The Newly Developed Competitiveness Orientation Measure: Psychometric Development and Evaluation

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A thesis presented to Lakehead University in partial fulfilment of the requirements for the degree of Master of Arts in Clinical Psychology,

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This research was supported in part by scholarships awarded by the Social Sciences and Humanities Research Council of Canada and the Ontario Graduate Scholarship program.

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Abstract

The concept of competitiveness as a personality trait has been alluded to for over 70 years; yet, it has surprisingly been largely neglected as an individual differences variable. Instead, researchers have focused on the application of competitiveness to more context-specific environments, such as sports, academics and occupational settings. In spite of the potential utility of identifying individual differences in competitiveness, there currently exists no psychometrically valid, broadly applicable and unified measure of these differences. Furthermore, a review of the literature, has illuminated the need for at least two underlying dimensions of this trait; Dominant and Personal-Enhancement competitiveness. Thus, the goal of the present study is to provide preliminary construct-validity and confirmation of the factor structure of a new measure of competitiveness: the Competitiveness Orientation Measure. The initial 137-item Competitiveness Orientation Measure was tested in two independent samples of 886 University, and community participants. Examination of item-total correlations, discrimination indices and factor analysis procedures using Horn's Parallel Analysis and the Velicer's test resulted in the retention of 37 final items with Cronbach's alpha reported as .96 and split-half reliability reported as .93. Retained items supported past theoretical accounts of Dominant and Personal-Enhancement competitiveness in addition to two newly-emerged dimensions corresponding to General Competitiveness and Pervasive Competitiveness. Theoretically, the Competitiveness Orientation Measure is the first comprehensive, psychometrically valid scale that adequately captures individual differences in competitiveness across four dimensions. Multidimensional differences in competitiveness may serve to differentiate competitors' success in sports, occupational and academic contexts.

Keywords: human competition, competitiveness, personality, individual differences, trait, achievement orientation, dominance

The Newly Developed Competitiveness Orientation Measure: Psychometric Development and Evaluation

The notion of competitiveness as a personality trait is relevant to a broad range of interpersonal and achievement contexts including professional (Brown, Cron, & Slocum, 1998; Nickel & Fuentes, 2004), sports (Duda, 1989; Fabian & Ross, 1984; Gill & Deeter, 1988; Houston, Carter, & Smither, 1997), and academic settings (Dweck, 1986; Johnson, Johnson & Anderson, 1983). Yet, although psychologists have attempted to measure the degree of competition involved in situational contexts, differentiating competitiveness as a personality variable has generally been overlooked (Smither & Houston, 1992).

Smither and Houston (1992) note that competitiveness is a unitary trait that does not vary between environments, providing support that competitiveness is not simply a mechanism which is either evoked or impeded by environmental or situational contexts. Furthermore, Houston et al. (2000) argue that competitiveness in an imperative individual differences variable that influences behaviour across a broad range of situations. However, in spite of the relevance of competitiveness to behavior and affective responses in situations containing interpersonal conflict, surprisingly little research has focused on competitiveness as a personality variable (Houston et al., 2000).

One of the most important studies in competitiveness to date was a meta-analysis conducted in 2002 by Houston, McIntyre, Kinnie, and Terry. These authors conducted a factor analysis of the seven most widely used measures of competitiveness dating from 1976 to 1996. The meta-analysis revealed that all scales loaded on two distinct factors of competitiveness. The first dimension included items that portrayed competitiveness as a

means to validating the superiority of the competitor over others, while the second dimension illustrated items that were centered on the personal benefits of competitiveness without the emphasis on the denigration of others. The two dimensions were found to be orthogonal constructs, illustrating two mutually exclusive dimensions. However, in spite of the groundbreaking development of uncovering the dimensional nature of the trait, little research emerged in competitiveness as result of Houston's research.

One explanation for the apparent disregard of competitiveness as a personality trait may be evidenced by the fact that there currently exists no psychometrically valid, unitary measure of the construct. For example, in an extensive review of the literature, Smither and Houston (1992) found that "no measure of competitiveness was independent of an achievement motivation scale, psychometrically sound and generalizable to settings other than athletics" (p. 411). Even with Houston et al. (2002) uniting the historically disjointed construct by uncovering a potential two-dimensional factor structure, no researchers have attempted to put together the pieces into a single scale measuring the complexities of the trait. Thus, the goal of the present study is to construct a multidimensional, psychometrically sound scale that measures competitiveness from a non-context specific perspective.

An independent review of the literature revealed that two mutually-exclusive dimensions of competitiveness can be traced back to theories described over 70 years ago. The historical review below provides additional theoretical support for the factor structure revealed in Houston et al.'s (2002) meta-analysis and expands on the rationale for a dimensional framework of competitiveness.

Historical Conceptualizations of Competitiveness

In the past, theorists in personality psychology have alluded to competitiveness in the context of explaining more broadly defined theories. Most commonly, competitiveness was incorporated into theories of achievement. In general, these historical theories provided evidence for two underlying dimensions of competitiveness as outlined by Houston et al. (2002). The first dimension, Dominant Competitiveness, includes individuals who use competition as a way to prove their superiority over others. The second dimension is Personal-Enhancement Competitiveness and includes those who view competition as a means to evaluate their competency. They set high goals and strive to achieve those goals by using competition to measure their success. These two dimensions were entitled Self-aggrandizement and Interpersonal Success by Houston et al. (2002). They have been more appropriately renamed Dominance and Personal-Enhancement in the current study in order to more accurately reflect their theoretical framework.

The historical review below is an independent assessment of earliest evidences of Dominance and Personal Enhancement as outlined in various theoretical contexts. The review of these literatures will examine how theories of hypercompetitiveness and achievement motivation reveal historical support for the two-dimensional framework of competitiveness. The manner in which these dimensions correspond to the factors revealed by Houston et al.'s (2002) meta-analysis will also be addressed.

Hypercompetitiveness

Neo-Freudian Karen Horney (1937) was the first to originally elucidate competitiveness and her theory is most beneficial in providing conceptual evidence for

the Dominant dimension of competitiveness. Hypercompetitiveness was first defined as rigidity in reactions and a discrepancy between potentialities and achievements. According to Horney (1937), hypercompetitiveness was defined as the need by individuals to compete and win at any cost as a means of maintaining or enhancing feelings of self-worth, with an attendant orientation of manipulation, aggression, exploitation, and denigration of others across a myriad of situations.

Horney's conceptualization included key characteristics of hypercompetitive individuals which were magnified from normalcy to a unhealthy degree. These characteristics included measuring themselves against other individuals, even in situations where competition was uncalled for, a disregard for the content of the activity itself; only being ahead of others, and the success and prestige of the situation carried any value to these individuals.

Hypercompetitive individuals strived not only to accomplish more than others, but also sought to be regarded by others as unique and exceptional. These individuals had to be the best in every field, and their excessive ambition often led them to indecisiveness and ultimately, failure. Lastly, hostility was inherent in hypercompetitive individuals as they were driven by a blind need to disparage others, yet, ironically also sought to be loved and appreciated by those whom they disparaged (Horney, 1937). Horney's conceptualization of hypercompetitiveness evidenced the earliest theoretical support for the dimension of Dominant Competitiveness since the primary goal of these individuals was to gain superiority over others and prove their dominance. Historically, however, another line of research was simultaneously developing which argued for the acceptance of competitiveness within a more self-driven achievement motive.

Achievement

Early evidence for the second dimension of competitiveness, Personal-Enhancement Competitiveness, stems from research in achievement orientation. Murray (1938) first discussed achievement motivation as a personality disposition involving the desire to master, manipulate and organize difficult tasks as rapidly and as independently as possible while overcoming obstacles and attaining a high personal standard. Two decades later, achievement motivation became most prominent in the research of McClelland, Clark, Roby, and Atkinson (1958). Atkinson and Reitman (1956) defined achievement as one of three motives, the others being power and affiliation motives, defined as latent dispositions to strive for goal states.

McClelland (1961) contended that the achievement motive was less engaged in conditions involving routine and simple tasks since the goals of these tasks did not require skill or mastery. Atkinson and Reitman (1958) noted that subjects with other motives would perform better in these circumstances. Thus, if the task held no relevance to the individual, those with achievement motives would not strive to accomplish the task successfully. These findings opposed Horney's (1937) concept of competitiveness, since those who were more hypercompetitive were not concerned with the content of the activity, as long as they maintained domination over others. Thus, differences in those with hypercompetitive and achievement motivations were the first subtle and early suggestion that competitiveness may have a dimensional structure.

In summary, historical accounts of hypercompetitiveness and achievement failed to directly address individual differences in competitiveness, yet these parallel lines of research provided the earliest evidence for two distinct dimensions of competitiveness;

Dominance and Personal-Enhancement. Horney's (1937) theory revealed that hypercompetitive individuals' primary concern was with demonstrating superiority over others, providing support for Dominant Competitiveness. In contrast, McClelland's (1938) theory of achievement motivation evidenced the earliest conceptualization for Personal-Enhancement competitiveness, whereby individuals were especially concerned with achieving personal success. For over 70 years, psychological literature has been building up to an emerging theory of the two-factor structure of competitiveness that would serve to unite and build upon previous theories.

Recent Findings

In the most comprehensive review to date, Houston et al. (2002) conducted a meta-analysis which examined the factor structure of the seven most widely used and accepted measures of competitiveness available to researchers. These scales were analyzed for theoretical overlap and results indicated that all scales loaded on two discrete factors, consistent with the present study's dimensions of Dominant and Personal-Enhancement Competitiveness. The emergence of these two factors broke ground in personality psychology since they unified all existing measures and were consistent with competitive orientations dating back to Horney's original conception. Houston et al. (2002) concluded their meta-analysis with a statement calling for the need of a psychometrically valid, comprehensive measure of competitiveness that would serve to unite these two factors:

> Given the evidence indicating that competitiveness is a multidimensional construct, using an inappropriate measure of competitiveness could lead to erroneous conclusions that may stifle further research. To avoid problems of this nature and to explore how different aspects of competitiveness

> influence behavior across various social domains, more research is needed to untangle the folk concept of competitiveness and to explicate the construct with a more complete and precise definition. (p. 296)

In summary, an independent historical review has provided additional support of the two-dimensional framework emerging from Houston et al.'s (2002) meta-analysis. Problematically, however, Houston et al. (2002) argue that no measure of competitiveness currently exists which serves to unite both dimensions. Furthermore, a unique review of the measures reveals that not one scale effectively elucidates either dimension of competitiveness. Needless to say, each scale lacks the ability to unify the construct of competitiveness into one complete and psychometrically valid measure. The most logical and parsimonious way to unravel the ambiguity of the historically disjointed construct is to create one master scale which would serve to correctly and concisely measure competitiveness tendencies cutting across situational context. To this researcher's knowledge, no empirical study has been published to date that has created one fully encompassing measure of competitiveness. What follows is a critical review of the competitiveness scales used in the Houston et al. (2002) meta-analysis and in the current study. A careful review of these measures will highlight their inadequacy in elucidating competitiveness as a personality variable illustrating the need for a unified measure.

Review of the Competitiveness Measures

The Competition-Cooperation Attitude Scale. The Competition-Cooperation Attitude Scale (CCAS; Martin & Larsen, 1976) (see Table A1). The CCAS is a 28-item scale measuring five factors of competitive attitudes; Aggression Orientation was defined

as striving for achievement at the expense of others, ("People who overcome all competitors on the road to success are models for all young people to admire"), Fascist Tendencies were defined as the tendency to view losers as inferior ("I don't trust very many people"), Work Ethic Orientation was defined as working harder than others to achieve goals ("I play harder than my teammates"), Power Orientation included using pressure to achieve one's goals and the feeling of personal power whenever successful ("It doesn't matter who you hurt on the road to success"), and Independence Orientation was defined as working alone to achieve goals ("Nice guys finish last").

Problematically, most of the items loaded on at least two different factors and it was not always conceptually clear how the items loaded on each factor, which makes interpretation of the scale exceedingly difficult. Furthermore, reversed items were also unevenly distributed throughout factors. For example, the Power Orientation subscale had 9 items, 5 of which were reversed items, whereas the Fascist Orientation subscale had 10 items, where only one was reversed. Furthermore, reversals were defined as co-operative items but did not combine to make a separate co-cooperativeness scale. Additionally, 21% of the items failed to load on any factor.

The item analysis was conducted on a relatively small sample size (98 University students). The reliability-validity study used a sample of 99 undergraduate students. Split-half reliability was reported as .70 and was corrected to .82 using the Spearman-Brown formula. Construct validity was obtained by comparing Competitiveness to only one other construct; Machiavellianism, which revealed a significant positive correlation. In addition, Ryckman, Hammer, Kaczor, and Gold (1990) note that this scale has poor reliability.

The Work and Family Orientation scale. The Work and Family Orientation scale (WOFO; Spence & Helmreich, 1978) (see Table A2). These authors originally defined competitiveness as differentiating masculine and feminine traits. The scale was developed after identifying a need for achievement motivation measures (such as the Thematic Apperception Test) to include women in non-stereotyped roles. Spence and Helmreich (1978) defined achievement orientation as being a male characteristic that was associated with agency, instrumentation, dominance, activity and competitiveness. While female characteristics were associated with community and expression. The WOFO measures four dimensions, including competitiveness ("I really enjoy working in situations involving skill and competition"), mastery ("If I am not good at something I would rather keep struggling to master it then move on to something I may be good at"), personal unconcern ("I worry because my success may cause others to dislike me"-reverse item), and work ("It is very important for me to do my work as well as I can even if it isn't popular with my co-workers").

According to Burckle, Ryckman, Gold, Thornton, and Audesse (1999) the Personal Unconcern subscale had low item-correlations (all less than .18) with the total scale. Furthermore, Gill and Deeter (1988) argue that the personal unconcern scale of the WOFO has been of little value in Spence and Helmreich's research. Additionally, Gill, Dzewaltowski, and Deeter (1988) note that the WOFO is restricted to the measurement of interpersonal rivalry and is restricted in its ability to define competitiveness broadly. Furthermore, all of the four items on the competitiveness scale were reversed items, whereas there were no reversals on the any of the other scales. In addition, two of the items did not load on a factor. There is also a significant proportion of conceptual overlap

between the items and the utility of the scales in describing the individual difference of competitiveness is quite limited.

The Sport Orientation Questionnaire. The Sport Orientation Questionnaire (SOQ; Gill & Deeter, 1988) (see Table A3) is a 25-item questionnaire designed to measure the disposition to strive for success in competitive and noncompetitive sport activity. The goal was to be useful for males and females, athletes and nonathletes, and to cut across all competitive situations. Although the authors were striving for breadth, the usefulness of the scale in measuring competitiveness is constrained to sport activities and does not reflect the broader, more comprehensive trait of competitiveness. Instructions to participants read as follows "The following statements describe reactions to sport situations. We want to know how you usually feel about *sports and competition*…."

The scale yields three dimensions; Competitiveness ("I am a competitive person"), Win Orientation ("I have the most fun when I win") and Goal Orientation ("I set goals for myself when I compete"). Test-retest reliability, using a four-week interval, ranged from .73 on Goal Orientation to .89 on Competitiveness. Competitiveness consistently differentiated students in competitive physical activity skills classes from those in noncompetitive classes as well as competitive sports participants from non-competitive sports participants. The authors concluded that evidence is provided for construct validity of the sport-specific SOQ since the more general achievement and competitive measures failed to discriminate between competitive and noncompetitive groups. It is also important to note that the scale provided no reverse items. Problematically, this may contribute to an acquiescent response style.

The Hypercompetitive Attitude scale. The Hypercompetitive Attitude scale (HCA; Ryckman et al., 1990) (see Table A4) is a 26-item scale based on Horney's (1937) conceptualization of hypercompetitiveness. Ryckman et al. (1990) found adequate levels of internal and test-retest reliability. The initial item pool was administered to a group of 320 undergraduates. Item-total and test-retest reliabilities were satisfactory. The mean item-total correlation was reported as .49, which is lower than the Personal Development Competition Attitude Scale. Test-retest reliability, over a 6-week interval, was .81. Adequate discriminant and convergent validity was illustrated.

The Personal Development Competition Attitude scale. The Personal Development Competition Attitude scale (PDCA; Ryckman et al., 1996) (see Table A5) is a 15-item scale measuring Personal Development Competitiveness. Participants included 4 small samples of university undergraduates who were homogenous in regards to race and age. Mean item-total correlations were reported as .58. Over a 4-week interval, test-retest reliability was reported as .70. Thus, internal and test-retest reliability was reported as satisfactory. Discriminant validity was evidenced by a nonsignificant correlation with hypercompetitiveness. PDCA scores being positively linked to Affiliation and Achievement and being unrelated to Aggression and Dominance illustrated evidence for construct validity. In contrast, Hypercompetitiveness was related to Aggression, Dominance and Exhibitionism but was unrelated to Affiliation. PDCA was also found to be negatively related to neuroticism and higher in self-esteem.

Due to theoretical strength and adequate psychometric properties, the Ryckman scales provide the best measure of competitiveness to date. Problematically, however, they are separate scales which are not entirely commensurate, which may limit their use.

For example, items in Ryckman's HCA are rated on a scale from 1 ("never true of me") to 5 ("Always true of me") while the PDCA asks participants to rate each item on a scale from 1 ("Strongly disagree") to 5 ("Strongly agree"). The Competitive Attitude Scale (Ryckman, Hammer & Kaczor, 1986) includes hypercompetitiveness and personal development competitiveness on the same scale but is unpublished.

The Competitiveness Questionnaire. The Competitiveness Questionnaire (CQ; Griffin-Pearson, 1990) (see Table A6) is a 15-item questionnaire which assesses two dimensions of competitiveness. The first factor, Interpersonal competitiveness, is defined as traditional competitiveness, emphasizing doing or being better than others. This factor is synonymous with the current study's Dominance orientation. The second factor, Goal competitiveness, emphasizes striving for a goal that is not gained at expense of others, and this factor is synonymous with the current study's Personal Enhancement competitiveness.

The items are answered using a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The initial item pool was administered to a small sample of 94 undergraduate students. After first revisions, the item-pool was administered to a larger sample of racially homogenous undergraduates (195 students, 93% Caucasian). Problematically, the Goal Competitiveness scale showed limited reliability (Griffin-Pearson, 1990) and test-retest reliability was not reported. According to Griffin-Pearson (1990), "one limitation of the GC scale is its relatively low internal consistency. Thus, GC scores should be interpreted cautiously" (p. 112).

The Competitiveness Index. The Competitiveness Index (CI; Smither & Houston, 1992) (see Table A7) is a 20-item scale which measures competitiveness

dimensions Emotion ("I like competition"), Argument ("I try to avoid arguments") and Game ("When I play a game, I like to keep score"). The coefficient alpha for the 20-item scale was reported as .90. Although some evidence was provided for convergent validity, the authors noted that further evidence of discriminant and construct-validity should be explored. In addition, inadequate theoretical basis was demonstrated for the three factors, in particular the Argument and Game factors. Therefore, their significance in explicating the construct of competitiveness is limited.

The Present Study

A review of historical theories of competitiveness, along with more contemporary developments (Houston et al., 2002), have led the current perspective that there are two underlying dimensions of trait competitiveness; Dominant Competitiveness and Personal-Enhancement Competitiveness. Unfortunately, the seven scales summarized in Houston et al's (2002) meta-analysis are only useful in adequately measuring the dimensional framework of competitiveness when administered as a compilation. When considered individually, however, each scale is an inadequate measure of competitiveness. Presently, there exists no psychometrically sound measure that unifies both dimensions as distinct aspects of a singular construct, namely trait competitiveness.

The purpose of the present study involves two mutually related goals. First, we hope to replicate the findings of Houston et al.'s (2002) meta-analysis by providing confirmatory evidence of the two dimensions of competitiveness. Secondly, we hope to provide exploratory evidence and preliminary psychometric support for the factor structure of a newly developed competitiveness scale, the Competitiveness Orientation Measure (COM). Thus, we hope to compare and contrast the dimensions of the COM

with those illustrated by Houston et al. (2002) to ensure construct validity of the newly developed measure.

Confirmation of the two dimensions will be determined by the following analyses: First, an analysis determining Cronbach's alpha will be conducted to determine item-total correlations of items on the proposed measure (COM). The elimination of poorly discriminating items will reveal excellent levels of internal consistency for the COM.

1. Factor analysis will be conducted in order to verify the dimensional structure of competitiveness emerging from an independent historical literature review and previously conducted meta-analysis (Houston et al., 2002).
2. In specifics, an orthogonally-rotated factor analysis on the proposed measure (COM) is hypothesized to reveal two distinct factors (Dominant and Personal-Enhancement Competitiveness). An orthogonal rotation is chosen over an oblique rotation because findings by Ryckman (1996) and Griffin-Pearson (1990) revealed no significant correlations between competitiveness scales representing these two dimensions.
3. We hypothesize that performing orthogonally-rotated confirmatory factor analysis of the seven scales administered by Houston et al. (2002) will reveal two distinct dimensions of competitiveness.

