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The Dimensionality of the Verbal Aggressiveness Scale

Timothy R. Levine, Michael J. Beatty, Sean Limon, Mark A. Hamilton, Ross Buck & Rebecca M. Chory-Assad

Infante and Wigley's (1986) Verbal Aggressiveness Scale (VAS) is a widely accepted and frequently used measure of trait verbal aggression. Although the scale is almost always scored as if it were unidimensional, previous factor analytic studies provide evidence that it is multidimensional with two distinct factors. The present studies (N = 194 and 177) used confirmatory factor analysis to replicate the two-factor solution. The two-factor model was consistent with the data, and provides a better fit to the data than the unidimensional solution. The first factor, comprised of all aggressively worded, nonreflected items, appears to measure verbal aggressiveness as intended whereas the second factor, comprised of all reverse-scored items (benevolently worded), appears to measure a communication style related to other-esteem confirmation and supportiveness. Given this interpretation, it is recommended that only the 10 aggressively worded items be scored. Hamilton, Buck, and Chory-Assad, in an adversarial collaborative discussion, agree that the VAS is bidimensional, but offer an alternative conceptual model. They hold that the two factors reflect selfish individualism and prosocial cooperation.

Keywords: Verbal aggressiveness; Measurement validation

A substantial literature on aggressive communication exists (Infante & Rancer, 1996) and much of this research uses Infante and Wigley's (1986) Verbal Aggressiveness

Timothy R. Levine (Ph.D. Michigan State University, 1992) is Professor of Communication at Michigan State University. Michael J. Beatty (Ph.D. Ohio State University, 1976) is Professor and Chair of Communication at University of Missouri, St. Louis. Sean Limon (Ph.D. Michigan State University, 2000) is Assistant Professor of Communication at Illinois State University. Mark A. Hamilton (Ph.D., Michigan State University, 1987) is Associate Professor of Communication Sciences and Psychology at the University of Connecticut. Ross Buck (Ph.D., University of Pittsburgh, 1970) is Professor of Communication Sciences and Psychology at the University of Connecticut. Rebecca M. Chory-Assad (Ph.D., Michigan State University, 2000) is an Assistant Professor of Communication Studies at West Virginia University. Correspondence to: Tim Levine, Department of Communication, Michigan State University, East Lansing, MI 48824-1212, USA. Email: levinet@msu.edu.

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Scale (VAS). Verbal aggressiveness is conceptually defined as an individual difference that predisposes some people to attack the self-concept of others (Infante & Wigley, 1986). The VAS is a 20-item Likert-type scale intended to measure trait verbal aggression. The VAS is widely accepted, and there exists at least four published validation studies of the scale (e.g., Beatty, Rudd, & Valencic, 1999; Blickle, Habasch, & Senft, 1998; Infante & Wigley, 1986; Suzuki & Rancer, 1994). Blickle et al. (1998), Infante and Wigley (1986), and Suzuki and Rancer (1994) argue for the validity of the scale. For example, Blickle et al. conclude that their "results justify considering verbal aggressiveness a personality trait and the verbal aggressiveness scale as a valid measure" (p. 287).

Virtually all previous studies score the VAS as unidimensional. That is, all 20 VAS items are typically summed or averaged to form a single verbal aggressiveness score, with a single reliability estimate. This single verbal aggressiveness score is then correlated with outcome variables of interest to estimate a single effect per outcome measure.

This typical interpretation and use, however, may be problematic because several factor analyses have found that the VAS is comprised of two factors (Beatty et al., 1999; Infante & Wigley, 1986; Suzuki & Rancer, 1994). Aggressively worded (i.e., nonreflected) items are found to load on one-factor, whereas reverse-scored (i.e., reflected or benevolently worded) items load on a second distinct factor. If the VAS is multidimensional and VAS items measure two constructs, then either each dimension should be scored separately to yield two scores, or only the 10 items measuring verbal aggression should be scored. Summing across the two factors would produce confounded measurement and specious effects.

The key issue is whether the aggressively worded and the benevolently worded items assess opposite ends of the same continuum, or whether they assess two conceptually and empirically distinct constructs. The conceptual definition of verbal aggressiveness defines only the high (i.e., aggressive) end of the continuum. What counts as nonaggressive behavior is not specified. The benevolently worded items may reflect more than a mere lack of aggression, and some of the items seem to endorse active efforts toward ego-enhancing, supportive communication. Disagreeing with an aggression item may not necessitate an endorsement of ego-supportive communication. Similarly, failing to engage in supportive communication might not imply active aggression. Consequently, the reflected items might reflect a conceptually and empirically distinct construct related to ego-supportiveness.

Previous Validation Research

Infante and Wigley (1986) reported the original four-study validation research. The first two studies factor analyzed the VAS with exploratory factor analysis (EFA). Scale reliability in both studies was $\propto = .81$. The third study involved a Cronbach and Meehl (1955) type nomological network construct validation in which the VAS was correlated with seven other self-report measures. In the final study, scores on the VAS were correlated ($r = .69$) with the summed selection ratings of six verbally

aggressive messages. Infante and Wigley concluded that their "results indicate that the scale is valid and reliable" (p. 61). Subsequent meta-analysis finds that the average scale reliability is .84 with a 90% confidence interval of .78 to .90 (Hamilton & Mineo, 2001). Whereas evidence exists for acceptable reliability, this evidence is meaningful only to the extent that the VAS is unidimensional (Shevlin, Miles, Davies, & Walker, 2000).

Infante and Wigley's (1986) reporting of the factor analysis results is unclear. For the analysis of the first data set, they report that "factor analysis and item analyses resulted in a 20-item unidimensional scale" (p. 64). The results from the second data set were reported as follows:

> A factor analysis of responses also produced results consistent with the first study; i.e., a two-factor Varimax solution was obtained with all of the items loaded on the first factor worded positively and all of the second factor items worded negatively. As in the first study, it was decided that the scale was unidimensional with a latent variable being item wording which creates a simple structure for the items. (p. 65)

Finding two orthogonal factors is consistent with the VAS having two factors, not one. Nevertheless, the VAS was treated as unidimensional in the construct validation results reported subsequently.

Suzuki and Rancer (1994) report a second validation study that included a partial replication of Infante and Wigley (1986) in both the United States and Japan. Using confirmatory factor analysis (CFA) with LISREL, they found that the VAS had two factors, and that the two-factor solution provided a much better fit to their data than a unidimensional model. Again, the aggressively worded items loaded on one factor and the benevolently worded items loaded on a second factor. The correlation between the factors was $r = -.46$. Both factors correlated significantly with selection ratings of verbally aggressive messages; aggressively worded items $r = .40$, benevolently worded items $r = -.22$, although there is reason to believe that the latter correlation is spurious.[1]

Beatty et al. (1999), noting the two-factor solutions obtained by Infante and Wigley (1986), argued for the utility of considering aggressive and benevolent tendencies as separate dimensions rather than as opposite ends of the same continuum. They proposed that the nonreflected, aggressively worded items likely measure verbal aggressiveness, whereas reverse-scored, benevolently worded items may assess tendencies to actively "engage in nurturant, supportive, confirmational behavior during interaction" (p. 12). Beatty et al. conducted exploratory factor analyses and found, consistent with previous research, that a unidimensional solution did not provide a good fit to the data, but that the two-factor solution was consistent with the data. As in previous studies, aggressively worded items loaded on one factor and benevolently worded items loaded on a second factor. They recommended that the two dimensions be scored separately.

