 0.00 |
| 5 | 6 | 7 | 0.56 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 |
| 5 | 6 | 11 | 0.83 | 0.09 | 0.56 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 6 | 15 | 0.67 | 0.11 | 0.56 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 6 | 19 | 0.44 | 0.12 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 5 | 7 | 3 | 0.28 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 5 | 7 | 7 | 0.28 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 7 | 11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 7 | 15 | 0.78 | 0.10 | 0.72 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 5 | 7 | 19 | 0.50 | 0.12 | 0.56 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.33 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 |
| 5 | 8 | 3 | 0.33 | 0.11 | 0.44 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.28 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 |
| 5 | 8 | 7 | 0.22 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 |
| 5 | 8 | 11 | 0.56 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 8 | 15 | 0.89 | 0.08 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.44 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 8 | 19 | 0.78 | 0.10 | 0.61 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.28 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 6 | 1 | 3 | 0.78 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 11 | 0.44 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 15 | 0.39 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.28 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 |
| 6 | 1 | 19 | 0.50 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.39 | 0.12 | 0.33 | 0.11 |
| 6 | 2 | 3 | 0.39 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 2 | 7 | 0.72 | 0.11 | 0.56 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6 | 2 | 11 | 0.50 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 15 | 0.33 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.33 | 0.11 | 0.33 | 0.11 |
| 6 | 2 | 19 | 0.28 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.33 | 0.11 | 0.39 | 0.12 | 0.56 | 0.12 |
| 6 | 3 | 3 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.17 | 0.09 |
| 6 | 3 | 7 | 0.61 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 |
| 6 | 3 | 11 | 0.83 | 0.09 | 0.67 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6 | 3 | 15 | 0.56 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.11 | 0.08 |
| 6 | 3 | 19 | 0.17 | 0.09 | 0.44 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.28 | 0.11 | 0.33 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 |
| 6 | 4 | 3 | 0.22 | 0.10 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.22 | 0.10 |
| 6 | 4 | 7 | 0.72 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 4 | 11 | 0.72 | 0.11 | 0.67 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 |
| 6 | 4 | 15 | 0.44 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 |
| 6 | 4 | 19 | 0.39 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.17 | 0.09 | 0.33 | 0.11 | 0.22 | 0.10 | 0.22 | 0.10 |
| 6 | 5 | 3 | 0.28 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.28 | 0.11 |
| 6 | 5 | 7 | 0.61 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 5 | 11 | 0.83 | 0.09 | 0.61 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 5 | 15 | 0.33 | 0.11 | 0.50 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 |
| 6 | 5 | 19 | 0.22 | 0.10 | 0.44 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.33 | 0.11 | 0.28 | 0.11 | 0.17 | 0.09 |
| 6 | 6 | 3 | 0.39 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.33 | 0.11 | 0.28 | 0.11 |
| 6 | 6 | 7 | 0.50 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 |
| 6 | 6 | 11 | 0.78 | 0.10 | 0.78 | 0.10 | 0.22 | 0.10 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6 | 6 | 15 | 0.61 | 0.12 | 0.67 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 |
| 6 | 6 | 19 | 0.44 | 0.12 | 0.44 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 |
| 6 | 7 | 3 | 0.33 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.33 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 |
| 6 | 7 | 7 | 0.44 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 |
| 6 | 7 | 11 | 0.72 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 6 | 7 | 15 | 0.61 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 6 | 7 | 19 | 0.44 | 0.12 | 0.50 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.28 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 3 | 0.28 | 0.11 | 0.44 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 |
| 6 | 8 | 7 | 0.28 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.39 | 0.12 | 0.11 | 0.08 |
| 6 | 8 | 11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 |
| 6 | 8 | 15 | 0.72 | 0.11 | 0.67 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 8 | 19 | 0.50 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 |

Appendix I: TDS observed mean dominance rates and standard error (SE) of sensory attributes of vanilla milkshake (sipping from a cup) by the expert panel.

| *Product* | *Sip* | *Within-sip* | Observed mean dominance rates and SE | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.39 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.28 | 0.11 | 0.06 | 0.06 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 1 | 15 | 0.50 | 0.12 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 1 | 19 | 0.39 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 2 | 3 | 0.61 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 2 | 7 | 0.39 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 15 | 0.39 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 3 | 3 | 0.39 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 3 | 7 | 0.39 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 15 | 0.33 | 0.11 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 4 | 3 | 0.44 | 0.12 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 4 | 7 | 0.50 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 15 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 4 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 3 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 5 | 7 | 0.61 | 0.12 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 5 | 11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 15 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 5 | 19 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 3 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 6 | 7 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 6 | 11 | 0.50 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 15 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 6 | 19 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 3 | 0.33 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 7 | 7 | 0.61 | 0.12 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 7 | 11 | 0.44 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 15 | 0.39 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 19 | 0.44 | 0.12 | 0.06 | 0.06 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 3 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 8 | 7 | 0.39 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 8 | 11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 8 | 15 | 0.44 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 19 | 0.44 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 3 | 0.17 | 0.09 | 0.11 | 0.08 | 0.33 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 7 | 0.28 | 0.11 | 0.06 | 0.06 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 15 | 0.11 | 0.08 | 0.17 | 0.09 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 1 | 19 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 2 | 3 | 0.28 | 0.11 | 0.06 | 0.06 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 2 | 7 | 0.28 | 0.11 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 2 | 15 | 0.22 | 0.10 | 0.06 | 0.06 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 2 | 19 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 3 | 3 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 3 | 7 | 0.17 | 0.09 | 0.22 | 0.10 | 0.28 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.33 | 0.11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 15 | 0.33 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 19 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 4 | 3 | 0.33 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 4 | 7 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 15 | 0.33 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 4 | 19 | 0.17 | 0.09 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 5 | 3 | 0.28 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 5 | 7 | 0.28 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 5 | 11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 5 | 15 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 5 | 19 | 0.22 | 0.10 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 3 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 6 | 7 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 6 | 11 | 0.44 | 0.12 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 15 | 0.22 | 0.10 | 0.11 | 0.08 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 19 | 0.17 | 0.09 | 0.06 | 0.06 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 7 | 3 | 0.22 | 0.10 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 7 | 7 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 7 | 11 | 0.44 | 0.12 | 0.00 | 0.00 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 7 | 15 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 7 | 19 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 3 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 8 | 7 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 8 | 11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.28 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 15 | 0.22 | 0.10 | 0.06 | 0.06 | 0.28 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 19 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 1 | 3 | 0.44 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 1 | 7 | 0.28 | 0.11 | 0.50 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 1 | 11 | 0.33 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 1 | 15 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 1 | 19 | 0.44 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 2 | 3 | 0.67 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 2 | 7 | 0.67 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 2 | 11 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 2 | 15 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 2 | 19 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 3 | 3 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 3 | 7 | 0.50 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 3 | 11 | 0.56 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 3 | 15 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 |
| 3 | 3 | 19 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 4 | 3 | 0.44 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 4 | 7 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 4 | 11 | 0.56 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 4 | 15 | 0.50 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 4 | 19 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 5 | 3 | 0.44 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 5 | 7 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 5 | 11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 5 | 15 | 0.44 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 5 | 19 | 0.50 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 3 | 6 | 3 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.00 | 0.00 |
| 3 | 6 | 7 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 6 | 11 | 0.44 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 6 | 15 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 6 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 7 | 3 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 7 | 7 | 0.50 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 7 | 11 | 0.56 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 7 | 15 | 0.56 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 7 | 19 | 0.44 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 |
| 3 | 8 | 3 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 8 | 7 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 8 | 11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 15 | 0.44 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 19 | 0.50 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 1 | 3 | 0.50 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.39 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 4 | 1 | 11 | 0.11 | 0.08 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 |
| 4 | 1 | 15 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.00 | 0.00 |
| 4 | 1 | 19 | 0.22 | 0.10 | 0.44 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 2 | 3 | 0.56 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 7 | 0.39 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 4 | 2 | 11 | 0.17 | 0.09 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 15 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.28 | 0.11 | 0.06 | 0.06 |
| 4 | 2 | 19 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.44 | 0.12 | 0.06 | 0.06 |
| 4 | 3 | 3 | 0.67 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 3 | 7 | 0.33 | 0.11 | 0.44 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 15 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 |
| 4 | 3 | 19 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.50 | 0.12 | 0.11 | 0.08 |
| 4 | 4 | 3 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.06 | 0.06 |
| 4 | 4 | 7 | 0.39 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 11 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 15 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 4 | 19 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.39 | 0.12 | 0.06 | 0.06 |
| 4 | 5 | 3 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.00 | 0.00 |
| 4 | 5 | 7 | 0.67 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 5 | 11 | 0.44 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 15 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 5 | 19 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.33 | 0.11 | 0.06 | 0.06 |
| 4 | 6 | 3 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.06 | 0.06 |
| 4 | 6 | 7 | 0.56 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 4 | 6 | 11 | 0.50 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 4 | 6 | 15 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.33 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 |
| 4 | 6 | 19 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.11 | 0.08 |
| 4 | 7 | 3 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.06 | 0.06 |
| 4 | 7 | 7 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 7 | 11 | 0.33 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 7 | 15 | 0.39 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 19 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 8 | 3 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.12 | 0.00 | 0.00 |
| 4 | 8 | 7 | 0.39 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 8 | 11 | 0.33 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 |
| 4 | 8 | 15 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 8 | 19 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 |
| 5 | 1 | 3 | 0.50 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 7 | 0.28 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 11 | 0.17 | 0.09 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 15 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.28 | 0.11 | 0.11 | 0.08 |
| 5 | 1 | 19 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 2 | 3 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 5 | 2 | 7 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 |
| 5 | 2 | 11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 2 | 15 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 |
| 5 | 2 | 19 | 0.11 | 0.08 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.12 | 0.06 | 0.06 |
| 5 | 3 | 3 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 |
| 5 | 3 | 7 | 0.22 | 0.10 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 3 | 11 | 0.28 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 3 | 15 | 0.44 | 0.12 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 |
| 5 | 3 | 19 | 0.28 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 |
| 5 | 4 | 3 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 4 | 7 | 0.39 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 5 | 4 | 11 | 0.28 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4 | 15 | 0.39 | 0.12 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 |
| 5 | 4 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 |
| 5 | 5 | 3 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.12 | 0.00 | 0.00 |
| 5 | 5 | 7 | 0.33 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 11 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 5 | 15 | 0.44 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 5 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 |
| 5 | 6 | 3 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.06 | 0.06 |
| 5 | 6 | 7 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 6 | 11 | 0.28 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 6 | 15 | 0.44 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 6 | 19 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 |
| 5 | 7 | 3 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.44 | 0.12 | 0.00 | 0.00 |
| 5 | 7 | 7 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.00 | 0.00 |
| 5 | 7 | 11 | 0.33 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 7 | 15 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 7 | 19 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 |
| 5 | 8 | 3 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.61 | 0.12 | 0.00 | 0.00 |
| 5 | 8 | 7 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.00 | 0.00 |
| 5 | 8 | 11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 8 | 15 | 0.28 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 8 | 19 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6 | 1 | 3 | 0.56 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | 0.50 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 1 | 11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.28 | 0.11 |
| 6 | 1 | 15 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.17 | 0.09 | 0.22 | 0.10 |
| 6 | 1 | 19 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.28 | 0.11 |
| 6 | 2 | 3 | 0.39 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 |
| 6 | 2 | 7 | 0.33 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 |
| 6 | 2 | 11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.17 | 0.09 |
| 6 | 2 | 15 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 19 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.33 | 0.11 |
| 6 | 3 | 3 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.33 | 0.11 |
| 6 | 3 | 7 | 0.33 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 |
| 6 | 3 | 11 | 0.22 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 |
| 6 | 3 | 15 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.22 | 0.10 |
| 6 | 3 | 19 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.39 | 0.12 |
| 6 | 4 | 3 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.39 | 0.12 |
| 6 | 4 | 7 | 0.28 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 4 | 11 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 |
| 6 | 4 | 15 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 | 0.28 | 0.11 |
| 6 | 4 | 19 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.44 | 0.12 |
| 6 | 5 | 3 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.28 | 0.11 | 0.33 | 0.11 |
| 6 | 5 | 7 | 0.22 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 5 | 11 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 5 | 15 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 5 | 19 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.33 | 0.11 |