In addition to the factor analysis, a questionnaire measuring social desirability will be included. No specific hypotheses are made regarding the relationship to competitiveness. Previous studies have found conflicting results regarding the relationship between competitiveness and social desirability. For example, Ryckman et al. (1996) found hypercompetitiveness to be negatively correlated with social desirability,

while Ryckman et al. (1997) found hypercompetitiveness and social desirability to be positively related.

Past researchers have evidenced construct-validity by comparing the Dominant dimension of competitiveness to Machiavellianism, (Martin & Larsen, 1976; Ryckman et al., 1994) defined as a cynical view of others and a tendency to be suspicious, cold, exploitative and manipulative of others (Christie & Geis, 1970). Therefore, we hypothesize a significant positive correlational relationship between Dominant Competitiveness and Machiavellianism and include this measure in order to further demonstrate construct validity.

Method

Participants

Participants included 579 undergraduates, 300 community participants and 7 unidentified participants, totaling 886 participants. It was necessary to use a large sample (300 participants or greater) due to suggestions by both DeVellis (1991) and Tabachnick and Fidell (2007) as necessary for performing factor analysis. Participants were recruited from the Psychology 1100 participant pool, various psychology courses and recruitment posters (see Appendix C1). Participation was completely voluntary and complete confidentiality and anonymity was assured. Eligible psychology students were compensated for their time with 1% extra credit towards their final grade. Community participants were entered into a draw to receive one of two $50 Visa gift cards.

Materials

The present study involved the administration of an online questionnaire package (see Appendix C2 to Appendix C4), with a consent form (see Appendix C3) attached to the front of the package, including the following measures:

1. Demographics Sheet. The demographics sheet (see Table A8) asked participants to identify basic demographic information such as gender, age, year in university, major, grade point average and a list of competitive activities.

2. The Competition-Cooperation Attitude Scale. The Competition-Cooperation Attitude Scale (CCAS; Martin & Larsen, 1976) is a 28-item scale measuring four factors of competition; Aggression Orientation, Fascist Tendencies, Work Ethic Orientation, Power Orientation and Independence Orientation. Items are arranged on a 5-point Likert-scale from 1 ("Strongly disagree") to 5 ("Strongly agree").

3. The Work and Family Orientation scale. The Work and Family Orientation scale (WOFO; Spence & Helmreich, 1978) is a 14-item scale which measures competitiveness, mastery, personal unconcern, and work. Items are arranged on a 5 point Likert-scale ranging from 1 ("Strongly agree") to 5 ("Strongly disagree").

4. The Sport Orientation Questionnaire. The Sport Orientation Questionnaire (SOQ; Gill & Deeter, 1988) is a 25-item questionnaire designed to measure sport competitiveness. The scale yields three dimensions including Competitiveness, Win Orientation and Goal Orientation. Items are rated on a 5-point Likert scale from A ("strongly agree") to E ("strongly disagree").

5. The Hypercompetitive Attitude scale. The Hypercompetitive Attitude scale (HCA; Ryckman et al., 1990) is a 26-item scale based on Horney's (1937) conceptualization of hypercompetitiveness. Items are rated on a 5-point Likert scale from 1 ("never true of me") to 5 ("Always true of me").

6. The Personal Development Competition Attitude scale. The Personal Development Competition Attitude scale (PDCA; Ryckman et al., 1996) is a 15-item scale measuring

Personal Development Competitiveness. The PDCA asks participants to rate items on a 5-point Likert-scale from 1 (“Strongly disagree”) to 5 (“Strongly agree”).

7. The Competitiveness Questionnaire. The Competitiveness Questionnaire (CQ; Griffin-Pearson, 1990) is a 15-item questionnaire which assesses two dimensions of competitiveness; Interpersonal competitiveness and Goal competitiveness. The items are answered using a 5-point Likert scale ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”).

8. The Competitiveness Index. The Competitiveness Index (CI; Smither & Houston, 1992) is a 20-item scale which measures competitiveness dimensions Emotion, Argument and Game. Items are rated by participants as being either true or false.

9. The Competitiveness Orientation Measure. The Competitiveness Orientation Measure (COM; manuscript in preparation) (see Table A9) measures competitiveness dimensions of Dominant and Personal-Enhancement competitiveness and also provides a general measure of competitiveness.

Construction of the Competitiveness Orientation Measure (COM).

Construction of the COM items was based on an extensive literature review and an analysis of existing competitiveness scales. Approximately 40%-50% of items were based on those used in other scales. The COM was constructed based on methods outlined in Devellis (1991). The COM includes 137 items which are arranged on a 5-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The reading grade level of the COM is 6.3, as indicated by the Flesh-Kincaid grade level calculation (see Appendix B).

10. The Machiavellianism scale. The Machiavellianism Scale (MACH-IV; Christie & Geis, 1970) (see Table A10) is a 20-item scale measuring Machiavellianism on a 7-point Likert scale ("Generally speaking, men won't work hard unless they are forced to do so").

11. The Marlowe-Crowne Social Desirability Scale. The Marlowe-Crowne Social Desirability Scale (MC_SDS; Strahan & Gerbasi, 1972) (see Table A11) is a 20-item true/false scale measuring positive self-presentation ("I sometimes feel resentful when I don't get my way").

12. The Jackson Personality Research Form. The infrequency subscale of the Jackson Personality Research Form (Jackson, 1984; see Table A12) is a 16-item scale measuring random responding ("I make all my own clothes and shoes") and is included in the present study to ensure validity of responding. In order to be inserted into the COM, the response options were altered from the original true/false to accommodate Likert-type responses.

Procedure

The primary investigator invited Psychology undergraduates at Lakehead University as well as community participants to volunteer for the study. The investigator asked volunteers to fill out the package online. The questionnaire package took between 45 and 90 minutes to complete. It was emphasized that the information is completely anonymous and confidential. Order effects were not shown to influence results in previous studies (Houston et al., 2002) therefore, the scales were not counterbalanced in the present study.

Risks and Benefits of Participation

There were no significant physical, psychological or emotional risks associated with participation in this study. The consent form reminded participants that they were able to omit any information that they were uncomfortable disclosing and were free to withdraw from the study at any time. A full written debriefing followed completion of the study.

By participating in this study, students contributed to new psychological literature examining trait competitiveness. Students also received one hour of research credit for their participation in this study and community participants were entered into a draw for one of two $50 Visa gift cards.

Results

Data Cleaning

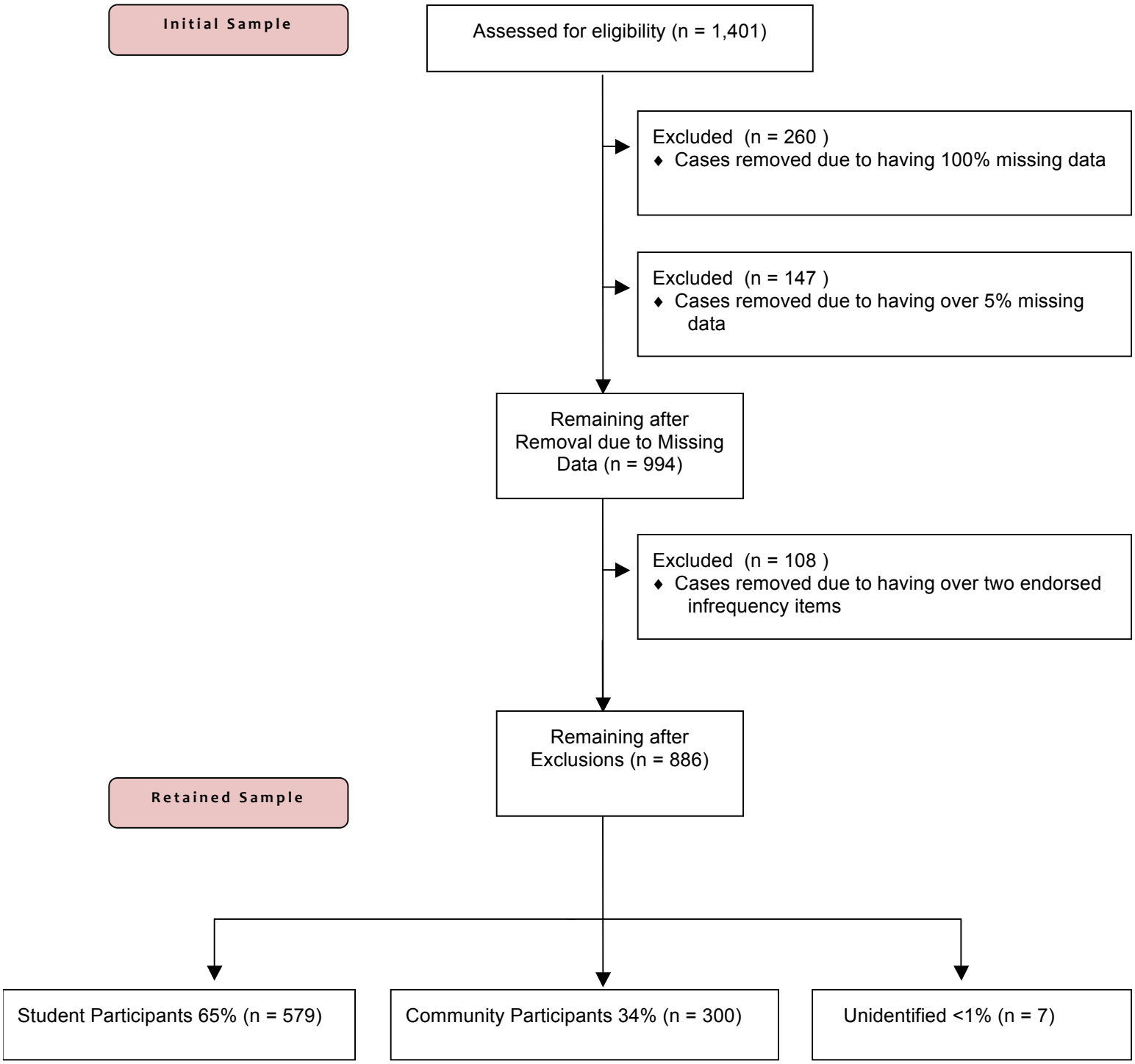
Descriptive statistics including frequencies, means and standard deviations were examined to determine accuracy of data transposition from survey monkey into SPSS.

Analyses of variance using a missing value indicator dummy variable (1 = missing, 0 = not missing) were conducted in order to determine potential biases in the data set comparing individuals with any missing data compared to individuals with no missing data on several outcome variables including subscale total scores, gender, education, and grade point average. No differences were found on any variable between those with missing data and those without missing data.

Initially, a total of 260 cases were removed due to having 100% missing data. Next, 147 cases were removed due to having over 5% missing data. An additional 108 participants were removed due to having met an established cut-off score of 2 or more endorsed infrequency items (indicated by a score of 4 or greater). A total of 886

participants were retained in the final sample (see Table D1 and Figure 1). A sample of this magnitude is not expected to reduce power and is still well within recommendations suggested by DeVellis (1991) and Tabachnick and Fidell (2007) in order to use structural equation modeling.

Figure 1
Retention of Participants



Little's Missing Completely at Random (MCAR) test using Estimation Maximization was conducted in the Missing Values Analysis program of SPSS in order to determine whether or not data was missing at random and to guide subsequent analyses. Little's MCAR test revealed that data was not missing completely at random, χ^2 (129809) = 133367.09, $p < .0001$. A visual analysis of Missing Values Patterns revealed that data appeared to be missing towards the end of the questionnaire contributing to a pattern of nonrandomness (see Table D45 for order of administration). A pattern in this direction was not expected to influence subsequent analyses.

Multiple Imputation (MI) is currently considered to be one of the most sophisticated methods for managing missing data (Allison, 2002; Schafer & Graham, 2002). As discussed in McKnight, McKnight, Sidani and Figueredo (2007) MI is a process that uses observed data to create several values imputed into a corresponding number of data sets. For each imputation, a separate data set is derived. The derived data sets are then used to produce multiple regression coefficients which are used to estimate the variables of interest. Lastly, the regression coefficients are combined in order to create a single mean based on all regression coefficients and standard errors.

Compared to single imputation methods, MI is found to reduce the likelihood of Type I error (McKnight et al., 2007). MI has also been found to be more statistically sound when using data that do not meet assumptions of normality (McKnight et al., 2007) or when data are known to be not missing completely at random (Tabachnick & Fidell, 2007). Although listwise and pairwise deletion methods would have been acceptable choices due to the amount of missing data (Graham, 2009) in the current study, MI is considered to be a more robust choice (Schafer & Graham, 2002). Five imputations were

chosen in the current study based on recent suggestions in the literature (Bodner, 2008; Graham, 2009; Rubin, 1987).

Following recommendations outlined in Tabachnick and Fidell (2007), outliers were examined as a sum of all continuous variables since data analysis will primarily involve the use of ungrouped data (e.g. factor analysis and structural equation modeling). Box and whisker plots in the Explore program were examined and revealed 26 potential outliers. An examination of z-scores, however, revealed that only six cases had z-scores higher than 3. An examination of qualitative data revealed that five of the six cases considered themselves to be "not competitive" and quantitative data appeared to be entered correctly. Considering the relatively low number of participants with outlying data, and the large number of participants, a decision was made to retain them in the following analyses.

Skewness and kurtosis were calculated for all scales in order to determine symmetry and peakedness of distributions. Significance of skewness and kurtosis was calculated using z-scores (see Tables D2 and Table D3). Although skewness and kurtosis significantly differed from zero on the PDCA and CCAS scales, a decision was made to refrain from transforming these scales. This decision was based on recommendations from Tabachnick and Fidell (2007) who state that significance level is secondary to the visual appearance of distributions. In addition, these authors cite Waternaux (1976) in the observation that the impact of significant skewness and kurtosis is likely to disappear in large sample sizes (over 200 participants).

Meta-analysis Replication and Extension

Comparative Reliability Analyses

In order to determine whether or not the current sample was comparative to the samples used in the original scales employed in Houston et al.'s (2002) meta-analysis, we sought to compare reliability indices found in the current sample to those reported in the past. Reliability statistics, including Cronbach's alpha and the Spearman-Brown coefficient are presented in Table D4 and intercorrelational analyses are displayed in Tables D5 and D6 comparing subscales as well as differences between community and student samples. In total, with the exception of the student sample of the WOFO, the reliabilities obtained in the current sample were comparable to those reported in the original scales as well as the Houston et al. (2002) meta-analysis. Furthermore, since an examination of pooled imputation data compared to original data exhibited no differences, a decision was made to use only original data in further analyses. Correlational analyses revealed that competitiveness scales are highly intercorrelated.

Factor Analysis Replication and Extension

In order to determine whether or not the present study's sample was comparable to those used in previous competitiveness studies (Houston et al., 2002), we sought to determine the factor structure of the seven most widely used Competitiveness scales, including the Competitiveness subscale of the Work and Family Orientation Scale (WOFO_Com), the Personal Development Competition Attitude Scale (PDCA), the Sport Orientation Questionnaire (SOQ), the Interpersonal subscale of the Competitiveness Questionnaire (CQ_IC), the Competitiveness Index (CI), the Hypercompetitive Attitude Scale (HCA) and the Competition-Cooperation Attitude Scale (CCAS). In Houston et

al.'s meta-analysis, the decision of whether or not to retain a factor was based first on parallel analysis, followed by an examination of pattern coefficients in principal axis analysis with varimax rotation.

When determining the number of factors to retain in factor analysis, decisions made employing the examination of eigenvalues (Kaiser, 1960) or scree plots (Cattell, 1966) are the most common methods used (Hayton, Allen, & Scarpello, 2004; O'Connor, 2000; Thompson & Daniel, 1996). Problematically, however, factor retention decisions based upon the "eigenvalue-greater-than-one rule" is considered to be an arbitrary decision that often results in inaccurate factor structures representing both overextraction and underextraction of factors (Cliff, 1988; Zwick & Velicer, 1986). Problematically, the underextraction of factors leads to an important loss of information by specifying too few factors while the overextraction of factors fails to result in parsimonious results that lack feasibility of interpretation (Zwick & Velicer, 1986). According to Thompson and Daniel, the eigenvalue rule is relied upon blindly by researchers and is widespread adoption is based solely upon the fact that it is the default decision rule in most statistical packages. Some researchers have suggested that factor retention decisions based on the eigenvalue rule are found to result in accurate decisions only 22% of the time (Zwick & Velicer, 1986) and often associated with factor overextraction (Glorfeld, 1995).

Besides the eigenvalue rule, the other most commonly employed factor retention technique involves the visual examination of eigenvalues plotted on scree plots (Hayton et al., 2004; O'Connor, 2000; Thompson & Daniel, 1996). According to Hayton et al. (2004), the rationale for this procedure is that factors accounting for the most variance would be easily identified visually in the plot's steep cliff while factors accounting for

numerous and minor factors would be easily identified in the shallow scree (p. 193) resulting in a visual break in the scree plot. However, this procedure involves a very subjective visual interpretation, involving simply "eye-balling" the results (Hayton et al., 2004) leading to low interrater reliability (Streiner, 1988). Furthermore, an examination of scree plots has been found to be associated with accurate decision rules in only 57% of the time (Zwick & Velicer, 1986).

Both on a conceptual and empirical level, basing factor retention decisions solely on rules pertaining to eigenvalues or scree plots have been shown to substantially affect results and alter the interpretation of data in the direction of inaccuracy (Hayton et al., 2000). There is increasing consensus in the literature suggesting that Parallel Analysis procedures can be used as an effective alternative to traditional methods including eigenvalue and scree plot rules. Zwick and Velicer (1986) found that Parallel Analysis was the most accurate factor analysis procedure, resulting in accurate decisions 92% of the time. The underutilization of this procedure may be attributed to the fact that there exists no standard statistical package that utilizes this program, rather it is only available in syntax and involves a slight learning curve. Unfortunately, although Parallel Analysis is the most accurate test available when deciding how many factors should be retained, it is also the most underutilized (Hayton et al., 2004).

Parallel Analysis operates by comparing the actual data set to extracted eigenvalues obtained from a random data set that is parallel in terms of number of variables and cases (O'Connor, 2000). Unlike the eigenvalue-greater-than-one and the scree plot rules, factor retention decisions in Parallel Analysis are statistically based, corresponding to a decision to retain factors that exceed the 95th percentile. Thus, actual

eigenvalues that exceed the 95th percentile in the randomly generated eigenvalues are retained. Although underutilized, these methods have been noted to be the most accurate when deciding how many factors should be retained in any given data set (Velicer et al., 2000; Wood et al., 1996; Zwick & Velicer, 1986).

In the current study, the eigenvalues obtained through Horn's Parallel Analysis were compared to Velicer's Minimum Average Partial test, a procedure recommended by Dr. Brian O'Connor, the developer of the Horn's Parallel Analysis program. Horn's Parallel Analysis and Velicer's Minimum Average Partial test were conducted using the total sample of 886 participants and original, non-imputed data. When comparing principal components obtained through Velicer's Minimum Average Partial test to those randomly generated in the Parallel Analysis, only two factors exceeded the 95th percentile cutoff replicating results found in Houston et al.'s (2002) meta-analysis (see Table D7 for eigenvalues).

In order to determine the factor loadings of the seven Competitiveness scales, a principal components axis factor analysis with a varimax rotation was conducted using a two-factor solution. The two-factor solution accounted for 71% of the total variance, a figure similar to that reported by Houston et al. (2002) who found that two factors accounted for 67% of total variance. The first factor accounted for 54% of the total explained variance while the second factor accounted for 17% of the variance. Communalities, indicating the degree to which each scale correlates with all others, ranged from .59 (WOFO_Com) to .82 (HCA). Scales loading on the first factor included the HCA, CQ_IC and CCAS while scales loading on the second factor included the PDCA, WOFO_Com, CI, and SOQ (see Table 8). Our findings replicated those found in

Houston et al. (2002), however the WOFO_Com tended to load more strongly on the second factor in the present study. These results were replicated with community and student samples independently and results are presented below in Tables D9 through D12.

Table D8

Meta-analysis Replication Factor Loadings for Total Sample

Scale	Factor 1	Factor 2	Communalities
PDCA	-.111	**.846**	.727
WOFO_Com	.435	**.635**	.593
CI	.419	**.669**	.623
SOQ	.372	**.782**	.750
HCA	**.863**	.277	.821
CQ_IC	**.752**	.351	.688
CCAS	**.891**	.016	.794

Note. WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

COM Scale Development

Scale development protocols outlined in Jackson (1971), Dawis (1987) Clark and Watson (1995) and Devellis (2003) were employed in the present study in order to guide item retention processes and an overview of all analyses used to eliminate or retain items is displayed in Table D13.

Jackson (1971) recommends calculating Cronbach's alpha as an initial test of the full scale reliability. Prior to the removal of poor items, Cronbach's alpha was reported as .98, illustrating excellent levels of reliability (Nunnally, 1978). Since alpha is essentially determined both by the length of the scale and amount of overlapping variance, Nunnally (1978) has suggested item deletion in scales with alphas much greater than .90.