The Present Research Strategy

As Beatty et al. (1999) note, the key conceptual and empirical issue is whether the aggressively worded and the benevolently worded items reflect opposite ends of the same continuum, or whether they assess two conceptually and empirically distinct constructs. Given the conceptual definition of verbal aggressiveness, the aggressively worded items exhibit reasonable face validity. For example, item 6 "if individuals I am trying to influence really deserve it, I attack their character" clearly reflects a verbal self-concept attack consistent with the conceptual definition of verbal aggressiveness. Some benevolently worded items, however, might be argued to reflect not only a lack of aggression, but also active efforts toward ego-boosting, worth-confirming, confidence-giving communication (e.g., item 8, "I try to make people feel good about themselves even when their ideas are stupid"). Thus, disagreeing with an aggression item may or may not entail an endorsement of a benevolently worded, reflected item and vice versa. Consequently, the benevolently worded items might reflect a mere lack of verbal aggression, or they may reflect a conceptually and empirically distinct construct related to ego-supportive communication.

Although the results of factor analyses are informative about the dimensionality of the VAS, they cannot provide a definitive answer to the question of dimensionality for two reasons. First, there are at least two circumstances in which a unidimensional scale can produce data that appears multidimensional with conventional EFAs or CFAs. If the responses to a scale form either a Guttman Simplex or second-order unidimensional model, factor analysis can produce spurious multidimensional solutions (Hunter & Boster, 1987; Levine & McCroskey, 1990). If, for example, the mean on one subscale differs substantially from the mean on the other, items that reflected different ends of the same continuum could appear as separate factors as a function of the mean difference. Or, in the case of a second-order model, subscales that compose two constructs at one level might be unidimensional at a higher level of abstraction. Second, even if these alternative models can be ruled out (i.e., if the measurement model is linear and not second-order unidimensional), a properly conducted factor analysis provides information only about the number of constructs measured and not about the substantive content of the constructs.

The solution to both of these limitations requires that data be collected on measures other than the VAS following a line of reasoning based on principles of convergent and discriminant validity (Campbell & Fiske, 1959) and parallelism (Hunter & Gerbing, 1982). The principle of convergent validity holds that items measuring the same or similar constructs will converge (i.e., be highly and positively correlated with each other). Discriminant validity holds that measures of different constructs will function differently. At least two alternative measures for at least two different constructs are required to demonstrate discriminant validity (Nunnally & Bernstein, 1994). The related issue of parallelism holds that all items measuring a single construct are expected to correlate in a similar manner with a measure of an outside construct.

Applied to the VAS, if the scale is unidimensional, both the aggressively worded items and the benevolently worded items are expected to predict verbally aggressive messages equally well (to within sampling error). The same is expected for the association between the VAS and measures of other pro- and antisocial traits. That is, both sets of VAS items will converge and produce parallel results. If such a result is obtained, and if a unidimensional model fit the data with CFA, then it would be reasonable to conclude that the VAS is a linear, unidimensional, first-order scale. If the VAS scale functions as if it were unidimensional with respect to measures of different constructs, but appears multidimensional with factor analysis, then the subscale and item means will be examined for evidence of a Guttman Simplex. If the means of the aggressively worded items differ substantially from the means of the benevolently worded items, a Guttman simplex is possible; if not, second-order unidimensionality could reasonably be considered (see Hunter & Boster, 1987; Levine & McCroskey, 1990).

If the scale is multidimensional, however, the aggressively worded and the benevolently worded items will diverge with respect to outside measures producing nonparallel results. Specifically, the aggressively worded items will predict verbally aggressive messages better than the benevolently worded items, whereas the benevolently worded items will prove to be a stronger predictor of other-confirming, supportive messages and traits (e.g., empathy and communicative responsiveness). Further, the correlations between the two subscales will be less than -1.00 when accounting for both measurement and sampling error. Such results, in combination with a CFA consistent with a two-factor model, provide strong evidence for multidimensionality.

Therefore, the research strategy reported here involves collecting responses to the VAS, multiple measures of aggressive and supportive communication, and measures of conceptually related constructs. Unidimensional and two-factor models of the VAS are tested with CFA, and subscale means are examined for indications of a Guttman Simplex. Scores on both the aggressively worded and the benevolently worded items are used to predict aggressive message selection ratings, the generation of verbally aggressive messages, the selection of nonaggressive messages, scores on a communicative responsiveness scale, and empathic concern scores. Communication responsiveness and empathic concern were included because both are conceptually linked with an actively ego-supportive communication style.

Study 1

Method

Participants and procedures

Participants were 194 (50 male, 144 female) undergraduate students enrolled in communication classes at a large Midwestern University. These students ranged in age from 18 to 50 years old ($M = 21.68$, $SD = 3.00$) and most (84.5%) were Caucasian. All participants received extra credit in their class in exchange for their participation.

Following instructions and questions, each participant was asked to complete a questionnaire during regular class time. This questionnaire contained Infante and Wigley's (1986) Verbal Aggressiveness Scale, a message generation task, short scales measuring communicative responsiveness and empathic concern, a message selection task, and demographic questions. After the questionnaires were completed the respondents were debriefed.

Measurement

Infante and Wigley's (1986) Verbal Aggressiveness Scale is a 20-item Likert-type scale that uses five-point response formats. Agreement with 10 (aggressively worded) items indicates endorsement of verbally aggressive practices, whereas the other 10 (benevolently worded) items are reverse-scored. When averaged as a 20-item unidimensional scale, scores were approximately normally distributed ($M = 2.33$, $SD = 0.56$, $\propto = .85$). The distributions of both the 10 aggressively worded items ($M = 2.32$, $SD = 0.70$, $\propto = .82$) and 10 benevolently worded items ($M = 2.33$, $SD = 0.56$, $\propto = .73$)[2] also approximated normality. The results of a paired t-test found that the means of the two subscales were not significantly different, $t(192) = 0.23$, n.s.[3] The similarity in means suggests that a Guttman Simplex Model is unlikely.

Empathic concern was measured with a five-item Likert-type scale reported in Stiff, Dillard, Somera, Kim, and Sleight (1988). The empathic concern items assess "a general concern and regard for the welfare of others" (p. 199). Five-point response formats were used in this study, and the distribution of scores approximated normality ($M = 4.25$, $SD = 0.53$, $\propto = .72$).

Communicative responsiveness (Stiff et al., 1988) was measured with four Likert-type items with five-point response formats. This scale was intended to measure people's ability to "communicate effectively to others who are experiencing distress" (p. 205). One item from the scale was omitted a priori because it referenced listening instead of actively prosocial verbal behaviors. When averaged, the distribution of scores approximated normality ($M = 3.95$, $SD = 0.60$, $\propto = .76$).