| 6 | 6 | 3 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.39 | 0.12 |
| 6 | 6 | 7 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 |
| 6 | 6 | 11 | 0.33 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 |
| 6 | 6 | 15 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 |
| 6 | 6 | 19 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.28 | 0.11 | 0.28 | 0.11 |
| 6 | 7 | 3 | 0.06 | 0.06 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.11 | 0.39 | 0.12 |
| 6 | 7 | 7 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.33 | 0.11 |
| 6 | 7 | 11 | 0.22 | 0.10 | 0.61 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 7 | 15 | 0.22 | 0.10 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 |
| 6 | 7 | 19 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.39 | 0.12 |
| 6 | 8 | 3 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.33 | 0.11 | 0.39 | 0.12 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 7 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.33 | 0.11 |
| 6 | 8 | 11 | 0.22 | 0.10 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.11 | 0.08 |
| 6 | 8 | 15 | 0.22 | 0.10 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 |
| 6 | 8 | 19 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.33 | 0.11 |

Appendix J: TCATA mean citation proportions and observed standard error (SE) of sensory attributes of milkshakes by the average of sipping methods by the expert panel.

| *Product* | *Sip* | *Within -sip* | Observed mean citation proportions and SE of attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.78 | 0.07 | 0.42 | 0.08 | 0.39 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.92 | 0.05 | 0.69 | 0.08 | 0.69 | 0.08 | 0.58 | 0.08 | 0.47 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | 0.69 | 0.08 | 0.58 | 0.08 | 0.67 | 0.08 | 0.58 | 0.08 | 0.47 | 0.08 | 0.39 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 1 | 15 | 0.75 | 0.07 | 0.56 | 0.08 | 0.72 | 0.08 | 0.58 | 0.08 | 0.44 | 0.08 | 0.64 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |
| 1 | 1 | 19 | 0.78 | 0.07 | 0.61 | 0.08 | 0.61 | 0.08 | 0.42 | 0.08 | 0.33 | 0.08 | 0.69 | 0.08 | 0.25 | 0.07 | 0.00 | 0.00 |
| 1 | 2 | 3 | 0.69 | 0.08 | 0.47 | 0.08 | 0.33 | 0.08 | 0.25 | 0.07 | 0.17 | 0.06 | 0.22 | 0.07 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 2 | 7 | 0.94 | 0.04 | 0.72 | 0.08 | 0.56 | 0.08 | 0.64 | 0.08 | 0.58 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 11 | 0.69 | 0.08 | 0.67 | 0.08 | 0.61 | 0.08 | 0.72 | 0.08 | 0.50 | 0.08 | 0.33 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 2 | 15 | 0.67 | 0.08 | 0.64 | 0.08 | 0.61 | 0.08 | 0.53 | 0.08 | 0.33 | 0.08 | 0.64 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 |
| 1 | 2 | 19 | 0.69 | 0.08 | 0.58 | 0.08 | 0.58 | 0.08 | 0.39 | 0.08 | 0.31 | 0.08 | 0.69 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 |
| 1 | 3 | 3 | 0.69 | 0.08 | 0.50 | 0.08 | 0.28 | 0.08 | 0.11 | 0.05 | 0.08 | 0.05 | 0.28 | 0.08 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 3 | 7 | 0.92 | 0.05 | 0.72 | 0.08 | 0.47 | 0.08 | 0.64 | 0.08 | 0.50 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 11 | 0.75 | 0.07 | 0.67 | 0.08 | 0.56 | 0.08 | 0.75 | 0.07 | 0.72 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 3 | 15 | 0.78 | 0.07 | 0.64 | 0.08 | 0.64 | 0.08 | 0.53 | 0.08 | 0.47 | 0.08 | 0.64 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 1 | 3 | 19 | 0.81 | 0.07 | 0.67 | 0.08 | 0.69 | 0.08 | 0.39 | 0.08 | 0.33 | 0.08 | 0.75 | 0.07 | 0.25 | 0.07 | 0.00 | 0.00 |
| 1 | 4 | 3 | 0.53 | 0.08 | 0.33 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.22 | 0.07 | 0.14 | 0.06 | 0.00 | 0.00 |
| 1 | 4 | 7 | 0.89 | 0.05 | 0.64 | 0.08 | 0.47 | 0.08 | 0.47 | 0.08 | 0.33 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | 0.78 | 0.07 | 0.69 | 0.08 | 0.64 | 0.08 | 0.72 | 0.08 | 0.67 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 4 | 15 | 0.75 | 0.07 | 0.64 | 0.08 | 0.69 | 0.08 | 0.67 | 0.08 | 0.61 | 0.08 | 0.47 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 19 | 0.78 | 0.07 | 0.56 | 0.08 | 0.64 | 0.08 | 0.53 | 0.08 | 0.39 | 0.08 | 0.64 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 |
| 1 | 5 | 3 | 0.47 | 0.08 | 0.36 | 0.08 | 0.36 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 | 0.42 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 |
| 1 | 5 | 7 | 0.72 | 0.08 | 0.47 | 0.08 | 0.28 | 0.08 | 0.17 | 0.06 | 0.19 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 5 | 11 | 0.92 | 0.05 | 0.72 | 0.08 | 0.56 | 0.08 | 0.72 | 0.08 | 0.69 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 |
| 1 | 5 | 15 | 0.81 | 0.07 | 0.64 | 0.08 | 0.64 | 0.08 | 0.81 | 0.07 | 0.61 | 0.08 | 0.44 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 |
| 1 | 5 | 19 | 0.69 | 0.08 | 0.61 | 0.08 | 0.67 | 0.08 | 0.42 | 0.08 | 0.28 | 0.08 | 0.67 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 |
| 1 | 6 | 3 | 0.50 | 0.08 | 0.39 | 0.08 | 0.42 | 0.08 | 0.19 | 0.07 | 0.06 | 0.04 | 0.56 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 1 | 6 | 7 | 0.64 | 0.08 | 0.36 | 0.08 | 0.31 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.28 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 6 | 11 | 0.89 | 0.05 | 0.67 | 0.08 | 0.50 | 0.08 | 0.61 | 0.08 | 0.61 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 |
| 1 | 6 | 15 | 0.83 | 0.06 | 0.75 | 0.07 | 0.56 | 0.08 | 0.56 | 0.08 | 0.69 | 0.08 | 0.31 | 0.08 | 0.06 | 0.04 | 0.03 | 0.03 |
| 1 | 6 | 19 | 0.83 | 0.06 | 0.69 | 0.08 | 0.75 | 0.07 | 0.44 | 0.08 | 0.44 | 0.08 | 0.64 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 3 | 0.64 | 0.08 | 0.53 | 0.08 | 0.42 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.47 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 |
| 1 | 7 | 7 | 0.42 | 0.08 | 0.44 | 0.08 | 0.28 | 0.08 | 0.17 | 0.06 | 0.03 | 0.03 | 0.19 | 0.07 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 7 | 11 | 0.94 | 0.04 | 0.64 | 0.08 | 0.50 | 0.08 | 0.53 | 0.08 | 0.50 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 15 | 0.86 | 0.06 | 0.72 | 0.08 | 0.58 | 0.08 | 0.67 | 0.08 | 0.67 | 0.08 | 0.22 | 0.07 | 0.06 | 0.04 | 0.00 | 0.00 |
| 1 | 7 | 19 | 0.72 | 0.08 | 0.64 | 0.08 | 0.50 | 0.08 | 0.47 | 0.08 | 0.44 | 0.08 | 0.58 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 |
| 1 | 8 | 3 | 0.78 | 0.07 | 0.56 | 0.08 | 0.56 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.50 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 |
| 1 | 8 | 7 | 0.61 | 0.08 | 0.39 | 0.08 | 0.22 | 0.07 | 0.11 | 0.05 | 0.00 | 0.00 | 0.42 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 |
| 1 | 8 | 11 | 0.92 | 0.05 | 0.67 | 0.08 | 0.47 | 0.08 | 0.50 | 0.08 | 0.28 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 8 | 15 | 0.94 | 0.04 | 0.75 | 0.07 | 0.56 | 0.08 | 0.72 | 0.08 | 0.67 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 19 | 0.78 | 0.07 | 0.64 | 0.08 | 0.64 | 0.08 | 0.67 | 0.08 | 0.53 | 0.08 | 0.50 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 |
| 2 | 1 | 3 | 0.83 | 0.06 | 0.58 | 0.08 | 0.39 | 0.08 | 0.36 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 7 | 0.94 | 0.04 | 0.72 | 0.08 | 0.56 | 0.08 | 0.67 | 0.08 | 0.58 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 11 | 0.64 | 0.08 | 0.58 | 0.08 | 0.67 | 0.08 | 0.56 | 0.08 | 0.69 | 0.08 | 0.36 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 |
| 2 | 1 | 15 | 0.67 | 0.08 | 0.56 | 0.08 | 0.78 | 0.07 | 0.56 | 0.08 | 0.44 | 0.08 | 0.56 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |
| 2 | 1 | 19 | 0.53 | 0.08 | 0.56 | 0.08 | 0.56 | 0.08 | 0.44 | 0.08 | 0.33 | 0.08 | 0.58 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 |
| 2 | 2 | 3 | 0.53 | 0.08 | 0.33 | 0.08 | 0.19 | 0.07 | 0.17 | 0.06 | 0.08 | 0.05 | 0.19 | 0.07 | 0.00 | 0.00 | 0.03 | 0.03 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 7 | 0.94 | 0.04 | 0.78 | 0.07 | 0.50 | 0.08 | 0.56 | 0.08 | 0.44 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 2 | 11 | 0.72 | 0.08 | 0.78 | 0.07 | 0.75 | 0.07 | 0.67 | 0.08 | 0.69 | 0.08 | 0.28 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |
| 2 | 2 | 15 | 0.64 | 0.08 | 0.64 | 0.08 | 0.78 | 0.07 | 0.56 | 0.08 | 0.47 | 0.08 | 0.67 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 2 | 19 | 0.61 | 0.08 | 0.67 | 0.08 | 0.72 | 0.08 | 0.42 | 0.08 | 0.19 | 0.07 | 0.72 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 |
| 2 | 3 | 3 | 0.50 | 0.08 | 0.31 | 0.08 | 0.28 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.31 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 |
| 2 | 3 | 7 | 0.94 | 0.04 | 0.75 | 0.07 | 0.39 | 0.08 | 0.53 | 0.08 | 0.39 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 11 | 0.78 | 0.07 | 0.75 | 0.07 | 0.64 | 0.08 | 0.75 | 0.07 | 0.67 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.00 | 0.00 |
| 2 | 3 | 15 | 0.53 | 0.08 | 0.61 | 0.08 | 0.78 | 0.07 | 0.58 | 0.08 | 0.56 | 0.08 | 0.56 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 |
| 2 | 3 | 19 | 0.58 | 0.08 | 0.72 | 0.08 | 0.69 | 0.08 | 0.39 | 0.08 | 0.22 | 0.07 | 0.72 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 |
| 2 | 4 | 3 | 0.44 | 0.08 | 0.33 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.31 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 |
| 2 | 4 | 7 | 0.81 | 0.07 | 0.64 | 0.08 | 0.47 | 0.08 | 0.44 | 0.08 | 0.47 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| 2 | 4 | 11 | 0.83 | 0.06 | 0.72 | 0.08 | 0.61 | 0.08 | 0.67 | 0.08 | 0.69 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 15 | 0.58 | 0.08 | 0.64 | 0.08 | 0.75 | 0.07 | 0.61 | 0.08 | 0.50 | 0.08 | 0.53 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 4 | 19 | 0.61 | 0.08 | 0.69 | 0.08 | 0.75 | 0.07 | 0.47 | 0.08 | 0.25 | 0.07 | 0.69 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 |
| 2 | 5 | 3 | 0.33 | 0.08 | 0.31 | 0.08 | 0.42 | 0.08 | 0.08 | 0.05 | 0.03 | 0.03 | 0.28 | 0.08 | 0.17 | 0.06 | 0.03 | 0.03 |
| 2 | 5 | 7 | 0.69 | 0.08 | 0.53 | 0.08 | 0.39 | 0.08 | 0.47 | 0.08 | 0.25 | 0.07 | 0.17 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 |
| 2 | 5 | 11 | 0.92 | 0.05 | 0.78 | 0.07 | 0.58 | 0.08 | 0.64 | 0.08 | 0.61 | 0.08 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| 2 | 5 | 15 | 0.75 | 0.07 | 0.61 | 0.08 | 0.67 | 0.08 | 0.50 | 0.08 | 0.61 | 0.08 | 0.39 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 5 | 19 | 0.58 | 0.08 | 0.61 | 0.08 | 0.75 | 0.07 | 0.47 | 0.08 | 0.50 | 0.08 | 0.67 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 3 | 0.39 | 0.08 | 0.42 | 0.08 | 0.53 | 0.08 | 0.25 | 0.07 | 0.08 | 0.05 | 0.42 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 |
| 2 | 6 | 7 | 0.64 | 0.08 | 0.33 | 0.08 | 0.39 | 0.08 | 0.25 | 0.07 | 0.19 | 0.07 | 0.22 | 0.07 | 0.08 | 0.05 | 0.00 | 0.00 |
| 2 | 6 | 11 | 0.94 | 0.04 | 0.75 | 0.07 | 0.53 | 0.08 | 0.56 | 0.08 | 0.56 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 6 | 15 | 0.72 | 0.08 | 0.69 | 0.08 | 0.61 | 0.08 | 0.69 | 0.08 | 0.58 | 0.08 | 0.28 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 |
| 2 | 6 | 19 | 0.64 | 0.08 | 0.56 | 0.08 | 0.78 | 0.07 | 0.56 | 0.08 | 0.47 | 0.08 | 0.67 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 7 | 3 | 0.39 | 0.08 | 0.50 | 0.08 | 0.44 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.44 | 0.08 | 0.31 | 0.08 | 0.03 | 0.03 |
| 2 | 7 | 7 | 0.44 | 0.08 | 0.33 | 0.08 | 0.39 | 0.08 | 0.11 | 0.05 | 0.06 | 0.04 | 0.19 | 0.07 | 0.17 | 0.06 | 0.03 | 0.03 |
| 2 | 7 | 11 | 0.86 | 0.06 | 0.67 | 0.08 | 0.53 | 0.08 | 0.47 | 0.08 | 0.44 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 7 | 15 | 0.81 | 0.07 | 0.69 | 0.08 | 0.61 | 0.08 | 0.61 | 0.08 | 0.58 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 |
| 2 | 7 | 19 | 0.72 | 0.08 | 0.72 | 0.08 | 0.81 | 0.07 | 0.47 | 0.08 | 0.47 | 0.08 | 0.58 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 2 | 8 | 3 | 0.47 | 0.08 | 0.47 | 0.08 | 0.47 | 0.08 | 0.31 | 0.08 | 0.08 | 0.05 | 0.53 | 0.08 | 0.28 | 0.08 | 0.03 | 0.03 |
| 2 | 8 | 7 | 0.47 | 0.08 | 0.42 | 0.08 | 0.39 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.28 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 |
| 2 | 8 | 11 | 0.92 | 0.05 | 0.67 | 0.08 | 0.42 | 0.08 | 0.47 | 0.08 | 0.39 | 0.08 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| 2 | 8 | 15 | 0.92 | 0.05 | 0.72 | 0.08 | 0.61 | 0.08 | 0.72 | 0.08 | 0.69 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 19 | 0.64 | 0.08 | 0.61 | 0.08 | 0.72 | 0.08 | 0.58 | 0.08 | 0.58 | 0.08 | 0.44 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 |
| 3 | 1 | 3 | 0.81 | 0.07 | 0.53 | 0.08 | 0.11 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 |
| 3 | 1 | 7 | 1.00 | 0.00 | 0.83 | 0.06 | 0.42 | 0.08 | 0.25 | 0.07 | 0.19 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 |
| 3 | 1 | 11 | 0.69 | 0.08 | 0.67 | 0.08 | 0.36 | 0.08 | 0.17 | 0.06 | 0.22 | 0.07 | 0.06 | 0.04 | 0.19 | 0.07 | 0.03 | 0.03 |
| 3 | 1 | 15 | 0.69 | 0.08 | 0.64 | 0.08 | 0.25 | 0.07 | 0.08 | 0.05 | 0.11 | 0.05 | 0.22 | 0.07 | 0.33 | 0.08 | 0.08 | 0.05 |
| 3 | 1 | 19 | 0.75 | 0.07 | 0.64 | 0.08 | 0.36 | 0.08 | 0.08 | 0.05 | 0.06 | 0.04 | 0.22 | 0.07 | 0.36 | 0.08 | 0.11 | 0.05 |
| 3 | 2 | 3 | 0.67 | 0.08 | 0.47 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.06 | 0.04 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 |
| 3 | 2 | 7 | 1.00 | 0.00 | 0.69 | 0.08 | 0.39 | 0.08 | 0.19 | 0.07 | 0.11 | 0.05 | 0.00 | 0.00 | 0.06 | 0.04 | 0.00 | 0.00 |
| 3 | 2 | 11 | 0.83 | 0.06 | 0.72 | 0.08 | 0.47 | 0.08 | 0.22 | 0.07 | 0.19 | 0.07 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 |
| 3 | 2 | 15 | 0.64 | 0.08 | 0.75 | 0.07 | 0.28 | 0.08 | 0.08 | 0.05 | 0.14 | 0.06 | 0.17 | 0.06 | 0.36 | 0.08 | 0.08 | 0.05 |
| 3 | 2 | 19 | 0.69 | 0.08 | 0.61 | 0.08 | 0.19 | 0.07 | 0.11 | 0.05 | 0.06 | 0.04 | 0.28 | 0.08 | 0.47 | 0.08 | 0.08 | 0.05 |
| 3 | 3 | 3 | 0.53 | 0.08 | 0.42 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.06 | 0.04 | 0.22 | 0.07 | 0.06 | 0.04 |
| 3 | 3 | 7 | 0.86 | 0.06 | 0.69 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 |
| 3 | 3 | 11 | 0.94 | 0.04 | 0.83 | 0.06 | 0.39 | 0.08 | 0.14 | 0.06 | 0.14 | 0.06 | 0.00 | 0.00 | 0.06 | 0.04 | 0.00 | 0.00 |
| 3 | 3 | 15 | 0.75 | 0.07 | 0.69 | 0.08 | 0.19 | 0.07 | 0.06 | 0.04 | 0.11 | 0.05 | 0.06 | 0.04 | 0.25 | 0.07 | 0.08 | 0.05 |
| 3 | 3 | 19 | 0.56 | 0.08 | 0.67 | 0.08 | 0.28 | 0.08 | 0.06 | 0.04 | 0.08 | 0.05 | 0.31 | 0.08 | 0.44 | 0.08 | 0.08 | 0.05 |
| 3 | 4 | 3 | 0.56 | 0.08 | 0.44 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.05 | 0.28 | 0.08 | 0.08 | 0.05 |
| 3 | 4 | 7 | 0.75 | 0.07 | 0.53 | 0.08 | 0.31 | 0.08 | 0.08 | 0.05 | 0.19 | 0.07 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| 3 | 4 | 11 | 0.92 | 0.05 | 0.78 | 0.07 | 0.36 | 0.08 | 0.17 | 0.06 | 0.22 | 0.07 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| 3 | 4 | 15 | 0.86 | 0.06 | 0.81 | 0.07 | 0.25 | 0.07 | 0.14 | 0.06 | 0.11 | 0.05 | 0.11 | 0.05 | 0.25 | 0.07 | 0.00 | 0.00 |
| 3 | 4 | 19 | 0.86 | 0.06 | 0.83 | 0.06 | 0.31 | 0.08 | 0.06 | 0.04 | 0.08 | 0.05 | 0.22 | 0.07 | 0.47 | 0.08 | 0.03 | 0.03 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 5 | 3 | 0.44 | 0.08 | 0.44 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 | 0.19 | 0.07 | 0.31 | 0.08 | 0.08 | 0.05 |
| 3 | 5 | 7 | 0.81 | 0.07 | 0.61 | 0.08 | 0.22 | 0.07 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.03 | 0.03 |
| 3 | 5 | 11 | 0.97 | 0.03 | 0.89 | 0.05 | 0.44 | 0.08 | 0.22 | 0.07 | 0.19 | 0.07 | 0.03 | 0.03 | 0.06 | 0.04 | 0.00 | 0.00 |
| 3 | 5 | 15 | 0.83 | 0.06 | 0.75 | 0.07 | 0.44 | 0.08 | 0.22 | 0.07 | 0.22 | 0.07 | 0.14 | 0.06 | 0.25 | 0.07 | 0.00 | 0.00 |
| 3 | 5 | 19 | 0.86 | 0.06 | 0.69 | 0.08 | 0.28 | 0.08 | 0.11 | 0.05 | 0.14 | 0.06 | 0.25 | 0.07 | 0.31 | 0.08 | 0.06 | 0.04 |
| 3 | 6 | 3 | 0.44 | 0.08 | 0.39 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 | 0.06 | 0.04 | 0.19 | 0.07 | 0.39 | 0.08 | 0.00 | 0.00 |
| 3 | 6 | 7 | 0.67 | 0.08 | 0.50 | 0.08 | 0.14 | 0.06 | 0.08 | 0.05 | 0.03 | 0.03 | 0.06 | 0.04 | 0.14 | 0.06 | 0.03 | 0.03 |
| 3 | 6 | 11 | 1.00 | 0.00 | 0.78 | 0.07 | 0.36 | 0.08 | 0.25 | 0.07 | 0.14 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.06 | 0.04 |
| 3 | 6 | 15 | 0.86 | 0.06 | 0.83 | 0.06 | 0.42 | 0.08 | 0.19 | 0.07 | 0.17 | 0.06 | 0.03 | 0.03 | 0.06 | 0.04 | 0.06 | 0.04 |
| 3 | 6 | 19 | 0.83 | 0.06 | 0.78 | 0.07 | 0.33 | 0.08 | 0.06 | 0.04 | 0.08 | 0.05 | 0.19 | 0.07 | 0.36 | 0.08 | 0.06 | 0.04 |
| 3 | 7 | 3 | 0.58 | 0.08 | 0.47 | 0.08 | 0.14 | 0.06 | 0.06 | 0.04 | 0.03 | 0.03 | 0.31 | 0.08 | 0.50 | 0.08 | 0.06 | 0.04 |
| 3 | 7 | 7 | 0.67 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.33 | 0.08 | 0.03 | 0.03 |
| 3 | 7 | 11 | 0.94 | 0.04 | 0.72 | 0.08 | 0.42 | 0.08 | 0.19 | 0.07 | 0.11 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 7 | 15 | 0.86 | 0.06 | 0.83 | 0.06 | 0.50 | 0.08 | 0.25 | 0.07 | 0.28 | 0.08 | 0.06 | 0.04 | 0.06 | 0.04 | 0.06 | 0.04 |
| 3 | 7 | 19 | 0.83 | 0.06 | 0.75 | 0.07 | 0.22 | 0.07 | 0.11 | 0.05 | 0.17 | 0.06 | 0.19 | 0.07 | 0.36 | 0.08 | 0.08 | 0.05 |
| 3 | 8 | 3 | 0.69 | 0.08 | 0.58 | 0.08 | 0.28 | 0.08 | 0.06 | 0.04 | 0.03 | 0.03 | 0.39 | 0.08 | 0.50 | 0.08 | 0.03 | 0.03 |
| 3 | 8 | 7 | 0.50 | 0.08 | 0.39 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.00 | 0.00 | 0.14 | 0.06 | 0.33 | 0.08 | 0.03 | 0.03 |
| 3 | 8 | 11 | 0.86 | 0.06 | 0.61 | 0.08 | 0.31 | 0.08 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 15 | 0.89 | 0.05 | 0.86 | 0.06 | 0.50 | 0.08 | 0.17 | 0.06 | 0.22 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 19 | 0.89 | 0.05 | 0.78 | 0.07 | 0.36 | 0.08 | 0.17 | 0.06 | 0.19 | 0.07 | 0.14 | 0.06 | 0.19 | 0.07 | 0.00 | 0.00 |
| 4 | 1 | 3 | 0.72 | 0.08 | 0.50 | 0.08 | 0.19 | 0.07 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.86 | 0.06 | 0.78 | 0.07 | 0.42 | 0.08 | 0.17 | 0.06 | 0.22 | 0.07 | 0.00 | 0.00 | 0.06 | 0.04 | 0.03 | 0.03 |
| 4 | 1 | 11 | 0.69 | 0.08 | 0.69 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.19 | 0.07 | 0.17 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |
| 4 | 1 | 15 | 0.81 | 0.07 | 0.69 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 | 0.11 | 0.05 | 0.25 | 0.07 | 0.28 | 0.08 | 0.06 | 0.04 |
| 4 | 1 | 19 | 0.61 | 0.08 | 0.67 | 0.08 | 0.25 | 0.07 | 0.03 | 0.03 | 0.06 | 0.04 | 0.28 | 0.08 | 0.39 | 0.08 | 0.19 | 0.07 |
| 4 | 2 | 3 | 0.53 | 0.08 | 0.39 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.06 | 0.04 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 |
| 4 | 2 | 7 | 0.81 | 0.07 | 0.58 | 0.08 | 0.28 | 0.08 | 0.14 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 11 | 0.78 | 0.07 | 0.72 | 0.08 | 0.33 | 0.08 | 0.11 | 0.05 | 0.25 | 0.07 | 0.08 | 0.05 | 0.17 | 0.06 | 0.00 | 0.00 |
| 4 | 2 | 15 | 0.61 | 0.08 | 0.81 | 0.07 | 0.39 | 0.08 | 0.06 | 0.04 | 0.14 | 0.06 | 0.19 | 0.07 | 0.39 | 0.08 | 0.14 | 0.06 |
| 4 | 2 | 19 | 0.50 | 0.08 | 0.61 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.06 | 0.04 | 0.17 | 0.06 | 0.33 | 0.08 | 0.22 | 0.07 |
| 4 | 3 | 3 | 0.42 | 0.08 | 0.50 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 | 0.08 | 0.05 | 0.17 | 0.06 | 0.19 | 0.07 | 0.00 | 0.00 |
| 4 | 3 | 7 | 0.78 | 0.07 | 0.67 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.17 | 0.06 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 |
| 4 | 3 | 11 | 0.75 | 0.07 | 0.72 | 0.08 | 0.42 | 0.08 | 0.11 | 0.05 | 0.14 | 0.06 | 0.08 | 0.05 | 0.06 | 0.04 | 0.03 | 0.03 |
| 4 | 3 | 15 | 0.61 | 0.08 | 0.72 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 | 0.11 | 0.05 | 0.28 | 0.08 | 0.36 | 0.08 | 0.00 | 0.00 |
| 4 | 3 | 19 | 0.47 | 0.08 | 0.75 | 0.07 | 0.19 | 0.07 | 0.00 | 0.00 | 0.06 | 0.04 | 0.39 | 0.08 | 0.44 | 0.08 | 0.11 | 0.05 |
| 4 | 4 | 3 | 0.47 | 0.08 | 0.33 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 | 0.25 | 0.07 | 0.03 | 0.03 |
| 4 | 4 | 7 | 0.78 | 0.07 | 0.58 | 0.08 | 0.25 | 0.07 | 0.08 | 0.05 | 0.17 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| 4 | 4 | 11 | 0.86 | 0.06 | 0.75 | 0.07 | 0.53 | 0.08 | 0.11 | 0.05 | 0.17 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 15 | 0.72 | 0.08 | 0.72 | 0.08 | 0.36 | 0.08 | 0.06 | 0.04 | 0.11 | 0.05 | 0.19 | 0.07 | 0.33 | 0.08 | 0.00 | 0.00 |
| 4 | 4 | 19 | 0.64 | 0.08 | 0.64 | 0.08 | 0.17 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.25 | 0.07 | 0.39 | 0.08 | 0.08 | 0.05 |