Next, several authors (Devellis, 2003; Murphy & Davidshofer, 2005) have recommended that the item retention process involve a preliminary examination of corrected item-total correlations using all scale items. Corrected item-total correlations are a measure of the degree to which each item correlates with the entire set of scale items after removing the influence of the variable in question (Devellis, 2003). Examining the corrected item-total correlations was chosen over uncorrected item-total correlations due to the desire to avoid inflation by including the variable's influence in the correlation (Devellis, 2003). Some authors (Gliem & Gliem, 2003; Smither & Houston, 1992) have suggested that retained items should display corrected item-total correlations of at least .40 as a measure of adequate internal consistency. Corrected item-total correlations are displayed in Table D14.

Discrimination indices are used to determine the discriminating power of items (Murphy & Davidshofer, 2005). For example, items with adequate discriminating power are those that participants high and low in Competitiveness should respond to differentially. Calculations were based on differences between participants with high total COM scores (highest 27%) and participants with low total COM scores (lowest 27%). Calculations were based on recommendations outlined in Murphy and Davidshofer (2005) and Furr and Bacharach (2008) are displayed in Appendix E1. Discrimination indices for total, student and community samples are displayed in Tables E1 through E3. Items were retained if the discrimination index was above a set cut-off point of .35. Another method of verifying discrimination between participants is an examination of item variances (Devellis, 2003). According to Devellis (2003), it is desirable for retained items to have relatively high variance, as a method of determining that participants'

responses were diverse. Item variances are displayed in Table D13. Lastly, Devellis (2003) recommends that means of each item should be close to the scale midpoint and that means should be examined along with variances as a useful "double check" to ensure that items selected on the basis of item-total correlations and discrimination indices have adequate room for response variability. On the basis of these criteria, 65 items were retained for further analyses and corresponding items are displayed in Table D15.

In order to determine the amount of extracted factors and the loadings of each respective factor, Horn's Parallel Analysis and the Velicer's test were employed. These tests revealed that a five factor solution best accommodated the 65 retained items (see Table D16). A principal components axis factor analysis with a varimax rotation was conducted using the five-factor solution. The five-factor solution accounted for 57% of the total variance. The first factor accounted for 40.5% of the total explained variance while the second factor accounted for 7.7%, the third accounted for 3.9%, the fourth accounted for 2.8% and the fifth accounted for 2.4% of the variance. Communalities, indicating the degree to which each scale correlates with all others, ranged from .31 ("I don't care to be recognized for being better than others") to .79 ("I love to compete") and are shown in Table D17.

According to Tabachnick and Fiddell, items loading less then .32 should not be interpreted, however, slightly more stringent criteria are discussed in Comrey and Lee (1992). These authors suggest that items loading higher than .71 are excellent, .63 and above are very good, .55 and above are good, .45 and above are fair and .32 and above as poor. After the initial factor analysis, a decision was made to retain items with factor loadings of at least .55.

Using this criterion, of the initial 65 items, 40 were retained and Horn's Parallel Analysis and the Velicer's test were recalculated. These tests indicated that a four factor solution best accommodated the remaining 40 items (see Table D23). A principal components factor analysis with varimax rotation was recalculated using the four-factor solution and is summarized in Table D24. The four-factor solution accounted for 61% of the total variance. The first factor accounted for 42% of the total explained variance while the second factor accounted for 10%, the third accounted for 5%, and the fourth accounted for 4% of the variance. Communalities, ranged from .45 ("Winning does not make me feel superior to others") to .78 ("I love to compete") and are shown in Table D24.

Using the .55 retention criterion, this process was repeated and resulted in retaining 37 items for further analysis. Horn's Parallel Analysis and the Velicer's test indicated that a four factor solution best accommodated the remaining 37 items (see Table D25). A principal components factor analysis with varimax rotation was recalculated using the four-factor solution and is summarized in Table D26. The four-factor solution accounted for 62% of the total variance. The first factor accounted for 43% of the total explained variance while the second factor accounted for 10%, the third accounted for 5%, and the fourth accounted for 4% of the variance. Communalities, ranged from .45 ("Winning does not make me feel superior to others") to .77 ("I love to compete") and are shown in Table D26. Since only one item was below the retention criterion after completing this procedure (item 70), a decision was made to retain all 37 items (see Table D27).

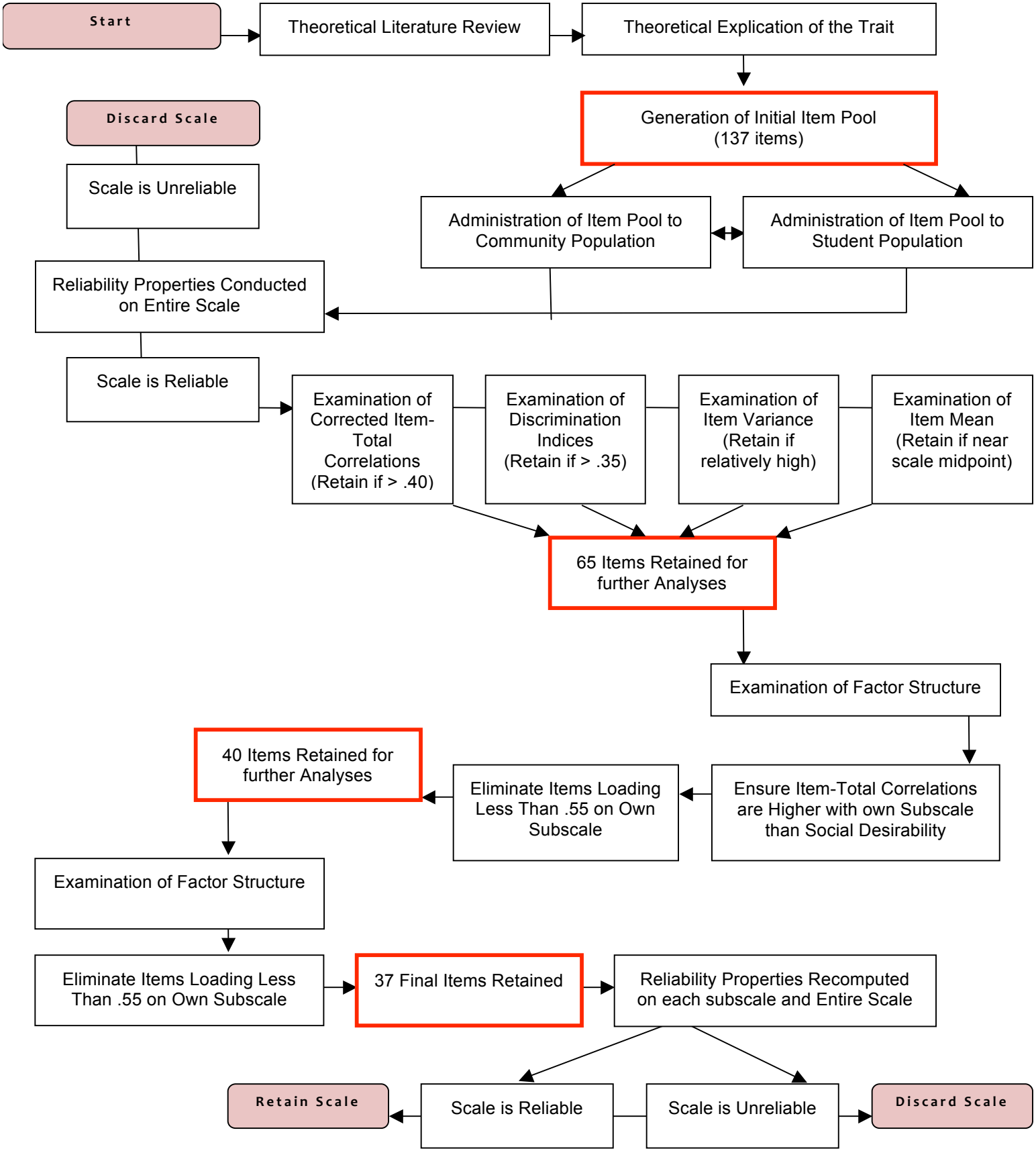
Next, item-total correlations were reanalyzed for each subscale separately to

ensure that each item had adequate levels of reliability within its respective subscale. Each item's correlation with Social Desirability (see Tables D28 through D31) was also analyzed to ensure that the item-total correlation was higher than Social Desirability as suggested by Jackson (1971). For Factor 1, which consists of 12 items, Cronbach's alpha is .94. For Factor 2, which consists of 13 items, Cronbach's alpha is .95. For Factor 3, which consists of 8 items, Cronbach's alpha is .87. Finally, for Factor 4, which consists of 4 items, Cronbach's alpha is .84. For the total scale, including all 37 items, Cronbach's alpha is reported as .96 while split-half reliability is reported to be .93 using the Spearman-Brown coefficient.

According to Clark and Watson (1995) each item should share a higher item-total correlation with its own scale compared to any other scale. Inter-item correlations loading on each subscale are displayed in Tables D32 through D35. In summary, the aforementioned scale development process resulted in excellent psychometric properties for the COM. The full review of this process is summarized in Figure 2. Again, all competitiveness subscales were significantly intercorrelated (see Table 36).

Figure 2

COM Scale Development Process



Hierarchical multiple regression was used to determine the unique effects of each factor in contributing to the overall COM scale. Overall, these variables accounted for 99.8% of the variance in predicting the total COM scale, F (4, 788) = 116726.29, $p < .001$. An examination of regression coefficients revealed that Factor One, t (791) = 44.97, $p < .001$, Factor Two, t (790) = 35.48, $p < .001$, Factor Three t (789) = 31.36, $p < .001$, and Factor Four, t (788) = 147.60, $p < .001$ each added significant unique variance in predicting the overall COM scale.

In order to determine whether or not gender differences exist in COM scores, a one-way multivariate analysis of variance was performed using five different dependent variables: factor one scores, factor two scores, factor three scores, factor four scores and total COM score. The independent variable was participant gender (male and female). Using Wilks' Lambda, gender was found to differ between factors, F (4, 787) = 9.81, $p < .001$. For Factor One, Men (M = 3.91) had greater COM scores compared to women (M = 3.48), F (1, 787) =31.82, $p < .001$, η = .05. For factor Two, men (M = 2.81) scored higher than women (M = 2.38), F (1, 787) = 27.58, $p < .001$, η = .04. For Factor Three, again men (M = 3.30) scored higher than women (M = 3.11), F = 5.86, $p < .05$, η = .01, and for Factor Four, men (M= 3.91) had higher COM scores compared to women (M = 3.62), F (1, 787) = 15.64, $p < .001$, η = .02. Lastly, the scores on the overall scale also differed between gender, with men (M = 13.93) scoring higher than women (M = 12.58), F (1, 787) = 27.87, $p < .001$, η = .03. Thus, although gender differences were observed, effect sizes were very small and means were similar between genders.

Correlations between COM factors and Participant's Age and Grade Point Average are provided in Table D38. Age did not significantly correlate with any of the COM factors or COM total score. In contrast, GPA was found significantly and positively related to Factors One, Three, Four and the total COM scale (see Table D38).

Finally, we sought to determine the combined factor structure of the COM and all competitiveness scales used in Houston et al.'s (2002) meta-analysis. Horn's Parallel Analysis and the Velicer's test indicated that a two-factor solution best accommodated the 11 subscales (see Table D39). A principal components factor analysis with varimax rotation was recalculated using the two-factor solution and is summarized in Table D40. The two-factor solution accounted for 70% of the total variance. The first factor accounted for 55% of the total explained variance while the second factor accounted for 15% of the variance. Communalities, ranged from .51 (Competitiveness subscale of the WOFO) to .82 (General Competitiveness subscale of the COM) and are shown in Table D40.

Table D40

Factor Structure of Final Retained COM Items with Meta-analysis Competitiveness Scales

Scale	Factor 1	Factor 2	Communalities
General Compet.	.345	**.840**	.82
Personal Enhance.	.245	**.766**	.65
PDCA	-.081	**.863**	.75
WOFO_Com	.468	**.536**	.51
CI	.418	**.662**	.61
SOQ	.423	**.703**	.67
HCA	**.867**	.252	.82
CQ_IC	**.756**	.332	.68
CCAS	**.838**	.000	.70
Pervasive Compet.	**.773**	.439	.79
Dominant Compet.	**.771**	.279	.67

Note. General Compet. = COM (General Competitiveness Subscale); Pervasive Compet. = COM (Pervasive Competitiveness Subscale); Dominant Compet. = COM (Dominant Competitiveness Subscale); Personal Enhance. = COM (Personal Enhancement Subscale); WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Confirmatory Factor Analysis Using Structural Equation Modeling

Confirmatory factor analysis was performed in order to determine the fit of our four-factor model of competitiveness in adequately assessing competitiveness overall. When determining a model's relative goodness of fit to a proposed latent variable, some researchers (Arbuckle, 1997; Tabachnick & Fiddell, 2007) have suggested that the ratio of chi-square value and degrees of freedom should not exceed 2. Morgenson and Humphrey (2006) along with Tabachnick and Fiddell have suggested that the root-mean-square error of approximation (RMSEA) and comparative fit index (CFI) should also be analyzed as measures of goodness of fit. These authors suggest that a low value on the RMSEA is indicative of a model with good fit (around .08), while in contrast, a high value on the CFI (around .90) illustrate a good fit. In this manner, CFI is succinctly described as a measure of fitness while RMSEA is a measure of error (Morgenson & Humphrey, 2006). Thus, each item loading on its respective scale was entered as a predictor of the overall model (see Figure 3), and the results of the model are presented in Table D43. Although our model's chi-square value was above the suggested cut-off score of 2 (a finding which occurs in most circumstances employing confirmatory factor analysis), values on the RMSEA and CFI indicated that the overall model is a good fit. Importantly, although dimensions were correlated, each item was significant in predicting the relationship between its respective scale and the overall model.

Table D43

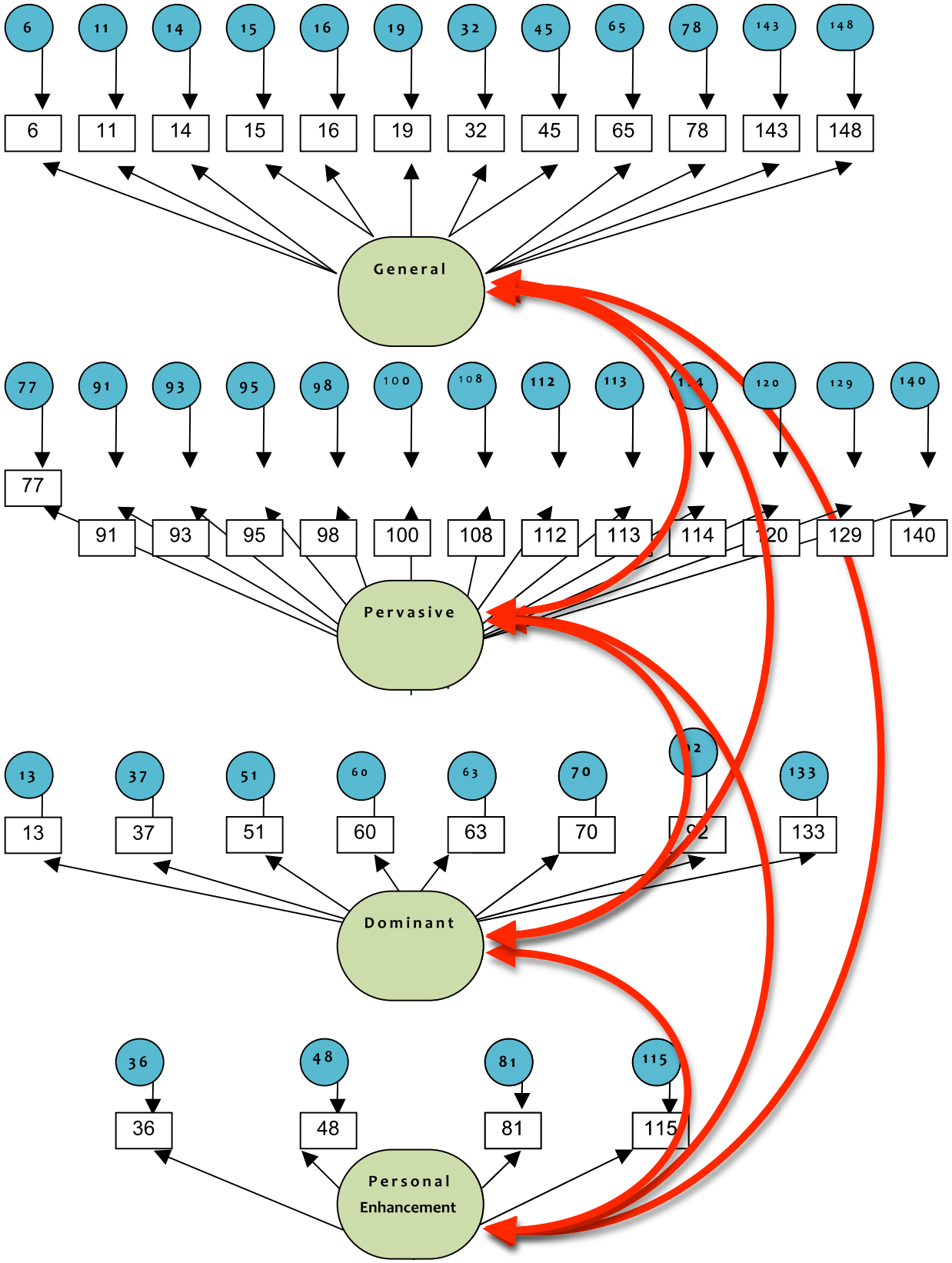
Confirmatory Factor Analysis Using the Four Factor Solution

Model	χ^2	*df*	χ^2/df ratio	RMSEA	CFI
4-factor	23618.762	623	37.91	.083	.835

Note. RMSEA= root-mean-square error of approximation; CFI= comparative fit index.

Figure 3

Confirmatory Factor Analysis of the COM



Discussion

In general, the purpose of the present study was to extend previous findings, particularly those reported in Houston et al.'s (2002) meta-analysis of various competitiveness scales, by providing evidence of at least two dimensions of competitiveness in a newly developed, psychometrically valid competitiveness scale, the Competitiveness Orientation Measure (COM). Broadly, we sought to achieve this goal by providing exploratory evidence and preliminary psychometric support of the COM followed by comparing and contrasting the dimensions obtained in the COM with those illustrated by Houston et al. (2002) to ensure construct validity of the COM. Fundamentally, Houston et al.'s (2002) meta-analysis outlined the need for two distinct dimensions of competitiveness; one dimension that summarized competitiveness as a desire to demonstrate superiority over others while the other was more focused on self-improvement and mastery.

In order to ensure efficient and valid comparisons between the current study and Houston et al.'s (2002) meta-analysis, it was necessary to compare results obtained in the present sample with those reported in the meta-analysis. Using all measures of competitiveness, with the exception of the COM, intercorrelational analyses revealed that competitiveness scales are highly intercorrelated; a finding that replicated the aforementioned meta-analysis. Several additional analyses comparing amount of missing data, reliabilities, and factor analysis replication using sophisticated empirical techniques revealed that the present study's samples were comparable to those used in previous competitiveness studies (Houston et al., 2002). Importantly, samples of community and student participants used in the current study did not differ on any competitiveness variable which ensured generalizability not only between the Houston et al. (2002) meta-analysis but also within samples employed in the present study. Ensuring

generalizability of competiveness scores was a crucial first step in establishing the very notion that competitiveness is a stable trait that differs between individuals and reliably across samples.

Secondly, in order to establish content validity of the COM as well as determine additional generalizability across samples, it was necessary to establish the factor structure of the seven most widely used competitiveness scales by replicating results obtained in Houston et al.'s (2002) meta-analysis. Using sophisticated, statistically-based data analysis techniques including Horn's Parallel analysis and the Velicer's test, a robust two-factor solution emerged. Our findings replicated those found in Houston et al. (2002), with community and student samples independently confirming the total sample. The Competitiveness subscale of the Work and Family Orientation Scale (WOFO) did tend to slightly waver between factors depending on whether student or community samples were used. For example, in the community sample the subscale loaded equally on both factors one and two; while for the student sample, it tended to load more strongly on the second factor (akin to Personal Enhancement). Differences in loadings were likely due to this subscale loading almost equally on both factors, as was seen in the present study as well as Houston's meta-analysis. Although the student sample in the present study seemed to more closely resemble that which was reported in Houston et al.'s student sample, differences observed were minimal and were likely due to sampling error, since the subscale is comprised of only four items.

