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Does student sampling impact our understanding of argumentativeness and verbal aggressiveness?

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ABSTRACT

Student samples are regularly used in research. While student samples are convenient and easy to access, the use of such samples has been criticized for exposing theories and research to internal validity threats, as students are not representative of the general population. Using argumentativeness and verbal aggressiveness as contexts for analysis, this study explores the extent to which student and non-student samples differ in published empirical research. We found that in the case of the original verbal aggression and argumentativeness measures, sample type did not moderate the means among argumentativeness and verbal aggressiveness studies. We discuss the implications of these findings in terms of student vs. non-student samples.

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Sampling; validity; communication scales; argumentativeness; verbal aggressiveness

Examinations of the debate over the representativeness of university student samples can be found in numerous disciplines over the past five decades including accounting (Ashton and Kramer 1980), consumer research (Peterson 2001; Peterson and Merunka 2014), human resources (Covin and Brush 1993), management (Gordon, Slade, and Schmitt 1986; Greenberg 1987), organizational psychology (Wheeler et al. 2014), social psychology (Sears 1986), tax (Marriott 2014), and communication (Abelman 1996; Basil 1996; Courtright 1996, Meltzer, Naab, and Daschmann 2012). Opinions on the issue of the use of university students differ. Many support the use of such samples as a point for comparison with other groups (Basil 1996). Others in support of university student samples have argued such samples are more homogeneous, which provides validity advantages for empirical examinations (Peterson 2001). Moreover, such samples are cheap and easily accessible, which affords researchers more opportunities to explore phenomena. Those who question the use of such samples have criticized the validity of these convenience samples (e.g. Potter, Cooper, and Dupagne 1993; Sears 1986), and the weaker sense of self among adolescents used to generalize to the population (Sears 1986). Researchers have asserted

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individuals between 18 and 25 year-olds (often labelled adolescents), who make up the bulk of university samples often do not have a firm or established self-definition, as they are still developing a sense of identity (Cauffman and Steinberg 2000). Researchers have also asserted this population will differ from the general “adult” population, as many 18–25 year-old do not consider themselves to be fully developed adults (Nelson and Barry 2005). Sears (1986) and Peterson (2001) asserted adolescent development has potential effects on the validity of university student samples, and thus how 18–25 year-olds respond to a survey may differ from older individuals. It is this difference the current study examines.

The Argumentativeness Scale (Infante and Rancer 1982) and the Verbal Aggressiveness Scale (Infante and Wigley 1986) are two of the most used and cited communication measures exploring aggression (Kotowski et al. 2009). A review of studies using these measures was conducted to see if there is a consistent difference in the way university students vs. adults respond to these measures.

Concerns with using university/student samples

Validity

In 1966, Smart asked if researchers knew what was “going on, psychologically, in the big world beyond the university” (Smart 1966, p. 12) due to the overuse of student-recruited samples. Researchers have continued to ask such questions about external validity and student-recruited samples in social scientific research for decades (Meltzer, Naab, and Daschmann 2012; Peterson 2001). Wheeler et al. (2014) asserted student-recruited samples represent a significant threat to validity, particularly external validity. Campbell and Stanley (1963) stated, “external validity asks the question of generalizability: To what populations, settings, treatment variables, and measurement variables can this effect be generalized?” (p. 5). Student-recruited samples are often criticized as non-representative of the population, leading to invariance of measures (Schmitt and Kuljanin 2008). Such samples also often have selection biases that impact data normality and data dependency (Wheeler et al. 2014). Students are also a more homogeneous population. Such samples have less variability and are typically convenience samples that yield less generalizability to a target population (Lucas 2003).

However, those who see student-recruited samples as an asset do not see these samples as lacking external validity. Meltzer, Naab, and Daschmann (2012) for example stated:

The issue with student convenience samples, however, is not “making generalizations, but testing them” (Mook 1983, 380). As they are cheap and readily accessible, student convenience samples enable researchers to take risks with their research and explore ideas that may appear farfetched. Furthermore, in many cases it is not the “real world” that researchers seek to understand, but rather the validity of a theoretical approach by predicting a larger population’s behaviour under circumstances. (p. 252)

The authors went on to claim student-recruited samples are more of an asset than a threat to research and that internal validity is more likely threatened when student-recruited samples are used.