To assess verbally aggressive message generation, participants were asked to write down what they might say in response to a hypothetical situation. The situation read:

> Imagine you are taking a class this semester which requires that students work in groups and give a major group presentation in front of class. Each member must give part of the presentation, and all group members get the same grade. The presentation is worth 50% of the final grade in the class. Imagine that you and three of your classmates are members of the same group. You need a good grade, and have really worked hard on your part. The night before the presentation, you heard that one of your group members went out partying late. On the day of the presentation, everyone does well but the group member who went out partying the night before. They were not prepared, and they made several obvious mistakes. You know their presentation was poorly done, and you think the group will get a poor grade because of them. After class, what would you say to your group member who did poorly? Please write exactly what you would say, or describe how you would respond.

The written messages were independently coded by three trained coders who were unaware of the purpose of the study. Each coder rated each message for verbally aggressive content on a continuous scale ranging from 1 to 5. An average verbal aggressiveness rating was calculated. The resulting scores for coded verbal aggression were reasonably reliable and distributed normally ($M = 2.17$, $SD = 0.96$, $\propto = .89$).

Verbally aggressive and prosocial message selection ratings were obtained by having participants rate a series of potential messages in response to a second hypothetical situation. The situation read:

> Imagine that you have a computer, and that your computer stopped working. Fortunately, it was still under warranty, so you took it back to the store where you bought it for repair and they agreed to fix it for free. They originally told you it would be done in three or four days, but now more than a week and a half has passed and it's still not fixed! You have assignments due in your classes so you really need your computer back and working. Upon returning to the store for the third time in the past several days, you find that it is still not ready even though they said it would be. You are talking to the service manager. Think what you might say to him. Below are several reactions that people might have in this situation. Please rate each in terms of how likely you would be to say each.

The participants were then provided with a list of 10 messages, and asked to estimate the likelihood that they would use each on a five-point scale ranging for extremely likely to extremely unlikely. Five of the messages reflected verbally aggressive responses (e.g., "I would tell the manager that I thought they were incompetent and that their service sucked"). Ratings of the five verbally aggressive messages were averaged as a measure of verbally aggressive message selection ($M = 2.71$, $SD = 0.86$, $\propto = .78$), and the distribution approximated normality. The remaining five messages reflected nonaggressive, prosocial responses (e.g., "Even though I would be mad, I'd try to not lose my temper and would remain reasonable and pleasant"). When averaged, these rating were also distributed normally with $M = 3.02$, $SD = 0.97$, $\propto = .84$.

Results

Confirmatory factor analyses

The dimensionality of the VAS was first tested with two confirmatory factor analyses (CFA). All factor analyses were performed with Hunter and Hamilton's (1992) *CFA.BAS* program. This program provides factor loadings based on a least squares, centroid solution. Communalities were placed on the diagonal in all analyses. Predicted correlations were calculated based on the factor loadings and the model specified, and deviations between predicted and obtained correlations were computed. The magnitude of these deviations was considered in assessing model fit. The ratings of the five verbally aggressive messages were used to test parallelism.

The unidimensional model was tested first. Eleven (6.1%) statistically significant deviations at $p < .05$ were observed in the internal consistency matrix, with three (1.6%) of these deviations statistically significant at $p < .01$. The omnibus goodness

of fit was statistically significant, $\chi^2(189) = 334.29$, $p < .05$. The root mean squared error was .072 and three deviations exceeded .20. Four (4.0%) statistically significant deviations at $p < .05$ were observed in the parallelism matrix, with two (2.0%) of these deviations statistically significant at $p < .01$. Two deviations were .20. The root mean squared error was .120. These results suggest that the fit of the unidimensional model is acceptable in these data.

Next, a two-factor model was specified where all reflected items loaded on one factor, and the positively worded items loaded on a second factor. For this model only two (2.5%) statistically significant deviations were observed at $p < .05$ in the internal consistency matrix. One (1.3%) of these deviations was statistically significant at $p < .01$. The omnibus goodness of fit indicated that the data did not differ significantly from the predicted model, $\chi^2(44) = 54.35$, n.s. The root mean squared error was .059, and no errors were larger than .20. In the test of parallelism no statistically significant deviations (out of 50) were observed for the factor containing the 10 aggressively worded items (root mean squared error = .057). For the factor containing the 10 benevolently worded items, four (8.0%) statistically significant deviations at $p < .05$ were observed in the parallelism matrix, with one (2.0%) of these deviations statistically significant at $p < .01$ (root mean squared error = .068). These results can be interpreted as providing a reasonable fit to the two-factor model. Thus, although the results of the CFAs are not definitive, the data appear to fit the two-factor model slightly better than unidimensional model. Nevertheless, the differences might be attributable to sampling error.

Construct validity analyses

As additional tests of dimensionality and construct validity, the VAS was scored both as a 20-item unidimensional scale and as two separate scales, one consisting of the 10 nonreflected items and the other containing the 10 reflected items. The scores on each of these three scales were correlated with each of the outcome measures. These correlations are reported in Table 1.

As can be seen in Table 1, when considering the zero-order correlations each of the three scoring methods produce approximately parallel results. In each case, scores are significantly and positively correlated with verbally aggressive message selection and generation and significantly and negatively correlated with communicative responsiveness, empathic concern, and prosocial message selection. Although these results are consistent with unidimensionality, an examination of the subscales with regression analysis yielded a different pattern of results.

Because the subscales containing reflected and nonreflected items were substantially correlated ($r = .56$), the zero-order correlations for the VAS subscales with the outcome measures may be misleading. If the VAS were bidimensional, then the aggressively worded items will predict aggression-related outcomes more strongly than the benevolently worded items, whereas the benevolently worded items will predict prosocial outcomes more than the aggressively worded items. Alternatively, if the benevolently worded items are less reliable indicators of the same construct, it

Table 1 Zero-Order Correlations and Standardized Regression Coefficients for the Association between Verbal Aggressiveness and the Outcome Measures in Study 1

	Verbal aggressiveness				
	20-item total	Aggressive items		Benevolent items	
Outcome measure	*r*	*r*	*β*	*r*	*β*
Coded VA messages	.32*	.30*	.23*	.26*	.13
Selected VA messages	.54*	.54*	.46*$_a$	.40*	.14$_a$
Prosocial messages	−.51*	−.42*	−.22	−.48*	−.36*
Comunicative responsiveness	−.21*	−.18*	−.11	−.19*	−.13
Empathic concern	−.41*	−.37*	−.25*	−.36*	−.21*

Note: * denotes a statistically significant result at $p < .05$. *df* for all tests are between 185 and 191.Regression coefficients with the same subscript are different at $p < .05$, two-tailed. The correlation between the 10 nonreflected items and the 10 reflected items is $r(191) = .56$. All benevolent items were reflected so that low scores reflect more prosocial responses.

is expected that the aggressively worded items will be the stronger predictor of all outside variables regardless of content.