| 4 | 5 | 3 | 0.44 | 0.08 | 0.36 | 0.08 | 0.22 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.25 | 0.07 | 0.50 | 0.08 | 0.03 | 0.03 |
| 4 | 5 | 7 | 0.56 | 0.08 | 0.50 | 0.08 | 0.28 | 0.08 | 0.00 | 0.00 | 0.11 | 0.05 | 0.06 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 |
| 4 | 5 | 11 | 0.89 | 0.05 | 0.69 | 0.08 | 0.47 | 0.08 | 0.08 | 0.05 | 0.19 | 0.07 | 0.03 | 0.03 | 0.06 | 0.04 | 0.00 | 0.00 |
| 4 | 5 | 15 | 0.78 | 0.07 | 0.61 | 0.08 | 0.39 | 0.08 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 | 0.17 | 0.06 | 0.00 | 0.00 |
| 4 | 5 | 19 | 0.58 | 0.08 | 0.69 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.06 | 0.04 | 0.25 | 0.07 | 0.36 | 0.08 | 0.03 | 0.03 |
| 4 | 6 | 3 | 0.39 | 0.08 | 0.36 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.06 | 0.42 | 0.08 | 0.11 | 0.05 |
| 4 | 6 | 7 | 0.53 | 0.08 | 0.31 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.14 | 0.06 | 0.08 | 0.05 | 0.17 | 0.06 | 0.00 | 0.00 |
| 4 | 6 | 11 | 0.83 | 0.06 | 0.75 | 0.07 | 0.39 | 0.08 | 0.06 | 0.04 | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 15 | 0.78 | 0.07 | 0.72 | 0.08 | 0.42 | 0.08 | 0.11 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 | 0.00 | 0.00 |
| 4 | 6 | 19 | 0.58 | 0.08 | 0.81 | 0.07 | 0.31 | 0.08 | 0.08 | 0.05 | 0.06 | 0.04 | 0.25 | 0.07 | 0.44 | 0.08 | 0.00 | 0.00 |
| 4 | 7 | 3 | 0.39 | 0.08 | 0.44 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.07 | 0.56 | 0.08 | 0.03 | 0.03 |
| 4 | 7 | 7 | 0.56 | 0.08 | 0.44 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.06 | 0.28 | 0.08 | 0.00 | 0.00 |
| 4 | 7 | 11 | 0.86 | 0.06 | 0.75 | 0.07 | 0.42 | 0.08 | 0.14 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| 4 | 7 | 15 | 0.78 | 0.07 | 0.78 | 0.07 | 0.47 | 0.08 | 0.17 | 0.06 | 0.19 | 0.07 | 0.06 | 0.04 | 0.06 | 0.04 | 0.03 | 0.03 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 7 | 19 | 0.67 | 0.08 | 0.67 | 0.08 | 0.25 | 0.07 | 0.03 | 0.03 | 0.06 | 0.04 | 0.25 | 0.07 | 0.44 | 0.08 | 0.03 | 0.03 |
| 4 | 8 | 3 | 0.44 | 0.08 | 0.53 | 0.08 | 0.19 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.07 | 0.58 | 0.08 | 0.06 | 0.04 |
| 4 | 8 | 7 | 0.42 | 0.08 | 0.39 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.05 | 0.36 | 0.08 | 0.03 | 0.03 |
| 4 | 8 | 11 | 0.78 | 0.07 | 0.67 | 0.08 | 0.39 | 0.08 | 0.06 | 0.04 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 15 | 0.89 | 0.05 | 0.72 | 0.08 | 0.53 | 0.08 | 0.14 | 0.06 | 0.22 | 0.07 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| 4 | 8 | 19 | 0.67 | 0.08 | 0.72 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.17 | 0.06 | 0.19 | 0.07 | 0.28 | 0.08 | 0.03 | 0.03 |
| 5 | 1 | 3 | 0.94 | 0.04 | 0.58 | 0.08 | 0.36 | 0.08 | 0.17 | 0.06 | 0.08 | 0.05 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 7 | 0.97 | 0.03 | 0.78 | 0.07 | 0.44 | 0.08 | 0.22 | 0.07 | 0.36 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 11 | 0.58 | 0.08 | 0.56 | 0.08 | 0.39 | 0.08 | 0.19 | 0.07 | 0.39 | 0.08 | 0.19 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 |
| 5 | 1 | 15 | 0.61 | 0.08 | 0.61 | 0.08 | 0.50 | 0.08 | 0.19 | 0.07 | 0.19 | 0.07 | 0.31 | 0.08 | 0.31 | 0.08 | 0.11 | 0.05 |
| 5 | 1 | 19 | 0.47 | 0.08 | 0.61 | 0.08 | 0.33 | 0.08 | 0.11 | 0.05 | 0.08 | 0.05 | 0.39 | 0.08 | 0.33 | 0.08 | 0.11 | 0.05 |
| 5 | 2 | 3 | 0.58 | 0.08 | 0.44 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 | 0.11 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 |
| 5 | 2 | 7 | 0.83 | 0.06 | 0.67 | 0.08 | 0.36 | 0.08 | 0.22 | 0.07 | 0.31 | 0.08 | 0.06 | 0.04 | 0.00 | 0.00 | 0.03 | 0.03 |
| 5 | 2 | 11 | 0.61 | 0.08 | 0.67 | 0.08 | 0.33 | 0.08 | 0.31 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.08 | 0.05 | 0.03 | 0.03 |
| 5 | 2 | 15 | 0.53 | 0.08 | 0.78 | 0.07 | 0.42 | 0.08 | 0.22 | 0.07 | 0.17 | 0.06 | 0.31 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 |
| 5 | 2 | 19 | 0.67 | 0.08 | 0.69 | 0.08 | 0.31 | 0.08 | 0.11 | 0.05 | 0.08 | 0.05 | 0.33 | 0.08 | 0.39 | 0.08 | 0.08 | 0.05 |
| 5 | 3 | 3 | 0.42 | 0.08 | 0.33 | 0.08 | 0.19 | 0.07 | 0.08 | 0.05 | 0.06 | 0.04 | 0.19 | 0.07 | 0.11 | 0.05 | 0.06 | 0.04 |
| 5 | 3 | 7 | 0.78 | 0.07 | 0.69 | 0.08 | 0.42 | 0.08 | 0.28 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 |
| 5 | 3 | 11 | 0.78 | 0.07 | 0.75 | 0.07 | 0.42 | 0.08 | 0.28 | 0.08 | 0.31 | 0.08 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 |
| 5 | 3 | 15 | 0.61 | 0.08 | 0.67 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.19 | 0.07 | 0.25 | 0.07 | 0.25 | 0.07 | 0.00 | 0.00 |
| 5 | 3 | 19 | 0.58 | 0.08 | 0.72 | 0.08 | 0.31 | 0.08 | 0.03 | 0.03 | 0.22 | 0.07 | 0.47 | 0.08 | 0.42 | 0.08 | 0.11 | 0.05 |
| 5 | 4 | 3 | 0.36 | 0.08 | 0.36 | 0.08 | 0.22 | 0.07 | 0.08 | 0.05 | 0.08 | 0.05 | 0.17 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |
| 5 | 4 | 7 | 0.78 | 0.07 | 0.61 | 0.08 | 0.36 | 0.08 | 0.17 | 0.06 | 0.25 | 0.07 | 0.06 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4 | 11 | 0.83 | 0.06 | 0.69 | 0.08 | 0.47 | 0.08 | 0.19 | 0.07 | 0.36 | 0.08 | 0.06 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 |
| 5 | 4 | 15 | 0.64 | 0.08 | 0.67 | 0.08 | 0.42 | 0.08 | 0.17 | 0.06 | 0.28 | 0.08 | 0.25 | 0.07 | 0.19 | 0.07 | 0.00 | 0.00 |
| 5 | 4 | 19 | 0.61 | 0.08 | 0.75 | 0.07 | 0.28 | 0.08 | 0.11 | 0.05 | 0.19 | 0.07 | 0.42 | 0.08 | 0.36 | 0.08 | 0.03 | 0.03 |
| 5 | 5 | 3 | 0.33 | 0.08 | 0.31 | 0.08 | 0.17 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.28 | 0.08 | 0.22 | 0.07 | 0.11 | 0.05 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 7 | 0.69 | 0.08 | 0.58 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.11 | 0.05 | 0.06 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 |
| 5 | 5 | 11 | 0.83 | 0.06 | 0.75 | 0.07 | 0.42 | 0.08 | 0.17 | 0.06 | 0.39 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| 5 | 5 | 15 | 0.56 | 0.08 | 0.64 | 0.08 | 0.31 | 0.08 | 0.17 | 0.06 | 0.36 | 0.08 | 0.25 | 0.07 | 0.14 | 0.06 | 0.00 | 0.00 |
| 5 | 5 | 19 | 0.50 | 0.08 | 0.75 | 0.07 | 0.47 | 0.08 | 0.19 | 0.07 | 0.19 | 0.07 | 0.39 | 0.08 | 0.33 | 0.08 | 0.03 | 0.03 |
| 5 | 6 | 3 | 0.31 | 0.08 | 0.25 | 0.07 | 0.17 | 0.06 | 0.03 | 0.03 | 0.06 | 0.04 | 0.31 | 0.08 | 0.39 | 0.08 | 0.03 | 0.03 |
| 5 | 6 | 7 | 0.58 | 0.08 | 0.33 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 | 0.11 | 0.05 | 0.14 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 |
| 5 | 6 | 11 | 0.86 | 0.06 | 0.67 | 0.08 | 0.44 | 0.08 | 0.19 | 0.07 | 0.28 | 0.08 | 0.03 | 0.03 | 0.06 | 0.04 | 0.03 | 0.03 |
| 5 | 6 | 15 | 0.72 | 0.08 | 0.69 | 0.08 | 0.50 | 0.08 | 0.25 | 0.07 | 0.39 | 0.08 | 0.14 | 0.06 | 0.08 | 0.05 | 0.00 | 0.00 |
| 5 | 6 | 19 | 0.58 | 0.08 | 0.78 | 0.07 | 0.44 | 0.08 | 0.14 | 0.06 | 0.31 | 0.08 | 0.36 | 0.08 | 0.31 | 0.08 | 0.03 | 0.03 |
| 5 | 7 | 3 | 0.28 | 0.08 | 0.44 | 0.08 | 0.11 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.28 | 0.08 | 0.47 | 0.08 | 0.03 | 0.03 |
| 5 | 7 | 7 | 0.33 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.17 | 0.06 | 0.25 | 0.07 | 0.03 | 0.03 |
| 5 | 7 | 11 | 0.75 | 0.07 | 0.67 | 0.08 | 0.42 | 0.08 | 0.19 | 0.07 | 0.28 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| 5 | 7 | 15 | 0.83 | 0.06 | 0.75 | 0.07 | 0.47 | 0.08 | 0.22 | 0.07 | 0.36 | 0.08 | 0.03 | 0.03 | 0.06 | 0.04 | 0.03 | 0.03 |
| 5 | 7 | 19 | 0.64 | 0.08 | 0.72 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.31 | 0.08 | 0.33 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 |
| 5 | 8 | 3 | 0.39 | 0.08 | 0.47 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.11 | 0.05 | 0.36 | 0.08 | 0.53 | 0.08 | 0.06 | 0.04 |
| 5 | 8 | 7 | 0.22 | 0.07 | 0.39 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.19 | 0.07 | 0.28 | 0.08 | 0.03 | 0.03 |
| 5 | 8 | 11 | 0.67 | 0.08 | 0.58 | 0.08 | 0.33 | 0.08 | 0.14 | 0.06 | 0.28 | 0.08 | 0.03 | 0.03 | 0.06 | 0.04 | 0.00 | 0.00 |
| 5 | 8 | 15 | 0.89 | 0.05 | 0.72 | 0.08 | 0.50 | 0.08 | 0.22 | 0.07 | 0.44 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| 5 | 8 | 19 | 0.78 | 0.07 | 0.69 | 0.08 | 0.50 | 0.08 | 0.17 | 0.06 | 0.28 | 0.08 | 0.33 | 0.08 | 0.17 | 0.06 | 0.00 | 0.00 |
| 6 | 1 | 3 | 0.78 | 0.07 | 0.44 | 0.08 | 0.19 | 0.07 | 0.03 | 0.03 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 |
| 6 | 1 | 7 | 0.94 | 0.04 | 0.81 | 0.07 | 0.39 | 0.08 | 0.22 | 0.07 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 |
| 6 | 1 | 11 | 0.64 | 0.08 | 0.72 | 0.08 | 0.33 | 0.08 | 0.19 | 0.07 | 0.17 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 |
| 6 | 1 | 15 | 0.50 | 0.08 | 0.56 | 0.08 | 0.28 | 0.08 | 0.03 | 0.03 | 0.14 | 0.06 | 0.28 | 0.08 | 0.28 | 0.08 | 0.19 | 0.07 |
| 6 | 1 | 19 | 0.50 | 0.08 | 0.44 | 0.08 | 0.28 | 0.08 | 0.03 | 0.03 | 0.11 | 0.05 | 0.25 | 0.07 | 0.39 | 0.08 | 0.36 | 0.08 |
| 6 | 2 | 3 | 0.44 | 0.08 | 0.42 | 0.08 | 0.17 | 0.06 | 0.06 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.22 | 0.07 |
| 6 | 2 | 7 | 0.81 | 0.07 | 0.64 | 0.08 | 0.31 | 0.08 | 0.19 | 0.07 | 0.14 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 |
| 6 | 2 | 11 | 0.61 | 0.08 | 0.61 | 0.08 | 0.33 | 0.08 | 0.19 | 0.07 | 0.28 | 0.08 | 0.06 | 0.04 | 0.08 | 0.05 | 0.17 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 15 | 0.39 | 0.08 | 0.47 | 0.08 | 0.19 | 0.07 | 0.08 | 0.05 | 0.25 | 0.07 | 0.19 | 0.07 | 0.36 | 0.08 | 0.31 | 0.08 |
| 6 | 2 | 19 | 0.42 | 0.08 | 0.53 | 0.08 | 0.22 | 0.07 | 0.06 | 0.04 | 0.11 | 0.05 | 0.36 | 0.08 | 0.42 | 0.08 | 0.47 | 0.08 |
| 6 | 3 | 3 | 0.33 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.06 | 0.04 | 0.08 | 0.05 | 0.19 | 0.07 | 0.22 | 0.07 |
| 6 | 3 | 7 | 0.69 | 0.08 | 0.56 | 0.08 | 0.22 | 0.07 | 0.11 | 0.05 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.06 |
| 6 | 3 | 11 | 0.78 | 0.07 | 0.69 | 0.08 | 0.28 | 0.08 | 0.17 | 0.06 | 0.17 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 |
| 6 | 3 | 15 | 0.50 | 0.08 | 0.58 | 0.08 | 0.28 | 0.08 | 0.14 | 0.06 | 0.22 | 0.07 | 0.17 | 0.06 | 0.31 | 0.08 | 0.17 | 0.06 |
| 6 | 3 | 19 | 0.36 | 0.08 | 0.44 | 0.08 | 0.28 | 0.08 | 0.11 | 0.05 | 0.19 | 0.07 | 0.33 | 0.08 | 0.36 | 0.08 | 0.36 | 0.08 |
| 6 | 4 | 3 | 0.25 | 0.07 | 0.31 | 0.08 | 0.11 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.17 | 0.06 | 0.25 | 0.07 | 0.22 | 0.07 |
| 6 | 4 | 7 | 0.75 | 0.07 | 0.56 | 0.08 | 0.25 | 0.07 | 0.06 | 0.04 | 0.19 | 0.07 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 |
| 6 | 4 | 11 | 0.78 | 0.07 | 0.75 | 0.07 | 0.44 | 0.08 | 0.19 | 0.07 | 0.28 | 0.08 | 0.03 | 0.03 | 0.03 | 0.03 | 0.14 | 0.06 |
| 6 | 4 | 15 | 0.47 | 0.08 | 0.50 | 0.08 | 0.36 | 0.08 | 0.14 | 0.06 | 0.14 | 0.06 | 0.17 | 0.06 | 0.19 | 0.07 | 0.14 | 0.06 |
| 6 | 4 | 19 | 0.47 | 0.08 | 0.56 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 | 0.08 | 0.05 | 0.28 | 0.08 | 0.28 | 0.08 | 0.36 | 0.08 |
| 6 | 5 | 3 | 0.28 | 0.08 | 0.33 | 0.08 | 0.14 | 0.06 | 0.06 | 0.04 | 0.06 | 0.04 | 0.22 | 0.07 | 0.31 | 0.08 | 0.33 | 0.08 |
| 6 | 5 | 7 | 0.53 | 0.08 | 0.42 | 0.08 | 0.17 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.06 | 0.04 | 0.03 | 0.03 | 0.14 | 0.06 |
| 6 | 5 | 11 | 0.81 | 0.07 | 0.67 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.17 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.06 |
| 6 | 5 | 15 | 0.53 | 0.08 | 0.56 | 0.08 | 0.42 | 0.08 | 0.11 | 0.05 | 0.19 | 0.07 | 0.19 | 0.07 | 0.17 | 0.06 | 0.17 | 0.06 |
| 6 | 5 | 19 | 0.42 | 0.08 | 0.61 | 0.08 | 0.31 | 0.08 | 0.11 | 0.05 | 0.22 | 0.07 | 0.33 | 0.08 | 0.33 | 0.08 | 0.25 | 0.07 |
| 6 | 6 | 3 | 0.39 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.25 | 0.07 | 0.36 | 0.08 | 0.31 | 0.08 |
| 6 | 6 | 7 | 0.39 | 0.08 | 0.33 | 0.08 | 0.14 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 |
| 6 | 6 | 11 | 0.83 | 0.06 | 0.81 | 0.07 | 0.28 | 0.08 | 0.17 | 0.06 | 0.19 | 0.07 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 |
| 6 | 6 | 15 | 0.78 | 0.07 | 0.67 | 0.08 | 0.39 | 0.08 | 0.14 | 0.06 | 0.19 | 0.07 | 0.11 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 |
| 6 | 6 | 19 | 0.47 | 0.08 | 0.53 | 0.08 | 0.39 | 0.08 | 0.08 | 0.05 | 0.08 | 0.05 | 0.22 | 0.07 | 0.31 | 0.08 | 0.25 | 0.07 |
| 6 | 7 | 3 | 0.39 | 0.08 | 0.44 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.11 | 0.05 | 0.33 | 0.08 | 0.39 | 0.08 | 0.28 | 0.08 |
| 6 | 7 | 7 | 0.42 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.17 | 0.06 | 0.25 | 0.07 | 0.08 | 0.05 |
| 6 | 7 | 11 | 0.75 | 0.07 | 0.56 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.17 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 |
| 6 | 7 | 15 | 0.67 | 0.08 | 0.69 | 0.08 | 0.36 | 0.08 | 0.19 | 0.07 | 0.22 | 0.07 | 0.03 | 0.03 | 0.11 | 0.05 | 0.11 | 0.05 |
| 6 | 7 | 19 | 0.47 | 0.08 | 0.61 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.22 | 0.07 | 0.19 | 0.07 | 0.22 | 0.07 | 0.14 | 0.06 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 3 | 0.39 | 0.08 | 0.39 | 0.08 | 0.17 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.33 | 0.08 | 0.44 | 0.08 | 0.33 | 0.08 |
| 6 | 8 | 7 | 0.33 | 0.08 | 0.31 | 0.08 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.07 | 0.28 | 0.08 | 0.17 | 0.06 |
| 6 | 8 | 11 | 0.69 | 0.08 | 0.56 | 0.08 | 0.28 | 0.08 | 0.08 | 0.05 | 0.17 | 0.06 | 0.00 | 0.00 | 0.08 | 0.05 | 0.08 | 0.05 |
| 6 | 8 | 15 | 0.75 | 0.07 | 0.75 | 0.07 | 0.39 | 0.08 | 0.17 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 | 0.06 | 0.04 | 0.11 | 0.05 |
| 6 | 8 | 19 | 0.53 | 0.08 | 0.61 | 0.08 | 0.36 | 0.08 | 0.11 | 0.05 | 0.14 | 0.06 | 0.17 | 0.06 | 0.22 | 0.07 | 0.19 | 0.07 |

Appendix K: TCATA mean citation proportions and observed standard error (SE) of sensory attributes of milkshakes (sipping through a straw) by the expert panel.

| *Product* | *Sip* | *Within-sip* | Observed mean citation proportions and SE of attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.72 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.78 | 0.10 | 0.61 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.78 | 0.10 | 0.61 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 1 | 15 | 0.78 | 0.10 | 0.61 | 0.12 | 0.67 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 1 | 19 | 0.83 | 0.09 | 0.67 | 0.11 | 0.56 | 0.12 | 0.39 | 0.12 | 0.33 | 0.11 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 |
| 1 | 2 | 3 | 0.67 | 0.11 | 0.44 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 2 | 7 | 0.94 | 0.06 | 0.67 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.56 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 11 | 0.78 | 0.10 | 0.67 | 0.11 | 0.61 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 2 | 15 | 0.78 | 0.10 | 0.67 | 0.11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.33 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 2 | 19 | 0.72 | 0.11 | 0.56 | 0.12 | 0.61 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.72 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 3 | 3 | 0.67 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 3 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.44 | 0.12 | 0.56 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 11 | 0.89 | 0.08 | 0.83 | 0.09 | 0.61 | 0.12 | 0.72 | 0.11 | 0.67 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 3 | 15 | 0.78 | 0.10 | 0.72 | 0.11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.50 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 3 | 19 | 0.78 | 0.10 | 0.72 | 0.11 | 0.67 | 0.11 | 0.39 | 0.12 | 0.39 | 0.12 | 0.72 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 4 | 3 | 0.50 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 4 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.56 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.61 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 15 | 0.83 | 0.09 | 0.78 | 0.10 | 0.67 | 0.11 | 0.67 | 0.11 | 0.61 | 0.12 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 19 | 0.78 | 0.10 | 0.67 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.33 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 5 | 3 | 0.56 | 0.12 | 0.33 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 5 | 7 | 0.67 | 0.11 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 5 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.61 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.61 | 0.12 | 0.78 | 0.10 | 0.61 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 5 | 19 | 0.78 | 0.10 | 0.72 | 0.11 | 0.67 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.67 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 6 | 3 | 0.50 | 0.12 | 0.39 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 6 | 7 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 6 | 11 | 0.89 | 0.08 | 0.72 | 0.11 | 0.56 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 1 | 6 | 15 | 0.94 | 0.06 | 0.83 | 0.09 | 0.61 | 0.12 | 0.67 | 0.11 | 0.67 | 0.11 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 |
| 1 | 6 | 19 | 0.89 | 0.08 | 0.67 | 0.11 | 0.78 | 0.10 | 0.44 | 0.12 | 0.44 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 1 | 7 | 3 | 0.67 | 0.11 | 0.56 | 0.12 | 0.39 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 |
| 1 | 7 | 7 | 0.39 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 11 | 0.94 | 0.06 | 0.67 | 0.11 | 0.50 | 0.12 | 0.50 | 0.12 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.56 | 0.12 | 0.72 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 7 | 19 | 0.78 | 0.10 | 0.61 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.44 | 0.12 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 1 | 8 | 3 | 0.83 | 0.09 | 0.67 | 0.11 | 0.56 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.56 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 1 | 8 | 7 | 0.56 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 |
| 1 | 8 | 11 | 0.94 | 0.06 | 0.72 | 0.11 | 0.44 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 1 | 8 | 15 | 0.94 | 0.06 | 0.83 | 0.09 | 0.56 | 0.12 | 0.78 | 0.10 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 19 | 0.83 | 0.09 | 0.67 | 0.11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 1 | 3 | 0.94 | 0.06 | 0.67 | 0.11 | 0.39 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 7 | 0.94 | 0.06 | 0.78 | 0.10 | 0.56 | 0.12 | 0.67 | 0.11 | 0.67 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 1 | 11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.72 | 0.11 | 0.50 | 0.12 | 0.78 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 1 | 15 | 0.83 | 0.09 | 0.61 | 0.12 | 0.89 | 0.08 | 0.50 | 0.12 | 0.44 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 1 | 19 | 0.56 | 0.12 | 0.50 | 0.12 | 0.61 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.67 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 2 | 3 | 0.61 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 7 | 0.94 | 0.06 | 0.78 | 0.10 | 0.50 | 0.12 | 0.61 | 0.12 | 0.56 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 2 | 11 | 0.78 | 0.10 | 0.83 | 0.09 | 0.78 | 0.10 | 0.72 | 0.11 | 0.78 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 2 | 15 | 0.72 | 0.11 | 0.78 | 0.10 | 0.89 | 0.08 | 0.56 | 0.12 | 0.39 | 0.12 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 2 | 19 | 0.72 | 0.11 | 0.72 | 0.11 | 0.83 | 0.09 | 0.39 | 0.12 | 0.11 | 0.08 | 0.67 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 3 | 3 | 0.50 | 0.12 | 0.33 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.39 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 3 | 7 | 0.94 | 0.06 | 0.78 | 0.10 | 0.50 | 0.12 | 0.61 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 3 | 11 | 0.89 | 0.08 | 0.83 | 0.09 | 0.61 | 0.12 | 0.72 | 0.11 | 0.72 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 3 | 15 | 0.61 | 0.12 | 0.67 | 0.11 | 0.72 | 0.11 | 0.50 | 0.12 | 0.67 | 0.11 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 3 | 19 | 0.61 | 0.12 | 0.72 | 0.11 | 0.72 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.78 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 4 | 3 | 0.44 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 4 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.61 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.61 | 0.12 | 0.72 | 0.11 | 0.78 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 15 | 0.61 | 0.12 | 0.67 | 0.11 | 0.72 | 0.11 | 0.50 | 0.12 | 0.50 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 4 | 19 | 0.61 | 0.12 | 0.72 | 0.11 | 0.83 | 0.09 | 0.33 | 0.11 | 0.17 | 0.09 | 0.67 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 5 | 3 | 0.44 | 0.12 | 0.39 | 0.12 | 0.44 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 5 | 7 | 0.67 | 0.11 | 0.61 | 0.12 | 0.44 | 0.12 | 0.56 | 0.12 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 5 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.56 | 0.12 | 0.67 | 0.11 | 0.61 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 5 | 15 | 0.83 | 0.09 | 0.67 | 0.11 | 0.72 | 0.11 | 0.56 | 0.12 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 5 | 19 | 0.72 | 0.11 | 0.61 | 0.12 | 0.83 | 0.09 | 0.44 | 0.12 | 0.50 | 0.12 | 0.67 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 6 | 3 | 0.44 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.50 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 |