Sense of self and internal validity

Internal validity refers to the degree of confidence and precision with which researchers can confidently claim relationships or effects are trustworthy and not influenced by confounding factors/variables. Researchers critical of student-recruited samples have asserted such samples pose a threat to internal validity because university students lack requisite experience and knowledge to adequately respond to most survey questions (Bello et al. 2009). Carlson (1971) for example asserted typical university students are “unfinished personalities” in adult development (p. 212). Sears (1986) argued that compared to older adults (more than 25 years of age), university students have less developed attitudes, have an under developed sense of self, higher cognitive skills, are more likely to comply with authority, have less stable peer groups, and have more experience with experiments/research. Such samples are also more sensitive to demand effects as a result of university students being more able to detect the purpose of the research (Clark 1996). In fact, research on demand effects has supported the argument that experience with experiments can lead to biased responses (Hertwig and Ortmann 2008). Moreover, research on emotions such as fear, anger, and aggression have largely been based on university students (Nelson and Barry 2005). Such samples run the risk of limiting understanding and/or over/under-estimating theoretical relationships, as the research is unable to accurately detect effects in the “average” population due to limited sampling (Peterson 2001) and risks the possibility of demand effects.

Researchers have questioned such internal validity challenges. Basil (1996) questioned the assertion that adolescents (the age range for many university students) are not fully emotionally and psychologically developed. In fact Basil (1996) asserted individuals categorized as adolescents should be considered “adults.” He asserted it would be more problematic to not study their attitudes and behaviors to provide points of comparison to other groups. Basil (1996) also questioned the argument that this group is more compliant to authority, supporting the use of objective measures as a way to reduce compliance.

Argumentativeness and verbal aggressiveness scales review

Aggressive communication

While the study of aggression has a rich history in psychology, Infante (1987) asserted the study of aggression in communication was limited by the lack of a “comprehensive and unified conception of aggressiveness as a personality trait” (p. 161). Infante (1987) defined aggression as: “An interpersonal behaviour may be considered aggressive if it applies force physically or symbolically in order, minimally, to dominate and perhaps damage or, maximally, to defeat and perhaps destroy to locus of attack” (p. 158). Rancer and Avtgis (2014) keenly pointed out that aggressive communication is not inherently bad. While some aggressive behaviors may be inappropriate, others are appropriate, depending on how constructive and destructive

the communication is. Whether a communicative act is constructive/destructive is based on the following (Infante 1987):

- a. When one person in a dyad feels that the act is constructive or destructive,
- (b) when both persons in the dyad agree on whether the act was constructive or destructive,
- (c) when an observer deems the act to be either constructive or destructive, and
- (d) whether the act is consistent with societal norms for classifying the act as constructive or destructive. (p. 163)

Assertiveness and argumentativeness are considered constructive communication traits, while hostility and verbal aggressiveness are considered destructive traits.

Argumentativeness and the argumentativeness scale

Argumentativeness is conceptually defined as a trait that “predisposes people to advocate positions on controversial issues while attacking verbally the positions which other people take on these issues” (Infante and Rancer 1982, p. 72). Infante and Rancer (1982) developed a 20-item scale to measure an individual’s general trait argumentativeness (ARG_{GT}), which is the predisposition to approach argument (ARG_{AP}) minus the predisposition to avoid argument (ARG_{AV}). Research has demonstrated that ARG_{GT} as a form of aggressive communication, is a significant factor in numerous communicative contexts: interpersonal, organizational, mediated, persuasive, instructional, cross-cultural, intercultural, etc. (see Croucher et al. 2020; Levine et al. 2012; Rancer and Avtgis 2014 for reviews).