Although it was necessary to replicate findings from Houston et al.'s (2002) meta-analysis, as well as to extend those findings by using a community sample, the primary goal of the present study was to develop a competitiveness scale that was psychometrically valid and capable of differentiating competitiveness as a multidimensional trait. Scale development protocols outlined in Jackson (1971), Dawis (1987), Clark and Watson (1995), and Devellis

(2003) were employed in the present study in order to guide item retention processes. Initial procedures involving the use of item retention based on corrected item-total correlations, discrimination indices, means and variances were employed and resulted in the retention of 37 finalized items. Importantly, although subscales were intercorrelated, each item loaded more strongly on its own subscale compared to any other subscale. As predicted, the elimination of items with poor psychometric properties revealed excellent levels of reliability for all subscales of the COM as well as the total scale. Split-half reliability was also found to be excellent. Additionally, hierarchical multiple regression revealed that each subscale was significant in adding unique variance in interpreting the overall competitiveness score.

Factor analytic procedures on the COM were hypothesized to reveal at least two orthogonal factors corresponding to Dominant and Personal-Enhancement Competitiveness. Consistent with our hypotheses, these factors did indeed emerge, in addition to two other unpredicted factors, equaling a total of four factors. Although the factors General Competitiveness and Pervasive Competitiveness were not explicitly hypothesized, they correspond to past theoretical descriptions and are intuitive in understanding competitiveness as a multidimensional trait. In regards to General Competitiveness, it seems logical that this factor contributes a substantial proportion of the variance in competitiveness since it can be regarded as a superordinate dimension that encompasses all other dimensions. Additionally, although Pervasive Competitiveness was not predicted, its emergence was logical in both its shared conceptual relationship with descriptions of dominance in addition to acting as a frequency dimension related to an indiscriminate need to compete. Additional theoretical support for each of the competitiveness dimensions is demonstrated below.

The COM Dimensions

General Competitiveness

Factor one consisted of 12 items, three of which were reversed and was labeled General Competitiveness. Factor one broadly reflects the degree to which an individual enjoys competition and considers him or herself to be a competitive person. Specific items reflect an individual's sense of personal fulfillment gained through competition, the degree to which he or she is motivated by competition and the extent to which an individual may feel his or her performance is enhanced by competition. Example items include "I am a competitive person" and "I perform better when I compete against others." This factor explained the most amount of variance compared to any other factor, which substantiates the title of "General" Competitiveness.

Theoretical support for factor one dates back to Triplett's (1897) definition of competitiveness, which included enjoyment and positive attitude towards competition and a strong desire to win in competitive contexts. As Houston et al. (2002) suggested in their pivotal meta-analysis, the most important question that researchers can ask is not simply *if* an individual likes to compete but more specifically *why* he or she competes. Although this factor assesses the "if," it is essential in determining the degree to which individuals enjoy competition in a general sense, and makes available Dominant and Personal Enhancement Competitiveness to address questions related to individuals' specific motivations for competition. Similar items to those loading on factor one are found on the Competitiveness subscale of the Work and Family Orientation Scale (e.g. "I really enjoy working in situations involving skill and competition"), the Hypercompetitive Attitude Scale (e.g. "Competition inspires me to excel"), the Sport Orientation Questionnaire (e.g. "I look forward to competing"), and the Emotion subscale of the

Competitiveness Questionnaire (e.g. “I get satisfaction from competing with others”).

Pervasive Competitiveness

Factor two consisted of 13 items, none of which were reversed. Factor two was named Pervasive Competitiveness in order to reflect the degree to which an individual indiscriminantly competes with others in daily life. Although this factor was not explicitly predicted, it is consistent with descriptions of competitiveness outlined in Horney’s (1937) original definition of hypercompetitiveness illustrating an individual’s need to compete with others, even in situations that do not call for competition. Although this factor was theoretically alluded to by Horney, empirical support for the factor is more adequately demonstrated in Ryckman’s Hypercompetitive Attitude Scale. This factor is therefore related to dominance in that an individual attempts to demonstrate superiority over others in all aspects of life, but is more centered on the pervasive quality of competitiveness rather than the act of dominating others itself. Specifically, items on this subscale illustrate competitive prevalence related to cognitions (e.g. “I think about competition a lot” and “I think a lot about ways to win”), importance of competition (e.g. “It is important for me to outperform others”), third party agreement (e.g. “Other people comment on how competitive I am”) and indiscriminance (e.g. “I like to be better than others at almost everything”). Similar items are found on the Competitiveness Questionnaire (e.g. “I wish to excel in all that I do”), and the Hypercompetitive Attitudes Scale (e.g. “I find myself being competitive in situations which do not call for competition” and “I compete with others even if they are not competing with me”).

Although very few items are found on other competitiveness scales indicating an individual’s level of Pervasive Competitiveness, this dimension is considered to be an important element of trait competitiveness partly due to its theoretical relationship with Dominant

Competitiveness, but also due to the unique ability to detect differences in Pervasiveness over and above what a high score on a Likert scale can predict. Thus, in comparison to a Likert scale, which simply assesses level of endorsement, this factor seems to assess a true qualitative difference between those who compete indiscriminantly and those who only compete when required to, according to the situational context. Uncovering this dimension of competitiveness is considered to be crucial in understanding the overall trait and may be effective in explaining performance outcomes in various contexts such as business and academics.

Dominant Competitiveness

Factor three consisted of eight items, five of which were reversed and was named Dominant Competitiveness. Although this factor is related to factor two, it is a more pure measure of Dominant Competitiveness as the focus is on the individual's need to be the best compared to others and to demonstrate superiority over others. This factor contains the emotional component of competitiveness as scoring highly would signify lack of emotional ambivalence towards competition. Specific items assess the individual's general level of caring towards winning (e.g. "I don't really care if I get beat in a competition"), and tendency to experience a sense of superiority over others when winning (e.g. "Being the best makes me feel powerful").

Theoretical support for Dominant Competitiveness stems from Horney's (1937) original conceptualization, which emphasized an individual's need to compete with others in order to demonstrate superiority and experience feelings of self-worth. Since then, Ryckman et al. (1990) have provided additional theoretical and psychometric support indicating that individuals high in hypercompetitiveness exert control and domination over others in an attempt to maintain feelings of superiority. Furthermore, Dominant Competitiveness is consistent with descriptions from Kagan and Madsen (1972) who outline that some individuals not only seek to be the best, but

also desire to deprive others of winning. These researchers found that, as early as childhood, a subset of individuals would decrease their personal gains in order to ensure that an opponent was left with nothing. In addition, Tjosvold et al. (2006) note that two methods of winning a competition are, first ensuring that you outperform others, and second ensuring that no individual outperforms you.

Similar items to those loading on Dominant Competitiveness are found on the WOFO (e.g. “It is important for me to perform better than others on a task”), the Sport Orientation Questionnaire (e.g. “Scoring more points than my opponent is very important to me”) and the Hypercompetitive Attitude Scale (e.g. “Winning in competition makes me feel more powerful as a person”).

Personal Enhancement Competitiveness

Factor four contained four items, none of which were reversed. Factor four was entitled Personal Enhancement in order to accurately reflect the measurement of individuals’ tendency towards competing for the purposes of demonstrating self-competence, mastery, achievement and self-improvement. Specific items assess the degree to which individuals perceive that a personal sense of competence (e.g. “Competition allows me to judge my level of competence”) and success (e.g. “Competition allows me to measure my own success”) are ameliorated through competitive means.

Theoretical support for Personal Enhancement Competitiveness comes from previous research (Griffin-Pierson, 1990; Ryckman et al., 1997) describing unique elements of competitiveness related to the desire to compete as a method to gain personal insight, competence and mastery of difficult tasks. This dimension of competitiveness has been shown to be related to the achievement motive- an individual’s tendency to strive for a personal standard

of quality (Houston et al., 2002). However, although achievement orientation is related to Personal Enhancement, it does not necessarily exist in other dimensions of competitiveness (Houston et al., 1992). Houston et al. (1992) note that individual standards of achievement are not a prerequisite for competitiveness in general; for example, an individual can be competitive without having a high personal standard of achievement and the current study's dimensions would support this notion.

Similar items are found on the Work and Family Orientation Scale (e.g. "If I am not good at something I would rather keep struggling to master it then move on to something I may be good at"), the Personal Development Competitive Attitudes scale (e.g. "I value competition because it helps me to be the best that I can be"), the Sport Orientation Questionnaire (e.g. "Reaching personal performance goals is very important to me"), the Competitiveness Questionnaire (e.g. "I am not disappointed if I do not reach a goal that I have set for myself").

The Relationship between Competitiveness, Social Desirability and Machiavellianism

In accordance with past studies reporting conflicting results describing the relationship between social desirability and competitiveness, no specific hypotheses were made. For example, Ryckman et al. (1996) found hypercompetitiveness to be negatively correlated with social desirability, while Ryckman et al. (1997) found the opposite pattern. Results indicated that although social desirability and competitiveness were positively correlated, each item shared a stronger relationship with its own scale compared to the social desirability scale, a process suggested by Jackson (1971) in order to establish adequate discriminant validity. Although social desirability was correlated with all subscales of the COM, the strongest relationships were observed between Pervasive Competitiveness and Dominant Competitiveness and social

desirability. Thus, individuals who use competition as a means to demonstrating superiority over others and those that view almost every situation as a way to demonstrate this superiority, also tend to present themselves in a socially desirable manner. This finding is not surprising due to Horney's (1937) original theoretical definition of hypercompetitiveness which included the need for some individuals to not only prove their dominance over others, but also to be regarded by others as being superior, unique and exceptional. Since then, this theoretical description has been substantiated by empirical research by Ryckman et al. (1990).

Due to past researchers having evidenced construct-validity for competitiveness scales by comparing Dominant competitiveness to Machiavellianism (Martin & Larsen, 1976; Ryckman et al., 1994), we hypothesized a significant positive relationship between these two variables and included this measure in order to further demonstrate construct validity for the COM. As predicted, a significant relationship was found in the anticipated direction for all COM subscales and this relationship was statistically strongest for Dominant Competitiveness and Pervasive Competitiveness (see Table D41). Thus, individuals high on Dominant or Pervasive Competitiveness also tended to be manipulative, cold, and suspicious of others.

Most importantly, the present study supported the concept that competitiveness may be a stable and unique individual differences variable. Although past research has neglected to differentiate competitiveness as a trait, the present study suggests that competitiveness is generalizable beyond an undergraduate sample. In fact, this is the only known study to examine trait competitiveness outside of an undergraduate sample. Furthermore, although gender differences were observed, effect sizes were very small and means were remarkably similar between genders. This finding would support previous research that outlines that competitiveness

is more positively related to the psychological construct of masculinity rather than being biologically male (Adams et al., 1985; Cashdan, 1998, as cited in Salvador & Costa, 2009).

The Utility of the COM in Explaining Real-World Behaviour

In addition to providing support for competitiveness as a stable trait that generalizes beyond a student population and young adulthood, the COM factors were also shown to provide some evidence that competitiveness explains behavioural differences between individuals. For example, higher grade point averages in the present sample was related to having increased levels of General Competitiveness, Dominant Competitiveness, and Personal Enhancement Competitiveness, although the relationship was weaker for Pervasive Competitiveness in comparison to Personal Enhancement Competitiveness (see Table D44). Not surprisingly, the strongest relationship between grade point average and competitiveness existed with Personal Enhancement Competitiveness, although correlational differences were only significant in regards to Personal Enhancement Competitiveness compared to Pervasive Competitiveness (*z-score* difference = -1.88, $p < .05$). Z-tests comparing the aforementioned correlational differences demonstrated that significance was approached when comparing Personal Enhancement Competitiveness to Dominant Competitiveness (*z-score* difference = 1.39, $p = .08$). Thus, although it seems intuitive that individuals who use competitive means to measure personal success would have higher grades, the finding that the COM is an effective means of detecting these differences provides extensive empirical support for the utility of the measure. Even more importantly, the finding that the COM factors are useful in explaining real world differences provides discriminant validity for the factors' feasibility in being able to detect differences between individuals, despite the finding that they are intercorrelated.

In addition to grade point average, each factor of the COM was shown to be positively

and significantly correlated to an increased likelihood of participants endorsing being competitive in a number of daily life activities. For example, individuals who endorsed being competitive in many settings, such as school, occupational settings, sports, other forms of leisure, video games, their social life, gambling, and family settings were also more likely to score highly on the COM. Thus, the importance of the COM in being able to assess real world behavioural differences between competitive and noncompetitive individuals provides validity for the measure itself.

Is Competitiveness Adaptive or Maladaptive? A Multidimensional Explanation

In general, the utility of distinguishing multidimensional individual differences in trait competitiveness provides possible theoretical explanations of why competitiveness has been regarded by researchers as a conflictingly beneficial and maladaptive trait. On one hand, some authors have argued that competitiveness studies using social comparisons were related to an individual's sense of personal success or self-doubt depending on whether or not the individual had a chronically activated competitive or cooperative mindset (Stapel & Koomen, 2005). Although the notion of chronically activated competitive cognitions seems most relevant to the dimension of Pervasive Competitiveness, it nonetheless helps to explain why a dimensional framework of competitiveness is required and demonstrates additional support for this unpredicted factor. For example, Stapel and Koomen (2005) noted that even in non-competitive situations, competitive individuals exhibit psychological states that interfere with processing social information, making it more likely that competitive individuals will interpret a non-threatening target person as being different as opposed to similar to them. Thus, competitive individuals seem to have chronically activated cognitions that make it more likely that they will see another person as being an opponent. The notion of chronically activated cognitions provides

additional support for Pervasive Competitiveness, indicating that individuals high on this dimension have an indiscriminant need to be competitive in all contexts.

In addition to chronically activated cognitions, some research has found that individuals who compete not only to win, but to deprive others of winning (as in Dominant Competitiveness) have an increased likelihood of wanting to abandon an occupational group and seek employment elsewhere. In addition, Helmreich et al. (1982) found competitiveness to be associated with decreased levels of achievement. Furthermore, not only is competitiveness related to occupational abandonment and lower levels of achievement in general, but also some authors argue that the personal importance of the situation to the individual drives whether or not the individual will perceive a competitive situation as threatening (Maxwell-Smith & Seligman, 2010). Additional difficulties, such as a fragile sense of self-worth, have been found to arise when an individual sees their self-esteem as being contingent on winning (Crocker & Wolfe, 2001). Although there is some evidence to suggest that competitiveness is almost always maladaptive, some researchers argue that if competition were entirely destructive, people would simply not involve themselves with it (Tjosvold, Johnson, Johnson, & Sun, 2006).

In contrast to what was outlined above, some researchers have found that competitiveness is related to positive outcomes. According to Forsyth (1999), competition is an effective motivator since individuals involved exert increased effort and set higher goals. Additionally, Tjosvold et al. (2006) outlined that an internal motivation to compete was associated with a tendency to increase task effectiveness, experience increased positive attitudes and commitment towards competition, experience positive relationships with competitors and display an internal desire to compete. According to Kirkcaldy et al. (2003) competitiveness has been depicted as not only a desired, but also an ideal personality characteristic for those employed in management

positions. Additionally, competitiveness has been shown to predict economic prosperity (Lynn, 1991) and some preliminary evidence has suggested that adults who are high in competitiveness tend to have higher incomes and teach their children to adopt a more vigilant attitude towards excessive spending (Kilcaldy et al., 2003). Additionally, some dimensions of trait competitiveness, such as mastery and competitiveness (akin to Dominant Competitiveness) have been shown to be related to increased occupational salary and number of citations for authors (Helmreich, 1982). Thus, identifying competitiveness indices may help to explain how competition can be understood as being both mutually constructive and destructive (Tjosvold et al., 2006).

The utility of defining competitiveness as a multidimensional trait theoretically explains how it has received such conflicting empirical findings. Dweck and Leggett's (1988) theory regarding goals states that when individuals focus on performance, rather than mastery, they experience a loss of self-efficacy, withdrawal of effort, divided attention, negative affect and few intrinsic rewards. On the other hand, when the focus is on gaining mastery, the individual experiences an increased level of self-efficacy, increased effort exertion, undivided attention, positive affect and an increased sense of intrinsic motivation. Thus, performance and mastery goals may be related to competitiveness dimensions of Dominant and Personal Enhancement Competitiveness and lack of clarity in definitions of competitiveness may help to explain areas of confusion in competitiveness research.

Competitive Orientation goes beyond behavioural outcomes, such as GPA and life outcomes, and may even help to explain conflicting results in studies examining neuroendocrinological responses to competition. Although there exists no direct evidence relating differences in competitiveness factors to physiological responses (partly since, until

now, these dimensions were neither explicitly theorized nor measurable), some preliminary research suggests that a multidimensional perspective may help to explain why physiological differences to similar competitive situations differ so drastically between participants. Results measuring cortisol, a hormone which has been reliably related to stress (Pruessner, Hellhammer & Kirschbaum, 1999), has been shown to be particularly inconsistent. For example, in a live basketball game, González-Bono, Salvador, Ricarte, Serrano, and Arnedo (2000) found increases in cortisol for winning and losing teams and suggested that individual differences in competitiveness should be explored in future research as a moderator of physiological responses to competition. Furthermore, in a recent meta-analysis, Salvador and Costa (2009) summarized that conflicting results in testosterone and cortisol responses as a reaction to competition may be attributed to cognitive interpretations of the event due to individual differences in competitiveness. Thus, differences in competitiveness, as measured by a multidimensional, psychometrically sound scale such as the COM, may help to explain why some individuals seem to excel in competitive situations, while others seem to exhibit an increased stress response. Salvador and Costa (2009) summarize that competition is essential to an adaptive role of gaining primary reinforcements, such as food and shelter, as well as secondary reinforcements such as employment, graduate school admissions, and monetary rewards. In addition, social status makes apparent several beneficial physiological characteristics such as neuroendocrine responses, body weight, cardiovascular health, and neuro-chemical and immunological responses. These authors note that dominating males are less likely to have high levels of cortisol and more likely to have high levels of testosterone, a pattern which is especially evident in lower primates. However, these authors note that results presented concerning physiological responses in competition "do not reflect a clear, unanimous panorama" of the human stress response (p. 163). These authors

argue that personality is a potential moderating variable that determines what a given individual's physiological response will be to a competitive situation. They argue that how the event is interpreted by any given individual due to differences in personality would have profound effects on their physiological response. Thus, they note that although research on human competition was catalyzed by evolutionary perspectives, empirical findings are more and more easily interpreted only through the consideration of individual differences in competitiveness. Future research should attempt to relate specific physiological responses to competitiveness dimensions and behavioural indices from a multitrait-multimethod perspective (Knäuper & Klein, 2006) in order to more explicitly identify multidimensional differences in competitiveness.

Due to the conflicting nature of outcomes related to competitiveness, the theoretical and empirical evidence calling for competitiveness to be understood as a multidimensional trait is overwhelming. Defining it as such may be the missing piece of the puzzle that can finally help researchers to understand whether some aspects of competitiveness (Personal Enhancement) may give individuals an advantage while other aspects (such as Dominant Competitiveness or Pervasive Competitiveness) may lead them to ultimate failure. Thus, the current research supports the notion that competition is not merely contextual; it occurs as a stable trait within the individual.

Even in competitive and non-competitive contexts, such as the classic Prisoner's Dilemma (a game where players must choose between competing or cooperating with a hypothetical opponent to maximize personal gain or sacrifice some gain to ensure that the opponent is left with less), Kuhlman and Marshello (1975) found that the majority of participants responded consistently and had minimal regard for whether they were being subjected to a

competitive or cooperative game condition. These authors therefore proposed that, since the majority of participants responded with consistency, regardless of the competitive context, examining individual differences in competitiveness is crucial to understanding the complete spectrum of competitive behaviour. Thus, they concluded that "subjects failing to show a consistent preference for a single [competitive] motive have been the exception rather than the rule" (p. 930). These authors indicated that a substantial proportion of variation in competitive situations could be understood by going outside of the competitive context and within the motivational orientation of the individual. They concluded that researchers often mistakenly imply that the physical competitive structure is equivalent to the psychological structure of its participants. Although the COM will undoubtedly be beneficial in understanding this psychological structure, it is not without limitations.

Limitations and Suggestions for Future Research

First, although some convergent validity was demonstrated in terms of how the COM theoretically relates to other competitiveness scales, future research should demonstrate additional discriminant validity by comparing the COM with other scales measuring similar constructs. Specifically, future research should attempt to demonstrate discriminant validity using measures of achievement striving, motivation, and dominance. Furthermore, although some preliminary convergent validity was established in the present study, we recognize that establishing validity is an ongoing process (Downing, 2003) and that one study, in isolation, is incapable of ascertaining validity. Additionally, we recognize that establishing validity is not simply a binary "yes/no" process and that researchers should view validity as an enduring hypothesis to be tested (Downing, 2003).

Secondly, there were a substantial number of participants with missing data in the present

study. Although no differences were found between individuals with completed and non completed questionnaires, and advanced statistical methods, such as multiple imputation, were used in order to handle missing data, any amount of missing data is certain to have some degree of influence on the data. Due to missing data analyses revealing patterns of non-completion towards the end of the study, the missing data in the present study was likely due to effects of fatigue; for example, questionnaires took approximately 90 minutes to complete and questions tended to be quite repetitive. Although this pattern of missing data did not have any statistical impact on the results observed, questionnaires could have been counterbalanced in the present study in order to more evenly disperse missing data.