To test this reasoning, scores on each outcome measure were regressed onto both subscales. When controlling for scores on the benevolently worded items, the aggressively worded items statistically significantly predicted coded verbal aggressiveness, $\beta = .23$, $t(187) = 2.70$, $p < .05$, verbally aggressive message selection, $\beta = .46$, $t(185) = 6.17$, $p < .05$, prosocial message selection, $\beta = -.22$, $t(185) = -2.88$, $p < .05$, and empathic concern, $\beta = -.25$, $t(191) = -3.16$, $p < .05$, but not communicative responsiveness, $\beta = -.11$, $t(190) = 1.26$, $p = .20$. The benevolently worded items statistically significantly predicted prosocial message selection, $\beta = -.36$, $t(185) = -4.72$, $p < .05$, empathic concern, $\beta = -.22$, $t(191) = -2.72$, $p < .05$, but not verbally aggressive message selection, $\beta = .14$, $t(185) = 1.90$, $p = .06$, coded verbal aggressiveness, $\beta = .13$, $t(187) = 1.53$, n.s., or communicative responsiveness, $\beta = -.13$, $t(190) = -1.49$, $p < .14$. The unstandardized regression coefficients were tested for statistically significant differences in magnitude. The slopes for verbally aggression message selection were different, $t(182) = 2.33$, two-tailed. All other differences, while in the predicted direction, are explainable in terms of sampling error. The results of the regression analyses are also summarized in Table 1. A full correlation matrix is presented in Table 2.

Discussion

The results of Study 1 provide some evidence consistent with the speculation that Infante and Wigley's (1986) Verbal Aggressiveness Scale is multidimensional and assesses two empirically distinct constructs. The evidence generated for this claim is as follows. First, consistent with previous research (Beatty et al., 1999; Infante & Wigley, 1986; Suzuki & Rancer, 1994), the results of CFAs suggest that a two-factor

Table 2 Zero-Order Correlations among all Measures in Study 1

	1	2	3	4	5	6	7
1. 20-item total	—						
2. Aggressive items	.91*	—					
3. Benevolent items	.85*	.56*	—				
4. Coded VA messages	.32*	.30*	.26*	—			
5. Selected VA messages	.54*	.54*	.40*	.36*	—		
6. Prosocial messages	− .51*	− .42*	− .48*	− .27*	− .64*	—	
7. Communicative responsiveness	− .21*	− .18*	− .19*	.12	− .15*	.24*	—
8. Empathic concern	− .41*	− .37*	− .36*	− .25*	− .24*	.16*	.25*

Note: * denotes a statistically significant result at $p < .05$. *df* for all tests are between 185 and 191.

solution provides a closer fit with the data than a unidimensional solution. Second, the correlation between the 10 aggressively worded items and the 10 benevolently worded items, although substantial ($r = .56$), is well below 1.00 even when considering sampling error and measurement error. If both sets of items measured the same construct, a larger correlation would be anticipated. Third, removing the 10 benevolently worded items has a less detrimental effect on scale reliability (dropping only .03 from .85 to .82) than would be expected by Spearman-Brown. If the 10 benevolently worded items were equally strong items, dropping 10 items would produce $\propto = .74$. Finally, a subtle but consistent pattern in associations with outside variables was observed. The 10 aggressively worded items correlate with verbally aggressive message selection and generation as highly as the 20-item total. The benevolently worded items were not statistically significant predictors of verbally aggressive message selection and generation when controlling for scores on the positive items. Alternatively, the benevolently worded items appeared to predict nonaggressive and prosocial communication better than the aggressively worded items. However, all but one of these apparent differences can be attributed to sampling error.

Although the data seem more consistent with the two-dimensional model than with the unidimensional model, these data are far from definitive. For example, whereas the data were consistent with the two-factor model, a unidimensional model with some bad items cannot be discounted. Further, it is doubtful that the fit of the two-factor model would be significantly better than that of the unidimensional model. Finally, whereas the results of the regression analysis are suggestive of two dimensions, the zero-order correlations are parallel and consistent with unidimensionality, and only one of five slopes was statistically significantly different. Therefore, a second study was conducted on the grounds that additional data might yield less ambiguus results.

Study 2

Method

Participants and procedures

The participants in Study 2 were 177 (60 male, 115 female, 2 who did not respond to this item) undergraduate students enrolled in communication classes at the same large Midwestern University. These students ranged in age from 17 to 24 years old ($M = 19.34$, $SD = 1.28$) and most (75.1%) were Caucasian. All participants received extra credit in their class in exchange for their participation.

Following instructions and questions, each participant was asked to complete a questionnaire during regular class time. This questionnaire contained Infante and Wigley's (1986) Verbal Aggressiveness Scale, scales measuring perspective taking, empathic concern, obsessive relational intrusion (ORI), narcissism, two message selection tasks, and demographic questions. Perspective taking was included because it was expected to be related to an actively ego-supportive communication style, and narcissism and obsessive relational intrusiveness are expected to be associated with verbal aggressiveness. After the questionnaires were completed the respondents were debriefed.

Measurement

As in Study 1, participants completed Infante and Wigley's (1986) Verbal Aggressiveness Scale. When scored as a 20-item unidimensional scale, scores were normally distributed ($M = 2.53$, $SD = 0.58$, $\propto = .84$). The distributions of both the 10 aggressively worded items ($M = 2.53$, $SD = 0.77$, $\propto = .82$) and 10 benevolently worded items ($M = 2.52$, $SD = 0.61$, $\propto = .74$) also approximated normality. The means of the two subscales were not statistically significantly different, $t(176) = 0.26$, n.s. The similarity in means again suggests that a Guttman Simplex Model is inconsistent with the data.

Empathic concern was measured with a six-item, seven-point Likert-type scale adapted from Stiff et al. (1988). The distribution of scores approximated normality ($M = 5.54$, $SD = 1.02$, $\propto = .82$).

Perspective taking was assessed with a six-item, seven-point Likert scale modified from Stiff et al. (1988). All items were intended to measure the ability to adopt others' viewpoints. Responses were averaged to yield a total score with higher scores reflecting greater empathy. The distribution of the scale average approximated normality ($M = 4.88$, $SD = 1.12$, $\propto = .87$).

Narcissism was assessed with an eight-item, seven-point Likert-type measure that was constructed for use in another study. As with the other measures, responses were averaged to yield a total score with higher scores reflecting greater narcissism. Measurement analysis indicated that the items clustered onto two dimensions. Three items measured grandiosity ($M = 3.24$, $SD = 1.49$, $\propto = .83$), and five items measured exhibitionism ($M = 4.24$, $SD = 1.29$, $\propto = .82$).

Obsessive relational intrusion (ORI) acceptability was assessed with a 28-item, seven-point Likert-type measure adapted from Cupach and Spitzberg (1998). Re-

sponses were averaged to yield a total score ($M = 2.92$, $SD = 0.94$, $\propto = .93$). Higher scores reflected higher ratings of acceptability of ORI behaviors. Overtly threatening and aggressive behaviors were omitted because this scale was intended to measure a construct distinct from aggression.