The Argumentativeness Scale was developed through a series of studies among U.S. university students. Initially the scale had 45 items, before it was reduced to 20 items through a series of reliability and factor analyses (Infante and Rancer 1982). The final scale includes 10 items that measure ARG_{AP} and 10 items that measure ARG_{AV} . The scale is a Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree). Among U.S. university samples, the scale has shown consistent reliability as calculated with Cronbach’s coefficient alpha (Infante and Rancer 1996; Kotowski et al. 2009). While the scale tends to show reliability (in U.S. student samples), there is controversy over the scale. The scale’s wording of items, validity, whether the scale measures behaviors or predispositions, social desirability bias, and lack of sampling representativeness have all been questioned (Croucher et al. 2020; Dowling and Flint 1990; Hamilton and Mineo 2002; Infante, Rancer, and Wigley 2011; Nicotera 1996; Nicotera and Robinson 2010). The dimensionality of the scale has faced particular criticism. Researchers have debated whether the scale has a bi or uni-dimensional factor structure (Croucher et al. 2017, 2020; Infante, Rancer, and Wigley 2011; Kotowski et al. 2009; Levine et al. 2012).

Verbal Aggressiveness and Verbal Aggressiveness scale

Verbal aggressiveness is “the tendency to attack the self-concepts of individuals instead of, or in addition to, their positions on topics of communication” (Infante

and Wigley 1986, p. 61). This trait has traditionally been measured using Infante and Wigley (1986) Verbal Aggressiveness Scale. Verbal aggressiveness, like argumentativeness, has been studied in numerous contexts: interpersonal, organizational, cross-cultural/intercultural, mediated, etc. (see Infante 1989; Infante and Rancer 1982; Infante, Rancer, and Wigley 2011; Suzuki and Rancer 1994 for reviews).

The Verbal Aggressiveness Scale was developed through a series of studies among U.S. university students. The scale initially had 30 items before being reduced to 20 items. Analysis revealed two factors, positively and negatively worded items. Infante and Wigley (1986) suggested these two factors should be combined as the two factors combine to form one dimension. The scale is a Likert-type scale (1=Almost never true, 2=Rarely true, 3=Occasionally true, 4=Often true, 5=Almost always true). The scale has shown consistent reliability among U.S. university student samples (Rancer and Avtgis 2014). While the scale, like the Argumentativeness Scale, has shown consistent reliability among U.S. student samples, there is extensive debate over the scale's validity and whether the scale measures behaviors or predispositions (Infante, Rancer, and Wigley 2011). The most attention has been paid to the dimensionality of the scale. Questions such as whether the scale has a bi or uni-dimensional factor structure are common. In addition, researchers have argued the scale measures verbal aggressiveness and a form of benevolence, an unintended factor (Beatty, Rudd, and Valencic 1999; Croucher et al. 2012; Kotowski et al. 2009; Levine et al. 2004).

While our knowledge of measurement, and statistical and psychometric abilities increase every year, so does our ability to detect measurement error within our older measures and our tendency to modify these measures (Autman and Kelly 2017; Croucher and Kelly 2019). Modification of measures to a specific context or sample should be done with caution, as this process poses validity and reliability threats and potentially limits our theoretical and methodological understanding of the concept under investigation (Croucher and Kelly 2019). Thus, to mitigate potential effects of modified scales in our comparison of student-recruited versus non-student recruited samples, this study examines Infante and Rancer (1982) original Argumentativeness Scale and Infante and Wigley (1986) original Verbal Aggressiveness Scale.

Researchers continue to question the use of student-recruited samples in social scientific research. It is common for researchers conducting argumentativeness and verbal aggressiveness research (as well as other communication research) to discuss how the use of student samples is a limitation, as such samples are often non-representative of the population (i.e. Hsu 2007; Martin, Anderson, and Thweatt 1998). While such samples often have less variability and are typically convenience samples, researchers have not empirically shown student and non-student samples differ on aggressiveness. Therefore, based on the previously reviewed debate surrounding validity and the utility of student samples, we pose the following research questions to explore differences between student and non-student samples on measures of aggression:

RQ1a: To what extent does argumentativeness differ between student and non-student recruited samples?

RQ1b: To what extent does verbal aggressiveness differ between student and non-student recruited samples?