Third, there may have been a certain degree of sampling bias that emerged. For example, some recruitment posters stated that participants were being sought for a study about personality and competitiveness. Therefore, the degree to which attenuation due to range restriction may have occurred is unknown through having only competitive people volunteer to participate. However, even if a degree of sampling bias did occur, future studies eliminating this potential bias would be expected to demonstrate even more robust results due to having a larger variability of competitiveness scores. Fourth, some items on various subscales of the COM were slightly redundant. Although constructing somewhat redundant items is an important element of scale development (Devellis, 2006) in order to ensure high internal consistency, having items that are too similar can lead to a reduction in content validity. Future versions of the COM should eliminate items that are redundant. Additionally, future studies should explore test-retest reliability in order to provide increased evidence of the stability of the trait.

Lastly, although some preliminary evidence in the present study found that the COM is effective in predicting real world behaviours, such as GPA, future studies should determine the

degree to which competitiveness dimensions relate to other areas such as occupational and sport success.

In summary, deciphering the multidimensional framework of competitiveness as a personality trait is a necessary component to advancing the field of competitiveness and personality in general. Specifically, understanding competitiveness as a multidimensional trait can help to explain conflicting results regarding behavioural and physiological outcome research. Importantly, the COM was shown to be a theoretically and psychometrically sound, unified, and multidimensional measure of competitiveness that is capable of measuring behavioural outcomes such as academic performance. Additionally, the COM is independently validated in a community sample, making it generalizable beyond a student sample. The development of the COM is a necessary first step in fueling competitiveness research and has substantial significance for understanding success in sport, academic and occupational settings.

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Appendix A

Administered Measures

Table A1

Competitive-Cooperative Attitude Scale (Martin & Larsen, 1975)

---

1 strongly disagree
2 slightly disagree
3 neither agree nor disagree
4 slightly agree
5 strongly agree

---

1. People who get in my way end up paying for it

1 2 3 4 5

2. The best way to get someone to do something is to use force

1 2 3 4 5

3. It is alright to do something to someone to get even

1 2 3 4 5

4. I don't trust very many people

1 2 3 4 5

* 5. It is important to treat everyone with kindness

1 2 3 4 5

6. It doesn't matter who you hurt on the road to success

1 2 3 4 5

* 7. Teamwork is really more important than who wins

1 2 3 4 5

8. I want to be successful, even if it's at the expense of others

1 2 3 4 5

9. Do not give anyone a second chance

1 2 3 4 5

10. I play a game like my life depended on it

1 2 3 4 5

11. I play harder than my teammates

1 2 3 4 5

12. All is fair in love and war

1 2 3 4 5

13. Nice guys finish last

1 2 3 4 5

14. Losers are inferior

1 2 3 4 5

15. A group slows me down

1 2 3 4 5

* 16. People need to learn to get along with others as equals

1 2 3 4 5

17. My way of doing things is best

1 2 3 4 5

18. Every man for himself is the best policy

1 2 3 4 5

19. I will do anything to win

1 2 3 4 5

20. Winning is the most important part of the game

1 2 3 4 5

* 21. Our country should try harder to achieve peace among all

1 2 3 4 5

* 22. I like to help others

1 2 3 4 5

23. Your loss is my gain

1 2 3 4 5

24. People who overcome all competitors on the road to success are models for all young people to admire

1 2 3 4 5

25. The more I win the more powerful I feel

1 2 3 4 5

* 26. I like to see the whole class do well on a test

1 2 3 4 5

* 27. I try not to speak unkindly of others

1 2 3 4 5

28. I don't like to use pressure to get my way

1 2 3 4 5

Note. * = cooperative items; Aggression Orientation items = (8, 9, 12, 13, 22, 23, 24, 26, 27); Fascist Tendencies items = (2, 4, 5, 6, 8, 9, 10, 12, 14, 17); Work Ethic Orientation items = (10, 11, 12, 21); Power Orientation items = (4, 5, 6, 9, 21, 25, 26, 27, 28); Independence Orientation items = (9, 13, 15, 16, 17, 25).

Table A2

The Work and Family Orientation Questionnaire-2 (Spence & Helmreich, 1978)

---

1 Strongly agree
2 Slightly agree
3 Neither agree nor disagree
4 Slightly disagree
5 Strongly disagree

---

1. I would rather work in a situation where group effort is stressed and more important rather than one in which my individual effort is stressed.

   1 2 3 4 5

2. I more often attempt difficult tasks that I am not sure I can do than easier tasks I believe I can do.

   1 2 3 4 5

3. It is very important for me to do my work as well as I can even if it isn't popular with my co-workers.

   1 2 3 4 5

4. I would rather do something at which I feel confident and relaxed than something which is challenging and difficult.

   1 2 3 4 5

5. I would rather learn fun games that most people know than a difficult thought game.

   1 2 3 4 5

6. If I am not good at something I would rather keep struggling to master it than move on to something I may be good at.

   1 2 3 4 5

7. I really enjoy working in situations involving skill and competition.

   1 2 3 4 5

8. When a group I belong to plans an activity, I would rather organize it myself that have someone else organize it and just help out.

1 2 3 4 5

9. Once I undertake a task, I dislike goofing up and not doing the best job I can.

1 2 3 4 5

10. I think more if the future than of the present and past.

1 2 3 4 5

11. I hate losing more than I like winning.

1 2 3 4 5

12. I worry because my success may cause other to dislike me.

1 2 3 4 5

13. It is important to me to perform better than others on a task.

1 2 3 4 5

14. I feel winning is very important in both work and games.

1 2 3 4 5

Note. * = reversed items; Competitiveness items = (7, 8, 13, 14); Work items = (2, 3); Personal Unconcern items = (1, 9, 12); Mastery items = (4- also loads on work, but more strongly related to mastery, 5, 6); Items failing to load on any scale = (10, 11).

Table A3

Sports Orientation Questionnaire (Gill & Deeter, 1988)

A Strongly agree
B Slightly agree
C Neither agree nor disagree
D Slightly disagree
E Strongly disagree

---

1. I am a determined competitor.

A B C D E

2. Winning is important

A B C D E

3. I am a competitive person.

A B C D E

4. I set goals for myself when I compete.

A B C D E

5. I try my hardest to win.

A B C D E

6. Scoring more points than my opponent is very important to me.

A B C D E

7. I look forward to competing.

A B C D E

8. I am most competitive when I try to achieve personal goals.

A B C D E

9. I enjoy competing against others.

A B C D E

10. I hate to lose.

A B C D E

11. I thrive on competition.

A B C D E

12. I try hardest when I have a specific goal.

A B C D E

13. My goal is to be the best athlete possible.

A B C D E

14. The only time I am satisfied is when I win.

A B C D E

15. I want to be successful in sports.

A B C D E

16. Performing to the best of my ability is very important to me.

A B C D E

17. I work hard to be successful in sports.

A B C D E

18. Losing upsets me.

A B C D E

19. The best test of my ability is competing against others.

A B C D E

20. Reaching personal performance goals is very important to me.

A B C D E

21. I look forward to the opportunity to test my skills in competition.

A B C D E

22. I have the most fun when I win.

A B C D E

23. I perform my best when I am competing against an opponent.

A B C D E

24. The best way to determine my ability is to set a goal and try to reach it.

A B C D E

25. I want to be the best every time I compete.

A B C D E

Note. * = reversed items; Competitiveness items = (1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25); Win Orientation items = (2, 6, 10, 14, 18, 22); Goal Orientation items = (4, 8, 12, 16, 20, 24).

Table A4

Hypercompetitive Attitude Scale (Ryckman et al., 1990)

---

1 Never true of me
2 Seldom true of me
3 Sometimes true of me
4 Often true of me
5 Always true of me

---

1. Winning in competition makes me feel more powerful as a person.

1 2 3 4 5

2. I find myself being competitive even in situations which do not call for competition.

1 2 3 4 5

* 3. I do not see my opponents in competition as my enemies.

1 2 3 4 5

4. I compete with others even if they are not competing with me.

1 2 3 4 5

* 5. Success in athletic competition does not make me feel superior to others.

1 2 3 4 5

* 6. Winning in competition does not give me a greater sense of worth.

1 2 3 4 5

7. When my competitors receive rewards for their accomplishments, I feel envy.

1 2 3 4 5

8. I find myself turning a friendly game or activity into a serious contest or conflict.

1 2 3 4 5

9. It's a dog-eat-dog world. If you don't get the better of others, they will surely get the better of you.

1 2 3 4 5

* 10. I do not mind giving credit to someone for doing something that I could have done just as well or better.

1 2 3 4 5

11. If I can disturb my opponent in some way in order to get the edge in competition, I will do so.

1 2 3 4 5

12. I really feel down when I lose in athletic competition.

1 2 3 4 5

* 13. Gaining praise from others is not an important reason why I enter competitive situations.

1 2 3 4 5

14. I like the challenge of getting someone to like me who is already going with someone else.

1 2 3 4 5

* 15. I do not view my relationships in competitive terms.

1 2 3 4 5

* 16. It does not bother me to be passed by someone while I am driving on the roads.

1 2 3 4 5

17. I can't stand to lose an argument.

1 2 3 4 5

* 18. In school, I do not feel superior whenever I do better on tests than other students.

1 2 3 4 5

* 19. I feel no need to get even with a person who criticizes or makes me look bad in front of others.

1 2 3 4 5

* 20. Losing in competition has little effect on me.

1 2 3 4 5

21. Failure or loss in competition makes me feel less worthy as a person.

1 2 3 4 5

22. People who quit during competition are weak.

1 2 3 4 5

23. Competition inspires me to excel.

1 2 3 4 5

* 24. I do not try to win arguments with members of my family.

1 2 3 4 5

* 25. I believe that you can be a nice guy and still win or be successful in competition.

1 2 3 4 5

* 26. I do not find it difficult to be fully satisfied with my performance in a competitive situation.

1 2 3 4 5

Note. * = reversed items.

Table A5

Personal Development Attitude Scale (Ryckman et al., 1996)

---

1 Strongly disagree
2 Slightly disagree
3 Neither agree nor disagree
4 Slightly agree
5 Strongly agree

---

1. I enjoy competition because it gives me a chance to discover my abilities.

1 2 3 4 5

* 2. Competition does not increase my awareness and understanding of myself and others.

1 2 3 4 5

3. Competition can lead to the formation of friendship with others.

1 2 3 4 5

* 4. Competition is not a means of motivating me to bring out the best in myself.

1 2 3 4 5

5. I enjoy competition because it tends to bring out the best in me rather than as a means of feeling better than others.

1 2 3 4 5

* 6. I do not find competition to be a very valuable mans of learning about myself and others.

1 2 3 4 5

7. I like competition because it teaches me a lot about myself.

1 2 3 4 5

8. I value competition because it helps me to be the best that I can be

1 2 3 4 5

9. I find competition enjoyable because it lets me express my own potentials and abilities during competition.

1 2 3 4 5

* 1O. Competition does not help me develop my abilities more.

1 2 3 4 5

11. Without the challenge of competition I might never discover that I had certain potentials or abilities.

1 2 3 4 5

12. I enjoy competition because it brings me and my competitors closer together as human beings.

1 2 3 4 5

13. I enjoy competition because it helps me to develop my own potentials more fully than if I engages in these activities alone

1 2 3 4 5

14. I enjoy competition because it brings me to a higher level of motivation to bring the best out of myself rather than as a means of doing better than others.

1 2 3 4 5

15. Through competition I feel that I am contributing to the well-being of others.

1 2 3 4 5

Note. * = reversed items.

Table A6

The Competitiveness Questionnaire (Griffin-Pearson, 1990)

For each item, indicate how much you agree or disagree with the statements, as it refers to yourself, by choosing the appropriate letter [number] on the scale, A, B, C, D, or E [1, 2, 3, 4, or 5].

1 Strongly disagree
2 Slightly disagree
3 Neither agree nor disagree
4 Slightly agree
5 Strongly agree

---

1. I would want to get an A because that is the best grade a person can get.

1 2 3 4 5

2. I perform better when I am competing against someone rather than when I am the only one striving for a goal.

1 2 3 4 5

3. I do not care to be the best that I can be.

1 2 3 4 5

4. When applying for an award I focus on my qualifications for the award and why I deserve it, not on how the other applicants compare to me.

1 2 3 4 5

5. I do not feel that winning is important in both work and games.

1 2 3 4 5

6. When I win an award or game it means that I am the best compared to everyone else that was playing. It is only fair that the best person win the game.

1 2 3 4 5

7. In school, I always liked to be the first one finished with a test.

1 2 3 4 5

8. I am not disappointed if I do not reach a goal that I have set for myself.

1 2 3 4 5

9. I have always wanted to be better than others.

1 2 3 4 5

10. Achieving excellence is not important to me.

1 2 3 4 5

11. When nominated for an award, I focus on how much better or worse the other candidates' qualifications are as compared to mine.

1 2 3 4 5

12. I would want an A because that means that I did better than other people.

1 2 3 4 5

13. I wish to excel in all that I do.

1 2 3 4 5

14. Because it is important that a winner is decided, I do not like to leave a game unfinished.

1 2 3 4 5

16. I would rather work in an area in which I can excel, even if there are other areas that would be easier or would pay more money.

1 2 3 4 5

Note. * = reversed items; Goal Competitiveness items = (1, 3, 4, 8, 10, 13, 15); Interpersonal Competitiveness items = (2, 5, 6, 7, 9, 11, 12, 14).

Table A7

Competitiveness Index (Smither & Houston, 1992)

1. I like competition.	T	F
2. I find competitive situations unpleasant.	T	F
3. I don't like competing against other people.	T	F
4. I enjoy competing against an opponent.	T	F
5. I try to avoid competing with other.	T	F
6. I get satisfaction from competing with others.	T	F
7. I dread competing against other people.	T	F
8. I am a competitive individual.	T	F
9. Competition destroys friendships.	T	F
10. I will do almost anything to avoid an argument.	T	F
11. I try to avoid arguments.	T	F
12. I often remain quiet rather then risk hurting another person's feelings.	T	F
13. In general, I will go along with the group rather then create conflict.	T	F
14. I don't enjoy challenging others, even when I think they are wrong.	T	F
15. I would like to be on a debating team.	T	F
16. Games that have no clear-cut winner are boring.	T	F
17. It's usually not important to me to be the best.	T	F
18. I often try to outperform others.	T	F
19. When I play a game, I like to keep score.	T	F
20. I don't like games that are winner-take-all.	T	F

Note. * = reversed items; Emotion items = (1 through 9); Argument items = (10 through 15); Games items = (16 through 20).

Table A8

Participant Demographics

---

1. Please indicate your gender:
   - ☐ Male
   - ☐ Female

2. Please indicate your age: _____

3. What year of university are you currently in?
   - ☐ Year 1
   - ☐ Year 2
   - ☐ Year 3
   - ☐ Year 4
   - ☐ Year 5 and above

4. What is your major? _____

5. What is your current Grade Point Average? (From 0% to 100%) _____
☐ Don't know

6. What areas of your life are you competitive in? (check all that apply)
   - ☐ School (please specify)_____
   - ☐ Occupation (please specify)_____
   - ☐ Sports (please specify)_____
   - ☐ Other forms of leisure (please specify) _____
   - ☐ Video Games (please specify)_____
   - ☐ Social life (please specify)_____
   - ☐ Gambling (please specify)_____
   - ☐ Family (please specify)_____
   - ☐ Almost every area of my life (please specify)_____
   - ☐ Other (please specify)_____

Table A9

The Competitiveness Orientation Measure (COM)

The following scale measures aspects of competitiveness. Please read each question carefully and try to answer as honestly as possible. Do not spend too much time on any one item; if trying to decide between two responses, choose the one that first comes to mind.

1 Strongly disagree
2 Slightly disagree
3 Neither agree nor disagree
4 Slightly agree
5 Strongly agree

---

1. Competing allows me to prove that I am the best.

   1 2 3 4 5

2. I like to be better at things than others.

   1 2 3 4 5

3. Competition is a way to demonstrate my competence.

   1 2 3 4 5

4. I compete with others to improve myself.

   1 2 3 4 5

5. I get a lot of enjoyment out of competition.

   1 2 3 4 5

6. I compete with people even when they don’t realize it.

   1 2 3 4 5

7. I would do almost anything to make my opponent lose.

   1 2 3 4 5

8. * There is no point to competition.

   1 2 3 4 5

9. * I cannot learn anything new about myself by competing with others.

   1 2 3 4 5

10. I enjoy setting and beating goals through competition.

    1 2 3 4 5

11. I would like to try something difficult, even if I knew I wouldn't be the best.

    1 2 3 4 5

12. * I don't really care if I get beat in a competition.

    1 2 3 4 5

13. I am a competitive person.

    1 2 3 4 5

14. I enjoy competing against others.

    1 2 3 4 5

15. * I do not find competition self-fulfilling.

    1 2 3 4 5

16. There is no unfair way to win.

    1 2 3 4 5

17. Competition is a way for me to reach my goals.

    1 2 3 4 5

18. I love the thrill of competition.

    1 2 3 4 5

19. Competition is an opportunity to learn where my skills can be improved.

1 2 3 4 5

20. I enjoy competition only when there is a clear-cut winner and loser.

1 2 3 4 5

21. * Competing does not allow me to demonstrate how superior my skills are.

1 2 3 4 5

22. Competing allows me to prove that my skills are better than others'.

1 2 3 4 5

23. Competing allows me to be the best I can be.

1 2 3 4 5

24. I am constantly measuring my abilities in comparison to other people.

1 2 3 4 5

25. I don't care if I win, as long as I don't lose.

1 2 3 4 5

26. * Competing does not allow me to demonstrate my superiority over others.

1 2 3 4 5

27. I would only compete when I knew I had a chance of winning.

1 2 3 4 5

28. Competition allows me to improve myself.

1 2 3 4 5

29. I would rather lose a competition that requires a great degree of skill than win at a competition that requires less skill.

1 2 3 4 5

30. * Competing doesn't really matter to me.

1 2 3 4 5

31. I love to compete.

1 2 3 4 5

32. Competition allows me to judge how I am doing.

1 2 3 4 5

33. I can improve my competence by competing.

1 2 3 4 5

34. * I don't care if other people are better at things than I am.

1 2 3 4 5

35. I always have to be the best at things.

1 2 3 4 5

36. Even when there is no competition, I like to compare myself to others to show I am the best.
1 2 3 4 5

37. I would rather improve my abilities than dominate an opponent.

1 2 3 4 5

38. *Competition does not allow me to master any abilities.

1 2 3 4 5

39. I wouldn't mind coming second place to a person who is more skilled than I am.

1 2 3 4 5

40. * I never try to be the best person on a team.

1 2 3 4 5

41. I perform better when I compete against others.

1 2 3 4 5

42. * I don't believe that I will improve my skills by competing.

1 2 3 4 5

43. Competition allows me to measure my own success.

1 2 3 4 5

44. The only point of competition is to beat others.

1 2 3 4 5

45. I like to compete against my own personal standards.

1 2 3 4 5

46. Winning makes me feel superior to others.

1 2 3 4 5

47. * I wouldn't mind finishing in second place in a competition.

1 2 3 4 5

48. I don't care if I win or lose, as long as I improve myself.

1 2 3 4 5

49. I think a lot about dominating others in a competition.

1 2 3 4 5

50. I put a lot of effort into winning in order to prove to myself that I can do something.

1 2 3 4 5

51. Competition is a way to dominate an opponent.

1 2 3 4 5

52. * Competition teaches me nothing about myself.

1 2 3 4 5

53. I like being the best compared to other people.

1 2 3 4 5

54. I think a lot about winning.

1 2 3 4 5

55. Competing against others allows me to gain self-insight.

1 2 3 4 5

56. * Losing in a competition wouldn't bother me.

1 2 3 4 5

57. I would rather win a competition that does not require a lot of skill than come second place in a competition that requires more skill.

1 2 3 4 5

58. Competition motivates me.

1 2 3 4 5

59. * Competing with others does not allow me to enhance my skill set.

1 2 3 4 5

60. I can learn a lot from a superior opponent.

1 2 3 4 5

61. *Competition does not allow me to become more competent.

1 2 3 4 5

62. Being the best makes me feel powerful.

1 2 3 4 5

63. I hate coming second place to someone, even if I know they are more skilled.

1 2 3 4 5

64. I am determined to win.

1 2 3 4 5

65. * Competition does not allow me to gauge my success.

1 2 3 4 5

66. I would only compete if other people appreciated my success.

1 2 3 4 5

67. * Competition does not allow me to judge my abilities.

1 2 3 4 5

68. Competing against others allows me to improve my skills.

1 2 3 4 5

69. Other people comment on how competitive I am.

1 2 3 4 5

70. I like to challenge others.

1 2 3 4 5

71. I would only compete if it were for a prize.

1 2 3 4 5

72. * I cannot measure my own success by competing with others.