| 2 | 6 | 7 | 0.44 | 0.12 | 0.33 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 6 | 11 | 0.94 | 0.06 | 0.72 | 0.11 | 0.56 | 0.12 | 0.67 | 0.11 | 0.72 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 6 | 15 | 0.89 | 0.08 | 0.72 | 0.11 | 0.67 | 0.11 | 0.67 | 0.11 | 0.72 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 6 | 19 | 0.83 | 0.09 | 0.67 | 0.11 | 0.83 | 0.09 | 0.50 | 0.12 | 0.56 | 0.12 | 0.61 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 7 | 3 | 0.33 | 0.11 | 0.50 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.50 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 7 | 7 | 0.44 | 0.12 | 0.33 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 |
| 2 | 7 | 11 | 0.89 | 0.08 | 0.61 | 0.12 | 0.56 | 0.12 | 0.50 | 0.12 | 0.50 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 7 | 15 | 0.94 | 0.06 | 0.83 | 0.09 | 0.61 | 0.12 | 0.67 | 0.11 | 0.67 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 7 | 19 | 0.83 | 0.09 | 0.72 | 0.11 | 0.78 | 0.10 | 0.56 | 0.12 | 0.56 | 0.12 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 2 | 8 | 3 | 0.50 | 0.12 | 0.50 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 |
| 2 | 8 | 7 | 0.50 | 0.12 | 0.50 | 0.12 | 0.56 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.39 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 |
| 2 | 8 | 11 | 0.89 | 0.08 | 0.67 | 0.11 | 0.50 | 0.12 | 0.56 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 2 | 8 | 15 | 0.94 | 0.06 | 0.72 | 0.11 | 0.61 | 0.12 | 0.78 | 0.10 | 0.72 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 8 | 19 | 0.56 | 0.12 | 0.50 | 0.12 | 0.83 | 0.09 | 0.61 | 0.12 | 0.78 | 0.10 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 |
| 3 | 1 | 3 | 0.83 | 0.09 | 0.72 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 3 | 1 | 7 | 1.00 | 0.00 | 0.83 | 0.09 | 0.44 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 3 | 1 | 11 | 0.72 | 0.11 | 0.67 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 |
| 3 | 1 | 15 | 0.72 | 0.11 | 0.72 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 |
| 3 | 1 | 19 | 0.72 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 |
| 3 | 2 | 3 | 0.56 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 3 | 2 | 7 | 1.00 | 0.00 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 2 | 11 | 0.83 | 0.09 | 0.67 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 |
| 3 | 2 | 15 | 0.67 | 0.11 | 0.89 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.33 | 0.11 | 0.06 | 0.06 |
| 3 | 2 | 19 | 0.78 | 0.10 | 0.78 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.17 | 0.09 | 0.50 | 0.12 | 0.06 | 0.06 |
| 3 | 3 | 3 | 0.44 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.11 | 0.08 |
| 3 | 3 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 3 | 3 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 3 | 3 | 15 | 0.72 | 0.11 | 0.78 | 0.10 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.22 | 0.10 | 0.11 | 0.08 |
| 3 | 3 | 19 | 0.61 | 0.12 | 0.67 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 | 0.50 | 0.12 | 0.11 | 0.08 |
| 3 | 4 | 3 | 0.61 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.39 | 0.12 | 0.11 | 0.08 |
| 3 | 4 | 7 | 0.72 | 0.11 | 0.56 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 4 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.39 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 4 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 4 | 19 | 0.89 | 0.08 | 0.83 | 0.09 | 0.33 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.56 | 0.12 | 0.06 | 0.06 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 5 | 3 | 0.39 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.44 | 0.12 | 0.17 | 0.09 |
| 3 | 5 | 7 | 0.78 | 0.10 | 0.56 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 |
| 3 | 5 | 11 | 0.94 | 0.06 | 0.83 | 0.09 | 0.44 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 3 | 5 | 15 | 0.83 | 0.09 | 0.72 | 0.11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.17 | 0.09 | 0.28 | 0.11 | 0.00 | 0.00 |
| 3 | 5 | 19 | 0.89 | 0.08 | 0.72 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.28 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 |
| 3 | 6 | 3 | 0.44 | 0.12 | 0.44 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.39 | 0.12 | 0.00 | 0.00 |
| 3 | 6 | 7 | 0.67 | 0.11 | 0.56 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 3 | 6 | 11 | 1.00 | 0.00 | 0.83 | 0.09 | 0.39 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 |
| 3 | 6 | 15 | 0.83 | 0.09 | 0.94 | 0.06 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 |
| 3 | 6 | 19 | 0.94 | 0.06 | 0.83 | 0.09 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.39 | 0.12 | 0.11 | 0.08 |
| 3 | 7 | 3 | 0.56 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.61 | 0.12 | 0.06 | 0.06 |
| 3 | 7 | 7 | 0.61 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.39 | 0.12 | 0.00 | 0.00 |
| 3 | 7 | 11 | 1.00 | 0.00 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 7 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.44 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 |
| 3 | 7 | 19 | 0.78 | 0.10 | 0.67 | 0.11 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.39 | 0.12 | 0.17 | 0.09 |
| 3 | 8 | 3 | 0.72 | 0.11 | 0.56 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.61 | 0.12 | 0.00 | 0.00 |
| 3 | 8 | 7 | 0.50 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.44 | 0.12 | 0.00 | 0.00 |
| 3 | 8 | 11 | 0.78 | 0.10 | 0.56 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.44 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 8 | 19 | 1.00 | 0.00 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 1 | 3 | 0.83 | 0.09 | 0.67 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.89 | 0.08 | 0.89 | 0.08 | 0.50 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 1 | 11 | 0.72 | 0.11 | 0.78 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.28 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 1 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.28 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 |
| 4 | 1 | 19 | 0.72 | 0.11 | 0.78 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 |
| 4 | 2 | 3 | 0.61 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 |
| 4 | 2 | 7 | 0.83 | 0.09 | 0.61 | 0.12 | 0.39 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 11 | 0.78 | 0.10 | 0.78 | 0.10 | 0.33 | 0.11 | 0.22 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 2 | 15 | 0.78 | 0.10 | 0.94 | 0.06 | 0.39 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.50 | 0.12 | 0.17 | 0.09 |
| 4 | 2 | 19 | 0.67 | 0.11 | 0.67 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 | 0.44 | 0.12 | 0.22 | 0.10 |
| 4 | 3 | 3 | 0.33 | 0.11 | 0.50 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 3 | 7 | 0.78 | 0.10 | 0.72 | 0.11 | 0.50 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 4 | 3 | 11 | 0.72 | 0.11 | 0.78 | 0.10 | 0.50 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 |
| 4 | 3 | 15 | 0.61 | 0.12 | 0.83 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.44 | 0.12 | 0.00 | 0.00 |
| 4 | 3 | 19 | 0.50 | 0.12 | 0.83 | 0.09 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.11 | 0.56 | 0.12 | 0.06 | 0.06 |
| 4 | 4 | 3 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 |
| 4 | 4 | 7 | 0.78 | 0.10 | 0.72 | 0.11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 11 | 0.89 | 0.08 | 0.83 | 0.09 | 0.61 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 15 | 0.78 | 0.10 | 0.72 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.39 | 0.12 | 0.00 | 0.00 |
| 4 | 4 | 19 | 0.83 | 0.09 | 0.67 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.28 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 |
| 4 | 5 | 3 | 0.50 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.17 | 0.09 | 0.56 | 0.12 | 0.00 | 0.00 |
| 4 | 5 | 7 | 0.61 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 11 | 0.94 | 0.06 | 0.78 | 0.10 | 0.44 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 5 | 15 | 0.83 | 0.09 | 0.72 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 |
| 4 | 5 | 19 | 0.61 | 0.12 | 0.72 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.28 | 0.11 | 0.39 | 0.12 | 0.00 | 0.00 |
| 4 | 6 | 3 | 0.50 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.61 | 0.12 | 0.11 | 0.08 |
| 4 | 6 | 7 | 0.56 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.17 | 0.09 | 0.11 | 0.08 | 0.22 | 0.10 | 0.00 | 0.00 |
| 4 | 6 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.44 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 15 | 0.89 | 0.08 | 0.83 | 0.09 | 0.50 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 |
| 4 | 6 | 19 | 0.72 | 0.11 | 0.78 | 0.10 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 | 0.56 | 0.12 | 0.00 | 0.00 |
| 4 | 7 | 3 | 0.50 | 0.12 | 0.56 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.61 | 0.12 | 0.00 | 0.00 |
| 4 | 7 | 7 | 0.56 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.33 | 0.11 | 0.00 | 0.00 |
| 4 | 7 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.44 | 0.12 | 0.17 | 0.09 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 7 | 15 | 0.89 | 0.08 | 0.83 | 0.09 | 0.56 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.11 | 0.08 | 0.06 | 0.06 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 7 | 19 | 0.78 | 0.10 | 0.72 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.50 | 0.12 | 0.06 | 0.06 |
| 4 | 8 | 3 | 0.56 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.78 | 0.10 | 0.00 | 0.00 |
| 4 | 8 | 7 | 0.44 | 0.12 | 0.44 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.56 | 0.12 | 0.00 | 0.00 |
| 4 | 8 | 11 | 0.83 | 0.09 | 0.67 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 15 | 1.00 | 0.00 | 0.83 | 0.09 | 0.61 | 0.12 | 0.22 | 0.10 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 4 | 8 | 19 | 0.78 | 0.10 | 0.78 | 0.10 | 0.44 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.33 | 0.11 | 0.00 | 0.00 |
| 5 | 1 | 3 | 0.94 | 0.06 | 0.67 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 7 | 1.00 | 0.00 | 0.83 | 0.09 | 0.50 | 0.12 | 0.22 | 0.10 | 0.44 | 0.12 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1 | 11 | 0.61 | 0.12 | 0.61 | 0.12 | 0.50 | 0.12 | 0.11 | 0.08 | 0.39 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.06 | 0.06 |
| 5 | 1 | 15 | 0.67 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 | 0.33 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 |
| 5 | 1 | 19 | 0.61 | 0.12 | 0.72 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.50 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 |
| 5 | 2 | 3 | 0.61 | 0.12 | 0.50 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 2 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 |
| 5 | 2 | 11 | 0.72 | 0.11 | 0.72 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.33 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 |
| 5 | 2 | 15 | 0.67 | 0.11 | 0.89 | 0.08 | 0.39 | 0.12 | 0.22 | 0.10 | 0.28 | 0.11 | 0.39 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 |
| 5 | 2 | 19 | 0.78 | 0.10 | 0.78 | 0.10 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.39 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 |
| 5 | 3 | 3 | 0.33 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 |
| 5 | 3 | 7 | 0.78 | 0.10 | 0.72 | 0.11 | 0.44 | 0.12 | 0.28 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 3 | 11 | 0.83 | 0.09 | 0.78 | 0.10 | 0.50 | 0.12 | 0.28 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 3 | 15 | 0.61 | 0.12 | 0.72 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 5 | 3 | 19 | 0.56 | 0.12 | 0.89 | 0.08 | 0.28 | 0.11 | 0.00 | 0.00 | 0.28 | 0.11 | 0.56 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 |
| 5 | 4 | 3 | 0.33 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 4 | 7 | 0.83 | 0.09 | 0.67 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4 | 11 | 1.00 | 0.00 | 0.78 | 0.10 | 0.61 | 0.12 | 0.22 | 0.10 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 4 | 15 | 0.67 | 0.11 | 0.67 | 0.11 | 0.50 | 0.12 | 0.11 | 0.08 | 0.39 | 0.12 | 0.28 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 |
| 5 | 4 | 19 | 0.78 | 0.10 | 0.83 | 0.09 | 0.28 | 0.11 | 0.06 | 0.06 | 0.28 | 0.11 | 0.44 | 0.12 | 0.39 | 0.12 | 0.00 | 0.00 |
| 5 | 5 | 3 | 0.33 | 0.11 | 0.44 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 7 | 0.78 | 0.10 | 0.78 | 0.10 | 0.44 | 0.12 | 0.22 | 0.10 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.06 | 0.06 |
| 5 | 5 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.50 | 0.12 | 0.28 | 0.11 | 0.39 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 5 | 15 | 0.56 | 0.12 | 0.72 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.33 | 0.11 | 0.22 | 0.10 | 0.22 | 0.10 | 0.00 | 0.00 |
| 5 | 5 | 19 | 0.61 | 0.12 | 0.83 | 0.09 | 0.56 | 0.12 | 0.11 | 0.08 | 0.22 | 0.10 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 |
| 5 | 6 | 3 | 0.33 | 0.11 | 0.28 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.39 | 0.12 | 0.44 | 0.12 | 0.06 | 0.06 |
| 5 | 6 | 7 | 0.61 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 6 | 11 | 0.89 | 0.08 | 0.78 | 0.10 | 0.56 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 5 | 6 | 15 | 0.78 | 0.10 | 0.83 | 0.09 | 0.56 | 0.12 | 0.22 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 6 | 19 | 0.72 | 0.11 | 0.78 | 0.10 | 0.44 | 0.12 | 0.06 | 0.06 | 0.28 | 0.11 | 0.39 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 |
| 5 | 7 | 3 | 0.28 | 0.11 | 0.61 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.67 | 0.11 | 0.06 | 0.06 |
| 5 | 7 | 7 | 0.39 | 0.12 | 0.33 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.08 | 0.39 | 0.12 | 0.06 | 0.06 |
| 5 | 7 | 11 | 0.83 | 0.09 | 0.72 | 0.11 | 0.56 | 0.12 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 5 | 7 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.56 | 0.12 | 0.22 | 0.10 | 0.39 | 0.12 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 |
| 5 | 7 | 19 | 0.78 | 0.10 | 0.89 | 0.08 | 0.39 | 0.12 | 0.06 | 0.06 | 0.28 | 0.11 | 0.33 | 0.11 | 0.22 | 0.10 | 0.06 | 0.06 |
| 5 | 8 | 3 | 0.44 | 0.12 | 0.50 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.44 | 0.12 | 0.67 | 0.11 | 0.11 | 0.08 |
| 5 | 8 | 7 | 0.22 | 0.10 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.33 | 0.11 | 0.06 | 0.06 |
| 5 | 8 | 11 | 0.78 | 0.10 | 0.72 | 0.11 | 0.44 | 0.12 | 0.22 | 0.10 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 8 | 15 | 0.89 | 0.08 | 0.78 | 0.10 | 0.61 | 0.12 | 0.28 | 0.11 | 0.44 | 0.12 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| 5 | 8 | 19 | 0.78 | 0.10 | 0.78 | 0.10 | 0.56 | 0.12 | 0.17 | 0.09 | 0.28 | 0.11 | 0.33 | 0.11 | 0.28 | 0.11 | 0.00 | 0.00 |
| 6 | 1 | 3 | 0.78 | 0.10 | 0.50 | 0.12 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 1 | 7 | 1.00 | 0.00 | 0.89 | 0.08 | 0.44 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 |
| 6 | 1 | 11 | 0.83 | 0.09 | 0.83 | 0.09 | 0.33 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6 | 1 | 15 | 0.61 | 0.12 | 0.67 | 0.11 | 0.33 | 0.11 | 0.00 | 0.00 | 0.17 | 0.09 | 0.28 | 0.11 | 0.28 | 0.11 | 0.28 | 0.11 |
| 6 | 1 | 19 | 0.50 | 0.12 | 0.44 | 0.12 | 0.33 | 0.11 | 0.00 | 0.00 | 0.11 | 0.08 | 0.28 | 0.11 | 0.39 | 0.12 | 0.39 | 0.12 |
| 6 | 2 | 3 | 0.50 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 |
| 6 | 2 | 7 | 0.89 | 0.08 | 0.72 | 0.11 | 0.39 | 0.12 | 0.22 | 0.10 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 |
| 6 | 2 | 11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 15 | 0.44 | 0.12 | 0.50 | 0.12 | 0.33 | 0.11 | 0.06 | 0.06 | 0.33 | 0.11 | 0.22 | 0.10 | 0.39 | 0.12 | 0.28 | 0.11 |
| 6 | 2 | 19 | 0.56 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.39 | 0.12 | 0.44 | 0.12 | 0.39 | 0.12 |
| 6 | 3 | 3 | 0.33 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.06 | 0.06 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 | 0.28 | 0.11 |
| 6 | 3 | 7 | 0.78 | 0.10 | 0.61 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 |
| 6 | 3 | 11 | 0.72 | 0.11 | 0.72 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.22 | 0.10 |
| 6 | 3 | 15 | 0.44 | 0.12 | 0.61 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.22 | 0.10 | 0.22 | 0.10 | 0.39 | 0.12 | 0.22 | 0.10 |
| 6 | 3 | 19 | 0.56 | 0.12 | 0.44 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.11 | 0.08 | 0.33 | 0.11 | 0.39 | 0.12 | 0.50 | 0.12 |
| 6 | 4 | 3 | 0.28 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.10 | 0.33 | 0.11 | 0.22 | 0.10 |
| 6 | 4 | 7 | 0.78 | 0.10 | 0.67 | 0.11 | 0.28 | 0.11 | 0.06 | 0.06 | 0.22 | 0.10 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 |
| 6 | 4 | 11 | 0.83 | 0.09 | 0.83 | 0.09 | 0.44 | 0.12 | 0.22 | 0.10 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.17 | 0.09 |
| 6 | 4 | 15 | 0.50 | 0.12 | 0.56 | 0.12 | 0.39 | 0.12 | 0.17 | 0.09 | 0.11 | 0.08 | 0.11 | 0.08 | 0.28 | 0.11 | 0.22 | 0.10 |
| 6 | 4 | 19 | 0.56 | 0.12 | 0.61 | 0.12 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.33 | 0.11 | 0.50 | 0.12 |
| 6 | 5 | 3 | 0.28 | 0.11 | 0.33 | 0.11 | 0.17 | 0.09 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.39 | 0.12 | 0.39 | 0.12 |
| 6 | 5 | 7 | 0.44 | 0.12 | 0.50 | 0.12 | 0.17 | 0.09 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.06 | 0.06 | 0.22 | 0.10 |
| 6 | 5 | 11 | 0.78 | 0.10 | 0.72 | 0.11 | 0.28 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 |
| 6 | 5 | 15 | 0.72 | 0.11 | 0.61 | 0.12 | 0.39 | 0.12 | 0.06 | 0.06 | 0.22 | 0.10 | 0.22 | 0.10 | 0.22 | 0.10 | 0.22 | 0.10 |
| 6 | 5 | 19 | 0.61 | 0.12 | 0.78 | 0.10 | 0.28 | 0.11 | 0.06 | 0.06 | 0.22 | 0.10 | 0.33 | 0.11 | 0.39 | 0.12 | 0.33 | 0.11 |
| 6 | 6 | 3 | 0.39 | 0.12 | 0.28 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.11 | 0.39 | 0.12 | 0.33 | 0.11 |
| 6 | 6 | 7 | 0.28 | 0.11 | 0.39 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.11 | 0.08 |
| 6 | 6 | 11 | 0.89 | 0.08 | 0.83 | 0.09 | 0.33 | 0.11 | 0.11 | 0.08 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 |
| 6 | 6 | 15 | 0.94 | 0.06 | 0.67 | 0.11 | 0.44 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 |
| 6 | 6 | 19 | 0.50 | 0.12 | 0.61 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.06 | 0.06 | 0.28 | 0.11 | 0.44 | 0.12 | 0.33 | 0.11 |
| 6 | 7 | 3 | 0.44 | 0.12 | 0.56 | 0.12 | 0.17 | 0.09 | 0.00 | 0.00 | 0.06 | 0.06 | 0.33 | 0.11 | 0.44 | 0.12 | 0.33 | 0.11 |
| 6 | 7 | 7 | 0.39 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 | 0.28 | 0.11 | 0.11 | 0.08 |
| 6 | 7 | 11 | 0.78 | 0.10 | 0.67 | 0.11 | 0.33 | 0.11 | 0.11 | 0.08 | 0.11 | 0.08 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 7 | 15 | 0.72 | 0.11 | 0.78 | 0.10 | 0.39 | 0.12 | 0.28 | 0.11 | 0.11 | 0.08 | 0.06 | 0.06 | 0.17 | 0.09 | 0.22 | 0.10 |
| 6 | 7 | 19 | 0.50 | 0.12 | 0.72 | 0.11 | 0.22 | 0.10 | 0.17 | 0.09 | 0.17 | 0.09 | 0.22 | 0.10 | 0.28 | 0.11 | 0.22 | 0.10 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 3 | 0.50 | 0.12 | 0.33 | 0.11 | 0.22 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.12 | 0.44 | 0.12 | 0.44 | 0.12 |
| 6 | 8 | 7 | 0.39 | 0.12 | 0.33 | 0.11 | 0.17 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.10 | 0.17 | 0.09 | 0.22 | 0.10 |
| 6 | 8 | 11 | 0.72 | 0.11 | 0.61 | 0.12 | 0.28 | 0.11 | 0.06 | 0.06 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.09 |
| 6 | 8 | 15 | 0.78 | 0.10 | 0.83 | 0.09 | 0.44 | 0.12 | 0.17 | 0.09 | 0.17 | 0.09 | 0.06 | 0.06 | 0.11 | 0.08 | 0.17 | 0.09 |
| 6 | 8 | 19 | 0.56 | 0.12 | 0.72 | 0.11 | 0.39 | 0.12 | 0.11 | 0.08 | 0.17 | 0.09 | 0.17 | 0.09 | 0.28 | 0.11 | 0.28 | 0.11 |

Appendix L: TCATA observed mean citation proportions and standard error (SE) of sensory attributes of vanilla milkshakes for the experts and consumer panels.