Method

Meta-analysis is a statistical technique used to synthesize and analyze data from multiple studies on a particular topic so scholars may identify variables that moderate outcomes and make suggestions for better practices studying these variables (Borenstein et al. 2021; Hunter and Schmidt 2004). In meta-analysis, results of individual studies are pooled to provide a comprehensive overview of how particular variables behave across samples and draw conclusions. By combining data from multiple studies (and therefore multiple samples), meta-analysis enhances statistical power and typically provides a more diverse sample than any individual study (Borenstein et al. 2021; Hunter and Schmidt 2004). Meta-analysis is utilized in this study to explore mean scores for the verbal aggression and argumentativeness measures to address the debate of whether using a college/university student vs. non-student adult sample affects results.

Literature search

A literature search was conducted *via* Google Scholar to collect published studies that included the Argumentativeness Scale and the Verbal Aggressiveness Scale. Four phrases were utilized: Argumentativeness Scale, Argumentativeness Measure, Verbal Aggressiveness Scale, and Verbal Aggressiveness Measure. The search was limited to references from 1982 to 2023 for Argumentativeness and 1986 to 2023 for Verbal Aggressiveness. These dates were chosen as both (1982 and 1986) represent when the scales were first published.

Inclusion and exclusion criteria

Seven criteria were used to determine which studies would be included in the final analysis. First, the study had to be published in a peer-reviewed journal article. While the initial search did pull-up references and citations from conferences, book, and chapters, those were excluded for peer-reviewed journal articles. Second, the study had to use either the original 20-item version of the Argumentativeness Scale (Infante and Rancer 1982) or the original 20-item version of the Verbal Aggressiveness Scale (Infante and Wigley 1986) so that comparisons were consistent. Similarly, the third criteria was that the study sample be U.S.-based. Behavioural measures such as the Argumentativeness Scale and Verbal Aggressiveness Scale must be tailored for use in each country, else the meaning placed on the behaviors described by items may have different meaning within the cultures (Croucher et al. 2024; Croucher and Kelly 2019). Therefore, to ensure the study truly only compares college/university student vs. non-student adult responses, the sample was limited to U.S.-based studies to avoid measurement invariance noise. Fourth, we could only include articles that reported the mean and standard deviation of the Argumentativeness or Verbal

Aggressiveness Scale. As our objective was to compare student-recruited with non-student-recruited samples, the mean and standard deviation of the scale was essential. Fifth, we only included articles that included the sample's mean and standard deviation for age. Further to the fourth criteria, this information was essential for comparison purposes between student-recruited and non-student-recruited samples. Sixth, we excluded articles not published in the English language. Finally, the data had to be an original reporting of information. Measure descriptions published in a reuse of the same dataset were not included.

Results

For argumentativeness, 20 studies met the criteria for inclusion. The combined sample size was 8,010. The studies were corrected for restriction of range so all data was normalized to Infante and Rancer (1982) recommended 5-point response scale. Sample size, mean, and standard deviations were used to calculate the 95% confidence interval for each mean using the standard formula:

$$CI = \bar{x} \pm 1.96 \left(\frac{s}{\sqrt{n}} \right)$$

Here, \bar{x} represents the sample mean, s represents the standard deviation of the sample, and n represents sample size. Overlap in confidence intervals indicates whether the means are statistically significantly different, taking into account that samples of varying sizes have differing amounts of statistical power.

Standardized means, standard deviations, and confidence intervals are summarized in Table 1. Confidence intervals ranges are visually depicted in Figure 1. A review of Table 1, or a glance at Figure 1, reveals all of the adult non-student sample confidence intervals overlap with at least one college/university student only sample, indicating there are no differences in these studies that sample type alone explain. Thus, as shown by the overlap in confidence intervals, sample type did not differentiate sample means.

Because this study is interested specifically in a college/university student vs. non-student adult comparison, Figure 2 presents the confidence intervals again, but for only the college/university student and non-student adult samples (i.e. combination samples are excluded from this version of the visualization). There is abundant overlap between the confidence intervals of the non-student adult samples and college/university student samples.