1 2 3 4 5

73. Competition allows me to judge my level of competence.

1 2 3 4 5

74. Anything less than first place is losing.

1 2 3 4 5

75. *I would not care about dominating an opponent.

1 2 3 4 5

76. I get a lot of enjoyment from improving my standing in a competition.

1 2 3 4 5

77. I would do almost anything to prove my superiority over others.

1 2 3 4 5

78. I love to dominate over other people in a competition.

1 2 3 4 5

79. Winning allows me to demonstrate my capabilities.

1 2 3 4 5

80. I get a lot of enjoyment out of beating an opponent.

1 2 3 4 5

81. Competition gets my adrenaline pumping.

1 2 3 4 5

82. I think about competition a lot.

1 2 3 4 5

83. * Winning does not make me feel superior to others.

1 2 3 4 5

84. I think a lot about ways to win.

1 2 3 4 5

85. Winning makes me feel skilled.

1 2 3 4 5

86. I view almost every situation as a way to prove that I am better at things than others.

1 2 3 4 5

87. * Competition does not allow me to reach my goals.

1 2 3 4 5

88. I would hate it if I got beat at something.

1 2 3 4 5

89. Others notice that I am competitive.

1 2 3 4 5

90. For as long I can remember, I have wanted to outperform others.

1 2 3 4 5

91. Competing against an opponent is a good opportunity to improve my skills.

1 2 3 4 5

92. I can't stand to lose.

1 2 3 4 5

93. * I never use competition as an opportunity to improve myself.

1 2 3 4 5

94. It doesn't matter if you win or lose, but how you play the game.

1 2 3 4 5

95. Competing allows me to measure my own personal standards.

1 2 3 4 5

96. * I never pay much attention to who is winning a competition.

1 2 3 4 5

97. I enjoy beating others in almost every area in life.

1 2 3 4 5

98. I enjoy strategizing ways to win a competition.

1 2 3 4 5

99. * I get no enjoyment out of competing.

1 2 3 4 5

100. Other people notice how much I have to dominate others in a competition.

1 2 3 4 5

101. I put a lot of effort into beating others at things.

1 2 3 4 5

102. It is important for me to outperform others.

1 2 3 4 5

103. I use competition as a way to prove something to myself.

1 2 3 4 5

104. I would like to compete even when a winner is not declared.

1 2 3 4 5

105. * I cannot learn anything by competing against others.

1 2 3 4 5

106. I would never purposely let someone else win.

1 2 3 4 5

107. * Beating an opponent would give me no satisfaction.

1 2 3 4 5

108. I like to be better than others at almost everything.

1 2 3 4 5

109. * I don’t understand why people like to beat others in a competition.

1 2 3 4 5

110. It wouldn't matter to me who won a competition, as long as I learned a lot.

1 2 3 4 5

111. I hate to be second best.

1 2 3 4 5

112. I enjoy winning because it demonstrates that I am successful.

1 2 3 4 5

113. I compete with others, even though they don't know I am trying to beat them.

1 2 3 4 5

114. I get a lot of enjoyment from bringing down my opponent.

1 2 3 4 5

115. * I don't really understand why people like to compete.

1 2 3 4 5

116. I try to be the best person in the room at almost anything.

1 2 3 4 5

117. I am constantly trying to beat my own record.

1 2 3 4 5

118. * Nothing can be gained from competition.

1 2 3 4 5

119. * I wouldn't mind finishing in last place in a competition.

1 2 3 4 5

120. I like to be the best, even on my own team.

1 2 3 4 5

121. *Competition is silly.

1 2 3 4 5

122. I would feel bad if I wasn't the best person in the room at something.

1 2 3 4 5

123. I would want to win to gain recognition from others.

1 2 3 4 5

124. *I feel bad if I win and others lose

1 2 3 4 5

125. I notice that I compete even when others do not realize we are competing

1 2 3 4 5

126. No matter what, I try to be better than others at things.

1 2 3 4 5

127. I become upset when others demonstrate superior skills to me.

1 2 3 4 5

128. *I would rather not compete.

1 2 3 4 5

129. *I only compete when it's necessary to gain some outcome.

1 2 3 4 5

130. *I totally lack the motivation to be better than others.

1 2 3 4 5

131. *Being better than others doesn't matter to me.

1 2 3 4 5

132. *I would rather other people fulfill their need for competition by beating me.

1 2 3 4 5

133. *There is no such thing as an opponent.

1 2 3 4 5

134. *I would rather other people dominate me in a competition.

1 2 3 4 5

135. *I do not feel the need to be better than others at anything.

1 2 3 4 5

136. *I don't care to be recognized for being better than others.

1 2 3 4 5

137. *I don't care to be recognized for being competent or skilled.

1 2 3 4 5

Do you feel that there are any aspects of competitiveness that we've missed?

_____
_____
_____
_____
_____
_____
_____
_____

Table A10

The Machiavellianism Scale (MACH-IV; Christie & Geis, 1970)

---

1 Strongly agree
2 Somewhat agree
3 Slightly agree
4 No opinion
5 Slightly disagree
6 Somewhat disagree
7 Strongly disagree

---

1. Never tell anyone the real reason you did something unless it is useful to do so.

1 2 3 4 5 6 7

2. The best way to handle people is to tell them what they want to hear.

1 2 3 4 5 6 7

3. One should take action only when sure it is morally right.

1 2 3 4 5 6 7

4. Most people are basically good and kind.

1 2 3 4 5 6 7

5. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.

1 2 3 4 5 6 7

6. Honesty is the best policy in all cases.

1 2 3 4 5 6 7

7. There is no excuse for lying to someone else.

1 2 3 4 5 6 7

8. Generally speaking, men won't work hard unless they're forced to do so.

1 2 3 4 5 6 7

9. All in all, it is better to be humble and honest than important and dishonest.

1 2 3 4 5 6 7

10. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.

1 2 3 4 5 6 7

11. Most people who get ahead in the world lead clean, moral lives.

1 2 3 4 5 6 7

12. Anyone who completely trusts anyone else is asking for trouble.

1 2 3 4 5 6 7

13. biggest difference between most criminals and other people is that criminals are stupid enough to get caught.

1 2 3 4 5 6 7

14. Most men are brave.

1 2 3 4 5 6 7

15. It is wise to flatter important people.

1 2 3 4 5 6 7

16. It is possible to be good in all respects.

1 2 3 4 5 6 7

17. Barnum was very wrong when he said there's a sucker born every minute.

1 2 3 4 5 6 7

18. It is hard to get ahead without cutting corners here and there.

1 2 3 4 5 6 7

19. People suffering from incurable diseases should have the choice of being put painlessly to death.

1 2 3 4 5 6 7

20. Most men forget more easily the death of their father than the loss of their property.

20. Most men forget more easily the death of their father than the loss of their property.

1	2	3	4	5	6	7

Table A11

The Marlowe-Crowne Social Desirability Scale

1. I am always willing to admit it when I make a mistake.	T	F
2. I am always willing to admit it when I make a mistake.	T	F
3. I never resent being asked to return a favor.	T	F
4.I have never been irked when people expressed ideas very different from my own.	T	F
5. I have never deliberately said something that hurt someone's feelings.	T	F
6. I like to gossip at times.	T	F
7. There have been occasions when I took advantage of someone.	T	F
8. I sometimes try to get even rather than forgive and forget.	T	F
9. At times I have really insisted on having things my own way.	T	F
10. There have been occasions when I felt like smashing things.	T	F
11. I never hesitate to go out of my way to help someone in trouble.	T	F
12. I have never intensely disliked anyone.	T	F
13. When I don't know something I don't at all mind admitting it.	T	F
14. I am always courteous, even to people who are disagreeable.	T	F
15. I would never thing of letting someone else be punished for my wrong doings.	T	F
16. I sometimes feel resentful when I don't get my way.	T	F
17. There have been times when I felt like rebelling against people in authority even though I knew they were right.	T	F
18. I can remember "playing sick" to get out of something.	T	F
18. There have been times when I was quite jealous of the good fortune of others.	T	F
20. I am sometimes irritated by people who ask favors of me.	T	F

Appendix A12

Jackson Personality Research Form Infrequency Scale

---

1 Strongly disagree
2 Slightly disagree
3 Neither agree nor disagree
4 Slightly agree
5 Strongly agree

---

1. I have never bought anything in a store.

1 2 3 4 5

2. I can run a mile in less than four minutes.

1 2 3 4 5

3. I could easily count from one to twenty-five.

1 2 3 4 5

4. I have never talked to anyone by telephone.

1 2 3 4 5

5. I usually wear something warm when I go outside on a very cold day.

1 2 3 4 5

6. I make all my own clothes and shoes.

1 2 3 4 5

7. I have never brushed or cleaned my teeth.

1 2 3 4 5

8. Things with sugar in them usually taste sweet to me.

1 2 3 4 5

9. Sometimes I see cars near my home.

1 2 3 4 5

10. I have never had any hair on my head.

1 2 3 4 5

11. I have traveled away from my home town.

1 2 3 4 5

12. I have never ridden in an automobile.

1 2 3 4 5

13. I have never felt sad.

1 2 3 4 5

14. I try to get at least some sleep every night.

1 2 3 4 5

15. Sometimes I feel thirsty or hungry.

1 2 3 4 5

16. I have attended school at some time during my life.

1 2 3 4 5

Appendix B

Flesch-Kincaid Reading Level Calculation

Table B1

Flesch-Kincaid Reading Level Calculation

=6.2

[(.39 x ASL) + (11.8 x ASW) – 15.59]

ASL = average sentence length (the number of words divided by the number of sentences)

ASW = average number of syllables per word (the number of syllables divided by the number of words

---

Appendix C

Participant Correspondence

Appendix C1

Recruitment Poster

Want a Chance to Win $50?!

Lakehead University researcher seeking participants for psychology study!!

Who? Jennifer Newby, a Master's student at Lakehead University supervised by Dr. Rupert Klein.
You must be 18 years old or older to participate.

What? The **purpose** of the study is to examine personality differences in **Competitiveness.**

Where? and When? The study is being conducted **online**, which means you can fill out the questionnaires whenever you want, wherever you want! The survey takes about 45 minutes to 1 hour.

Why? To learn about personality, how psychological studies are conducted, as well as to **enter for a chance to win one of 2 $50 Visa gift cards** to be spent at the location of your choice!! You can also learn how competitive you are.

How? Simply rip off a tag, email Jennifer who will send you a link, and follow the instructions online!! This study has received ethical approval by the Research Ethics Board at Lakehead University.

Contact Jennifer Newby at (807) 343-8037 or jnewby@lakeheadu.ca) or Dr. Rupert Klein at (807) 343-8535 or rgklein@lakeheadu.ca) if you have any additional questions.

Tags Appear Here

Appendix C2

Participant Cover Letter

Lakehead
UNIVERSITY

DEPARTMENT OF PSYCHOLOGY

NEW MEASURE OF PERSONALITY
Participant Cover Letter

Dear Potential Participant,

You are invited to participate in a study about personality. The purpose of the study is to examine whether or not there are individual differences in a new measure of personality. The **principle investigator** is Jennifer Newby, a Master's student here at Lakekead University, supervised by Dr. Rupert Klein. This research was supported in part by a research grant from the Social Sciences and Humanities Research Council of Canada to Jennifer Newby.

The study has been reviewed and received ethical approval by the Research Ethics Board at Lakehead University. The **procedure** of the study will involve filling out online questionnaires which will take about 45 minutes to one hour to complete. Since these questionnaires are online, you may fill them out at your convenience at any time.

The study poses **no risk** to you for participating, however, if you do experience psychological discomfort as a result of participating, you will be provided with information regarding counselling resources that are available to you. Regarding personal **benefits**, you will receive 1 hour of research credit in Psychology 101 and will have an excellent opportunity to learn about how psychological research is conducted. You may also **withdraw** from the study at any time without penalty and are free to leave any questions unanswered.

All information obtained from you during the course of this research is completely **confidential** and will not be shared with anyone who is not a member of the research team. Data output from the tasks will be **stored** in password-protected computer files, where research codes will be used to identify data; names will not be used in data files. In accordance with disciplinary practice, raw data will be kept for 5 years. Although the results of this study may be published, they will be reported in a way that makes it impossible to identify individual participants. Furthermore, the results of the study will be shared with you at your request.

Thank you very much for your interest in the study and please do not hesitate
to contact the researchers if you have any questions or concerns.

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Appendix C3

Participant Consent Form

Lakehead
UNIVERSITY

DEPARTMENT OF PSYCHOLOGY

NEW MEASURE OF PERSONALITY
Participant Consent Form

I have been invited to participate in a study of personality. The **principal investigator** is Jennifer Newby, a Master's student at Lakehead University supervised by Dr. Rupert Klein.

The primary purpose of this research is to help us understand if there are individual differences in a newly constructed measure of personality. I am aware that this study has been reviewed and received ethical approval by the Research Ethics Board at Lakehead University.

I understand that the **procedure** of this study will take place over 1 online trial. I will be asked to fill out questionnaire on an online database at a time of my convenience. The administration of the questionnaire will take approximately 45 minutes to one hour.

I understand that participation in this study poses **no risk** to me. Regarding personal **benefits**, I understand that I will receive 1 hour of research credit in Psychology 101.

I understand that all information that is obtained from me during the course of this research is completely **confidential** and will not be shared with anyone who is not a member of the research team. Data output from the tasks will be **stored** in password-protected computer files, where research codes will be used to identify participants' data; names will not be used in data files. In accordance with disciplinary practice, raw data will be kept for 5 years. Although the results of this study may be published, they will be reported in a way that makes it impossible to identify individual participants. As such, my specific scores will not be made available to me, though a general report of the study's findings will be made available to me if I would like it.

I have read and understand the cover letter and preceding description and have had the procedures explained to me. I give my consent to participate in this project with the understanding that I may **withdraw freely,** without penalty at any time and may leave any question unanswered. If I have any questions after today, I may **contact** Jennifer Newby at (807) 343-8037 (email: jnewby@lakeheadu.ca) or Dr. Rupert Klein at (807) 343-8535 (email: rgklein@lakeheadu.ca).

Participant's Name (please print)	Participant's Signature	Date

Name of Witness (please print)	Signature of Witness	Date

Appendix C4

Participant Debriefing Form

Lakehead
UNIVERSITY

DEPARTMENT OF PSYCHOLOGY

NEW MEASURE OF PERSONALITY
Participant Debriefing Form

Dear Participant,

Thank you for participating in the study entitled: "Confirmatory Factor Analysis for the Newly Developed Competitiveness Orientation Measure." This study was a pilot study, which will act as a foundation for the principal researcher's Master's thesis. The purpose of this study was to determine whether or not people differed in a new measure of personality- the competitiveness orientation measure.

Researchers in the past have failed to give attention to this variable as a personality trait, and until now, there has not been an adequate questionnaire that would measure if people differed on this trait. The principle investigator has constructed one of the questionnaires that you filled out. We needed to give you so many of the same types of questionnaires to see if our scale measured the same types of things that other scales have measured in the past. This would ensure that the new scale was a good tool to use and that the test had good psychometric properties.

We hypothesized that there would be two types of competitiveness, the first type measuring if people liked competition because they liked beating others, and the other type measuring if people liked to use competition to better themselves. Other researchers have proposed these two types, but this was the first study to measure both using this scale.

Your participation was greatly appreciated and will serve to launch the new competitiveness scale. Please do not hesitate to contact the researchers or ethics board with any questions or concerns. Thanks!

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Appendix D

Presentation of Results

Table D1

Descriptive Statistics for Percentage of Missing Data in Retained Sample

Scale	n	Mean	Std. Dev.
COM	886	.31	.64
WOFO	886	.32	3.58
MC_SDS	886	.28	1.26
PDCA	886	.30	1.52
SOQ	886	.24	1.14
MACH-IV	886	.23	1.07
CQ	886	.27	1.39
CI	886	.39	1.50
HCA	886	.44	1.76
CCAS	886	.25	1.40
Total Missing	886	.31	.47

Note. COM= Competitiveness Orientation Measure; WOFO = Work and Family Orientation Scale; MC_SDS = Marlowe-Crowne Social Desirability Scale; PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire ; MACH-IV = Machiavellianism Scale; CQ = Competitiveness Questionnaire; CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D2

Skewness z-scores for Original and Pooled Imputed Data

Scale	Original	Pooled
COM	-2.88	-3.77
WOFO	.38	.30
MC_SDS	-3.19	-3.28
PDCA	-12.38	-12.28
SOQ	3.09	3.05
MACH-IV	-3.69	-3.47
CQ	-.96	-.94
CI	5.14	5.36
HCA	.69	.32
CCAS	7.02	7.07
Total	-.33	2.16

Note. COM= Competitiveness Orientation Measure; WOFO = Work and Family Orientation Scale; MC_SDS = Marlowe-Crowne Social Desirability Scale; PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire ; MACH-IV = Machiavellianism Scale; CQ = Competitiveness Questionnaire; CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D3

Kurtosis z-scores for Original and Pooled Imputed Data

Scale	Original	Pooled
COM	1.87	1.32
WOFO	1.90	1.88
MC_SDS	.006	.09
PDCA	7.95	7.14
SOQ	-2.28	-2.36
MACH-IV	3.32	3.54
CQ	1.40	1.41
CI	-4.02	-4.13
HCA	1.84	1.68
CCAS	2.51	2.18
Total	2.99	3.04

Note. COM= Competitiveness Orientation Measure; WOFO = Work and Family Orientation Scale; MC_SDS = Marlowe-Crowne Social Desirability Scale; PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire ; MACH-IV = Machiavellianism Scale; CQ = Competitiveness Questionnaire; CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D4

Reliability Statistics of Present and Original Samples

	Sample									
	Original Sample				Current Sample					
	Analysis	n	Population	Reliability	Student		Community		Total	
					Original	Pooled	Original	Pooled	Original	Pooled
CCAS	Split-half	98	Student	**.82** (.91)	.88	.88	.91	.91	.89	.89
WOFO_COM	IC		Student	**.74** (.78)	.63	.62	.72	.72	.67	.66
PDCA	IC	128	Student	**.90** (.94)	.94	.94	.94	.94	.94	.94
SOQ	IC	721	Student	**.87** (.94)	.95	.95	.95	.95	.95	.95
CQ	IC	94	Student	**.61** (.77)	.69	.69	.80	.79	.73	.73
CI	IC	215	Student	**.90** (.90)	.86	.86	.88	.88	.87	.87
HCA	IC	320	Student	**.91** (.85)	.86	.86	.92	.92	.88	.88

Note. IC= Internal Consistency; WOFO = Work and Family Orientation Scale; PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire ; CQ = Competitiveness Questionnaire; CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale. Bolded reliability is that which was reported in original scale construction, while reliability in brackets was that obtained in the Houston et al. (2002) meta-analysis.

Table D5

Intercorrelations among Competitiveness Measures Comparing Total Sample and Metaanalysis

	CCAS		CQ		HCA		PDCA		WOFO		CI	
	Meta	Total	Meta	Total	Meta	Total	Meta	Total	Meta	Total	Meta	Total
CQ Original	.61**	.56**										
HCA Original	.66**	.70**	.58**	.68**								
PDCA Original	.08	.04**	.23**	.28**	.23**	.19**						
WOFO Original	.56**	.34**	.61**	.51**	.61**	.49**	.49**	.35**				
CI Original	.37**	.34**	.45**	.48**	.48**	.48**	.57**	.44**	.64**	.51**		
SOQ Original	.41**	.31**	.44**	.51**	.50**	.55**	.66**	.49**	.66**	.61**	.75**	.58**

Note. COM= Competitiveness Orientation Measure; WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale. Original data is non-imputed.