| *Product* | *Sip* | *Within-sip* | Observed mean citation proportions and SE of sensory attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy Flavour | | Creamy Mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.21 | 0.04 | 0.04 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.52 | 0.05 | 0.39 | 0.04 | 0.17 | 0.03 | 0.20 | 0.04 | 0.14 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 |
| 1 | 1 | 11 | 0.54 | 0.05 | 0.51 | 0.05 | 0.35 | 0.04 | 0.43 | 0.05 | 0.34 | 0.04 | 0.11 | 0.03 | 0.00 | 0.00 | 0.02 | 0.01 |
| 1 | 1 | 15 | 0.65 | 0.04 | 0.50 | 0.05 | 0.46 | 0.05 | 0.48 | 0.05 | 0.33 | 0.04 | 0.39 | 0.04 | 0.02 | 0.01 | 0.05 | 0.02 |
| 1 | 1 | 19 | 0.60 | 0.04 | 0.49 | 0.05 | 0.50 | 0.05 | 0.45 | 0.05 | 0.22 | 0.04 | 0.52 | 0.05 | 0.04 | 0.02 | 0.07 | 0.02 |
| 1 | 2 | 3 | 0.39 | 0.04 | 0.28 | 0.04 | 0.24 | 0.04 | 0.21 | 0.04 | 0.11 | 0.03 | 0.25 | 0.04 | 0.07 | 0.02 | 0.09 | 0.03 |
| 1 | 2 | 7 | 0.63 | 0.04 | 0.44 | 0.05 | 0.25 | 0.04 | 0.29 | 0.04 | 0.25 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.05 | 0.02 |
| 1 | 2 | 11 | 0.67 | 0.04 | 0.57 | 0.05 | 0.34 | 0.04 | 0.46 | 0.05 | 0.34 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.07 | 0.02 |
| 1 | 2 | 15 | 0.58 | 0.04 | 0.52 | 0.05 | 0.41 | 0.04 | 0.43 | 0.05 | 0.29 | 0.04 | 0.39 | 0.04 | 0.03 | 0.02 | 0.09 | 0.03 |
| 1 | 2 | 19 | 0.57 | 0.04 | 0.50 | 0.05 | 0.43 | 0.04 | 0.38 | 0.04 | 0.27 | 0.04 | 0.48 | 0.05 | 0.08 | 0.02 | 0.10 | 0.03 |
| 1 | 3 | 3 | 0.40 | 0.04 | 0.34 | 0.04 | 0.22 | 0.04 | 0.16 | 0.03 | 0.06 | 0.02 | 0.33 | 0.04 | 0.07 | 0.02 | 0.07 | 0.02 |
| 1 | 3 | 7 | 0.57 | 0.05 | 0.43 | 0.04 | 0.27 | 0.04 | 0.26 | 0.04 | 0.23 | 0.04 | 0.08 | 0.02 | 0.01 | 0.01 | 0.05 | 0.02 |
| 1 | 3 | 11 | 0.66 | 0.04 | 0.52 | 0.05 | 0.39 | 0.04 | 0.42 | 0.04 | 0.34 | 0.04 | 0.12 | 0.03 | 0.02 | 0.01 | 0.07 | 0.02 |
| 1 | 3 | 15 | 0.57 | 0.04 | 0.49 | 0.05 | 0.40 | 0.04 | 0.48 | 0.05 | 0.33 | 0.04 | 0.27 | 0.04 | 0.02 | 0.01 | 0.06 | 0.02 |
| 1 | 3 | 19 | 0.61 | 0.04 | 0.57 | 0.04 | 0.49 | 0.05 | 0.46 | 0.05 | 0.26 | 0.04 | 0.52 | 0.05 | 0.10 | 0.03 | 0.11 | 0.03 |
| 1 | 4 | 3 | 0.36 | 0.04 | 0.30 | 0.04 | 0.25 | 0.04 | 0.16 | 0.03 | 0.05 | 0.02 | 0.28 | 0.04 | 0.10 | 0.03 | 0.08 | 0.02 |
| 1 | 4 | 7 | 0.47 | 0.05 | 0.41 | 0.04 | 0.25 | 0.04 | 0.24 | 0.04 | 0.20 | 0.04 | 0.15 | 0.03 | 0.07 | 0.02 | 0.05 | 0.02 |
| 1 | 4 | 11 | 0.68 | 0.04 | 0.51 | 0.05 | 0.39 | 0.04 | 0.46 | 0.05 | 0.32 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.07 | 0.02 |
| 1 | 4 | 15 | 0.61 | 0.04 | 0.43 | 0.04 | 0.38 | 0.04 | 0.48 | 0.05 | 0.30 | 0.04 | 0.19 | 0.04 | 0.03 | 0.02 | 0.09 | 0.03 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 19 | 0.65 | 0.04 | 0.48 | 0.05 | 0.46 | 0.05 | 0.48 | 0.05 | 0.26 | 0.04 | 0.39 | 0.04 | 0.09 | 0.03 | 0.07 | 0.02 |
| 1 | 5 | 3 | 0.37 | 0.04 | 0.35 | 0.04 | 0.34 | 0.04 | 0.20 | 0.04 | 0.08 | 0.02 | 0.38 | 0.04 | 0.12 | 0.03 | 0.12 | 0.03 |
| 1 | 5 | 7 | 0.38 | 0.04 | 0.30 | 0.04 | 0.24 | 0.04 | 0.15 | 0.03 | 0.12 | 0.03 | 0.20 | 0.04 | 0.06 | 0.02 | 0.06 | 0.02 |
| 1 | 5 | 11 | 0.61 | 0.04 | 0.47 | 0.05 | 0.32 | 0.04 | 0.33 | 0.04 | 0.26 | 0.04 | 0.09 | 0.03 | 0.02 | 0.01 | 0.02 | 0.01 |
| 1 | 5 | 15 | 0.58 | 0.04 | 0.48 | 0.05 | 0.35 | 0.04 | 0.48 | 0.05 | 0.35 | 0.04 | 0.13 | 0.03 | 0.03 | 0.02 | 0.07 | 0.02 |
| 1 | 5 | 19 | 0.60 | 0.04 | 0.47 | 0.05 | 0.42 | 0.04 | 0.48 | 0.05 | 0.26 | 0.04 | 0.40 | 0.04 | 0.05 | 0.02 | 0.14 | 0.03 |
| 1 | 6 | 3 | 0.45 | 0.05 | 0.34 | 0.04 | 0.39 | 0.04 | 0.21 | 0.04 | 0.16 | 0.03 | 0.46 | 0.05 | 0.17 | 0.03 | 0.14 | 0.03 |
| 1 | 6 | 7 | 0.34 | 0.04 | 0.26 | 0.04 | 0.24 | 0.04 | 0.13 | 0.03 | 0.10 | 0.03 | 0.29 | 0.04 | 0.10 | 0.03 | 0.08 | 0.02 |
| 1 | 6 | 11 | 0.60 | 0.04 | 0.46 | 0.05 | 0.32 | 0.04 | 0.34 | 0.04 | 0.28 | 0.04 | 0.11 | 0.03 | 0.04 | 0.02 | 0.05 | 0.02 |
| 1 | 6 | 15 | 0.61 | 0.04 | 0.52 | 0.05 | 0.38 | 0.04 | 0.43 | 0.05 | 0.34 | 0.04 | 0.13 | 0.03 | 0.02 | 0.01 | 0.04 | 0.02 |
| 1 | 6 | 19 | 0.62 | 0.04 | 0.48 | 0.05 | 0.41 | 0.04 | 0.44 | 0.05 | 0.27 | 0.04 | 0.34 | 0.04 | 0.06 | 0.02 | 0.07 | 0.02 |
| 1 | 7 | 3 | 0.47 | 0.05 | 0.41 | 0.04 | 0.41 | 0.04 | 0.24 | 0.04 | 0.18 | 0.03 | 0.48 | 0.05 | 0.12 | 0.03 | 0.13 | 0.03 |
| 1 | 7 | 7 | 0.34 | 0.04 | 0.31 | 0.04 | 0.25 | 0.04 | 0.14 | 0.03 | 0.11 | 0.03 | 0.30 | 0.04 | 0.08 | 0.02 | 0.06 | 0.02 |
| 1 | 7 | 11 | 0.51 | 0.05 | 0.37 | 0.04 | 0.22 | 0.04 | 0.28 | 0.04 | 0.18 | 0.03 | 0.16 | 0.03 | 0.05 | 0.02 | 0.04 | 0.02 |
| 1 | 7 | 15 | 0.66 | 0.04 | 0.53 | 0.05 | 0.37 | 0.04 | 0.42 | 0.04 | 0.30 | 0.04 | 0.12 | 0.03 | 0.02 | 0.01 | 0.06 | 0.02 |
| 1 | 7 | 19 | 0.60 | 0.04 | 0.51 | 0.05 | 0.36 | 0.04 | 0.43 | 0.04 | 0.30 | 0.04 | 0.29 | 0.04 | 0.04 | 0.02 | 0.09 | 0.03 |
| 1 | 8 | 3 | 0.49 | 0.05 | 0.43 | 0.04 | 0.43 | 0.05 | 0.25 | 0.04 | 0.15 | 0.03 | 0.49 | 0.05 | 0.14 | 0.03 | 0.18 | 0.03 |
| 1 | 8 | 7 | 0.32 | 0.04 | 0.29 | 0.04 | 0.30 | 0.04 | 0.16 | 0.03 | 0.07 | 0.02 | 0.33 | 0.04 | 0.13 | 0.03 | 0.09 | 0.03 |
| 1 | 8 | 11 | 0.50 | 0.05 | 0.35 | 0.04 | 0.22 | 0.04 | 0.22 | 0.04 | 0.13 | 0.03 | 0.19 | 0.04 | 0.07 | 0.02 | 0.04 | 0.02 |
| 1 | 8 | 15 | 0.70 | 0.04 | 0.52 | 0.05 | 0.34 | 0.04 | 0.40 | 0.04 | 0.28 | 0.04 | 0.09 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| 1 | 8 | 19 | 0.63 | 0.04 | 0.54 | 0.05 | 0.45 | 0.05 | 0.48 | 0.05 | 0.30 | 0.04 | 0.18 | 0.03 | 0.05 | 0.02 | 0.07 | 0.02 |
| 4 | 1 | 3 | 0.11 | 0.03 | 0.06 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.46 | 0.05 | 0.39 | 0.04 | 0.11 | 0.03 | 0.04 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.01 |
| 4 | 1 | 11 | 0.54 | 0.05 | 0.55 | 0.05 | 0.17 | 0.03 | 0.09 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.03 | 0.02 |
| 4 | 1 | 15 | 0.51 | 0.05 | 0.53 | 0.05 | 0.19 | 0.04 | 0.07 | 0.02 | 0.04 | 0.02 | 0.12 | 0.03 | 0.06 | 0.02 | 0.04 | 0.02 |
| 4 | 1 | 19 | 0.44 | 0.05 | 0.55 | 0.05 | 0.20 | 0.04 | 0.03 | 0.02 | 0.03 | 0.02 | 0.16 | 0.03 | 0.22 | 0.04 | 0.09 | 0.03 |
| 4 | 2 | 3 | 0.29 | 0.04 | 0.27 | 0.04 | 0.11 | 0.03 | 0.04 | 0.02 | 0.00 | 0.00 | 0.07 | 0.02 | 0.17 | 0.03 | 0.06 | 0.02 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 7 | 0.47 | 0.05 | 0.43 | 0.05 | 0.08 | 0.02 | 0.06 | 0.02 | 0.02 | 0.01 | 0.04 | 0.02 | 0.07 | 0.02 | 0.06 | 0.02 |
| 4 | 2 | 11 | 0.54 | 0.05 | 0.50 | 0.05 | 0.14 | 0.03 | 0.04 | 0.02 | 0.03 | 0.02 | 0.06 | 0.02 | 0.07 | 0.02 | 0.07 | 0.02 |
| 4 | 2 | 15 | 0.42 | 0.04 | 0.52 | 0.05 | 0.20 | 0.04 | 0.05 | 0.02 | 0.03 | 0.02 | 0.11 | 0.03 | 0.15 | 0.03 | 0.08 | 0.02 |
| 4 | 2 | 19 | 0.39 | 0.04 | 0.57 | 0.04 | 0.20 | 0.04 | 0.10 | 0.03 | 0.04 | 0.02 | 0.13 | 0.03 | 0.27 | 0.04 | 0.13 | 0.03 |
| 4 | 3 | 3 | 0.31 | 0.04 | 0.31 | 0.04 | 0.09 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.10 | 0.03 | 0.22 | 0.04 | 0.04 | 0.02 |
| 4 | 3 | 7 | 0.44 | 0.05 | 0.51 | 0.05 | 0.11 | 0.03 | 0.05 | 0.02 | 0.02 | 0.01 | 0.03 | 0.02 | 0.10 | 0.03 | 0.05 | 0.02 |
| 4 | 3 | 11 | 0.55 | 0.05 | 0.57 | 0.04 | 0.19 | 0.04 | 0.03 | 0.02 | 0.02 | 0.01 | 0.04 | 0.02 | 0.09 | 0.03 | 0.05 | 0.02 |
| 4 | 3 | 15 | 0.47 | 0.05 | 0.52 | 0.05 | 0.19 | 0.04 | 0.02 | 0.01 | 0.02 | 0.01 | 0.09 | 0.03 | 0.15 | 0.03 | 0.05 | 0.02 |
| 4 | 3 | 19 | 0.46 | 0.05 | 0.54 | 0.05 | 0.24 | 0.04 | 0.04 | 0.02 | 0.02 | 0.01 | 0.22 | 0.04 | 0.31 | 0.04 | 0.11 | 0.03 |
| 4 | 4 | 3 | 0.31 | 0.04 | 0.37 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.07 | 0.02 | 0.30 | 0.04 | 0.06 | 0.02 |
| 4 | 4 | 7 | 0.43 | 0.04 | 0.39 | 0.04 | 0.08 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.01 | 0.19 | 0.04 | 0.04 | 0.02 |
| 4 | 4 | 11 | 0.52 | 0.05 | 0.56 | 0.05 | 0.21 | 0.04 | 0.04 | 0.02 | 0.02 | 0.01 | 0.04 | 0.02 | 0.07 | 0.02 | 0.04 | 0.02 |
| 4 | 4 | 15 | 0.43 | 0.05 | 0.52 | 0.05 | 0.27 | 0.04 | 0.06 | 0.02 | 0.02 | 0.01 | 0.05 | 0.02 | 0.11 | 0.03 | 0.03 | 0.02 |
| 4 | 4 | 19 | 0.40 | 0.04 | 0.55 | 0.05 | 0.20 | 0.04 | 0.05 | 0.02 | 0.02 | 0.01 | 0.20 | 0.04 | 0.25 | 0.04 | 0.07 | 0.02 |
| 4 | 5 | 3 | 0.31 | 0.04 | 0.34 | 0.04 | 0.14 | 0.03 | 0.02 | 0.01 | 0.02 | 0.01 | 0.12 | 0.03 | 0.32 | 0.04 | 0.10 | 0.03 |
| 4 | 5 | 7 | 0.34 | 0.04 | 0.39 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.06 | 0.02 | 0.15 | 0.03 | 0.05 | 0.02 |
| 4 | 5 | 11 | 0.44 | 0.05 | 0.52 | 0.05 | 0.23 | 0.04 | 0.06 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.11 | 0.03 | 0.04 | 0.02 |
| 4 | 5 | 15 | 0.49 | 0.05 | 0.52 | 0.05 | 0.20 | 0.04 | 0.07 | 0.02 | 0.02 | 0.01 | 0.08 | 0.02 | 0.16 | 0.03 | 0.06 | 0.02 |
| 4 | 5 | 19 | 0.45 | 0.05 | 0.49 | 0.05 | 0.19 | 0.04 | 0.07 | 0.02 | 0.02 | 0.01 | 0.19 | 0.04 | 0.25 | 0.04 | 0.11 | 0.03 |
| 4 | 6 | 3 | 0.30 | 0.04 | 0.43 | 0.05 | 0.18 | 0.03 | 0.04 | 0.02 | 0.00 | 0.00 | 0.17 | 0.03 | 0.34 | 0.04 | 0.10 | 0.03 |
| 4 | 6 | 7 | 0.30 | 0.04 | 0.27 | 0.04 | 0.10 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.13 | 0.03 | 0.18 | 0.03 | 0.04 | 0.02 |
| 4 | 6 | 11 | 0.42 | 0.04 | 0.44 | 0.05 | 0.18 | 0.03 | 0.06 | 0.02 | 0.02 | 0.01 | 0.03 | 0.02 | 0.05 | 0.02 | 0.03 | 0.02 |
| 4 | 6 | 15 | 0.49 | 0.05 | 0.56 | 0.05 | 0.26 | 0.04 | 0.09 | 0.03 | 0.02 | 0.01 | 0.02 | 0.01 | 0.07 | 0.02 | 0.06 | 0.02 |
| 4 | 6 | 19 | 0.49 | 0.05 | 0.57 | 0.04 | 0.26 | 0.04 | 0.11 | 0.03 | 0.01 | 0.01 | 0.15 | 0.03 | 0.17 | 0.03 | 0.07 | 0.02 |
| 4 | 7 | 3 | 0.30 | 0.04 | 0.42 | 0.04 | 0.20 | 0.04 | 0.07 | 0.02 | 0.00 | 0.00 | 0.25 | 0.04 | 0.32 | 0.04 | 0.14 | 0.03 |
| 4 | 7 | 7 | 0.24 | 0.04 | 0.30 | 0.04 | 0.12 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 | 0.14 | 0.03 | 0.21 | 0.04 | 0.05 | 0.02 |
| 4 | 7 | 11 | 0.38 | 0.04 | 0.44 | 0.05 | 0.20 | 0.04 | 0.06 | 0.02 | 0.02 | 0.01 | 0.07 | 0.02 | 0.08 | 0.02 | 0.03 | 0.02 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 7 | 15 | 0.51 | 0.05 | 0.57 | 0.04 | 0.27 | 0.04 | 0.14 | 0.03 | 0.02 | 0.01 | 0.05 | 0.02 | 0.05 | 0.02 | 0.04 | 0.02 |
| 4 | 7 | 19 | 0.48 | 0.05 | 0.58 | 0.04 | 0.24 | 0.04 | 0.16 | 0.03 | 0.02 | 0.01 | 0.14 | 0.03 | 0.11 | 0.03 | 0.06 | 0.02 |
| 4 | 8 | 3 | 0.29 | 0.04 | 0.46 | 0.05 | 0.27 | 0.04 | 0.14 | 0.03 | 0.01 | 0.01 | 0.34 | 0.04 | 0.28 | 0.04 | 0.11 | 0.03 |
| 4 | 8 | 7 | 0.27 | 0.04 | 0.35 | 0.04 | 0.11 | 0.03 | 0.07 | 0.02 | 0.01 | 0.01 | 0.15 | 0.03 | 0.19 | 0.04 | 0.06 | 0.02 |
| 4 | 8 | 11 | 0.39 | 0.04 | 0.36 | 0.04 | 0.18 | 0.03 | 0.07 | 0.02 | 0.02 | 0.01 | 0.07 | 0.02 | 0.07 | 0.02 | 0.03 | 0.02 |
| 4 | 8 | 15 | 0.43 | 0.05 | 0.49 | 0.05 | 0.26 | 0.04 | 0.12 | 0.03 | 0.03 | 0.02 | 0.07 | 0.02 | 0.04 | 0.02 | 0.06 | 0.02 |
| 4 | 8 | 19 | 0.43 | 0.05 | 0.49 | 0.05 | 0.28 | 0.04 | 0.15 | 0.03 | 0.02 | 0.01 | 0.17 | 0.03 | 0.07 | 0.02 | 0.07 | 0.02 |
| 6 | 1 | 3 | 0.20 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | 0.46 | 0.05 | 0.39 | 0.04 | 0.13 | 0.03 | 0.07 | 0.02 | 0.11 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 |
| 6 | 1 | 11 | 0.46 | 0.05 | 0.52 | 0.05 | 0.22 | 0.04 | 0.17 | 0.03 | 0.18 | 0.03 | 0.04 | 0.02 | 0.02 | 0.01 | 0.06 | 0.02 |
| 6 | 1 | 15 | 0.43 | 0.04 | 0.39 | 0.04 | 0.16 | 0.03 | 0.20 | 0.04 | 0.14 | 0.03 | 0.18 | 0.03 | 0.11 | 0.03 | 0.18 | 0.03 |
| 6 | 1 | 19 | 0.41 | 0.04 | 0.44 | 0.05 | 0.17 | 0.03 | 0.16 | 0.03 | 0.11 | 0.03 | 0.30 | 0.04 | 0.27 | 0.04 | 0.30 | 0.04 |
| 6 | 2 | 3 | 0.34 | 0.04 | 0.27 | 0.04 | 0.06 | 0.02 | 0.01 | 0.01 | 0.11 | 0.03 | 0.15 | 0.03 | 0.20 | 0.04 | 0.26 | 0.04 |
| 6 | 2 | 7 | 0.43 | 0.05 | 0.41 | 0.04 | 0.14 | 0.03 | 0.09 | 0.03 | 0.16 | 0.03 | 0.06 | 0.02 | 0.08 | 0.02 | 0.11 | 0.03 |
| 6 | 2 | 11 | 0.49 | 0.05 | 0.53 | 0.05 | 0.20 | 0.04 | 0.20 | 0.04 | 0.22 | 0.04 | 0.05 | 0.02 | 0.08 | 0.02 | 0.14 | 0.03 |
| 6 | 2 | 15 | 0.38 | 0.04 | 0.46 | 0.05 | 0.17 | 0.03 | 0.16 | 0.03 | 0.22 | 0.04 | 0.18 | 0.03 | 0.16 | 0.03 | 0.23 | 0.04 |
| 6 | 2 | 19 | 0.37 | 0.04 | 0.44 | 0.05 | 0.17 | 0.03 | 0.11 | 0.03 | 0.16 | 0.03 | 0.34 | 0.04 | 0.30 | 0.04 | 0.34 | 0.04 |
| 6 | 3 | 3 | 0.25 | 0.04 | 0.27 | 0.04 | 0.07 | 0.02 | 0.03 | 0.02 | 0.10 | 0.03 | 0.14 | 0.03 | 0.24 | 0.04 | 0.24 | 0.04 |
| 6 | 3 | 7 | 0.37 | 0.04 | 0.37 | 0.04 | 0.11 | 0.03 | 0.08 | 0.02 | 0.18 | 0.03 | 0.07 | 0.02 | 0.10 | 0.03 | 0.17 | 0.03 |
| 6 | 3 | 11 | 0.47 | 0.05 | 0.47 | 0.05 | 0.20 | 0.04 | 0.18 | 0.03 | 0.22 | 0.04 | 0.08 | 0.02 | 0.10 | 0.03 | 0.16 | 0.03 |
| 6 | 3 | 15 | 0.44 | 0.05 | 0.44 | 0.05 | 0.17 | 0.03 | 0.19 | 0.04 | 0.20 | 0.04 | 0.17 | 0.03 | 0.11 | 0.03 | 0.16 | 0.03 |
| 6 | 3 | 19 | 0.34 | 0.04 | 0.49 | 0.05 | 0.24 | 0.04 | 0.13 | 0.03 | 0.15 | 0.03 | 0.29 | 0.04 | 0.25 | 0.04 | 0.28 | 0.04 |
| 6 | 4 | 3 | 0.25 | 0.04 | 0.30 | 0.04 | 0.04 | 0.02 | 0.02 | 0.01 | 0.05 | 0.02 | 0.20 | 0.04 | 0.30 | 0.04 | 0.23 | 0.04 |
| 6 | 4 | 7 | 0.34 | 0.04 | 0.33 | 0.04 | 0.07 | 0.02 | 0.06 | 0.02 | 0.15 | 0.03 | 0.09 | 0.03 | 0.16 | 0.03 | 0.17 | 0.03 |
| 6 | 4 | 11 | 0.46 | 0.05 | 0.48 | 0.05 | 0.20 | 0.04 | 0.20 | 0.04 | 0.24 | 0.04 | 0.08 | 0.02 | 0.07 | 0.02 | 0.15 | 0.03 |
| 6 | 4 | 15 | 0.46 | 0.05 | 0.40 | 0.04 | 0.23 | 0.04 | 0.20 | 0.04 | 0.25 | 0.04 | 0.13 | 0.03 | 0.07 | 0.02 | 0.17 | 0.03 |
| 6 | 4 | 19 | 0.40 | 0.04 | 0.42 | 0.04 | 0.23 | 0.04 | 0.09 | 0.03 | 0.18 | 0.03 | 0.37 | 0.04 | 0.25 | 0.04 | 0.23 | 0.04 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 5 | 3 | 0.27 | 0.04 | 0.31 | 0.04 | 0.08 | 0.02 | 0.07 | 0.02 | 0.10 | 0.03 | 0.28 | 0.04 | 0.31 | 0.04 | 0.27 | 0.04 |
| 6 | 5 | 7 | 0.27 | 0.04 | 0.32 | 0.04 | 0.07 | 0.02 | 0.05 | 0.02 | 0.14 | 0.03 | 0.12 | 0.03 | 0.13 | 0.03 | 0.16 | 0.03 |
| 6 | 5 | 11 | 0.43 | 0.04 | 0.43 | 0.05 | 0.20 | 0.04 | 0.15 | 0.03 | 0.25 | 0.04 | 0.07 | 0.02 | 0.02 | 0.01 | 0.11 | 0.03 |
| 6 | 5 | 15 | 0.46 | 0.05 | 0.45 | 0.05 | 0.24 | 0.04 | 0.22 | 0.04 | 0.27 | 0.04 | 0.11 | 0.03 | 0.04 | 0.02 | 0.12 | 0.03 |
| 6 | 5 | 19 | 0.37 | 0.04 | 0.43 | 0.04 | 0.24 | 0.04 | 0.20 | 0.04 | 0.20 | 0.04 | 0.34 | 0.04 | 0.18 | 0.03 | 0.24 | 0.04 |
| 6 | 6 | 3 | 0.28 | 0.04 | 0.33 | 0.04 | 0.08 | 0.02 | 0.04 | 0.02 | 0.07 | 0.02 | 0.39 | 0.04 | 0.32 | 0.04 | 0.23 | 0.04 |
| 6 | 6 | 7 | 0.25 | 0.04 | 0.24 | 0.04 | 0.06 | 0.02 | 0.02 | 0.01 | 0.09 | 0.03 | 0.20 | 0.04 | 0.16 | 0.03 | 0.16 | 0.03 |
| 6 | 6 | 11 | 0.43 | 0.05 | 0.41 | 0.04 | 0.14 | 0.03 | 0.11 | 0.03 | 0.18 | 0.03 | 0.08 | 0.02 | 0.07 | 0.02 | 0.14 | 0.03 |
| 6 | 6 | 15 | 0.48 | 0.05 | 0.51 | 0.05 | 0.25 | 0.04 | 0.20 | 0.04 | 0.17 | 0.03 | 0.11 | 0.03 | 0.04 | 0.02 | 0.15 | 0.03 |
| 6 | 6 | 19 | 0.43 | 0.05 | 0.43 | 0.04 | 0.21 | 0.04 | 0.20 | 0.04 | 0.20 | 0.04 | 0.28 | 0.04 | 0.15 | 0.03 | 0.20 | 0.04 |
| 6 | 7 | 3 | 0.28 | 0.04 | 0.35 | 0.04 | 0.12 | 0.03 | 0.10 | 0.03 | 0.09 | 0.03 | 0.35 | 0.04 | 0.34 | 0.04 | 0.26 | 0.04 |
| 6 | 7 | 7 | 0.22 | 0.04 | 0.24 | 0.04 | 0.07 | 0.02 | 0.02 | 0.01 | 0.07 | 0.02 | 0.20 | 0.04 | 0.20 | 0.04 | 0.17 | 0.03 |
| 6 | 7 | 11 | 0.41 | 0.04 | 0.39 | 0.04 | 0.12 | 0.03 | 0.11 | 0.03 | 0.18 | 0.03 | 0.11 | 0.03 | 0.13 | 0.03 | 0.11 | 0.03 |
| 6 | 7 | 15 | 0.49 | 0.05 | 0.50 | 0.05 | 0.25 | 0.04 | 0.20 | 0.04 | 0.28 | 0.04 | 0.11 | 0.03 | 0.08 | 0.02 | 0.12 | 0.03 |
| 6 | 7 | 19 | 0.40 | 0.04 | 0.46 | 0.05 | 0.27 | 0.04 | 0.21 | 0.04 | 0.25 | 0.04 | 0.21 | 0.04 | 0.11 | 0.03 | 0.15 | 0.03 |
| 6 | 8 | 3 | 0.30 | 0.04 | 0.35 | 0.04 | 0.20 | 0.04 | 0.10 | 0.03 | 0.11 | 0.03 | 0.39 | 0.04 | 0.35 | 0.04 | 0.26 | 0.04 |
| 6 | 8 | 7 | 0.25 | 0.04 | 0.25 | 0.04 | 0.13 | 0.03 | 0.03 | 0.02 | 0.04 | 0.02 | 0.26 | 0.04 | 0.29 | 0.04 | 0.19 | 0.04 |
| 6 | 8 | 11 | 0.33 | 0.04 | 0.26 | 0.04 | 0.15 | 0.03 | 0.07 | 0.02 | 0.15 | 0.03 | 0.12 | 0.03 | 0.20 | 0.04 | 0.10 | 0.03 |
| 6 | 8 | 15 | 0.48 | 0.05 | 0.47 | 0.05 | 0.21 | 0.04 | 0.22 | 0.04 | 0.23 | 0.04 | 0.07 | 0.02 | 0.07 | 0.02 | 0.10 | 0.03 |
| 6 | 8 | 19 | 0.41 | 0.04 | 0.48 | 0.05 | 0.22 | 0.04 | 0.26 | 0.04 | 0.24 | 0.04 | 0.14 | 0.03 | 0.09 | 0.03 | 0.13 | 0.03 |

Appendix M: TCATA observed mean citation proportions and standard error (SE) of sensory attributes of vanilla milkshakes by the consumer panel.