Notably, two student sample studies do stand apart as outliers in their scores: Bolkan and Goodboy (2011) and Martin, Anderson, and Thweatt (1998). The means of these scores were not just statistically significantly lower than all other studies, but also different from one another, with Bolkan and Goodboy's (2011) study having the lowest aggression score. Something unique to Bolkan and Goodboy's (2011) method is participants were not asked to report how they actually behave, but to imagine how they think they would behave in an imagined scenario. This may suggest individuals suppress their aggression instincts during the abstractness of

Table 1. Argumentativeness study summaries.

| Reference | Type of sample | <i>n</i> | Adjusted Mean | Adjusted <i>SD</i> | Lower CI | Upper CI |
|--------------------------------------|--------------------|----------|---------------|--------------------|----------|----------|
| Anderson and Martin (1999) | Students | 208 | 3.73 | 0.65 | 3.64 | 3.82 |
| Bolkan and Goodboy (2011) | Students | 235 | 1.00 | 1.12 | -0.20 | 0.08 |
| Cramer and Martin (2015) | Students | 205 | 3.31 | 0.67 | 3.22 | 3.40 |
| Croucher et al. (2009) | Combination | 1087 | 2.51 | 1.08 | 2.64 | 2.74 |
| Croucher et al. (2010) | Combination | 1176 | 1.17 | 1.39 | 1.09 | 1.25 |
| Croucher et al. (2012) | Non-Student Adults | 1068 | 2.69 | 0.89 | 2.64 | 2.74 |
| Croucher et al. (2013) | Non-Student Adults | 801 | 3.89 | 0.52 | 3.85 | 3.93 |
| Croucher et al. (2015) | Combination | 309 | 3.01 | 0.59 | 2.94 | 3.08 |
| Croucher et al. (2016) | Combination | 673 | 3.45 | 0.29 | 3.43 | 4.47 |
| Croucher et al. (2021) | Non-Student Adults | 454 | 3.21 | 0.06 | 3.2 | 3.22 |
| Edwards and Myers (2010) | Students | 172 | 3.12 | 0.61 | 3.03 | 3.21 |
| Goodboy and Myers (2012) | Students | 172 | 2.98 | 0.54 | 3.01 | 2.90 |
| Hsu (2007) | Students | 304 | 3.05 | 0.41 | 3.00 | 3.10 |
| Jodoi (2022) | Combination | 124 | 1.37 | 4.00 | 0.67 | 2.07 |
| Kennedy-Lightsey and Myers (2009) | Students | 187 | 2.91 | 0.57 | 2.83 | 2.99 |
| Madlock et al. (2007) | Non-Student Adults | 128 | 3.26 | 0.49 | 3.18 | 3.34 |
| Martin, Anderson, and Thweatt (1998) | Students | 276 | 1.26 | 0.61 | 0.19 | 0.33 |
| Ryan et al. (2011) | Students | 142 | 2.88 | 0.50 | 2.80 | 2.96 |
| Semic and Canary (1997) | Students | 62 | 3.37 | 0.36 | 3.28 | 3.46 |
| Wigley et al. 2023 | Students | 227 | 1.04 | 0.99 | 3.07 | 3.25 |

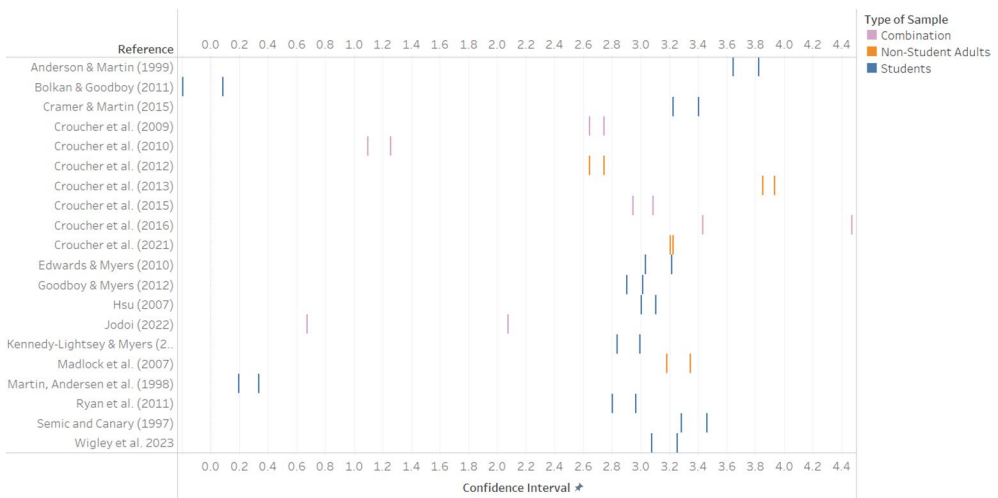


Figure 1. Argumentativeness confidence intervals.