To assess verbally aggressive and ego supportive message selection, participants were asked to read two message generation situations. The first situation was the message generation situation used in study one. The second read:

> Imagine that while on a trip to the library you happen to find a parking spot in the parking lot behind the library. You notice that a sign above the space reads, "Reserved for MSU vehicles only: Mon–Fri 7 a.m. to 6 p.m." It being a Friday evening after 6 p.m. you do not think much of the sign and figure it is okay to park your car there and go into the library. Later, upon returning to your car you notice a parking ticket on your windshield. Since you figure it must have been placed there by mistake, you decide to appeal the ticket. On Monday, you go to the police station. Although you explain the situation, the clerk at the parking violation desk repeatedly asks you to provide evidence of the situation as you explain it. At that point you leave the police station and return to the spot you received the parking ticket at and take a Polaroid of the sign for evidence. After this you return to the police station and find yourself lucky enough to speak to the same clerk as before. You show the clerk the picture and explain your situation again. The clerk responds by saying that you still must pay the $15.00 since there is no way to know whether or not the picture you took is of the spot you were parked in.
>
> What would you say in response? *(Please read each statement and using the scale provided indicate how likely you would be to use the statement as a response.)*

Verbally aggressive message selection ratings were obtained by having participants rate seven potential messages (four in the first situation and three in the second situation) for likelihood of use on a five-point scale (e.g., "You are only a clerk so this must be hard for you to understand. It appears you are too incompetent to figure this out for yourself so I want to speak with someone who can; perhaps your supervisor."). After two messages were dropped for failing to contribute to scale reliability the responses were averaged ($M = 1.84$, $SD = 0.91$, $\propto = .80$) as a measure of verbally aggressive message selection.

Participants also rated six (three in each situation) nonaggressive, prosocial responses (e.g., "I understand where you are coming from, what you are saying is reasonable. You must hear things like this every day, but the ticket really is an error."). The three items in the first situation were dropped for a lack of internal inconsistency. The remaining items were averaged ($M = 2.07$, $SD = 0.91$, $\propto = .69$).

Results

Confirmatory factor analyses

The unidimensional model was tested first. Twenty-four (13%) statistically significant deviations at $p < .05$ were observed in the internal consistency matrix, with nine (5%) of these deviations statistically significant at $p < .01$. Statistically significant deviations were distributed across 19 of 20 items. Seven deviations were

greater than .20 and two were .30 or larger. The root mean squared error was .093. These results suggest that the fit of the unidimensional model is unacceptable.

As in Study 1 a two-factor model was specified in which all benevolently worded items were specified on one factor, and the aggressively worded items were specified on a second factor. In the internal consistency matrix for aggressively worded items, only two (5%) statistically significant deviations were observed at $p < .05$ (one deviation at $p < .01$). All deviations were less than .20 with a root mean squared error of .066. For the benevolently worded items the test of internal consistency yielded four statistically significant deviations (10%), with one deviation statistically significant at $p < .01$ and one deviation larger than .20 (root mean squared error = .073). Three of the four deviations (including the largest), however, were attributable to a single item (no. 17). These data replicate the previous findings, and suggest that the two-factor solution provides a better fit than the unidimensional solution.

To test parallelism, the data were examined for comparison items. Three verbally aggressive message ratings ($\propto = .78$) and three empathic concern items ($\propto = .77$) were chosen. A CFA testing a two-factor solution for these six items indicated a close fit with no deviation greater than .05. Items in the full 20-item VAS were parallel with respect to the three message selection ratings with only a single statistically significant deviation (1.6%; root mean squared error = .068). The 20 VAS items, however, were not parallel with respect to the three empathic concern items. Fourteen of 60 (23.3%) deviations were statistically significant at $p < .05$, with six (10%) statistically significant at $p < .01$ and greater than or equal to .20 in magnitude (root mean squared error = .117). With the VAS specified as two factors, the aggressively worded items were parallel with both message ratings (two small deviations, 7%, at $p < .05$; root mean squared error = .078) and the empathic concern items (one large deviation, 3%, at $p < .01$; root mean squared error = .092). The benevolently worded items were also parallel with both message ratings (one small deviation, 3%, at $p < .05$; root mean squared error = .060) and the empathic concern items (two small deviations, 7%, at $p < .01$; root mean squared error = .083). Across the four tests the frequency of statistically significant deviations did not exceed that expected by chance. Therefore, these results suggest that the VAS items function as two dimensions in the current data.

Construct validity analyses

As in Study 1, the VAS was scored both as a 20-item unidimensional scale and as two separate scales, one consisting of the 10 aggressively worded items and the other containing the 10 benevolently worded items. The scores on each of these three scales were correlated with each of the outcome measures. These correlations are reported in Table 3.

As can be seen in Table 3, when considering the zero-order correlations each of the three scoring methods produce less parallel results than those observed in Study 1. Specifically, there is a clear trend for the aggressively worded items to correlate more highly with antisocial measures (verbal aggressive message ratings, ORI,

Table 3 Zero-Order Correlations and Standardized Regression Coefficients for the Association between Verbal Aggressiveness and the Outcome Measures in Study 2

	Verbal aggressiveness				
	20-item total	Aggressive items		Benevolent items	
Outcome measure	*r*	*r*	∃	*r*	∃
VA messages	.51*	.50*	.42*	.37*	.17*
Prosocial messages	−.09	−.03	.04	−.14	−.16
Obsessive relational intrusion	.21*	.23*	.23*	.11	.01
Empathic concern	−.34*	−.19*	$.01_a$	−.43*	$-.44_a$*
Perspective taking	−.38*	−.27*	$-.11_b$	−.40*	$-.35_b$*
Exhibitionism	.36*	.41*	$.40_c$*	.20*	$.02_c$
Grandiosity	.39*	.43*	$.43_d$*	.20*	$.01_d$

Note: * denotes a statistically significant result at $p < .05$. *df* for all tests are between 173 and 175. Regression coefficients with the same subscript are different at $p < .05$, two-tailed. The correlation between the 10 aggressively worded items and the 10 benevolently worded items is $r(175) = .46$. All benevolent items were reflected so that low scores reflect more prosocial responses.

exhibitionism, and grandiosity) and for the benevolently worded items to correlate more strongly with the prosocial traits of empathic concern and perspective taking. Once again, because the subscales containing reflected and nonreflected items were substantially correlated ($r = .46$), the zero-order correlations for the VAS subscales with the outcome measures may be misleading. Specifically, some of the zero-order correlations might be spurious. Therefore, scores on each outcome measure were regressed onto both subscales. In the resulting regression analyses, the trend reported above was exacerbated. The unstandardized regression coefficients were examined for statistically significant differences in strength of association. As anticipated, the aggressively worded items were stronger predictors of exhibitionism, $t(172) = 3.02$, and grandiosity, $t(172) = 3.46$, than the benevolently worded items. Alternatively, the benevolently worded items were stronger predictors of empathic concern, $t(172) = 3.02$, and perspective taking, $t(172) = 3.46$, than the benevolently worded items. Although the differences were in the anticipated direction, the differences for aggressive message selection, $t(172) = 1.70$, prosocial message selection, $t(172) = 1.75$, and ORI, $t(172) = 1.69$ were not statistically significant at $p < .05$ (two-tailed). These results are also summarized in Table 3. A full correlation matrix is presented in Table 4.