| *Product* | *Sip* | *Within-sip* | Observed mean citation proportions and SE of sensory attributes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sweetness | | Vanilla | | Creamy flavour | | Creamy mouthfeel | | Thickness | | Mouthcoating | | Astringency | | Liquorice | |
| | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | 0.13 | 0.03 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | 0.46 | 0.05 | 0.34 | 0.05 | 0.10 | 0.03 | 0.13 | 0.03 | 0.12 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 |
| 1 | 1 | 11 | 0.53 | 0.05 | 0.49 | 0.05 | 0.29 | 0.04 | 0.40 | 0.05 | 0.30 | 0.05 | 0.06 | 0.02 | 0.00 | 0.00 | 0.03 | 0.02 |
| 1 | 1 | 15 | 0.62 | 0.05 | 0.50 | 0.05 | 0.43 | 0.05 | 0.46 | 0.05 | 0.31 | 0.05 | 0.35 | 0.05 | 0.02 | 0.01 | 0.06 | 0.02 |
| 1 | 1 | 19 | 0.59 | 0.05 | 0.48 | 0.05 | 0.47 | 0.05 | 0.42 | 0.05 | 0.20 | 0.04 | 0.47 | 0.05 | 0.04 | 0.02 | 0.08 | 0.03 |
| 1 | 2 | 3 | 0.38 | 0.05 | 0.29 | 0.04 | 0.21 | 0.04 | 0.20 | 0.04 | 0.12 | 0.03 | 0.24 | 0.04 | 0.05 | 0.02 | 0.11 | 0.03 |
| 1 | 2 | 7 | 0.59 | 0.05 | 0.39 | 0.05 | 0.21 | 0.04 | 0.26 | 0.04 | 0.22 | 0.04 | 0.10 | 0.03 | 0.03 | 0.02 | 0.06 | 0.02 |
| 1 | 2 | 11 | 0.64 | 0.05 | 0.52 | 0.05 | 0.31 | 0.05 | 0.41 | 0.05 | 0.29 | 0.04 | 0.09 | 0.03 | 0.03 | 0.02 | 0.08 | 0.03 |
| 1 | 2 | 15 | 0.58 | 0.05 | 0.52 | 0.05 | 0.38 | 0.05 | 0.43 | 0.05 | 0.29 | 0.04 | 0.35 | 0.05 | 0.04 | 0.02 | 0.11 | 0.03 |
| 1 | 2 | 19 | 0.57 | 0.05 | 0.48 | 0.05 | 0.40 | 0.05 | 0.38 | 0.05 | 0.26 | 0.04 | 0.45 | 0.05 | 0.06 | 0.02 | 0.12 | 0.03 |
| 1 | 3 | 3 | 0.38 | 0.05 | 0.33 | 0.05 | 0.20 | 0.04 | 0.15 | 0.04 | 0.05 | 0.02 | 0.30 | 0.05 | 0.07 | 0.02 | 0.09 | 0.03 |
| 1 | 3 | 7 | 0.50 | 0.05 | 0.38 | 0.05 | 0.25 | 0.04 | 0.27 | 0.04 | 0.21 | 0.04 | 0.08 | 0.03 | 0.01 | 0.01 | 0.06 | 0.02 |
| 1 | 3 | 11 | 0.62 | 0.05 | 0.48 | 0.05 | 0.38 | 0.05 | 0.37 | 0.05 | 0.26 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.08 | 0.03 |
| 1 | 3 | 15 | 0.58 | 0.05 | 0.50 | 0.05 | 0.37 | 0.05 | 0.44 | 0.05 | 0.28 | 0.04 | 0.24 | 0.04 | 0.02 | 0.01 | 0.07 | 0.02 |
| 1 | 3 | 19 | 0.59 | 0.05 | 0.56 | 0.05 | 0.45 | 0.05 | 0.45 | 0.05 | 0.24 | 0.04 | 0.49 | 0.05 | 0.08 | 0.03 | 0.13 | 0.03 |
| 1 | 4 | 3 | 0.34 | 0.05 | 0.31 | 0.05 | 0.23 | 0.04 | 0.16 | 0.04 | 0.05 | 0.02 | 0.26 | 0.04 | 0.08 | 0.03 | 0.10 | 0.03 |
| 1 | 4 | 7 | 0.42 | 0.05 | 0.41 | 0.05 | 0.26 | 0.04 | 0.24 | 0.04 | 0.21 | 0.04 | 0.16 | 0.04 | 0.06 | 0.02 | 0.06 | 0.02 |
| 1 | 4 | 11 | 0.63 | 0.05 | 0.48 | 0.05 | 0.36 | 0.05 | 0.42 | 0.05 | 0.25 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.08 | 0.03 |
| 1 | 4 | 15 | 0.59 | 0.05 | 0.43 | 0.05 | 0.33 | 0.05 | 0.45 | 0.05 | 0.23 | 0.04 | 0.17 | 0.04 | 0.03 | 0.02 | 0.11 | 0.03 |
| 1 | 4 | 19 | 0.64 | 0.05 | 0.49 | 0.05 | 0.43 | 0.05 | 0.44 | 0.05 | 0.23 | 0.04 | 0.37 | 0.05 | 0.09 | 0.03 | 0.09 | 0.03 |
| 1 | 5 | 3 | 0.34 | 0.05 | 0.34 | 0.05 | 0.33 | 0.05 | 0.20 | 0.04 | 0.08 | 0.03 | 0.35 | 0.05 | 0.11 | 0.03 | 0.14 | 0.03 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 7 | 0.37 | 0.05 | 0.30 | 0.05 | 0.24 | 0.04 | 0.15 | 0.04 | 0.13 | 0.03 | 0.18 | 0.04 | 0.04 | 0.02 | 0.07 | 0.02 |
| 1 | 5 | 11 | 0.58 | 0.05 | 0.44 | 0.05 | 0.30 | 0.05 | 0.31 | 0.05 | 0.23 | 0.04 | 0.11 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| 1 | 5 | 15 | 0.55 | 0.05 | 0.46 | 0.05 | 0.33 | 0.05 | 0.43 | 0.05 | 0.29 | 0.04 | 0.13 | 0.03 | 0.04 | 0.02 | 0.08 | 0.03 |
| 1 | 5 | 19 | 0.59 | 0.05 | 0.46 | 0.05 | 0.38 | 0.05 | 0.46 | 0.05 | 0.24 | 0.04 | 0.35 | 0.05 | 0.05 | 0.02 | 0.15 | 0.04 |
| 1 | 6 | 3 | 0.42 | 0.05 | 0.33 | 0.05 | 0.38 | 0.05 | 0.20 | 0.04 | 0.16 | 0.04 | 0.44 | 0.05 | 0.17 | 0.04 | 0.16 | 0.04 |
| 1 | 6 | 7 | 0.29 | 0.04 | 0.24 | 0.04 | 0.23 | 0.04 | 0.13 | 0.03 | 0.12 | 0.03 | 0.28 | 0.04 | 0.12 | 0.03 | 0.10 | 0.03 |
| 1 | 6 | 11 | 0.55 | 0.05 | 0.44 | 0.05 | 0.30 | 0.05 | 0.32 | 0.05 | 0.25 | 0.04 | 0.11 | 0.03 | 0.05 | 0.02 | 0.06 | 0.02 |
| 1 | 6 | 15 | 0.58 | 0.05 | 0.50 | 0.05 | 0.35 | 0.05 | 0.40 | 0.05 | 0.28 | 0.04 | 0.11 | 0.03 | 0.03 | 0.02 | 0.05 | 0.02 |
| 1 | 6 | 19 | 0.61 | 0.05 | 0.46 | 0.05 | 0.38 | 0.05 | 0.42 | 0.05 | 0.23 | 0.04 | 0.31 | 0.05 | 0.06 | 0.02 | 0.08 | 0.03 |
| 1 | 7 | 3 | 0.41 | 0.05 | 0.38 | 0.05 | 0.38 | 0.05 | 0.24 | 0.04 | 0.16 | 0.04 | 0.45 | 0.05 | 0.11 | 0.03 | 0.15 | 0.04 |
| 1 | 7 | 7 | 0.29 | 0.04 | 0.30 | 0.05 | 0.23 | 0.04 | 0.14 | 0.03 | 0.12 | 0.03 | 0.29 | 0.04 | 0.07 | 0.02 | 0.07 | 0.02 |
| 1 | 7 | 11 | 0.46 | 0.05 | 0.36 | 0.05 | 0.20 | 0.04 | 0.26 | 0.04 | 0.18 | 0.04 | 0.16 | 0.04 | 0.05 | 0.02 | 0.05 | 0.02 |
| 1 | 7 | 15 | 0.61 | 0.05 | 0.51 | 0.05 | 0.33 | 0.05 | 0.38 | 0.05 | 0.24 | 0.04 | 0.10 | 0.03 | 0.02 | 0.01 | 0.07 | 0.02 |
| 1 | 7 | 19 | 0.60 | 0.05 | 0.48 | 0.05 | 0.33 | 0.05 | 0.40 | 0.05 | 0.23 | 0.04 | 0.25 | 0.04 | 0.02 | 0.01 | 0.11 | 0.03 |
| 1 | 8 | 3 | 0.45 | 0.05 | 0.40 | 0.05 | 0.40 | 0.05 | 0.26 | 0.04 | 0.12 | 0.03 | 0.47 | 0.05 | 0.13 | 0.03 | 0.21 | 0.04 |
| 1 | 8 | 7 | 0.27 | 0.04 | 0.27 | 0.04 | 0.30 | 0.05 | 0.16 | 0.04 | 0.08 | 0.03 | 0.31 | 0.05 | 0.13 | 0.03 | 0.11 | 0.03 |
| 1 | 8 | 11 | 0.46 | 0.05 | 0.36 | 0.05 | 0.23 | 0.04 | 0.24 | 0.04 | 0.13 | 0.03 | 0.18 | 0.04 | 0.08 | 0.03 | 0.05 | 0.02 |
| 1 | 8 | 15 | 0.65 | 0.05 | 0.51 | 0.05 | 0.30 | 0.05 | 0.37 | 0.05 | 0.22 | 0.04 | 0.09 | 0.03 | 0.04 | 0.02 | 0.04 | 0.02 |
| 1 | 8 | 19 | 0.61 | 0.05 | 0.50 | 0.05 | 0.40 | 0.05 | 0.44 | 0.05 | 0.26 | 0.04 | 0.16 | 0.04 | 0.05 | 0.02 | 0.09 | 0.03 |
| 4 | 1 | 3 | 0.08 | 0.03 | 0.06 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | 0.39 | 0.05 | 0.37 | 0.05 | 0.08 | 0.03 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 |
| 4 | 1 | 11 | 0.50 | 0.05 | 0.52 | 0.05 | 0.14 | 0.03 | 0.09 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.02 |
| 4 | 1 | 15 | 0.49 | 0.05 | 0.54 | 0.05 | 0.17 | 0.04 | 0.08 | 0.03 | 0.03 | 0.02 | 0.11 | 0.03 | 0.05 | 0.02 | 0.05 | 0.02 |
| 4 | 1 | 19 | 0.41 | 0.05 | 0.55 | 0.05 | 0.19 | 0.04 | 0.04 | 0.02 | 0.03 | 0.02 | 0.13 | 0.03 | 0.21 | 0.04 | 0.10 | 0.03 |
| 4 | 2 | 3 | 0.28 | 0.04 | 0.28 | 0.04 | 0.11 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 | 0.06 | 0.02 | 0.18 | 0.04 | 0.05 | 0.02 |
| 4 | 2 | 7 | 0.43 | 0.05 | 0.43 | 0.05 | 0.07 | 0.02 | 0.05 | 0.02 | 0.00 | 0.00 | 0.05 | 0.02 | 0.08 | 0.03 | 0.07 | 0.02 |
| 4 | 2 | 11 | 0.49 | 0.05 | 0.48 | 0.05 | 0.11 | 0.03 | 0.05 | 0.02 | 0.01 | 0.01 | 0.07 | 0.02 | 0.07 | 0.02 | 0.08 | 0.03 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 15 | 0.39 | 0.05 | 0.48 | 0.05 | 0.18 | 0.04 | 0.06 | 0.02 | 0.01 | 0.01 | 0.12 | 0.03 | 0.14 | 0.03 | 0.10 | 0.03 |
| 4 | 2 | 19 | 0.39 | 0.05 | 0.57 | 0.05 | 0.20 | 0.04 | 0.11 | 0.03 | 0.02 | 0.01 | 0.12 | 0.03 | 0.27 | 0.04 | 0.13 | 0.03 |
| 4 | 3 | 3 | 0.33 | 0.05 | 0.30 | 0.05 | 0.08 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 | 0.08 | 0.03 | 0.23 | 0.04 | 0.04 | 0.02 |
| 4 | 3 | 7 | 0.41 | 0.05 | 0.49 | 0.05 | 0.11 | 0.03 | 0.06 | 0.02 | 0.00 | 0.00 | 0.02 | 0.01 | 0.10 | 0.03 | 0.06 | 0.02 |
| 4 | 3 | 11 | 0.49 | 0.05 | 0.56 | 0.05 | 0.17 | 0.04 | 0.03 | 0.02 | 0.00 | 0.00 | 0.04 | 0.02 | 0.11 | 0.03 | 0.06 | 0.02 |
| 4 | 3 | 15 | 0.43 | 0.05 | 0.52 | 0.05 | 0.17 | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.08 | 0.03 | 0.15 | 0.04 | 0.06 | 0.02 |
| 4 | 3 | 19 | 0.45 | 0.05 | 0.53 | 0.05 | 0.24 | 0.04 | 0.05 | 0.02 | 0.01 | 0.01 | 0.18 | 0.04 | 0.31 | 0.05 | 0.11 | 0.03 |
| 4 | 4 | 3 | 0.30 | 0.05 | 0.36 | 0.05 | 0.11 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.06 | 0.02 | 0.31 | 0.05 | 0.06 | 0.02 |
| 4 | 4 | 7 | 0.39 | 0.05 | 0.39 | 0.05 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.18 | 0.04 | 0.05 | 0.02 |
| 4 | 4 | 11 | 0.46 | 0.05 | 0.54 | 0.05 | 0.19 | 0.04 | 0.04 | 0.02 | 0.00 | 0.00 | 0.05 | 0.02 | 0.09 | 0.03 | 0.05 | 0.02 |
| 4 | 4 | 15 | 0.38 | 0.05 | 0.50 | 0.05 | 0.26 | 0.04 | 0.06 | 0.02 | 0.00 | 0.00 | 0.06 | 0.02 | 0.13 | 0.03 | 0.04 | 0.02 |
| 4 | 4 | 19 | 0.38 | 0.05 | 0.52 | 0.05 | 0.21 | 0.04 | 0.06 | 0.02 | 0.00 | 0.00 | 0.20 | 0.04 | 0.25 | 0.04 | 0.07 | 0.02 |
| 4 | 5 | 3 | 0.31 | 0.05 | 0.36 | 0.05 | 0.13 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.09 | 0.03 | 0.28 | 0.04 | 0.11 | 0.03 |
| 4 | 5 | 7 | 0.31 | 0.05 | 0.40 | 0.05 | 0.12 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 | 0.04 | 0.02 | 0.13 | 0.03 | 0.05 | 0.02 |
| 4 | 5 | 11 | 0.40 | 0.05 | 0.52 | 0.05 | 0.21 | 0.04 | 0.07 | 0.02 | 0.00 | 0.00 | 0.02 | 0.01 | 0.13 | 0.03 | 0.05 | 0.02 |
| 4 | 5 | 15 | 0.45 | 0.05 | 0.52 | 0.05 | 0.14 | 0.03 | 0.09 | 0.03 | 0.00 | 0.00 | 0.10 | 0.03 | 0.17 | 0.04 | 0.07 | 0.02 |
| 4 | 5 | 19 | 0.41 | 0.05 | 0.48 | 0.05 | 0.17 | 0.04 | 0.09 | 0.03 | 0.01 | 0.01 | 0.18 | 0.04 | 0.24 | 0.04 | 0.13 | 0.03 |
| 4 | 6 | 3 | 0.30 | 0.05 | 0.41 | 0.05 | 0.18 | 0.04 | 0.05 | 0.02 | 0.00 | 0.00 | 0.16 | 0.04 | 0.35 | 0.05 | 0.10 | 0.03 |
| 4 | 6 | 7 | 0.29 | 0.04 | 0.28 | 0.04 | 0.11 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 | 0.12 | 0.03 | 0.19 | 0.04 | 0.04 | 0.02 |
| 4 | 6 | 11 | 0.38 | 0.05 | 0.44 | 0.05 | 0.17 | 0.04 | 0.07 | 0.02 | 0.00 | 0.00 | 0.04 | 0.02 | 0.06 | 0.02 | 0.04 | 0.02 |
| 4 | 6 | 15 | 0.46 | 0.05 | 0.53 | 0.05 | 0.24 | 0.04 | 0.10 | 0.03 | 0.00 | 0.00 | 0.02 | 0.01 | 0.09 | 0.03 | 0.07 | 0.02 |
| 4 | 6 | 19 | 0.47 | 0.05 | 0.55 | 0.05 | 0.26 | 0.04 | 0.11 | 0.03 | 0.00 | 0.00 | 0.13 | 0.03 | 0.16 | 0.04 | 0.09 | 0.03 |
| 4 | 7 | 3 | 0.30 | 0.05 | 0.38 | 0.05 | 0.23 | 0.04 | 0.09 | 0.03 | 0.00 | 0.00 | 0.25 | 0.04 | 0.28 | 0.04 | 0.15 | 0.04 |
| 4 | 7 | 7 | 0.23 | 0.04 | 0.29 | 0.04 | 0.13 | 0.03 | 0.04 | 0.02 | 0.00 | 0.00 | 0.13 | 0.03 | 0.20 | 0.04 | 0.06 | 0.02 |
| 4 | 7 | 11 | 0.33 | 0.05 | 0.40 | 0.05 | 0.19 | 0.04 | 0.06 | 0.02 | 0.00 | 0.00 | 0.07 | 0.02 | 0.08 | 0.03 | 0.04 | 0.02 |
| 4 | 7 | 15 | 0.44 | 0.05 | 0.55 | 0.05 | 0.25 | 0.04 | 0.14 | 0.03 | 0.00 | 0.00 | 0.06 | 0.02 | 0.06 | 0.02 | 0.05 | 0.02 |
| 4 | 7 | 19 | 0.44 | 0.05 | 0.60 | 0.05 | 0.24 | 0.04 | 0.17 | 0.04 | 0.01 | 0.01 | 0.13 | 0.03 | 0.08 | 0.03 | 0.07 | 0.02 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 8 | 3 | 0.28 | 0.04 | 0.44 | 0.05 | 0.29 | 0.04 | 0.16 | 0.04 | 0.01 | 0.01 | 0.34 | 0.05 | 0.24 | 0.04 | 0.13 | 0.03 |
| 4 | 8 | 7 | 0.26 | 0.04 | 0.36 | 0.05 | 0.13 | 0.03 | 0.08 | 0.03 | 0.01 | 0.01 | 0.14 | 0.03 | 0.16 | 0.04 | 0.05 | 0.02 |
| 4 | 8 | 11 | 0.34 | 0.05 | 0.34 | 0.05 | 0.17 | 0.04 | 0.09 | 0.03 | 0.01 | 0.01 | 0.06 | 0.02 | 0.06 | 0.02 | 0.03 | 0.02 |
| 4 | 8 | 15 | 0.38 | 0.05 | 0.47 | 0.05 | 0.23 | 0.04 | 0.13 | 0.03 | 0.01 | 0.01 | 0.09 | 0.03 | 0.05 | 0.02 | 0.07 | 0.02 |
| 4 | 8 | 19 | 0.41 | 0.05 | 0.49 | 0.05 | 0.28 | 0.04 | 0.16 | 0.04 | 0.01 | 0.01 | 0.19 | 0.04 | 0.08 | 0.03 | 0.08 | 0.03 |
| 6 | 1 | 3 | 0.13 | 0.03 | 0.04 | 0.02 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | 0.38 | 0.05 | 0.35 | 0.05 | 0.11 | 0.03 | 0.06 | 0.02 | 0.10 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 |
| 6 | 1 | 11 | 0.45 | 0.05 | 0.46 | 0.05 | 0.18 | 0.04 | 0.17 | 0.04 | 0.17 | 0.04 | 0.04 | 0.02 | 0.03 | 0.02 | 0.07 | 0.02 |
| 6 | 1 | 15 | 0.42 | 0.05 | 0.38 | 0.05 | 0.14 | 0.03 | 0.22 | 0.04 | 0.14 | 0.03 | 0.17 | 0.04 | 0.10 | 0.03 | 0.19 | 0.04 |
| 6 | 1 | 19 | 0.38 | 0.05 | 0.44 | 0.05 | 0.16 | 0.04 | 0.18 | 0.04 | 0.13 | 0.03 | 0.31 | 0.05 | 0.25 | 0.04 | 0.31 | 0.05 |
| 6 | 2 | 3 | 0.34 | 0.05 | 0.25 | 0.04 | 0.05 | 0.02 | 0.01 | 0.01 | 0.12 | 0.03 | 0.15 | 0.04 | 0.23 | 0.04 | 0.27 | 0.04 |
| 6 | 2 | 7 | 0.40 | 0.05 | 0.39 | 0.05 | 0.13 | 0.03 | 0.09 | 0.03 | 0.17 | 0.04 | 0.06 | 0.02 | 0.09 | 0.03 | 0.13 | 0.03 |
| 6 | 2 | 11 | 0.46 | 0.05 | 0.53 | 0.05 | 0.18 | 0.04 | 0.21 | 0.04 | 0.22 | 0.04 | 0.06 | 0.02 | 0.09 | 0.03 | 0.14 | 0.03 |
| 6 | 2 | 15 | 0.38 | 0.05 | 0.45 | 0.05 | 0.17 | 0.04 | 0.16 | 0.04 | 0.24 | 0.04 | 0.20 | 0.04 | 0.16 | 0.04 | 0.22 | 0.04 |
| 6 | 2 | 19 | 0.38 | 0.05 | 0.44 | 0.05 | 0.17 | 0.04 | 0.12 | 0.03 | 0.18 | 0.04 | 0.37 | 0.05 | 0.29 | 0.04 | 0.33 | 0.05 |
| 6 | 3 | 3 | 0.26 | 0.04 | 0.27 | 0.04 | 0.06 | 0.02 | 0.04 | 0.02 | 0.10 | 0.03 | 0.13 | 0.03 | 0.24 | 0.04 | 0.24 | 0.04 |
| 6 | 3 | 7 | 0.36 | 0.05 | 0.37 | 0.05 | 0.12 | 0.03 | 0.08 | 0.03 | 0.20 | 0.04 | 0.08 | 0.03 | 0.11 | 0.03 | 0.17 | 0.04 |
| 6 | 3 | 11 | 0.41 | 0.05 | 0.45 | 0.05 | 0.19 | 0.04 | 0.19 | 0.04 | 0.23 | 0.04 | 0.10 | 0.03 | 0.12 | 0.03 | 0.17 | 0.04 |
| 6 | 3 | 15 | 0.40 | 0.05 | 0.42 | 0.05 | 0.16 | 0.04 | 0.20 | 0.04 | 0.18 | 0.04 | 0.19 | 0.04 | 0.11 | 0.03 | 0.18 | 0.04 |
| 6 | 3 | 19 | 0.35 | 0.05 | 0.48 | 0.05 | 0.24 | 0.04 | 0.13 | 0.03 | 0.13 | 0.03 | 0.30 | 0.05 | 0.23 | 0.04 | 0.29 | 0.04 |
| 6 | 4 | 3 | 0.25 | 0.04 | 0.30 | 0.05 | 0.02 | 0.01 | 0.02 | 0.01 | 0.06 | 0.02 | 0.20 | 0.04 | 0.31 | 0.05 | 0.23 | 0.04 |
| 6 | 4 | 7 | 0.32 | 0.05 | 0.32 | 0.05 | 0.05 | 0.02 | 0.07 | 0.02 | 0.15 | 0.04 | 0.11 | 0.03 | 0.15 | 0.04 | 0.18 | 0.04 |
| 6 | 4 | 11 | 0.41 | 0.05 | 0.47 | 0.05 | 0.18 | 0.04 | 0.21 | 0.04 | 0.24 | 0.04 | 0.10 | 0.03 | 0.08 | 0.03 | 0.15 | 0.04 |
| 6 | 4 | 15 | 0.41 | 0.05 | 0.38 | 0.05 | 0.20 | 0.04 | 0.21 | 0.04 | 0.26 | 0.04 | 0.13 | 0.03 | 0.06 | 0.02 | 0.18 | 0.04 |
| 6 | 4 | 19 | 0.39 | 0.05 | 0.41 | 0.05 | 0.22 | 0.04 | 0.11 | 0.03 | 0.18 | 0.04 | 0.39 | 0.05 | 0.26 | 0.04 | 0.26 | 0.04 |
| 6 | 5 | 3 | 0.27 | 0.04 | 0.28 | 0.04 | 0.08 | 0.03 | 0.07 | 0.02 | 0.11 | 0.03 | 0.28 | 0.04 | 0.32 | 0.05 | 0.25 | 0.04 |
| 6 | 5 | 7 | 0.28 | 0.04 | 0.33 | 0.05 | 0.06 | 0.02 | 0.04 | 0.02 | 0.14 | 0.03 | 0.13 | 0.03 | 0.15 | 0.04 | 0.16 | 0.04 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 5 | 11 | 0.37 | 0.05 | 0.41 | 0.05 | 0.18 | 0.04 | 0.15 | 0.04 | 0.25 | 0.04 | 0.09 | 0.03 | 0.03 | 0.02 | 0.13 | 0.03 |
| 6 | 5 | 15 | 0.41 | 0.05 | 0.40 | 0.05 | 0.21 | 0.04 | 0.24 | 0.04 | 0.29 | 0.04 | 0.13 | 0.03 | 0.05 | 0.02 | 0.13 | 0.03 |
| 6 | 5 | 19 | 0.38 | 0.05 | 0.43 | 0.05 | 0.22 | 0.04 | 0.20 | 0.04 | 0.21 | 0.04 | 0.35 | 0.05 | 0.17 | 0.04 | 0.24 | 0.04 |
| 6 | 6 | 3 | 0.26 | 0.04 | 0.32 | 0.05 | 0.08 | 0.03 | 0.05 | 0.02 | 0.07 | 0.02 | 0.41 | 0.05 | 0.32 | 0.05 | 0.22 | 0.04 |
| 6 | 6 | 7 | 0.25 | 0.04 | 0.20 | 0.04 | 0.05 | 0.02 | 0.02 | 0.01 | 0.09 | 0.03 | 0.20 | 0.04 | 0.14 | 0.03 | 0.14 | 0.03 |
| 6 | 6 | 11 | 0.39 | 0.05 | 0.39 | 0.05 | 0.13 | 0.03 | 0.11 | 0.03 | 0.19 | 0.04 | 0.10 | 0.03 | 0.06 | 0.02 | 0.15 | 0.04 |
| 6 | 6 | 15 | 0.42 | 0.05 | 0.46 | 0.05 | 0.22 | 0.04 | 0.19 | 0.04 | 0.16 | 0.04 | 0.13 | 0.03 | 0.04 | 0.02 | 0.16 | 0.04 |
| 6 | 6 | 19 | 0.41 | 0.05 | 0.38 | 0.05 | 0.18 | 0.04 | 0.22 | 0.04 | 0.19 | 0.04 | 0.31 | 0.05 | 0.16 | 0.04 | 0.22 | 0.04 |
| 6 | 7 | 3 | 0.26 | 0.04 | 0.35 | 0.05 | 0.11 | 0.03 | 0.10 | 0.03 | 0.08 | 0.03 | 0.36 | 0.05 | 0.33 | 0.05 | 0.26 | 0.04 |
| 6 | 7 | 7 | 0.20 | 0.04 | 0.22 | 0.04 | 0.07 | 0.02 | 0.02 | 0.01 | 0.06 | 0.02 | 0.21 | 0.04 | 0.19 | 0.04 | 0.17 | 0.04 |
| 6 | 7 | 11 | 0.35 | 0.05 | 0.38 | 0.05 | 0.13 | 0.03 | 0.12 | 0.03 | 0.17 | 0.04 | 0.12 | 0.03 | 0.13 | 0.03 | 0.13 | 0.03 |
| 6 | 7 | 15 | 0.45 | 0.05 | 0.49 | 0.05 | 0.23 | 0.04 | 0.22 | 0.04 | 0.28 | 0.04 | 0.13 | 0.03 | 0.09 | 0.03 | 0.14 | 0.03 |
| 6 | 7 | 19 | 0.39 | 0.05 | 0.43 | 0.05 | 0.26 | 0.04 | 0.24 | 0.04 | 0.24 | 0.04 | 0.24 | 0.04 | 0.11 | 0.03 | 0.16 | 0.04 |
| 6 | 8 | 3 | 0.31 | 0.05 | 0.34 | 0.05 | 0.19 | 0.04 | 0.10 | 0.03 | 0.11 | 0.03 | 0.41 | 0.05 | 0.34 | 0.05 | 0.29 | 0.04 |
| 6 | 8 | 7 | 0.25 | 0.04 | 0.23 | 0.04 | 0.13 | 0.03 | 0.04 | 0.02 | 0.04 | 0.02 | 0.27 | 0.04 | 0.26 | 0.04 | 0.19 | 0.04 |
| 6 | 8 | 11 | 0.29 | 0.04 | 0.26 | 0.04 | 0.15 | 0.04 | 0.09 | 0.03 | 0.15 | 0.04 | 0.13 | 0.03 | 0.17 | 0.04 | 0.10 | 0.03 |
| 6 | 8 | 15 | 0.43 | 0.05 | 0.45 | 0.05 | 0.19 | 0.04 | 0.23 | 0.04 | 0.23 | 0.04 | 0.08 | 0.03 | 0.08 | 0.03 | 0.11 | 0.03 |
| 6 | 8 | 19 | 0.39 | 0.05 | 0.44 | 0.05 | 0.20 | 0.04 | 0.28 | 0.04 | 0.25 | 0.04 | 0.15 | 0.04 | 0.08 | 0.03 | 0.13 | 0.03 |

Appendix N: TDE observed mean dominance rates and standard error (SE) of emotions of the milkshakes for each product, by sip number and at each time point within a sip by the consumer panel, for each PTS and SLS phenotype category.