imagined interactions. In terms of Martin, Anderson, and Thweatt (1998), no characteristics unique to data gathering, participant incentive, and other demographic information reported in this study explain the moderation. Additional investigation and replication work is needed to better understand the uniqueness of these means.

For verbal aggression, 18 studies met the criteria for inclusion. The combined sample size was 6,761. The studies were corrected for restriction of range so that

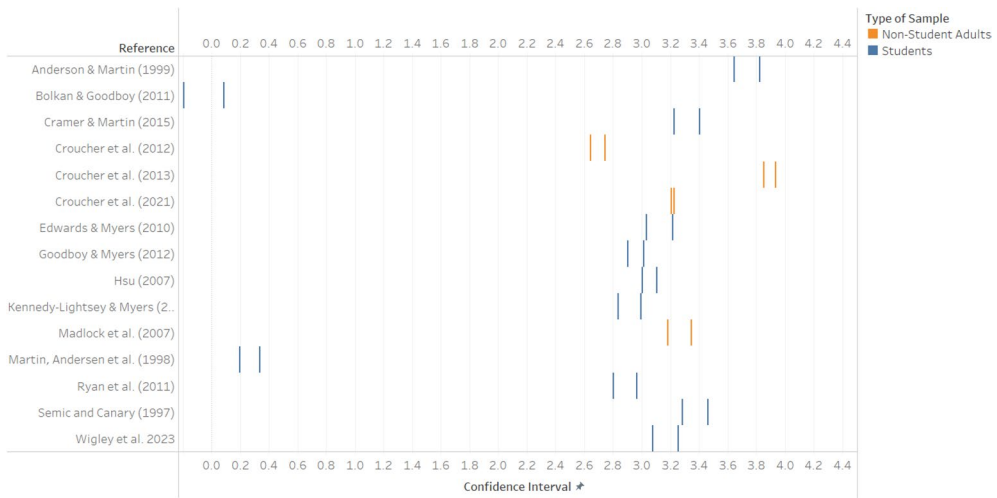


Figure 2. Argumentativeness confidence intervals without combination samples.

all data was normalized to Infante and Wigley (1986) recommended 5-point response scale. Confidence intervals were again calculated. Standardized means, standard deviations, and confidence intervals are summarized in Table 2. Confidence intervals ranges for the studies are plotted in Figure 2. All samples are of college/university students, except for Chang et al. (2015) who conducted research on a child sample with mean age 14.9 ($SD=1.03$) and Croucher et al. (2012) whose sample was non-student adults but with a relatively low mean age of 28.3 ($SD=12.87$). As shown by the overlap in confidence intervals in Figure 3, sample type did not differentiate sample means. Yet with only two samples not representing college/university students, there is little data from which to draw conclusions.

Discussion

Overall, results of the analyses show sample type does not moderate sample means among argumentativeness and verbal aggressiveness studies. These findings provide four considerations for verbal aggression and argumentativeness research.

First, given that the data were not moderated by adult vs. student samples, the data indicated student samples are representative of adult samples for verbal aggression and argumentativeness. Perhaps this is a phenomenon unique to these variables. Perhaps other variables are also unmoderated by these sampling differences. Regardless, the present study brings into question whether the common assumption that college/university student samples are a limitation to non-instructional studies is truly universal. There may be cases, such as with studies of verbal aggression and argumentativeness, in which college/university students are an appropriate, representative sample.