Table D6

Intercorrelations among Competitiveness Measures for Sample A (Student Sample) and Sample B (Community Sample)

	COM		CCAS		CQ		HCA		PDCA		WOFO		CI	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
CCAS														
Original	.42**	.59**												
Pooled	.49**	.55**												
CQ														
Original	.66**	.70**	.52**	.62**										
Pooled	.69**	.72**	.54**	.61**										
HCA														
Original	.71**	.73**	.69**	.72**	.68**	.70**								
Pooled	.73**	.73**	.68**	.71**	.68**	.71**								
PDCA														
Original	.54**	.54**	.03	.04	.31**	.24**	.23**	.15*						
Pooled	.57**	.56**	.06	.04	.32**	.25**	.26**	.15*						
WOFO														
Original	.62**	.65**	.29**	.40**	.49**	.54**	.48**	.49**	.37**	.33**				
Pooled	.61**	.61**	.29**	.38**	.48**	.53**	.48**	.50**	.37**	.33**				
CI														
Original	.71**	.70**	.37**	.42**	.48**	.51**	.50**	.48**	.42**	.47**	.49**	.55**		
Pooled	.72**	.72**	.37**	.40**	.48**	.52**	.50**	.49**	.45**	.49**	.50**	.55**		
SOQ														
Original	.73**	.74**	.28**	.37**	.50**	.56**	.52**	.58**	.48**	.51**	.58**	.65**	.57**	.59**
Pooled	.72**	.76**	.29**	.36**	.50**	.57**	.49**	.57**	.49**	.48**	.58**	.64**	.58**	.61**

Note. WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D7

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses: Total Sample

Velicer's Eigenvalues	Random Data Eigenvalues
3.7734	**1.1208**
1.2140	**1.0766**
.5598	1.0350
.4755	.9980
.3815	.9614
.3630	.9240
.2328	.8769

Table D9

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses: Student Sample

Velicer's Eigenvalues	Random Data Eigenvalues
3.7056	**1.1599**
1.2004	**1.0914**
.5652	1.0400
.5070	.9971
.3949	.9534
.3867	.9064
.2403	.8519

Table D10

Meta-analysis Replication Factor Loadings for Student Sample

Scale	Factor 1	Factor 2	Communalities
PDCA	**.830**	-.090	.697
WOFO_Com	**.683**	.358	.595
CI	**.652**	.412	.596
SOQ	**.809**	.303	.747
HCA	.317	**.847**	.818
CQ_IC	.390	**.712**	.659
CCAS	-.015	**.902**	.814

Note. WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D11

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses: Community Sample

Velicer's Eigenvalues	Random Data Eigenvalues
3.9043	**1.2249**
1.2404	**1.1371**
.5461	1.0578
.4441	.9950
.3342	.9366
.3217	.8669
.2091	.7818

Table D12

Meta-analysis Replication Factor Loadings for Community Sample

Scale	Factor 1	Factor 2	Communalities
PDCA	-.112	**.873**	.775
WOFO_Com	**.545**	**.545**	.594
CI	.462	**.679**	.675
SOQ	.490	**.724**	.764
HCA	**.893**	.196	.836
CQ_IC	**.813**	.283	.740
CCAS	**.882**	.045	.779

Note. WOFO = Work and Family Orientation Scale (Competitiveness subscale); PDCA = Personal Development Competition Attitude Scale; SOQ = Sport Orientation Questionnaire; CQ = Competitiveness Questionnaire (Interpersonal subscale); CI = Competitiveness Index; HCA = Hypercompetitive Attitude Scale; CCAS = Competition-Cooperation Attitude Scale.

Table D13

Comprehensive Newby-COM Scale Development Statistics for Total, Student (A) and Community (B) Samples

	Item-total Correlations			Discrimination Indices			Variance			Mean		
Item	Total	A	B	Total	A	B	Total	A	B	Total	A	B
1	0.56	0.53	0.62	0.56	0.53	0.63	1.29	1.22	1.41	3.44	3.42	3.47
2	0.59	0.58	0.6	0.29	0.24	0.32	0.97	.90	1.11	3.95	3.95	3.92
3	0.52	0.52	0.54	0.37	0.39	0.40	1.13	1.10	1.20	3.69	3.66	3.73
4	0.42	0.43	0.41	0.32	0.34	0.27	1.33	1.27	1.41	3.78	3.82	3.70
6	0.61	0.61	0.62	0.59	0.60	0.56	1.27	1.17	1.44	3.54	3.59	3.44
7	0.61	0.59	0.63	0.66	0.66	0.64	1.49	1.43	1.60	3.31	3.31	3.31
8	0.4	0.38	0.41	0.23	0.18	0.33	0.96	.93	.99	1.73	1.76	1.67
9	0.57	0.58	0.56	0.31	0.28	0.34	1.04	.97	1.71	3.95	4.01	3.84
10	0.57	0.47	0.27	0.14	0.20	0.03	0.92	.91	.94	4.09	4.10	4.06
11	0.4	0.52	0.52	0.34	0.32	0.37	1.11	1.01	1.27	3.82	3.91	3.64
12	0.02	0.06	-0.05	0.01	0.05	-0.04	0.95	.89	1.05	4.01	4.01	4.01
13	0.56	0.55	0.6	0.72	0.73	0.70	1.43	1.40	1.46	2.95	3.03	2.81
14	0.73	0.75	0.71	0.76	0.78	0.76	1.39	1.22	1.70	3.57	3.64	3.41
15	0.67	0.66	0.67	0.64	0.64	0.62	1.23	1.16	1.35	3.59	3.63	3.49
16	0.6	0.63	0.53	0.61	0.65	0.53	1.22	1.15	1.35	3.49	3.54	3.38
17	0.04	0	0.13	0.06	0.07	0.07	1.23	1.14	1.43	1.83	1.79	1.91
18	0.54	0.53	0.53	0.5	0.46	0.55	1.25	1.13	1.43	3.59	3.68	3.41
19	0.67	0.68	0.66	0.63	0.66	0.59	1.25	1.17	1.40	3.66	3.70	3.57
20	0.49	0.53	0.41	0.13	0.14	0.12	0.76	.71	.85	4.1	4.13	4.03
21	0.33	0.27	0.47	0.33	0.26	0.50	1.32	1.31	1.36	2.42	2.38	2.50
22	0.42	0.44	0.37	0.25	0.30	0.13	0.92	.82	1.09	3.65	3.66	6.64
24	0.1	0.05	0.21	0.03	0.03	0.05	0.93	.99	.77	1.64	1.70	1.50
26	0.53	0.5	0.58	0.56	0.50	0.68	1.63	1.54	1.80	3.46	3.51	3.35
27	0.21	0.15	0.28	0.29	0.23	0.39	1.32	1.29	1.39	2.95	2.98	2.88
28	0.41	0.45	0.34	0.45	0.43	0.47	0.97	.95	1.00	3.38	3.41	3.33

29	0.07	0.03	0.15	0.13	0.10	0.17	1.49	1.42	1.64	2.42	2.43	2.40
30	0.49	0.48	0.48	0.21	0.18	0.22	0.79	.70	.95	4.02	4.08	3.91
31	0.15	0.05	0.31	0.09	-0.02	0.31	1.24	1.22	1.30	3.4	3.43	3.35
32	0.72	0.71	0.75	0.87	0.86	0.88	1.52	1.50	1.53	3.27	3.34	3.13
34	0.4	0.42	0.38	0.43	0.44	0.45	1.27	1.27	1.27	3.66	3.68	3.63
35	0.59	0.57	0.62	0.31	0.25	0.39	0.86	.76	1.01	3.86	3.92	3.74
36	0.58	0.58	0.59	0.46	0.43	0.49	0.97	.90	1.09	3.63	3.65	3.58
37	0.51	0.49	0.55	0.64	0.64	0.61	1.59	1.61	1.49	2.77	2.85	2.63
38	59	0.56	0.64	0.73	0.71	0.76	1.54	1.53	1.53	2.47	2.49	2.39
40	0.56	0.53	0.63	0.65	0.64	0.70	1.52	1.46	1.65	2.65	2.64	2.67
41	-0.27	-0.27	-0.26	-0.15	-0.14	-0.21	0.92	.91	.96	4.04	4.05	4.02
42	0.47	0.53	0.37	0.38	0.36	0.39	1.09	1.04	1.17	3.68	3.72	3.62
43	-0.26	-0.23	-0.31	-0.17	-0.13	-0.24	0.85	.80	.94	4.18	4.18	4.19
44	0.43	0.37	0.56	0.4	0.36	0.51	1.39	1.40	1.37	3.43	3.41	3.46
45	0.59	0.56	0.65	0.61	0.59	0.63	1.35	1.30	1.46	3.51	3.57	3.39
47	0.58	0.61	0.53	0.3	0.30	0.28	0.93	.90	.97	4	4.04	3.91
48	0.62	0.61	0.63	0.36	0.33	0.38	0.94	.89	1.01	3.82	3.86	3.75
49	0.24	0.19	0.53	0.21	0.16	0.33	1.16	1.11	1.21	2	1.95	2.08
50	0.29	0.31	0.26	0.04	0.04	0.04	0.73	.72	.75	4.2	4.20	4.19
51	0.52	0.49	0.56	0.62	0.57	0.68	1.51	1.43	1.64	3.16	3.20	3.09
53	0.4	0.42	0.38	0.3	0.33	0.28	0.98	.99	.96	2.06	2.09	2.01
54	-0.36	-0.34	-0.41	-0.31	-0.31	-0.33	0.97	.98	.95	3.92	3.90	3.94
55	0.64	0.62	0.66	0.66	0.66	0.66	1.49	1.52	1.38	2.43	2.49	2.29
56	0.59	0.58	0.62	0.67	0.69	0.63	1.46	1.38	1.58	3.45	3.51	3.33
57	0.41	0.38	0.47	0.51	0.49	0.56	1.53	1.53	1.54	2.74	2.73	2.76
59	0.34	0.34	0.34	0.06	0.03	0.12	0.71	.71	.73	4.34	4.35	4.32
60	0.61	0.59	0.65	0.74	0.74	0.77	1.61	1.56	1.70	3.11	3.13	3.07
61	0.7	0.67	0.75	0.86	0.83	0.93	1.59	1.61	1.52	2.71	2.79	2.56
62	0.52	0.52	0.53	0.29	0.31	0.26	0.88	.84	.96	3.8	3.80	3.79
63	0.57	0.59	0.55	0.74	0.79	0.64	1.54	1.51	1.55	2.91	2.98	2.74
64	0.02	0.03	-0.01	0.13	0.12	0.16	1.13	1.10	1.18	2.31	2.32	2.30
65	0.7	0.68	0.73	0.39	0.34	0.49	0.99	.93	1.08	3.98	4.03	3.86
67	0.44	0.45	0.41	0.11	0.10	0.11	0.72	.77	.70	4.01	4.00	4.04
68	0.32	0.36	0.24	0.04	0.06	0.01	0.62	.61	.64	4.33	4.33	4.33

69	0.39	0.4	0.38	0.15	0.20	0.09	0.9	.92	.84	3.83	3.78	3.91
70	0.55	0.54	0.57	0.6	0.59	0.63	1.52	1.51	1.53	3.32	3.33	3.31
71	0.45	0.39	0.54	0.41	0.35	0.50	1.32	1.26	1.44	2.15	2.15	2.14
72	0.76	0.74	0.8	0.9	0.86	0.96	1.45	1.43	1.48	3.44	3.50	3.32
73	0.47	0.53	0.37	0.3	0.32	0.25	0.96	.90	1.06	3.78	3.80	3.75
74	0.06	0	0.15	0.08	0.03	0.15	1.25	1.20	1.33	2.3	2.33	2.25
75	0.49	0.5	0.48	0.2	0.21	0.18	0.86	.85	.86	3.99	3.98	4.01
76	0.53	0.54	0.5	0.14	0.14	0.13	0.75	.74	.75	4.09	4.08	4.09
77	0.63	0.63	0.64	0.72	0.73	0.72	1.75	1.72	1.77	2.38	2.40	2.35
78	0.61	0.59	0.66	0.63	0.64	0.63	1.41	1.33	1.57	3.4	3.39	3.40
79	-0.1	-0.14	-0.003	-0.07	-0.10	0.00	1.06	.99	1.18	1.84	1.80	1.89
80	0.47	0.52	0.36	0.36	0.38	0.31	1.12	1.03	1.25	3.79	3.82	3.72
81	0.5	0.48	0.54	0.38	0.41	0.37	1.02	.95	1.14	3.57	3.54	3.62
82	0.41	0.33	0.53	0.29	0.20	0.49	1.3	1.15	1.56	1.85	1.81	1.92
83	0.33	0.35	0.26	0.48	0.49	0.44	1.56	1.55	1.58	2.89	2.91	2.86
84	0.62	0.64	0.59	0.32	0.33	0.29	1.03	1.03	1.01	3.96	3.98	3.94
85	0.44	0.35	0.59	0.32	0.26	0.45	1.15	1.12	1.17	1.96	1.97	1.93
87	0.63	0.6	0.67	0.8	0.81	0.76	1.6	1.60	1.58	2.65	2.72	2.51
88	0.61	0.64	0.56	0.34	0.41	0.26	0.94	.95	.93	3.87	3.87	3.88
89	0.65	0.64	0.65	0.75	0.75	0.74	1.49	1.45	1.58	3.19	3.21	3.13
90	0.53	0.54	0.52	0.22	0.22	0.22	0.94	.92	1.00	4.12	4.15	4.07
91	0.7	0.7	0.69	0.73	0.77	0.63	1.45	1.50	1.29	2.37	2.47	2.19
92	0.49	0.5	0.47	0.6	0.57	0.63	1.36	1.23	1.57	3.24	3.32	3.09
93	0.64	0.63	0.65	0.77	0.76	0.79	1.64	1.64	1.64	2.69	2.72	2.63
94	0.56	0.57	0.53	0.34	0.24	0.18	0.83	.82	.84	3.97	3.98	3.96
95	0.56	0.5	0.68	0.57	0.48	0.76	1.42	1.33	1.57	2.24	2.20	2.32
96	0.46	0.55	0.3	0.26	0.25	0.23	0.94	.82	1.17	3.9	3.96	3.77
97	0.54	0.52	0.57	0.56	0.53	0.60	1.45	1.40	1.52	2.35	2.37	2.28
98	0.67	0.67	0.67	0.78	0.77	0.81	1.79	1.76	1.86	2.52	2.52	2.52
100	0.7	0.69	0.73	0.83	0.83	0.83	1.78	1.77	1.81	2.56	2.56	2.55
101	0.62	0.63	0.6	0.28	0.31	0.25	0.85	.82	.93	4.03	4.06	3.95
102	0.6	0.59	0.63	0.63	0.70	0.73	1.46	1.33	1.68	3.48	3.54	3.35
103	0.56	0.55	0.56	0.24	0.23	0.25	0.92	.85	1.04	4.03	4.07	3.96
104	-0.38	-0.36	-0.41	-0.29	-0.26	-0.34	1.21	1.14	1.35	3.93	3.92	3.93

106	0.56	0.56	0.55	0.22	0.23	0.20	0.8	.74	.90	4.01	4.03	3.96
107	0.52	0.56	0.46	0.32	0.34	0.26	0.97	.88	1.13	3.82	3.86	3.73
108	0.66	0.62	0.73	0.73	0.69	0.84	1.51	1.48	1.55	2.46	2.44	2.48
109	0.55	0.57	0.53	0.55	0.60	0.49	1.57	1.58	1.57	3.44	3.41	3.48
111	0.62	0.63	0.59	0.18	0.16	0.22	0.85	.84	.88	4.1	4.12	4.05
112	0.56	0.51	0.64	0.47	0.42	0.59	1.27	1.27	1.26	2.02	2.03	2.02
113	0.71	0.69	0.75	0.87	0.85	0.94	1.56	1.57	1.51	2.58	2.64	2.46
114	0.73	0.71	0.76	0.87	0.88	0.87	1.58	1.57	1.60	2.67	2.67	2.66
115	0.63	0.63	0.62	0.58	0.64	0.50	1.37	1.32	1.50	3.67	3.68	3.62
116	0.35	0.35	0.33	0.22	0.22	0.18	1.23	1.14	1.40	3.68	3.70	3.64
117	0.5	0.55	0.39	0.08	0.06	0.06	0.57	.57	.58	4.26	4.27	4.23
118	0.13	0.06	0.25	0.18	0.12	0.30	1.56	1.50	1.67	2.68	2.68	2.69
119	0.5	0.47	0.55	0.1	0.10	0.11	0.65	.65	.67	4.08	4.08	4.05
120	0.65	0.61	0.74	0.79	0.75	0.88	1.63	1.65	1.56	2.57	2.53	2.63
121	0.53	0.56	0.49	0.24	0.28	0.19	1.04	1.07	.99	3.99	3.98	4.03
122	-0.36	-0.35	-0.39	-0.38	-0.40	-0.37	1.23	1.21	1.24	3.62	3.59	3.68
123	0.49	0.46	0.55	0.51	0.47	0.58	1.3	1.23	1.40	2.29	2.26	2.32
125	0.58	0.6	0.55	0.47	0.50	0.43	1.16	1.07	1.31	3.7	3.77	3.58
126	0.64	0.63	0.63	0.79	0.80	0.77	1.79	1.73	1.91	2.97	2.99	2.93
127	0.49	0.48	0.51	0.53	0.51	0.55	1.48	1.47	1.48	2.37	2.37	2.36
128	0.56	0.58	0.51	0.27	0.29	0.25	0.97	.96	1.05	4.07	4.08	4.04
129	0.64	0.58	0.77	0.73	0.63	0.93	1.53	1.56	1.63	2.34	2.28	2.46
130	0.54	0.52	0.57	0.42	0.46	0.39	1.45	1.40	1.56	3.73	3.74	3.69
132	0.45	0.54	0.31	0.02	0.02	0.02	0.54	.47	.67	4.41	4.44	4.35
133	0.53	0.55	0.48	0.47	0.49	0.45	1.65	1.57	1.81	3.61	3.65	3.53
134	0.67	0.66	0.68	0.79	0.82	0.78	1.43	1.34	1.54	3.26	3.23	3.28
135	0.54	0.6	0.45	0.23	0.26	0.17	0.99	.97	1.04	4.1	4.11	4.09
136	0.49	0.52	0.44	0.48	0.51	0.44	1.43	1.38	1.50	3.38	3.38	3.38
137	0.42	0.36	0.51	0.41	0.34	0.57	1.45	1.30	1.66	2.26	2.18	2.39
138	0.25	0.24	0.31	0.3	0.23	0.45	1.18	1.12	1.28	3.38	3.39	3.36
139	0.38	0.41	0.39	0.3	0.29	0.35	1.1	1.08	1.10	3.72	3.69	3.81
140	0.63	0.61	0.66	0.77	0.80	0.70	1.41	1.37	1.49	2.72	2.69	2.77
142	0.33	0.35	0.29	0.37	0.41	0.30	1.25	1.17	1.38	2.5	2.52	2.45
143	0.59	0.6	0.58	0.59	0.63	0.53	1.47	1.42	1.57	3.6	3.65	3.51

144	0.22	0.25	0.17	0.27	0.31	0.20	1.33	1.27	1.46	3.47	3.48	3.45
145	0.5	0.49	0.52	0.31	0.28	0.37	1.11	1.01	1.30	4	4.06	3.87
146	0.66	0.66	0.68	0.75	0.78	0.72	1.46	1.38	1.58	3.4	3.45	3.32
148	0.75	0.74	0.75	0.86	0.87	0.86	1.71	1.69	1.72	3.28	3.33	3.18
149	0.29	0.28	0.31	0.06	0.04	0.12	0.72	.67	.81	4.33	4.31	4.36
150	0.47	0.51	0.42	0.09	0.08	0.10	0.66	.63	.74	4.31	4.33	4.27
151	0.57	0.57	0.58	0.71	0.71	0.72	1.61	1.54	1.73	2.61	2.62	2.60
152	0.46	0.5	0.43	0.53	0.56	0.53	1.23	1.20	1.28	3.37	3.35	3.40
153	0.62	0.61	0.64	0.75	0.77	0.70	1.91	1.84	2.06	2.96	2.97	2.94

Table D14

Newby-COM Scale Development Statistics: Corrected Item-Total Correlations for Original Data