| *Product* | *Sip* | *Within-sip* | PTS | SLS | Bored | | Comforted | | Delight | | Disappointed | | Disgusted | | Happy | | Indulgent | | Nostalgic | | Pleasant | | Relaxed | | Satisfied | | Uncomfortable | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE | Mean | SE |
| 1 | 1 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 3 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 3 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 7 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| 1 | 1 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 1 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 11 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 |
| 1 | 1 | 11 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.22 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.03 | 0.03 |
| 1 | 1 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 |
| 1 | 1 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 1 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1 | 15 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 |
| 1 | 1 | 15 | PT | SD | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 | 0.16 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 | 0.11 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.05 | 0.04 |
| 1 | 1 | 15 | PT | SL | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 |
| 1 | 1 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 1 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |
| 1 | 1 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 1 | 19 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.16 | 0.07 | 0.04 | 0.04 |
| 1 | 1 | 19 | PT | SD | 0.00 | 0.00 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.14 | 0.06 | 0.11 | 0.05 | 0.16 | 0.06 | 0.08 | 0.05 |
| 1 | 1 | 19 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 |
| 1 | 2 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 2 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |
| 1 | 2 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 3 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.24 | 0.09 | 0.04 | 0.04 |
| 1 | 2 | 3 | PT | SD | 0.00 | 0.00 | 0.05 | 0.04 | 0.11 | 0.05 | 0.14 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 | 0.05 | 0.04 |
| 1 | 2 | 3 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 |
| 1 | 2 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 2 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 2 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 7 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.20 | 0.08 | 0.04 | 0.04 |
| 1 | 2 | 7 | PT | SD | 0.03 | 0.03 | 0.05 | 0.04 | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.14 | 0.06 | 0.05 | 0.04 | 0.14 | 0.06 | 0.08 | 0.05 |
| 1 | 2 | 7 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 |
| 1 | 2 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 2 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 2 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 |
| 1 | 2 | 11 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.20 | 0.08 | 0.04 | 0.04 |
| 1 | 2 | 11 | PT | SD | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 11 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 2 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 2 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 2 | 15 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.24 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 2 | 15 | PT | SD | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.16 | 0.06 |
| 1 | 2 | 15 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.10 | 0.07 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 1 | 2 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 2 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 2 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 2 | 19 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 |
| 1 | 2 | 19 | PT | SD | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.14 | 0.06 | 0.14 | 0.06 |
| 1 | 2 | 19 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 | 0.35 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 |
| 1 | 3 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 3 | 3 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 3 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 3 | 3 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 3 | 3 | PT | SD | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.14 | 0.06 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 |
| 1 | 3 | 3 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.35 | 0.11 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 3 | 7 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 3 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 3 | 7 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 3 | 7 | PT | SD | 0.03 | 0.03 | 0.05 | 0.04 | 0.14 | 0.06 | 0.14 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.16 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 | 0.11 | 0.05 |
| 1 | 3 | 7 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 | 0.25 | 0.10 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 3 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 |
| 1 | 3 | 11 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.04 | 0.04 | 0.20 | 0.08 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 |
| 1 | 3 | 11 | PT | SD | 0.03 | 0.03 | 0.05 | 0.04 | 0.14 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.05 | 0.04 | 0.16 | 0.06 | 0.05 | 0.04 | 0.14 | 0.06 | 0.16 | 0.06 |
| 1 | 3 | 11 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.30 | 0.11 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 |
| 1 | 3 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 3 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 3 | 15 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 | 0.20 | 0.08 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 |
| 1 | 3 | 15 | PT | SD | 0.00 | 0.00 | 0.05 | 0.04 | 0.14 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.16 | 0.06 |
| 1 | 3 | 15 | PT | SL | 0.00 | 0.00 | 0.15 | 0.08 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1 | 3 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 |
| 1 | 3 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3 | 19 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.28 | 0.09 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 3 | 19 | PT | SD | 0.03 | 0.03 | 0.05 | 0.04 | 0.14 | 0.06 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 | 0.08 | 0.05 | 0.14 | 0.06 | 0.05 | 0.04 | 0.14 | 0.06 | 0.19 | 0.07 |
| 1 | 3 | 19 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 1 | 4 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 |
| 1 | 4 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 3 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.28 | 0.09 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 4 | 3 | PT | SD | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.14 | 0.06 | 0.08 | 0.05 | 0.16 | 0.06 | 0.16 | 0.06 |
| 1 | 4 | 3 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.35 | 0.11 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 1 | 4 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 |
| 1 | 4 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 7 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.28 | 0.09 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 4 | 7 | PT | SD | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.19 | 0.07 | 0.14 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 7 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.40 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 |
| 1 | 4 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 4 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 11 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.28 | 0.09 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 4 | 11 | PT | SD | 0.05 | 0.04 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.14 | 0.06 | 0.03 | 0.03 | 0.16 | 0.06 | 0.19 | 0.07 |
| 1 | 4 | 11 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 | 0.05 | 0.05 | 0.40 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 |
| 1 | 4 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 4 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 4 | 15 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 | 0.28 | 0.09 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 4 | 15 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.05 | 0.04 | 0.08 | 0.05 | 0.16 | 0.06 | 0.05 | 0.04 | 0.16 | 0.06 | 0.11 | 0.05 |
| 1 | 4 | 15 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 | 0.05 | 0.05 | 0.35 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 4 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 4 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 4 | 19 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.28 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 4 | 19 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.16 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 | 0.16 | 0.06 |
| 1 | 4 | 19 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.25 | 0.10 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 5 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 5 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 3 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.32 | 0.10 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 |
| 1 | 5 | 3 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.14 | 0.06 | 0.03 | 0.03 | 0.19 | 0.07 | 0.11 | 0.05 | 0.08 | 0.05 | 0.14 | 0.06 |
| 1 | 5 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.05 | 0.05 | 0.30 | 0.11 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 5 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 7 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.32 | 0.10 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 |
| 1 | 5 | 7 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.14 | 0.06 | 0.03 | 0.03 | 0.19 | 0.07 | 0.11 | 0.05 | 0.08 | 0.05 | 0.14 | 0.06 |
| 1 | 5 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.10 | 0.07 | 0.05 | 0.05 | 0.35 | 0.11 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 5 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 5 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 11 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.00 | 0.00 | 0.40 | 0.10 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 5 | 11 | PT | SD | 0.14 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.22 | 0.07 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 |
| 1 | 5 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 | 0.05 | 0.05 | 0.35 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.33 | 0.21 | 0.17 | 0.17 |
| 1 | 5 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 5 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 15 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.52 | 0.10 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 5 | 15 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.05 | 0.04 | 0.19 | 0.07 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 |
| 1 | 5 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.25 | 0.10 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.17 | 0.17 |
| 1 | 5 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 5 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 5 | 19 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.40 | 0.10 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1 | 5 | 19 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.14 | 0.06 | 0.03 | 0.03 | 0.22 | 0.07 | 0.05 | 0.04 | 0.05 | 0.04 | 0.14 | 0.06 |
| 1 | 5 | 19 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 6 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.67 | 0.21 | 0.17 | 0.17 |
| 1 | 6 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 6 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 6 | 3 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.28 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 6 | 3 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.14 | 0.06 | 0.08 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 |
| 1 | 6 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.67 | 0.21 | 0.17 | 0.17 |
| 1 | 6 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 6 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 6 | 7 | PT | IP | 0.00 | 0.00 | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.24 | 0.09 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 |
| 1 | 6 | 7 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.14 | 0.06 | 0.08 | 0.05 | 0.14 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 |
| 1 | 6 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 | 0.25 | 0.10 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 |
| 1 | 6 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.17 | 0.17 |
| 1 | 6 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 6 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 6 | 11 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.28 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.24 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 6 | 11 | PT | SD | 0.08 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.16 | 0.06 | 0.08 | 0.05 | 0.19 | 0.07 | 0.05 | 0.04 | 0.08 | 0.05 | 0.05 | 0.04 |
| 1 | 6 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 | 0.20 | 0.09 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 |
| 1 | 6 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 |
| 1 | 6 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 6 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 6 | 15 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.28 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.20 | 0.08 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 |
| 1 | 6 | 15 | PT | SD | 0.11 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.16 | 0.06 | 0.08 | 0.05 | 0.16 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 |
| 1 | 6 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.25 | 0.10 | 0.10 | 0.07 | 0.30 | 0.11 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 |
| 1 | 6 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 |
| 1 | 6 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 6 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 6 | 19 | PT | IP | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.28 | 0.09 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 |
| 1 | 6 | 19 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.16 | 0.06 | 0.03 | 0.03 | 0.11 | 0.05 | 0.11 | 0.05 |
| 1 | 6 | 19 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.15 | 0.08 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 |
| 1 | 7 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.17 | 0.17 |
| 1 | 7 | 3 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 7 | 3 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.12 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 |
| 1 | 7 | 3 | PT | SD | 0.14 | 0.06 | 0.16 | 0.06 | 0.03 | 0.03 | 0.14 | 0.06 | 0.00 | 0.00 | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.14 | 0.06 |
| 1 | 7 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 |
| 1 | 7 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.17 | 0.17 |
| 1 | 7 | 7 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 7 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 7 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.08 | 0.06 | 0.12 | 0.07 | 0.08 | 0.06 |
| 1 | 7 | 7 | PT | SD | 0.14 | 0.06 | 0.16 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.16 | 0.06 |
| 1 | 7 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 |
| 1 | 7 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.17 | 0.17 |
| 1 | 7 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 7 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 11 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.08 | 0.06 | 0.16 | 0.07 | 0.08 | 0.06 |
| 1 | 7 | 11 | PT | SD | 0.11 | 0.05 | 0.14 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.14 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.11 | 0.05 | 0.19 | 0.07 |
| 1 | 7 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.10 | 0.07 | 0.20 | 0.09 | 0.15 | 0.08 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 7 | 15 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 |
| 1 | 7 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 7 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 7 | 15 | PT | IP | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.00 | 0.00 | 0.04 | 0.04 | 0.32 | 0.10 | 0.04 | 0.04 | 0.20 | 0.08 | 0.08 | 0.06 |
| 1 | 7 | 15 | PT | SD | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.11 | 0.05 | 0.22 | 0.07 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.22 | 0.07 |
| 1 | 7 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.15 | 0.08 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 7 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 |
| 1 | 7 | 19 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 7 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 1 | 7 | 19 | PT | IP | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.40 | 0.10 | 0.00 | 0.00 | 0.24 | 0.09 | 0.08 | 0.06 |
| 1 | 7 | 19 | PT | SD | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.00 | 0.00 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.22 | 0.07 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 19 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.20 | 0.09 | 0.15 | 0.08 | 0.20 | 0.09 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 8 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 8 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 8 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 3 | PT | IP | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.20 | 0.08 | 0.00 | 0.00 | 0.24 | 0.09 | 0.08 | 0.06 |
| 1 | 8 | 3 | PT | SD | 0.05 | 0.04 | 0.14 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.24 | 0.07 |
| 1 | 8 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 8 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 8 | 7 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 8 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 7 | PT | IP | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.24 | 0.09 | 0.00 | 0.00 | 0.20 | 0.08 | 0.08 | 0.06 |
| 1 | 8 | 7 | PT | SD | 0.05 | 0.04 | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.24 | 0.07 |
| 1 | 8 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 8 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 1 | 8 | 11 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1 | 8 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 11 | PT | IP | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.24 | 0.09 | 0.00 | 0.00 | 0.20 | 0.08 | 0.08 | 0.06 |
| 1 | 8 | 11 | PT | SD | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.27 | 0.07 |
| 1 | 8 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.15 | 0.08 | 0.15 | 0.08 | 0.20 | 0.09 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1 | 8 | 15 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 8 | 15 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 1 | 8 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 15 | PT | IP | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.24 | 0.09 | 0.00 | 0.00 | 0.20 | 0.08 | 0.08 | 0.06 |
| 1 | 8 | 15 | PT | SD | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.30 | 0.08 |
| 1 | 8 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.25 | 0.10 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 |
| 1 | 8 | 19 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 1 | 8 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 8 | 19 | PT | IP | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.20 | 0.08 | 0.08 | 0.06 | 0.24 | 0.09 | 0.08 | 0.06 |
| 1 | 8 | 19 | PT | SD | 0.05 | 0.04 | 0.08 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.30 | 0.08 |
| 1 | 8 | 19 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 |
| 4 | 1 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 3 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 3 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PT | SD | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 11 | PT | IP | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 |
| 4 | 1 | 11 | PT | SD | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 4 | 1 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 15 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.20 | 0.08 | 0.00 | 0.00 |
| 4 | 1 | 15 | PT | SD | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 1 | 15 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 |
| 4 | 1 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 4 | 1 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1 | 19 | PT | IP | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 |
| 4 | 1 | 19 | PT | SD | 0.03 | 0.03 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.22 | 0.07 | 0.11 | 0.05 | 0.16 | 0.06 | 0.05 | 0.04 |
| 4 | 1 | 19 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 2 | 3 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 2 | 3 | PT | IP | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.32 | 0.10 | 0.00 | 0.00 |
| 4 | 2 | 3 | PT | SD | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.24 | 0.07 | 0.14 | 0.06 | 0.16 | 0.06 | 0.05 | 0.04 |
| 4 | 2 | 3 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 2 | 7 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 2 | 7 | PT | IP | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.28 | 0.09 | 0.00 | 0.00 |
| 4 | 2 | 7 | PT | SD | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.24 | 0.07 | 0.16 | 0.06 | 0.14 | 0.06 | 0.05 | 0.04 |
| 4 | 2 | 7 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 4 | 2 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 11 | PT | IP | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.08 | 0.06 | 0.16 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 11 | PT | SD | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.30 | 0.08 | 0.16 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 |
| 4 | 2 | 11 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 2 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 15 | PT | IP | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.08 | 0.06 | 0.12 | 0.07 | 0.00 | 0.00 |
| 4 | 2 | 15 | PT | SD | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.22 | 0.07 | 0.14 | 0.06 | 0.14 | 0.06 | 0.08 | 0.05 |
| 4 | 2 | 15 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.25 | 0.10 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 2 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 4 | 2 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 2 | 19 | PT | IP | 0.12 | 0.07 | 0.16 | 0.07 | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 2 | 19 | PT | SD | 0.11 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.11 | 0.05 | 0.14 | 0.06 | 0.05 | 0.04 |
| 4 | 2 | 19 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| 4 | 3 | 3 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 3 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 3 | PT | IP | 0.08 | 0.06 | 0.16 | 0.07 | 0.08 | 0.06 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.28 | 0.09 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 3 | 3 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.19 | 0.07 | 0.08 | 0.05 | 0.05 | 0.04 |
| 4 | 3 | 3 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.30 | 0.11 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 |
| 4 | 3 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 7 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 7 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 7 | PT | IP | 0.08 | 0.06 | 0.16 | 0.07 | 0.08 | 0.06 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.28 | 0.09 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 3 | 7 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.19 | 0.07 | 0.05 | 0.04 | 0.03 | 0.03 |
| 4 | 3 | 7 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 |
| 4 | 3 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 11 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 11 | PT | IP | 0.04 | 0.04 | 0.20 | 0.08 | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.28 | 0.09 | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 |
| 4 | 3 | 11 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.14 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.14 | 0.06 | 0.16 | 0.06 | 0.16 | 0.06 | 0.05 | 0.04 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 3 | 11 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 |
| 4 | 3 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 15 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 15 | PT | IP | 0.08 | 0.06 | 0.20 | 0.08 | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.28 | 0.09 | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 |
| 4 | 3 | 15 | PT | SD | 0.14 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.14 | 0.06 | 0.11 | 0.05 | 0.00 | 0.00 |
| 4 | 3 | 15 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 |
| 4 | 3 | 19 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 3 | 19 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.10 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 3 | 19 | PT | SD | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.16 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.19 | 0.07 | 0.19 | 0.07 | 0.08 | 0.05 | 0.00 | 0.00 |
| 4 | 3 | 19 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.10 | 0.07 | 0.15 | 0.08 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 4 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 4 | 3 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 3 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 3 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.10 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 4 | 3 | PT | SD | 0.16 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 | 0.19 | 0.07 | 0.22 | 0.07 | 0.11 | 0.05 | 0.03 | 0.03 |
| 4 | 4 | 3 | PT | SL | 0.20 | 0.09 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 4 | 7 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 4 | 7 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 7 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 7 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.10 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 4 | 7 | PT | SD | 0.16 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.14 | 0.06 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.19 | 0.07 | 0.24 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 |
| 4 | 4 | 7 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 4 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| 4 | 4 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 4 | 11 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 4 | 11 | PT | IP | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.32 | 0.10 | 0.24 | 0.09 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 4 | 11 | PT | SD | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.27 | 0.07 | 0.22 | 0.07 | 0.05 | 0.04 | 0.05 | 0.04 |
| 4 | 4 | 11 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 4 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 4 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 15 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 4 | 15 | PT | IP | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.10 | 0.20 | 0.08 | 0.04 | 0.04 | 0.00 | 0.00 |
| 4 | 4 | 15 | PT | SD | 0.16 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.27 | 0.07 | 0.16 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 |
| 4 | 4 | 15 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 4 | 19 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 4 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 4 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 4 | 19 | PT | IP | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.09 | 0.24 | 0.09 | 0.16 | 0.07 | 0.00 | 0.00 |
| 4 | 4 | 19 | PT | SD | 0.16 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.19 | 0.07 | 0.19 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 |
| 4 | 4 | 19 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 4 | 5 | 3 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 3 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 3 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.20 | 0.08 | 0.16 | 0.07 | 0.04 | 0.04 |
| 4 | 5 | 3 | PT | SD | 0.19 | 0.07 | 0.11 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.16 | 0.06 | 0.08 | 0.05 | 0.03 | 0.03 |
| 4 | 5 | 3 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 7 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 4 | 5 | 7 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 7 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 7 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.20 | 0.08 | 0.16 | 0.07 | 0.04 | 0.04 |
| 4 | 5 | 7 | PT | SD | 0.19 | 0.07 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.11 | 0.05 | 0.03 | 0.03 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 5 | 7 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 11 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 5 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 11 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 11 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.20 | 0.08 | 0.20 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 11 | PT | SD | 0.16 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.19 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 |
| 4 | 5 | 11 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 |
| 4 | 5 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 4 | 5 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 5 | 15 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 15 | PT | IP | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.16 | 0.07 | 0.32 | 0.10 | 0.00 | 0.00 |
| 4 | 5 | 15 | PT | SD | 0.16 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.11 | 0.05 | 0.24 | 0.07 | 0.08 | 0.05 | 0.05 | 0.04 |