Second, as the current study demonstrates previous research does not show students vs. non-student samples statistically differing on argumentativeness or verbal aggression, internal validity concerns with the use of student samples to measure argumentativeness and verbal aggression may not be as warranted as previously

Table 2. Verbal aggression summary.

| Reference | Type of sample | n | Adjusted Mean | Adjusted SD | Lower CI | Upper CI |
|----------------------------------|--------------------|------|---------------|-------------|----------|----------|
| Aloia and Solomon (2015) | Student | 132 | 1.92 | 0.71 | 1.8 | 2.04 |
| Anderson and Martin (1999) | Student | 208 | 1.07 | 0.33 | 1.03 | 1.12 |
| Bolkan and Goodboy (2011) | Student | 235 | 2.49 | 0.54 | 2.42 | 2.56 |
| Chang et al. (2015) | Child | 377 | 2.77 | 0.53 | 2.71 | 2.82 |
| Cramer and Martin (2015) | Student | 205 | 3.57 | 0.68 | 3.48 | 3.66 |
| Croucher et al. (2012) | Non-Student Adults | 1166 | 2.79 | 0.48 | 2.76 | 2.82 |
| Edwards and Myers (2010) | Student | 172 | 2.6 | 0.5 | 2.53 | 2.68 |
| Hamilton and Hample (2011) | Student | 1543 | 2.65 | 0.5 | 2.63 | 2.67 |
| *Kinney et al. (2001) | Student | 263 | 2.21 | 0.51 | 2.15 | 2.27 |
| *Kinney et al. (2001) | Student | 182 | 2.57 | 0.55 | 2.49 | 2.65 |
| Levine et al. (2004) | Student | 194 | 2.33 | 0.56 | 2.25 | 2.41 |
| Malachowski et al. (2013) | Student | 182 | 2.74 | 0.50 | 2.67 | 2.81 |
| Martin et al. (2003) | Student | 555 | 2.57 | 0.54 | 2.53 | 2.62 |
| Martin, Andersen et al. (1998) | Student | 276 | 2.48 | 0.57 | 2.41 | 2.55 |
| Martin, Weber et al., 1998 | Student | 555 | 2.57 | 0.53 | 2.53 | 2.61 |
| Ryan et al. (2011) | Student | 142 | 1.82 | 0.52 | 1.73 | 1.91 |
| Sallinen-Kuparinen et al. (1991) | Student | 145 | 2.13 | 0.46 | 2.5 | 2.64 |
| Semic and Canary (1997) | Student | 62 | 2.49 | 0.42 | 2.39 | 2.6 |
| Worthington (2005) | Student | 167 | 3.01 | 0.13 | 2.99 | 3.03 |
| Martin, Andersen et al. (1998) | Student | 276 | 2.48 | 0.57 | 2.41 | 2.55 |

*In this study, males and females were treated as two separate samples. The n=263 sample was female and the n=182 sample was male.

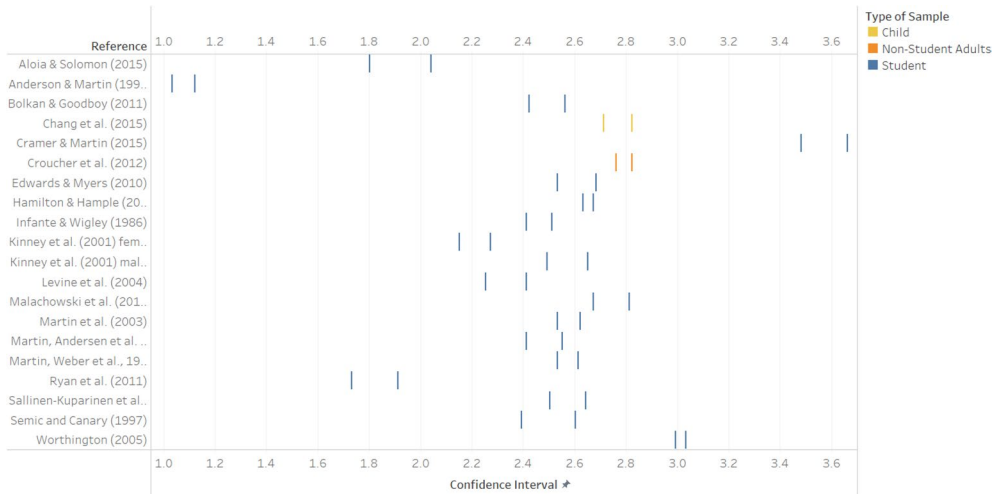


Figure 3. Verbal aggression confidence intervals.