General Discussion

This paper examined the dimensionality of Infante and Wigley's (1986) Verbal Aggressiveness Scale. Although most previous research uses the scale as if it were unidimensional, the results of previous validation studies suggest that the scale might be multidimensional. Specifically, aggressively worded items have been shown to load on one factor, whereas reflected, benevolently worded items have been found to load

Table 4 Zero-order Correlations among all Measures in Study 2

	1	2	3	4	5	6	7	8	9
1. 20-item total	—								
2. Aggressive items	.89*	—							
3. Benevolent items	.81*	.46*	—						
4. VA messages	.51*	.50*	.37*	—					
5. Prosocial messages	−.09	−.03	−.14	−.03	—				
6. Obsessive relational intrusion	.21*	.23*	.11	.12	.02	—			
7. Empathic concern	−.34*	−.19*	−.43*	−.29*	.10	−.15	—		
8. Perspective taking	−.38*	−.27*	−.40*	−.19*	.09	−.11	.43*	—	
9. Exhibitionism	.36*	.41*	.20*	.15	.04	.30*	−.15*	−.03	—
10. Grandiosity	.39*	.43*	.20*	.17*	−.10	.28*	−.26*	−.08	.56*

Note: * denotes a statistically significant result at $p < .05$. *df* for all tests are between 173 and 175.

on a second dimension (Beatty et al., 1999; Infante & Wigley, 1986; Suzuki & Rancer, 1994).

The key issue is whether the aggressively worded and the benevolently worded items assess opposite ends of the same continuum, or whether they assess two conceptually and empirically distinct constructs (Beatty et al., 1999). That is, it is plausible that some of the benevolently worded items measure more than a lack of aggression. Instead, they appear to assess endorsement of active efforts toward supportive, ego-enhancing communication. Disagreeing with an aggression item may not necessitate an endorsement of ego-supportive communication. Similarly, failing to engage in supportive communication might not mean that the person is actively aggressive. Consequently, some of the reflected items might reflect a conceptually and empirically distinct construct related to ego-supportiveness.

These data replicate previous factor analytic evidence showing the existence of two factors. The unidimensional model provided an acceptable fit with data in Study 1, but not in Study 2. Alternatively, consistent with previous studies, the two-factor model provided a close fit to the data in both data sets. Thus, given the superior fit of the two-factor model, the consistency with the findings of previous studies, and the conceptual reasons for expecting a second factor, accepting the two-factor solution seems reasonable.

The results of this study provide strong evidence that the two-factor solution is not a function of mean differences in the endorsement of reflected and nonreflected items stemming from a Guttman Simplex. In these data, the means of the two subscales were nearly identical in both studies. Therefore, mean differences cannot account for the finding of two factors. Similar findings are reported by Beatty et al. (1999) and the original Infante and Wigley (1986) study.

Given the failures of the linear, first-order, unidimensional model and Guttman Simplex Model, the VAS is most likely either multidimensional, unidimensional with several bad items, or second-order unidimensional. Given that the two subscales were highly correlated ($r = .56$ and .46 in studies 1 and 2 respectively), second-order unidimensionality is possible. To test this possibility scores on the VAS total and the two subscales were correlated with several outcome measures. When looking at the zero-order correlations, the three scoring methods produce parallel results consistent

with a second-order model in Study 1. Regression analyses in Study 1 and the results of Study 2, however, suggest that the aggressively worded items predict aggressive communication, and the reflected, benevolently worded items predict prosocial communication. Thus, overall the results are more consistent with a two-factor model.

The evidence for the two-factor interpretation over a unidimensional model can be summarized as follows. First, there are good conceptual reasons to expect two factors. It makes good sense that being trait nonaggressive is conceptually distinct from being actively ego-supportive toward others. Second, the correlations between the 10 aggressively worded items and the 10 benevolently worded items are $-.56$ and $-.46$ in our two studies respectively. Suzuki and Rancer (1994) report $r = -.46$. If corrected for attenuation, these correlations are consistently and substantially below the -1.00 expected if the two were valid measures of the same thing. Third, in both data sets and in several previous studies, the two-dimension solution fit better than the unidimensional solution, although perhaps not statistically significantly so. Fourth, the data suggest that reducing the number of items by 50% results in little reliability loss (much less than predicted by Spearman-Brown) and little loss in the prediction of antisocial behaviors and traits. Finally, the two dimensions are not parallel with outside prosocial measures in Study 2.

Thus, current findings provide the strongest evidence to date for bidimensionality. Simply put, only 10 items appear to measure verbal aggressiveness. Based on these results, it is recommended that researchers refrain from summing or averaging all 20 VAS items to obtain a single verbal aggressiveness score. Little is gained in either reliability or predictive utility, and there is a risk of invalid measurement. Instead, verbal aggressiveness scores can be calculated from the 10 aggressively worded, nonreflected items only.

The reflected, benevolently worded items seem to measure a prosocial, supportive, confirming communication style that is qualitatively different from mere nonaggression. It is recommended, however, that the second factor (i.e., the 10 reflected, benevolently worded items) not be scored. These items were not intended to measure an ego-confirming communication style, and it is suspected that a stronger measure of this construct is possible.

Whereas reducing the scale to 10 aggressively worded items is recommended, the current evidence suggests that the negative consequences of scoring all 20 items as a unidimensional scale are minimal. Scores from the 10-item aggressively worded items and the full 20-item VAS correlate similarly with the measures of other antisocial constructs, and the scoring method would not dramatically alter substantive conclusions. Some differences, however, were observed in the relationship between verbal aggression and measures of prosocial constructs (e.g., empathy). The data suggest that scoring the VAS as the full 20-item scale, relative to the reduced 10-item scoring, slightly to moderately inflates the observed negative correlations between verbal aggression and prosocial constructs. Thus, the current results do not provide a serious indictment of most previous studies scoring the VAS as a 20-item unidimensional scale.

An alternative possibility worthy of consideration is that the VAS is unidimensional with some bad items, and that if these problematic items are discarded, then the scale would be unidimensional. Published work exists showing a reasonable fit for a unidimensional model after several items are deleted (e.g., Boster & Levine, 1988; Boster, Levine, & Kazoleas, 1993). For example, Boster et al. (1993) reported data consistent with unidimensionality after discarding nine items. These studies, however, do not report tests of the two-factor alternative, and it is plausible that those bad items might form a second factor. Further, if the scale is considered unidimensional with bad items, then every time new data are collected, effort must be expended rooting out the bad items. Alternatively, under the two-factor solution, the data suggest a more consistent fit.

It can be reasonably argued that the two-factor model and the unidimensional-with-bad-items model are not necessarily inconsistent. This argument and data are consistent with a unidimensional solution with bad items so long as the reflected, benevolently worded items (i.e., items on the second factor) are the discarded items. In fact, a 10 all-nonreflected item (i.e., aggressively worded) scale works consistently, does not require additional refinement, is more efficient due to 50% fewer items, and results in little loss of reliability or predictive power. So, it seems little is lost from scoring only the 10 aggressively worded items. What is gained is efficiency and foreknowledge of item quality.