| 4 | 5 | 15 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.25 | 0.10 | 0.15 | 0.08 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 5 | 19 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 5 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 5 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.75 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 5 | 19 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.28 | 0.09 | 0.00 | 0.00 |
| 4 | 5 | 19 | PT | SD | 0.19 | 0.07 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.16 | 0.06 | 0.19 | 0.07 | 0.11 | 0.05 | 0.03 | 0.03 |
| 4 | 5 | 19 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.20 | 0.09 | 0.10 | 0.07 | 0.00 | 0.00 |
| 4 | 6 | 3 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 6 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 6 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 3 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.28 | 0.09 | 0.12 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 3 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.19 | 0.07 | 0.16 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 |
| 4 | 6 | 3 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.20 | 0.09 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 6 | 7 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 6 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 6 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 7 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.28 | 0.09 | 0.12 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 7 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.19 | 0.07 | 0.16 | 0.06 | 0.19 | 0.07 | 0.03 | 0.03 |
| 4 | 6 | 7 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.20 | 0.09 | 0.15 | 0.08 | 0.00 | 0.00 |
| 4 | 6 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 6 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 6 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 11 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.09 | 0.12 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 11 | PT | SD | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.30 | 0.08 | 0.19 | 0.07 | 0.14 | 0.06 | 0.03 | 0.03 |
| 4 | 6 | 11 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.15 | 0.08 | 0.20 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 15 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 6 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 6 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 15 | PT | IP | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.09 | 0.16 | 0.07 | 0.24 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 15 | PT | SD | 0.08 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.14 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.35 | 0.08 | 0.22 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 |
| 4 | 6 | 15 | PT | SL | 0.25 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.00 | 0.00 |
| 4 | 6 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 6 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 6 | 19 | PT | IP | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.20 | 0.08 | 0.16 | 0.07 | 0.00 | 0.00 |
| 4 | 6 | 19 | PT | SD | 0.08 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.14 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.27 | 0.07 | 0.22 | 0.07 | 0.08 | 0.05 | 0.05 | 0.04 |
| 4 | 6 | 19 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.25 | 0.10 | 0.00 | 0.00 |
| 4 | 7 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 |
| 4 | 7 | 3 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 3 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 4 | 7 | 3 | PT | IP | 0.12 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.16 | 0.07 | 0.20 | 0.08 | 0.16 | 0.07 | 0.08 | 0.06 |
| 4 | 7 | 3 | PT | SD | 0.08 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.14 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.03 | 0.03 | 0.27 | 0.07 | 0.24 | 0.07 | 0.03 | 0.03 | 0.05 | 0.04 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 7 | 3 | PT | SL | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.20 | 0.09 | 0.05 | 0.05 |
| 4 | 7 | 7 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 |
| 4 | 7 | 7 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 7 | 7 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 7 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 |
| 4 | 7 | 7 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.14 | 0.06 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.27 | 0.07 | 0.22 | 0.07 | 0.00 | 0.00 | 0.05 | 0.04 |
| 4 | 7 | 7 | PT | SL | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.25 | 0.10 | 0.05 | 0.05 |
| 4 | 7 | 11 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 7 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 7 | 11 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 11 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.16 | 0.07 | 0.20 | 0.08 | 0.08 | 0.06 |
| 4 | 7 | 11 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.14 | 0.06 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.27 | 0.07 | 0.19 | 0.07 | 0.03 | 0.03 | 0.05 | 0.04 |
| 4 | 7 | 11 | PT | SL | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.25 | 0.10 | 0.05 | 0.05 |
| 4 | 7 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 4 | 7 | 15 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 15 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.16 | 0.07 | 0.16 | 0.07 | 0.04 | 0.04 |
| 4 | 7 | 15 | PT | SD | 0.14 | 0.06 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.07 | 0.19 | 0.07 | 0.03 | 0.03 | 0.08 | 0.05 |
| 4 | 7 | 15 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.25 | 0.10 | 0.05 | 0.05 |
| 4 | 7 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 4 | 7 | 19 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 7 | 19 | PT | IP | 0.12 | 0.07 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.16 | 0.07 | 0.24 | 0.09 | 0.12 | 0.07 | 0.04 | 0.04 |
| 4 | 7 | 19 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.03 | 0.03 | 0.00 | 0.00 | 0.24 | 0.07 | 0.22 | 0.07 | 0.03 | 0.03 | 0.08 | 0.05 |
| 4 | 7 | 19 | PT | SL | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.20 | 0.09 | 0.05 | 0.05 |
| 4 | 8 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 8 | 3 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 3 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.24 | 0.09 | 0.08 | 0.06 | 0.04 | 0.04 |
| 4 | 8 | 3 | PT | SD | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.22 | 0.07 | 0.16 | 0.06 | 0.16 | 0.06 | 0.08 | 0.05 |
| 4 | 8 | 3 | PT | SL | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.15 | 0.08 | 0.10 | 0.07 | 0.05 | 0.05 |
| 4 | 8 | 7 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 4 | 8 | 7 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 7 | PT | IP | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 |
| 4 | 8 | 7 | PT | SD | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.22 | 0.07 | 0.16 | 0.06 | 0.16 | 0.06 | 0.08 | 0.05 |
| 4 | 8 | 7 | PT | SL | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.15 | 0.08 | 0.10 | 0.07 | 0.05 | 0.05 |
| 4 | 8 | 11 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 4 | 8 | 11 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 11 | PT | IP | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 |
| 4 | 8 | 11 | PT | SD | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 | 0.22 | 0.07 | 0.16 | 0.06 | 0.16 | 0.06 | 0.08 | 0.05 |
| 4 | 8 | 11 | PT | SL | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.10 | 0.07 |
| 4 | 8 | 15 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 |
| 4 | 8 | 15 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 15 | PT | IP | 0.08 | 0.06 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.20 | 0.08 | 0.08 | 0.06 | 0.04 | 0.04 |
| 4 | 8 | 15 | PT | SD | 0.19 | 0.07 | 0.03 | 0.03 | 0.00 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.30 | 0.08 | 0.16 | 0.06 | 0.08 | 0.05 | 0.11 | 0.05 |
| 4 | 8 | 15 | PT | SL | 0.20 | 0.09 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 | 0.10 | 0.07 | 0.10 | 0.07 |
| 4 | 8 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 |
| 4 | 8 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 4 | 8 | 19 | PNT | SL | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 8 | 19 | PT | IP | 0.08 | 0.06 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.24 | 0.09 | 0.20 | 0.08 | 0.08 | 0.06 | 0.08 | 0.06 |
| 4 | 8 | 19 | PT | SD | 0.19 | 0.07 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.27 | 0.07 | 0.16 | 0.06 | 0.11 | 0.05 | 0.11 | 0.05 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 8 | 19 | PT | SL | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 |
| 6 | 1 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 3 | PT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 3 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PT | IP | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 6 | 1 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 11 | PT | IP | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 11 | PT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.00 | 0.00 |
| 6 | 1 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 6 | 1 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 |
| 6 | 1 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 15 | PT | IP | 0.04 | 0.04 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 |
| 6 | 1 | 15 | PT | SD | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.00 | 0.00 |
| 6 | 1 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 |
| 6 | 1 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 19 | PNT | SD | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 1 | 19 | PT | IP | 0.08 | 0.06 | 0.16 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 |
| 6 | 1 | 19 | PT | SD | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.19 | 0.07 | 0.08 | 0.05 |
| 6 | 1 | 19 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.15 | 0.08 | 0.15 | 0.08 |
| 6 | 2 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 3 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.12 | 0.07 | 0.00 | 0.00 | 0.20 | 0.08 | 0.08 | 0.06 |
| 6 | 2 | 3 | PT | SD | 0.11 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.14 | 0.06 | 0.16 | 0.06 | 0.11 | 0.05 |
| 6 | 2 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 2 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 7 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.20 | 0.08 | 0.08 | 0.06 |
| 6 | 2 | 7 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 |
| 6 | 2 | 7 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 2 | 11 | PNT | IP | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 2 | 11 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.20 | 0.08 | 0.08 | 0.06 |
| 6 | 2 | 11 | PT | SD | 0.14 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 | 0.14 | 0.06 |
| 6 | 2 | 11 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 |
| 6 | 2 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 15 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 2 | 15 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.16 | 0.07 | 0.12 | 0.07 |
| 6 | 2 | 15 | PT | SD | 0.14 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.14 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 15 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.20 | 0.09 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.15 | 0.08 | 0.15 | 0.08 |
| 6 | 2 | 19 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 2 | 19 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 2 | 19 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.20 | 0.08 | 0.12 | 0.07 |
| 6 | 2 | 19 | PT | SD | 0.08 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 |
| 6 | 2 | 19 | PT | SL | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.15 | 0.08 | 0.15 | 0.08 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.00 | 0.00 | 0.10 | 0.07 | 0.15 | 0.08 |
| 6 | 3 | 3 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 3 | 3 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 3 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.16 | 0.07 | 0.16 | 0.07 |
| 6 | 3 | 3 | PT | SD | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 |
| 6 | 3 | 3 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.15 | 0.08 | 0.15 | 0.08 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.05 | 0.05 | 0.15 | 0.08 |
| 6 | 3 | 7 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 3 | 7 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 7 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.07 | 0.04 | 0.04 | 0.16 | 0.07 | 0.12 | 0.07 |
| 6 | 3 | 7 | PT | SD | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.14 | 0.06 | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 |
| 6 | 3 | 7 | PT | SL | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.20 | 0.09 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 |
| 6 | 3 | 11 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 3 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 11 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.12 | 0.07 | 0.16 | 0.07 | 0.12 | 0.07 |
| 6 | 3 | 11 | PT | SD | 0.11 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.08 | 0.05 | 0.05 | 0.04 | 0.14 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.14 | 0.06 | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 |
| 6 | 3 | 11 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.25 | 0.10 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 |
| 6 | 3 | 15 | PNT | IP | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 3 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 3 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 15 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.16 | 0.07 | 0.12 | 0.07 |
| 6 | 3 | 15 | PT | SD | 0.08 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.08 | 0.05 | 0.16 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 | 0.08 | 0.05 | 0.19 | 0.07 | 0.11 | 0.05 | 0.05 | 0.04 |
| 6 | 3 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.25 | 0.10 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.10 | 0.07 | 0.10 | 0.07 |
| 6 | 3 | 19 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 3 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 3 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 3 | 19 | PT | IP | 0.16 | 0.07 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 |
| 6 | 3 | 19 | PT | SD | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.11 | 0.05 | 0.16 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |
| 6 | 3 | 19 | PT | SL | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.30 | 0.11 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.30 | 0.11 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 |
| 6 | 4 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 3 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 4 | 3 | PT | IP | 0.24 | 0.09 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 4 | 3 | PT | SD | 0.14 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.08 | 0.05 | 0.05 | 0.04 | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.16 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |
| 6 | 4 | 3 | PT | SL | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 4 | 7 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 7 | PNT | SD | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 4 | 7 | PT | IP | 0.24 | 0.09 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 4 | 7 | PT | SD | 0.14 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.16 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |
| 6 | 4 | 7 | PT | SL | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 4 | 11 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 4 | 11 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.60 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 4 | 11 | PT | IP | 0.20 | 0.08 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 |
| 6 | 4 | 11 | PT | SD | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.16 | 0.06 | 0.14 | 0.06 | 0.03 | 0.03 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 4 | 11 | PT | SL | 0.00 | 0.00 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.15 | 0.08 | 0.15 | 0.08 |
| 6 | 4 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 4 | 15 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 4 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 4 | 15 | PT | IP | 0.20 | 0.08 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 |
| 6 | 4 | 15 | PT | SD | 0.16 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.16 | 0.06 | 0.03 | 0.03 | 0.16 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.19 | 0.07 | 0.05 | 0.04 | 0.05 | 0.04 |
| 6 | 4 | 15 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 |
| 6 | 4 | 19 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 4 | 19 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 4 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 4 | 19 | PT | IP | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.08 | 0.12 | 0.07 | 0.08 | 0.06 | 0.16 | 0.07 |
| 6 | 4 | 19 | PT | SD | 0.16 | 0.06 | 0.00 | 0.00 | 0.05 | 0.04 | 0.11 | 0.05 | 0.05 | 0.04 | 0.16 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 |
| 6 | 4 | 19 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.20 | 0.09 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 | 0.15 | 0.08 | 0.10 | 0.07 |
| 6 | 5 | 3 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 5 | 3 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 5 | 3 | PNT | SL | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 5 | 3 | PT | IP | 0.20 | 0.08 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 |
| 6 | 5 | 3 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.16 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 |
| 6 | 5 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.25 | 0.10 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 |
| 6 | 5 | 7 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 5 | 7 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 5 | 7 | PNT | SL | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 5 | 7 | PT | IP | 0.20 | 0.08 | 0.12 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 |
| 6 | 5 | 7 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.16 | 0.06 | 0.11 | 0.05 | 0.05 | 0.04 |
| 6 | 5 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.30 | 0.11 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 |
| 6 | 5 | 11 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 5 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 5 | 11 | PNT | SL | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 5 | 11 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 |
| 6 | 5 | 11 | PT | SD | 0.11 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.08 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.11 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.05 | 0.04 |
| 6 | 5 | 11 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.35 | 0.11 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 |
| 6 | 5 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 5 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |
| 6 | 5 | 15 | PNT | SL | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 5 | 15 | PT | IP | 0.20 | 0.08 | 0.08 | 0.06 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.07 | 0.12 | 0.07 | 0.08 | 0.06 | 0.08 | 0.06 |
| 6 | 5 | 15 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.16 | 0.06 | 0.11 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 |
| 6 | 5 | 15 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.25 | 0.10 | 0.10 | 0.07 | 0.20 | 0.09 | 0.05 | 0.05 |
| 6 | 5 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 5 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 5 | 19 | PNT | SL | 0.00 | 0.00 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 5 | 19 | PT | IP | 0.24 | 0.09 | 0.08 | 0.06 | 0.00 | 0.00 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.08 | 0.06 |
| 6 | 5 | 19 | PT | SD | 0.08 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.08 | 0.05 | 0.14 | 0.06 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.14 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 |
| 6 | 5 | 19 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.25 | 0.10 | 0.10 | 0.07 | 0.15 | 0.08 | 0.10 | 0.07 |
| 6 | 6 | 3 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 6 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 6 | 3 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 6 | 3 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.24 | 0.09 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 6 | 6 | 3 | PT | SD | 0.05 | 0.04 | 0.05 | 0.04 | 0.11 | 0.05 | 0.00 | 0.00 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.16 | 0.06 | 0.19 | 0.07 | 0.11 | 0.05 | 0.16 | 0.06 |
| 6 | 6 | 3 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.10 | 0.10 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 |
| 6 | 6 | 7 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 6 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 6 | 7 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 6 | 7 | PT | IP | 0.16 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.24 | 0.09 | 0.08 | 0.06 | 0.08 | 0.06 | 0.04 | 0.04 |
| 6 | 6 | 7 | PT | SD | 0.05 | 0.04 | 0.05 | 0.04 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.16 | 0.06 | 0.19 | 0.07 | 0.11 | 0.05 | 0.16 | 0.06 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 6 | 7 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 6 | 11 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 6 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.40 | 0.24 |
| 6 | 6 | 11 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 6 | 11 | PT | IP | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 |
| 6 | 6 | 11 | PT | SD | 0.08 | 0.05 | 0.03 | 0.03 | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.16 | 0.06 | 0.16 | 0.06 | 0.11 | 0.05 | 0.16 | 0.06 |
| 6 | 6 | 11 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.20 | 0.09 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 |
| 6 | 6 | 15 | PNT | IP | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 6 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.20 | 0.20 |
| 6 | 6 | 15 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 | 0.29 | 0.00 | 0.00 |
| 6 | 6 | 15 | PT | IP | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.06 |
| 6 | 6 | 15 | PT | SD | 0.14 | 0.06 | 0.11 | 0.05 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.16 | 0.06 |
| 6 | 6 | 15 | PT | SL | 0.10 | 0.07 | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.25 | 0.10 | 0.10 | 0.07 |
| 6 | 6 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 6 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.40 | 0.24 |
| 6 | 6 | 19 | PNT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.29 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 6 | 19 | PT | IP | 0.28 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.08 | 0.06 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 |
| 6 | 6 | 19 | PT | SD | 0.11 | 0.05 | 0.14 | 0.06 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.11 | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.16 | 0.06 |
| 6 | 6 | 19 | PT | SL | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.08 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.10 | 0.07 | 0.20 | 0.09 | 0.10 | 0.07 |
| 6 | 7 | 3 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 6 | 7 | 3 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 |
| 6 | 7 | 3 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 3 | PT | IP | 0.12 | 0.07 | 0.16 | 0.07 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 |
| 6 | 7 | 3 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.08 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.16 | 0.06 | 0.16 | 0.06 | 0.16 | 0.06 | 0.11 | 0.05 |
| 6 | 7 | 3 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.11 | 0.10 | 0.07 | 0.10 | 0.07 | 0.15 | 0.08 |
| 6 | 7 | 7 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 |
| 6 | 7 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7 | 7 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 7 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 |
| 6 | 7 | 7 | PT | SD | 0.16 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.16 | 0.06 | 0.19 | 0.07 | 0.14 | 0.06 | 0.11 | 0.05 |
| 6 | 7 | 7 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.11 | 0.10 | 0.07 | 0.10 | 0.07 | 0.15 | 0.08 |
| 6 | 7 | 11 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 7 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.24 |
| 6 | 7 | 11 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.50 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 11 | PT | IP | 0.12 | 0.07 | 0.12 | 0.07 | 0.00 | 0.00 | 0.20 | 0.08 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.12 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 |
| 6 | 7 | 11 | PT | SD | 0.16 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 | 0.00 | 0.00 | 0.08 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.16 | 0.06 | 0.19 | 0.07 | 0.11 | 0.05 | 0.11 | 0.05 |
| 6 | 7 | 11 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.11 | 0.05 | 0.05 | 0.15 | 0.08 | 0.20 | 0.09 |
| 6 | 7 | 15 | PNT | IP | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |
| 6 | 7 | 15 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 15 | PT | IP | 0.16 | 0.07 | 0.08 | 0.06 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.24 | 0.09 | 0.08 | 0.06 | 0.00 | 0.00 | 0.08 | 0.06 |
| 6 | 7 | 15 | PT | SD | 0.19 | 0.07 | 0.08 | 0.05 | 0.03 | 0.03 | 0.00 | 0.00 | 0.11 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.00 | 0.00 | 0.22 | 0.07 | 0.14 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 |
| 6 | 7 | 15 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 | 0.15 | 0.08 | 0.20 | 0.09 |
| 6 | 7 | 19 | PNT | IP | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.21 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 |
| 6 | 7 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 7 | 19 | PT | IP | 0.20 | 0.08 | 0.08 | 0.06 | 0.00 | 0.00 | 0.16 | 0.07 | 0.04 | 0.04 | 0.08 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 |
| 6 | 7 | 19 | PT | SD | 0.19 | 0.07 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.11 | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.00 | 0.00 | 0.22 | 0.07 | 0.16 | 0.06 | 0.03 | 0.03 | 0.14 | 0.06 |
| 6 | 7 | 19 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.05 | 0.05 | 0.10 | 0.07 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.15 | 0.08 | 0.10 | 0.07 | 0.20 | 0.09 |
| 6 | 8 | 3 | PNT | IP | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 8 | 3 | PNT | SD | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 |
| 6 | 8 | 3 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 8 | 3 | PT | IP | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 8 | 3 | PT | SD | 0.14 | 0.06 | 0.05 | 0.04 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.14 | 0.06 | 0.19 | 0.07 | 0.14 | 0.06 | 0.08 | 0.05 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 3 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.10 | 0.07 | 0.15 | 0.08 |
| 6 | 8 | 7 | PNT | IP | 0.50 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 8 | 7 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 |
| 6 | 8 | 7 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 8 | 7 | PT | IP | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 8 | 7 | PT | SD | 0.16 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.11 | 0.05 | 0.27 | 0.07 | 0.03 | 0.03 | 0.08 | 0.05 |
| 6 | 8 | 7 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.20 | 0.09 | 0.10 | 0.07 | 0.15 | 0.08 |
| 6 | 8 | 11 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 8 | 11 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.40 | 0.24 |
| 6 | 8 | 11 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 8 | 11 | PT | IP | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 | 0.12 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.12 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 |
| 6 | 8 | 11 | PT | SD | 0.14 | 0.06 | 0.08 | 0.05 | 0.05 | 0.04 | 0.08 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.14 | 0.06 | 0.27 | 0.07 | 0.03 | 0.03 | 0.08 | 0.05 |
| 6 | 8 | 11 | PT | SL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.20 | 0.09 | 0.20 | 0.09 | 0.15 | 0.08 |
| 6 | 8 | 15 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 8 | 15 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.60 | 0.24 |
| 6 | 8 | 15 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 8 | 15 | PT | IP | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.20 | 0.08 | 0.12 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 8 | 15 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.05 | 0.04 | 0.11 | 0.05 | 0.11 | 0.05 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.16 | 0.06 | 0.16 | 0.06 | 0.08 | 0.05 | 0.08 | 0.05 |
| 6 | 8 | 15 | PT | SL | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.08 | 0.10 | 0.07 | 0.20 | 0.09 | 0.20 | 0.09 |
| 6 | 8 | 19 | PNT | IP | 0.33 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.00 | 0.00 |
| 6 | 8 | 19 | PNT | SD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.60 | 0.24 |
| 6 | 8 | 19 | PNT | SL | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.00 | 0.00 |
| 6 | 8 | 19 | PT | IP | 0.16 | 0.07 | 0.00 | 0.00 | 0.04 | 0.04 | 0.12 | 0.07 | 0.08 | 0.06 | 0.16 | 0.07 | 0.04 | 0.04 | 0.00 | 0.00 | 0.16 | 0.07 | 0.16 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 |
| 6 | 8 | 19 | PT | SD | 0.11 | 0.05 | 0.08 | 0.05 | 0.08 | 0.05 | 0.03 | 0.03 | 0.11 | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 0.03 | 0.03 | 0.16 | 0.06 | 0.14 | 0.06 | 0.08 | 0.05 | 0.14 | 0.06 |
| 6 | 8 | 19 | PT | SL | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.07 | 0.05 | 0.05 | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.09 | 0.05 | 0.05 | 0.20 | 0.09 | 0.20 | 0.09 |