thought. Previous research has asserted university students are psychologically and socially under-developed and thus not representative of the general population (Bello et al. 2009; Meltzer, Naab, and Daschmann 2012; Peterson 2001). However, as the results of this review demonstrate no clear differences between these groups, it would be prudent for researchers to either conduct direct comparisons or

longitudinal studies on aggression and argumentativeness to ascertain statistical differences, instead of assuming differences and validity threats. Without such studies we cannot conclusively show internal validity threats in how we measure argumentativeness and/or verbal aggression.

Third, it was difficult to conduct this study due to the lack of adequate information reported in many of the articles initially collected for review. Of the studies collected, three studies appropriate for inclusion in the verbal aggression review and three studies appropriate for inclusion in the argumentativeness review could not be included because adequate information was not provided to calculate the mean or standard deviation on a standardized 5-point scale. In most cases, the studies did not include the response range for the measure. Another study was excluded from verbal aggression analysis because no demographics were reported for participants. It is critical for future reviews and meta-analyses that studies report mean, standard deviation, response scales, and reliability scores of each measure, as well as mean and standard deviations for participant age (and any other available demographic information).

Fourth, in this study we only considered studies that used the original 20-item Argumentativeness and/or Verbal Aggressiveness Measures. We did not include adapted or respecified measures as there is question over the theoretical and methodological rationale for such respecifications. The modification of measures has become increasingly common. Bowman and Goodboy (2020) argued that respecification of measures has become rampant in communication studies. Respecifications such as deleting items with low factor loadings are often done post-hoc without considering the a priori model that drives the CFA. Such practices shift analysis from confirmatory (testing hypotheses) to exploratory (hypothesis-generation) and are inappropriate. Through in-depth factor analyses, researchers have respecified and encouraged the use of modified versions of the Argumentativeness Measure (i.e. Kotowski et al. 2009; Levine et al. 2012; Nicotera 1996) and the Verbal Aggressiveness Measure (Beatty, Rudd, and Valencic 1999; Croucher et al. 2012; Kotowski et al. 2009; Levine et al. 2004; Suzuki and Rancer 1994). However, Bowman and Goodboy (2020) asserted the goal of CFA is not to fit a model to one's data, but to test whether a theoretically consistent measurement model fits a data set, and thus respecification is only appropriate when misfit is shown to be consistent across multiple samples. Thus, we explored only studies that used the original 20-item scales as using the original measures tests rather than those who respecified factor structures to fit their data. Future research should explore the extent to which respecification and the use of modified models has influenced our understanding of argumentativeness and verbal aggressiveness. Yet, it should be noted that among the studies reviewed in this paper, use of CFA to confirm the factor structures of the original 20-item measures was rare. As Kelly and Westerman (2020) explain, each use of a measure has an implied hypothesized factor structure and it limits our understanding of a measure to fail to confirm that factor structure within a new sample.

The primary limitation of this study was the inability to include studies in the analysis. While numerous studies have included the Argumentativeness and/or the Verbal Aggressiveness Measure, many identified studies did not include enough methodological information for analysis. Even in cases in which respecified measures were utilized for analysis, it was rare for the descriptive statistics of the original measures to be reported. Thus, we were unable to compare a large corpus of studies

due to a lack of comparable information. While there were five criteria for inclusion in this study, future research could benefit from reduced or modified inclusion criteria to even further enhance our understanding of sampling differences.

The current study provides evidence that in the case of the original verbal aggression and argumentativeness measures, adult vs. student sample type has not caused moderation of the data. This does not imply student vs. adult samples never moderate data. We invite scholars to conduct further reviews of communication measures so that as a field we may come to understand when such sampling decisions are a threat to the validity of a study.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix A. Analyzed Argumentativeness and Verbal Aggressiveness Scale Articles

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