One interesting finding was that the VAS predicted verbally aggressive message selection better than verbally aggressive message generation in Study 1. One possible explanation for this finding is a method variance artifact. An alternative explanation is that selection ratings provide a stronger measure of message use than the generation method. In any case, either observing and coding actual aggressive behavior or a full multitrait–multimethod matix validation study (Campbell & Fiske, 1959) may be needed to adequately test the construct validity of the VAS.

Future research may also want to consider if further conceptual and measurement refinement of the verbal aggression construct would be desirable. For example, perhaps defining verbal aggression as self-concept attacks is too limiting. A new conceptual definition covering a wider range of verbally aggressive behaviors (e.g., threats) may be needed. Additional items reflecting a new conceptualization could be written and evaluated.

A limitation in the current design involved the wording of the prosocial message selection items. These items were worded so as to reflect polite, nonaggressive message choices. But, the wording of these messages may not have fully captured an actively supportive and nurturing communication style. Had the wording been more actively supportive rather than merely nonaggressive, the current results might have been stronger. Future researchers might provide participants with three sets of messages: verbally aggressive messages, nonaggressive messages, and actively supportive messages.

Hamilton, Buck, and Chory-Assad Commentary

In this article Levine, Beatty, and Limon provide compelling evidence that the 20-item Verbal Aggressiveness Scale (VAS) by Infante and Wigley (1986) should be broken into two scales—an aggressiveness measure and a benevolence measure. After reanalyzing Levine et al.'s data plus additional data (Mineo & Hamilton, 1999), we concur with the conclusion that the VAS has two conceptually and empirically distinct factors. Levine et al. suggest that a better measure of verbal aggressiveness can and should be devised. We agree, but see value in working with the existing scales and interpreting past research using those scales as researchers seek to refine measures of verbal aggressiveness.

Selfish Individualism and Prosocial Cooperation

Examination of the content of the aggressiveness and benevolence items indicates that they reflect selfish individualism and prosocial cooperation, respectively. Rather than ignore the benevolence items, researchers could use the two scales to measure general predispositions to communicate that predict communicative behavior. Our analysis indicates that the benevolence items can be summed to measure verbal cooperativeness, a prosocial characteristic that has predictive validity in its own right.

The two dimensions of the VAS can be conceptualized such that verbal aggressiveness is a function of negative/selfish affect systems and verbal cooperativeness is a function of positive/prosocial affect systems, both of which are related to specific neurochemical systems in the brain. These distinct and dissociable systems can operate independently, but typically exert considerable influence on one another (Buck, 1999, 2002). Analysis based on Belief Systems Theory (Hamilton & Mineo, 1996, 1999, 2001; Rokeach, 1954, 1956, 1960, 1968) and Developmental-Interactionist Theory (Buck, 1988; Buck & Van Lear, 2002) shows that researchers will benefit from scoring the verbal cooperativeness measure. Self-concept and generalized beliefs about others laden with positive/prosocial affect are expected to be antecedents to verbal cooperativeness. In turn, self-concept and generalized beliefs about others laden with selfish-individualistic affect are expected to be antecedent to verbal aggressiveness and competitive message behavior.

Physiological Structures as Substrates for Selfish and Prosocial Emotions

Developmental-Interactionist Theory views behavior as a function of an interaction between rational-cognitive processing and emotional-cognitive processing, which occurs in a developmental context (Buck, 1988; Buck & VanLear, 2002). Rational cognitive processing is analytic, logical, serial, and abstract, and it is similar to central processing (Petty & Cacioppo, 1986) or systematic processing (Chaiken, 1980) in persuasion. In contrast, emotional cognitive processing is holistic, associational, image-oriented, and self-evidently valid (Epstein, Lipson, Holstein, & Huh, 1992).

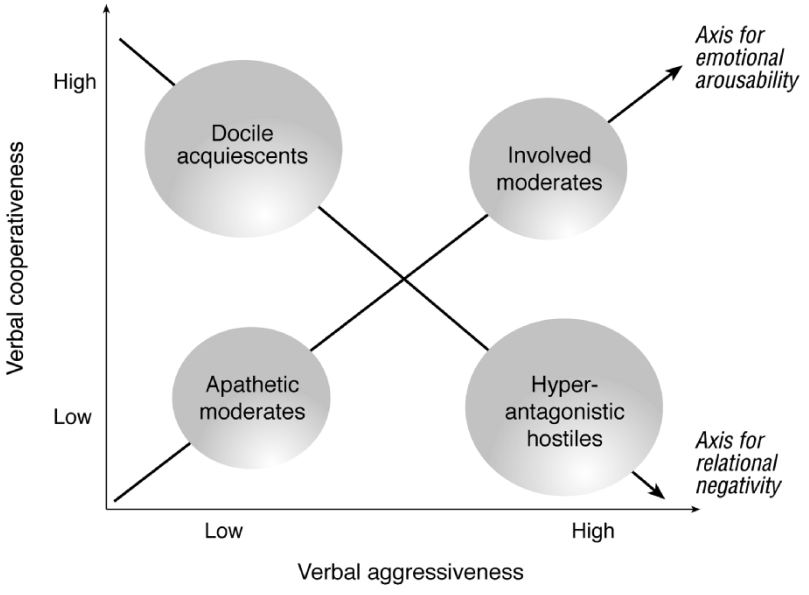

Figure 1 Typography of Emotional Style.

Emotional cognitive processing is seen as based upon the arousal and arousability of specific neurochemical systems in the brain.

Neurological studies of emotion have long suggested a distinction between selfish-individualistic and prosocial-cooperative systems. In his triune theory of the brain, MacLean (1973, 1993) distinguished two sorts of emotion circuits at the level of the limbic system: one associated with self-protection, and the other involving social and sexual behaviors, associated with species preservation. An abundance of converging evidence supports the concept of individualistic primary affects such as happiness, sadness, fear, anger, and disgust. More recent evidence has identified specific neurochemical systems—the chemical transmitter and receptor systems used by neurons to communicate—with prosocial biological emotions. Studies have demonstrated that a variety of specific neurochemical systems, involving for example the endorphins, oxytocin, vasopressin, and gonadotropin-releasing hormone, are associated with specific attachment mechanisms involving play, nurturance, protection, and sex (see Buck, 1999; Panksepp, 1998 for reviews; Panksepp & Burgdorf, 2003; Young & Insel, 2002; Young, Lim, Gingrich, & Insel, 2001).

Disentangling the negative/competitive and positive/cooperative tendencies in the VAS scores is accomplished by treating the VAS as bidimensional. By doing so a four-group typology of emotional style emerges. This typology reflects the two latent dimensions shown in Figure 1. The relational negativity dimension was the one the VAS was intended to tap. Those who are high on the relational negativity dimension (low cooperation, high competition) might be called *hyper-antagonistic hostiles*. Those who are low on the relational negativity dimension (high cooperation, low competition) might be called *docile acquiescents*. In principle, the emotional arousability dimension would be orthogonal to the relational negativity dimension. Those

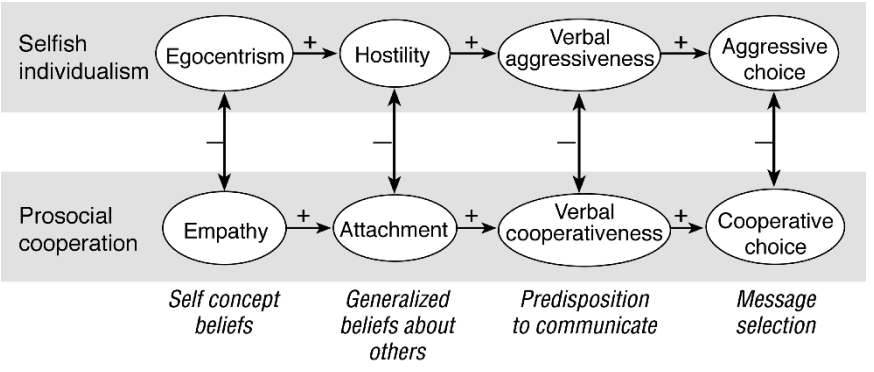

Figure 2 Proposed Causal Model

who are low on both dimensions (low cooperation, low competition) might be called *apathetic moderates*, whereas those who are high on both dimensions (high cooperation, high competition) might be called *involved moderates*. If researchers were to collapse across the two dimensions within the VAS to obtain a combined score, the apathetic moderates and the involved moderates would be indistinguishable.

Belief Systems Theory and the Predisposition to Communicate

Belief Systems Theory (BST) proposes that personality traits related to the self-concept are antecedent to generalized beliefs about others such as hostility and anxiety or attachment and caring (Hamilton & Mineo, 1999). Within the progression model of BST, cognitive competencies influence self-concept beliefs, and self-concept beliefs influence generalized beliefs about other people. In turn, generalized other beliefs affect the predisposition to communicate, and that predisposition has a strong impact on message behavior. The emotional arousability variable shown in Figure 1 may be associated with impulsivity. BST proposes that reflectiveness, the opposite of impulsiveness, increases reality testing. Operating within the progression model of BST, impulsiveness is expected to increase egocentrism and decrease empathy.

The self-concept operates in the person's social environment as shown in Figure 2, where self-worth facilitates reality testing. That is, self-worth is expected to lead to greater effort to map reality onto knowledge structures that represent the external world. The selfish emotions operate in systems that tie negative affect variables together in a causal chain of individualism. In parallel, the prosocial emotions operate in systems that tie positive affect variables together in a causal chain of cooperation. Figure 2 shows these two systems as causal chains in a proposed model.

Belief Systems Theory (BST) and Developmental-Interactionist Theory (DIT) were used to construct the causal model in Figure 2. The model identifies the tension between egocentrism and empathy as exerting opposing effects on the selfish individual and prosocial cooperative systems as the person compares the goodness of fit of knowledge structures against external reality. If egocentrism diminishes empathy, this would mean that selfish individualism would dominate prosocial

cooperation. If empathy diminishes egocentrism, the result is prosocial cooperation dominating selfish individualism. The system that dominates will influence the extent to which a person is negativistic or optimistic. Relational negativism takes hold when the aggressive-individualistic affect system suppresses the prosocial-cooperative affect system (see Figure 2). Conversely, relational optimism prevails when the prosocial-cooperative affect system suppresses the aggressive-individualistic affect system.

Egocentrism should act as the lead variable in the individualism chain that drives the negative-selfish emotions, as depicted in Figure 2. Egocentrism also serves as a disincentive to understand the feelings and thoughts of others, decreasing empathy. Paralleling the role of egocentrism in the individualism chain, empathy would be the lead variable in the cooperation chain (see Figure 2). That is, empathy is a key developmental variable because it may serve to inhibit negative-competitive affect and enhance positive-prosocial affect toward others (Boone & Buck, 2003). During interaction, empathy is expected to hinder the sequence from hostility to verbal aggressiveness to aggressive messages as it furthers the sequence from attachment to verbal cooperativeness to cooperative messages.

Although the VAS was not specifically designed to reflect the functioning of the emotion-laden systems we have described in Figure 2, the items do situate the respondent in antagonistic relationships with another person (e.g., "When people do things which are mean or cruel" and "When individuals insult me"), and in effect give the participant an opportunity either to compete with the other, or to cooperate. Researchers can gain conceptual clarity by recognizing that cooperation and competition are not necessarily opposites. That is, cooperation does not exclude competition, and a lack of cooperation does not imply competition (Boone & Buck, 2003). Analogous statements are true of competition.

Conclusion

This paper examined the dimensionality of the verbal aggressive scale. The data were most consistent with a linear, multidimensional, two-factor model of the VAS. Levine, Beatty, and Limon contend that the first factor, comprised of all the aggressively worded (nonreflected) items, appears to measure verbal aggressiveness as intended. This factor predicted self-reported verbal aggression reasonably well. The second factor, comprised of all benevolently worded (reflected) items, seems to measure a communication style related to other-esteem confirmation and supportiveness. Therefore, only one-half of the items in the Verbal Aggressiveness Scale actually measure verbal aggression. Hamilton, Buck, and Chory-Assad agree that the VAS is bidimensional, and suggest that the scales reflect emotion subsystems that might be labeled selfish individualism and prosocial cooperation. Both sets of authors agree that future research can either score the factors separately or only score the 10 aggressively worded items to avoid invalid measurement.

Editor's Note

This article exemplifies adversarial collaboration. Professor Hamilton reviewed the Professor Levine et al. manuscript. Because Hamilton et al. and Levine et al. initially disagreed about the interpretation of the data, and because it appeared possible that that disagreement could be managed by an extended discussion between the participants in the disagreement, both parties were asked if they would be willing to engage in adversarial collaboration. Both parties agreed, their identities were made known to each other, and they set out to work on the joint venture. Substantial common ground was found, but some disagreements remain. Professor Hamilton found the manuscript acceptable. He and Professor Buck then contributed some reanalysis and comment. The portions of the manuscript attributed to Hamilton and Buck are marked clearly, and do not necessarily express the views of Levine et al.

Notes

[1] Given that the two dimensions were substantially correlated ($-.46$), and that the nonreflected aggressively worded items correlated more highly (.40) with the aggressive messages than the reflected, benevolently worded items ($-.22$), the negative correlation between the benevolently worded items and verbally aggressive messages is possibly spurious. To illustrate, the partial correlation between the aggressively worded items and aggressive messages controlling for the benevolently worded items is .35, whereas the partial correlation between the benevolently worded items and aggressive messages controlling for the aggressively worded items is $-.04$.

[2] Although averaging the 10 aggressively worded items produced a score that is less reliable then the 20-item total, applying Spearman-Brown, it can be shown that the decline in reliability is less than would be expected given the reduction in the number of items. Given a 20-item scale with $\propto = .854$ and all items of equal strength, $\propto = .745$ is expected if the scale was cut to 10 items. Calculated differently, given that the 10 aggressively worded items yielded a reliability estimate of $\propto = .819$, a reliability of $\propto = .90$ would be expected if the number of items were doubled. Similar observations were reported in Beatty et al. (1999).

[3] The scores on the 10 benevolently worded (reflected items) were reflected before they were averaged. Thus, lower scores on the reflected item subscale reflect endorsement of supportive, confirming communication.

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