Item	Total	Student	Community
1. Competing allows me to prove that I am the best.	.56	.53	.62
2. I like to be better at things than others.	.59	.58	.60
3. Competition is a way to demonstrate my competence.	.52	.52	.54
4. I compete with others to improve myself.	.42	.43	.41
6. I get a lot of enjoyment out of competition.	.61	.61	.62
7. I compete with people even when they don't realize it.	.61	.59	.63
8. I would do almost anything to make my opponent lose.	.40	.38	.41
9. There is no point to competition.	.57	.58	.56
10. I cannot learn anything new about myself by competing with others.	.57	.47	.27
11. I enjoy setting and beating goals through competition.	.40	.52	.52
12. I would like to try something difficult, even if I knew I wouldn't be the best.	.02	.06	-.05
13. I don't really care if I get beat in a competition.	.56	.55	.60
14. I am a competitive person.	.73	.75	.71
15. I enjoy competing against others.	.67	.66	.67
16. I do not find competition self-fulfilling.	.60	.63	.53
17. There is no unfair way to win.	.04	.00	.13
18. Competition is a way for me to reach my goals.	.54	.53	.53
19. I love the thrill of competition.	.67	.68	.66
20. Competition is an opportunity to learn where my skills can be improved.	.49	.53	.41
21. I enjoy competition only when there is a clear-cut winner and loser.	.33	.27	.47
22. Competing does not allow me to demonstrate how superior my skills are.	.42	.44	.37
24. Competing allows me to prove that my skills are better than others'.	.10	.05	.21
26. I am constantly measuring my abilities in comparison to other people.	.53	.50	.58
27. I don't care if I win, as long as I don't lose.	.21	.15	.28
28. Competing does not allow me to demonstrate my superiority over others.	.41	.45	.34
29. I would only compete when I knew I had a chance of winning.	.07	.03	.15
30. Competition allows me to improve myself.	.49	.48	.48
31. I would rather lose a competition that requires a great degree of skill			

than win at a competition that requires less skill.	.15	.05	.31
32. Competing doesn't really matter to me.	.72	.71	.75
34. I would rather other people fulfill their need for competition by beating me.	.40	.42	.38
35. Competition allows me to judge how I am doing.	.59	.57	.62
36. I can improve my competence by competing.	.58	.58	.59
37. I don't care if other people are better at things than I am.	.51	.49	.55
38. I always have to be the best at things.	.59	.56	.64
40. Even when there is no competition, I like to compare myself to others to show I am the best.	.56	.53	.63
41. I would rather improve my abilities than dominate an opponent.	-.27	-.27	-.26
42. Competition does not allow me to master any abilities.	.47	.53	.37
43. I wouldn't mind coming second place to a person who is more skilled than I am.	-.26	-.23	-.31
44. I never try to be the best person on a team.	.43	.37	.56
45. I perform better when I compete against others.	.59	.56	.65
47. I don't believe that I will improve my skills by competing.	.58	.61	.53
48. Competition allows me to measure my own success.	.62	.61	.63
49. The only point of competition is to beat others.	.24	.19	.53
50. I like to compete against my own personal standards.	.29	.31	.26
51. Winning makes me feel superior to others.	.52	.49	.56
53. I wouldn't mind finishing in second place in a competition.	.40	.42	.38
54. I don't care if I win or lose, as long as I improve myself.	-.36	-.34	-.41
55. I think a lot about dominating others in a competition.	.64	.62	.66
56. I put a lot of effort into winning in order to prove to myself that I can do something.	.59	.58	.62
57. Competition is a way to dominate an opponent.	.41	.38	.47
59. Competition teaches me nothing about myself.	.34	.34	.34
60. I like being the best compared to other people.	.61	.59	.65
61. I think a lot about winning.	.70	.67	.75
62. Competing against others allows me to gain self-insight.	.52	.52	.53
63. Losing in a competition wouldn't bother me.	.57	.59	.55
64. I would rather win a competition that does not require a lot of skill than come second place in a competition that requires more skill.	.02	.03	-.01
65. Competition motivates me.	.70	.68	.73
67. Competing with others does not allow me to enhance my skill set.	.44	.45	.41
68. I can learn a lot from a superior opponent.	.32	.36	.24
69. Competition does not allow me to become more competent.	.39	.40	.38

70. Being the best makes me feel powerful.	.55	.54	.57
71. I hate coming second place to someone, even if I know they are more skilled.	.45	.39	.54
72. I am determined to win.	.76	.74	.80
73. Competition does not allow me to gauge my success.	.47	.53	.37
74. I would only compete if other people appreciated my success.	.06	.00	.15
75. Competition does not allow me to judge my abilities.	.49	.50	.48
76. Competing against others allows me to improve my skills.	.53	.54	.50
77. Other people comment on how competitive I am.	.63	.63	.64
78. I like to challenge others.	.61	.59	.66
79. I would only compete if it were for a prize.	-.10	-.14	-.003
80. I cannot measure my own success by competing with others.	.47	.52	.36
81. Competition allows me to judge my level of competence.	.50	.48	.54
82. Anything less than first place is losing.	.41	.33	.53
83. I would not care about dominating an opponent.	.33	.35	.26
84. I get a lot of enjoyment from improving my standing in a competition.	.62	.64	.59
85. I would do almost anything to prove my superiority over others.	.44	.35	.59
87. I love to dominate over other people in a competition.	.63	.60	.67
88. Winning allows me to demonstrate my capabilities.	.61	.64	.56
89. I get a lot of enjoyment out of beating an opponent.	.65	.64	.65
90. Competition gets my adrenaline pumping.	.53	.54	.52
91. I think about competition a lot.	.70	.70	.69
92. Winning does not make me feel superior to others.	.49	.50	.47
93. I think a lot about ways to win.	.64	.63	.65
94. Winning makes me feel skilled.	.56	.57	.53
95. I view almost every situation as a way to prove that I am better at things than others.	.56	.50	.68
96. Competition does not allow me to reach my goals.	.46	.55	.30
97. I would hate it if I got beat at something.	.54	.52	.57
98. Others notice that I am competitive.	.67	.67	.67
100. For as long I can remember, I have wanted to outperform others.	.70	.69	.73
101. Competing against an opponent is a good opportunity to improve my skills.	.62	.63	.60
102. I do not feel the need to be better than others at anything.	.60	.59	.63
103. I never use competition as an opportunity to improve myself.	.56	.55	.56
104. It doesn't matter if you win or lose, but how you play the game.	-.38	-.36	-.41
106. Competing allows me to measure my own personal standards.	.56	.56	.55
107. I never pay much attention to who is winning a competition.	.52	.56	.46

108. I enjoy beating others in almost every area in life.	.66	.62	.73
109. I enjoy strategizing ways to win a competition.	.55	.57	.53
111. I get no enjoyment out of competing.	.62	.63	.59
112. Other people notice how much I have to dominate others in a competition.	.56	.51	.64
113. I put a lot of effort into beating others at things.	.71	.69	.75
114. It is important for me to outperform others.	.73	.71	.76
115. I use competition as a way to prove something to myself.	.63	.63	.62
116. I would like to compete even when a winner is not declared.	.35	.35	.33
117. I cannot learn anything by competing against others.	.50	.55	.39
118. I would never purposely let someone else win.	.13	.06	.25
119. Beating an opponent would give me no satisfaction.	.50	.47	.55
120. I like to be better than others at almost everything.	.65	.61	.74
121. I don’t understand why people like to beat others in a competition.	.53	.56	.49
122. It wouldn’t matter to me who won a competition, as long as I learned a lot.	-.36	-.35	-.39
123. I hate to be second best.	.49	.46	.55
125. I enjoy winning because it demonstrates that I am successful.	.58	.60	.55
126. I compete with others, even though they don’t know I am trying to beat them.	.64	.63	.63
127. I get a lot of enjoyment from bringing down my opponent.	.49	.48	.51
128. I don’t really understand why people like to compete.	.56	.58	.51
129. I try to be the best person in the room at almost anything.	.64	.58	.77
130. I am constantly trying to beat my own record.	.54	.52	.57
132. Nothing can be gained from competition.	.45	.54	.31
133. I wouldn’t mind finishing in last place in a competition.	.53	.55	.48
134. I like to be the best, even on my own team.	.67	.66	.68
135. Competition is silly.	.54	.60	.45
136. I would want to win to gain recognition from others.	.49	.52	.44
137. I would feel bad if I wasn’t the best person in the room at something.	.42	.36	.51
138. I feel bad if I win and others lose.	.25	.24	.31
139. I don’t care to be recognized for being competent or skilled.	.38	.41	.39
140. No matter what, I try to be better than others at things.	.63	.61	.66
142. I become upset when others demonstrate superior skills to me.	.33	.35	.29
143. I would rather not compete.	.59	.60	.58
144. I only compete when it’s necessary to gain some outcome.	.22	.25	.17
145. I totally lack the motivation to be better than others.	.50	.49	.52
146. Being better than others doesn’t matter to me.	.66	.66	.68
148. I love to compete.	.75	.74	.75

149. There is no such thing as an opponent.	.29	.28	.31
150. I would rather other people dominate me in a competition.	.47	.51	.42
151. I can’t stand to lose.	.57	.57	.58
152. I don’t care to be recognized for being better than others.	.46	.50	.43
153. I notice that I compete even when others do not realize we are competing.	.62	.61	.64

Table D15

Newby-COM Potential Retained and Eliminated Items

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1. Competing allows me to prove that I am the best.
3. Competition is a way to demonstrate my competence.
6. I get a lot of enjoyment out of competition.
7. I compete with people even when they don't realize it.
11. I enjoy setting and beating goals through competition.
13. I don't really care if I get beat in a competition. R
14. I am a competitive person.
15. I enjoy competing against others.
16. I do not find competition self-fulfilling. R
18. Competition is a way for me to reach my goals.
19. I love the thrill of competition.
26. I am constantly measuring my abilities in comparison to other people.
32. Competing doesn't really matter to me. R
36. I can improve my competence by competing.
37. I don't care if other people are better at things than I am. R
38. I always have to be the best at things.
40. Even when there is no competition, I like to compare myself to others to show I am the best.
45. I perform better when I compete against others.
48. Competition allows me to measure my own success.
51. Winning makes me feel superior to others.
55. I think a lot about dominating others in a competition.
56. I put a lot of effort into winning in order to prove to myself that I can do something.
60. I like being the best compared to other people.
61. I think a lot about winning.
63. Losing in a competition wouldn't bother me. R
65. Competition motivates me.
70. Being the best makes me feel powerful.
72. I am determined to win.
77. Other people comment on how competitive I am.
78. I like to challenge others.
81. Competition allows me to judge my level of competence.

84. I get a lot of enjoyment from improving my standing in a competition.
87. I love to dominate over other people in a competition.
89. I get a lot of enjoyment out of beating an opponent.
91. I think about competition a lot.
92. Winning does not make me feel superior to others. R
93. I think a lot about ways to win.
95. I view almost every situation as a way to prove that I am better at things than others.
97. I would hate it if I got beat at something.
98. Others notice that I am competitive.
100. For as long I can remember, I have wanted to outperform others.
102. I do not feel the need to be better than others at anything. R
108. I enjoy beating others in almost every area in life.
109. I enjoy strategizing ways to win a competition.
112. Other people notice how much I have to dominate others in a competition.
113. I put a lot of effort into beating others at things.
114. It is important for me to outperform others.
115. I use competition as a way to prove something to myself.
120. I like to be better than others at almost everything.
123. I hate to be second best.
125. I enjoy winning because it demonstrates that I am successful.
126. I compete with others, even though they don't know I am trying to beat them.
127. I get a lot of enjoyment from bringing down my opponent.
129. I try to be the best person in the room at almost anything.
130. I am constantly trying to beat my own record.
133. I wouldn't mind finishing in last place in a competition.
134. I like to be the best, even on my own team.
136. I would want to win to gain recognition from others.
140. No matter what, I try to be better than others at things.
143. I would rather not compete. R
146. Being better than others doesn't matter to me. R
148. I love to compete.
151. I can't stand to lose.
152. I don't care to be recognized for being better than others. R
153. I notice that I compete even when others do not realize we are competing.

Potential Eliminations:
2. I like to be better at things than others.
4. I compete with others to improve myself.
8. I would do almost anything to make my opponent lose.
9. There is no point to competition.
10. I cannot learn anything new about myself by competing with others.
12. I would like to try something difficult, even if I knew I wouldn't be the best.
17. There is no unfair way to win.
20. Competition is an opportunity to learn where my skills can be improved.
21. I enjoy competition only when there is a clear-cut winner and loser.
22. Competing does not allow me to demonstrate how superior my skills are.
24. Competing allows me to prove that my skills are better than others'.
27. I don't care if I win, as long as I don't lose.
28. Competing does not allow me to demonstrate my superiority over others.
29. I would only compete when I knew I had a chance of winning.
30. Competition allows me to improve myself.
31. I would rather lose a competition that requires a great degree of skill
than win at a competition that requires less skill.
34. I would rather other people fulfill their need for competition by beating me.
35. Competition allows me to judge how I am doing.
41. I would rather improve my abilities than dominate an opponent.
42. Competition does not allow me to master any abilities.
43. I wouldn't mind coming second place to a person who is
more skilled than I am.
44. I never try to be the best person on a team.
47. I don't believe that I will improve my skills by competing.
49. The only point of competition is to beat others.
50. I like to compete against my own personal standards.
53. I wouldn't mind finishing in second place in a competition.
54. I don't care if I win or lose, as long as I improve myself.
57. Competition is a way to dominate an opponent.
59. Competition teaches me nothing about myself.
62. Competing against others allows me to gain self-insight.
64. I would rather win a competition that does not require a lot of
skill than come second place in a competition that requires more skill.
67. Competing with others does not allow me to enhance my skill set.
68. I can learn a lot from a superior opponent.

69. Competition does not allow me to become more competent.
71. I hate coming second place to someone, even if I know
they are more skilled.
73. Competition does not allow me to gauge my success.
74. I would only compete if other people appreciated my success.
75. Competition does not allow me to judge my abilities.
76. Competing against others allows me to improve my skills.
79. I would only compete if it were for a prize.
80. I cannot measure my own success by competing with others.
82. Anything less than first place is losing.
83. I would not care about dominating an opponent.
85. I would do almost anything to prove my superiority over others.
88. Winning allows me to demonstrate my capabilities.
90. Competition gets my adrenaline pumping.
94. Winning makes me feel skilled.
96. Competition does not allow me to reach my goals.
101. Competing against an opponent is a good opportunity to improve my skills.
103. I never use competition as an opportunity to improve myself.
104. It doesn't matter if you win or lose, but how you play the game.
106. Competing allows me to measure my own personal standards.
107. I never pay much attention to who is winning a competition.
111. I get no enjoyment out of competing.
116. I would like to compete even when a winner is not declared.
117. I cannot learn anything by competing against others.
118. I would never purposely let someone else win.
119. Beating an opponent would give me no satisfaction.
121. I don't understand why people like to beat others in a competition.
122. It wouldn't matter to me who won a competition, as long as I learned a lot.
128. I don't really understand why people like to compete.
132. Nothing can be gained from competition.
135. Competition is silly.
137. I would feel bad if I wasn't the best person in the room at something.
138. I feel bad if I win and others lose.
139. I don't care to be recognized for being competent or skilled.
142. I become upset when others demonstrate superior skills to me.
144. I only compete when it's necessary to gain some outcome.
145. I totally lack the motivation to be better than others.

149. There is no such thing as an opponent.
150. I would rather other people dominate me in a competition.

Table D16

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses for COM: Total Sample

Velicer's Eigenvalues	Random Data Eigenvalues
26.4291	**1.575267**
4.9165	**1.525126**
2.5253	**1.491367**
1.7974	**1.461862**
1.5734	**1.435751**
1.2223	1.411148
1.1151	1.388629
1.0990	1.367226
.9670	1.346653
.8955	1.324281
.8590	1.306213
.8292	1.287004
.7527	1.270946
.7182	1.253476
.6958	1.234882
.6712	1.218724
.6572	1.202184
.6479	1.18715
.6199	1.173396
.5719	1.156778
.5662	1.141932
.5601	1.128746
.5457	1.113403
.5232	1.097564
.5074	1.08256
.4949	1.068964
.4830	1.055034
.4713	1.042214
.4528	1.028152
.4425	1.015228
.4374	1.00244
.4241	0.988724
.4232	0.976073

.4047	0.96336
.3989	0.949783
.3923	0.937319
.3771	0.924597
.3740	0.913417
.3709	0.901102
.3550	0.888278
.3494	0.875754
.3385	0.86398
.3354	0.851293
.3326	0.84023
.3289	0.827297
.3156	0.816005
.3042	0.804716
.3000	0.793014
.2862	0.78016
.2803	0.767284
.2772	0.756078
.2675	0.743204
.2622	0.730115
.2582	0.718452
.2512	0.705784
.2412	0.691683
.2343	0.679864
.2250	0.668279
.2186	0.653968
.2144	0.639343
.1848	0.626327
.1783	0.610348
.1757	0.593508
.1592	0.574889
.1130	0.55147

Table D17

Factor Loadings for COM using Total Sample

Item	Factor					Communalities
	1	2	3	4	5	
1. Competing allows me to prove that I am the best.	.290	.227	.333	.266	.218	.365
3. Competition is a way to demonstrate my competence.	.143	.303	.240	.438	.154	.385
6. I get a lot of enjoyment out of competition.	.162	.780	.077	.114	.068	.659
7. I compete with people even when they don't realize it.	.408	.207	.122	.474	.242	.507
11. I enjoy setting and beating goals through competition.	.058	.618	.004	.360	.084	.522
13. I don't really care if I get beat in a competition.	.271	.229	.152	.067	.702	.646
14. I am a competitive person.	.347	.642	.089	.227	.290	.676
15. I enjoy competing against others.	.220	.804	.130	.102	.051	.724
16. I do not find competition self-fulfilling.	.075	.643	.143	.140	.265	.529
18. Competition is a way for me to reach my goals.	.111	.548	-.019	.467	.067	.535
19. I love the thrill of competition.	.171	.785	.162	.147	.041	.695
26. I am constantly measuring my abilities in comparison to other people.	.332	.078	.206	.483	.289	.475
32. Competing doesn't really matter to me. R	.265	.594	.138	.177	.412	.642
36. I can improve my competence by competing.	.055	.499	.139	.563	.007	.588
37. I don't care if other people are better at things than I am.	.289	.035	.284	.113	.662	.616
38. I always have to be the best at things.	.554	.073	.175	.248	.379	.548
40. Even when there is no competition, I like to compare	.496	.023	.321	.399	.220	.557

myself to others to show I am the best.						
45. I perform better when I compete against others.	.192	.615	.127	.229	.095	.493
48. Competition allows me to measure my own success.	.055	.441	.207	.589	.076	.593
51. Winning makes me feel superior to others.	.275	.037	.697	.208	.167	.633
55. I think a lot about dominating others in a competition.	.508	.312	.446	.046	.117	.570
56. I put a lot of effort into winning in order to prove to myself that I can do something.	.301	.342	.212	.413	.083	.431
60. I like being the best compared to other people.	.354	.072	.579	.260	.325	.639
61. I think a lot about winning.	.539	.345	.356	.132	.170	.583
63. Losing in a competition wouldn't bother me. R	.260	.169	.263	.090	.685	.643
65. Competition motivates me.	.131	.648	.160	.377	.136	.623
70. Being the best makes me feel powerful.	.263	.074	.698	.191	.160	.625
72. I am determined to win.	.358	.523	.344	.134	.208	.581
77. Other people comment on how competitive I am.	.592	.531	-.024	.043	.129	.651
78. I like to challenge others.	.356	.581	.147	.126	.042	.503
81. Competition allows me to judge my level of competence.	.010	.358	.177	.615	-.037	.539
84. I get a lot of enjoyment from improving my standing in a competition.	.050	.540	.255	.392	.073	.519
87. I love to dominate over other people in a competition.	.478	.282	.547	-.048	.164	.637
89. I get a lot of enjoyment out of beating an opponent.	.340	.324	.612	.038	.176	.627
91. I think about competition a lot.	.587	.447	.158	.135	.185	.622
92. Winning does not make me feel superior to others.	.116	.134	.596	.163	.272	.486
93. I think a lot about ways to win.	.567	.398	.248	.077	.054	.550
95. I view almost every situation as a way to prove that I am better at things than others.	.692	.112	.211	.235	.037	.593

97. I would hate it if I got beat at something.	.547	.046	.310	.068	.378	.546
98. Others notice that I am competitive.	.609	.560	.005	.049	.164	.714
100. For as long I can remember, I have wanted to outperform others.	.644	.273	.224	.254	.218	.651
102. I do not feel the need to be better than others at anything. R	.230	.291	.331	.172	.473	.500
108. I enjoy beating others in almost every area in life.	.665	.134	.359	.158	.217	.661
109. I enjoy strategizing ways to win a competition.	.349	.478	.259	.170	-.117	.460
112. Other people notice how much I have to dominate others in a competition.	.695	.325	.077	-.011	.075	.601
113. I put a lot of effort into beating others at things.	.641	.350	.331	.132	.127	.677
114. It is important for me to outperform others.	.602	.209	.367	.277	.248	.679
115. I use competition as a way to prove something to myself.	.198	.359	.188	.605	.095	.579
120. I like to be better than others at almost everything.	.665	.146	.317	.172	.245	.652
123. I hate to be second best.	.536	.058	.135	.043	.415	.483
125. I enjoy winning because it demonstrates that I am successful.	.163	.209	.455	.491	.131	.536
126. I compete with others, even though they don't know I am trying to beat them.	.536	.138	.152	.521	.230	.654
127. I get a lot of enjoyment from bringing down my opponent.	.491	.125	.499	-.054	.080	.514
129. I try to be the best person in the room at almost anything.	.701	.138	.224	.218	.183	.641
130. I am constantly trying to beat my own record.	.209	.463	-.006	.406	.104	.434
133. I wouldn't mind finishing in last place in a competition.	.168	.166	.305	.127	.567	.486
134. I like to be the best, even on my own team.	.389	.329	.372	.183	.250	.494

136. I would want to win to gain recognition from others.	.202	.079	.555	.254	.185	.453
140. No matter what, I try to be better than others at things.	.645	.201	.215	.188	.218	.586
143. I would rather not compete. R	.074	.781	.068	.105	.149	.652
146. Being better than others doesn't matter to me.	.244	.316	.294	.253	.465	.525
148. I love to compete.	.314	.793	.148	.100	.167	.788
151. I can't stand to lose.	.512	.198	.204	.026	.431	.529
152. I don't care to be recognized for being better than others. R	.145	.115	.421	.188	.260	.314
153. I notice that I compete even when others do not realize we are competing.	.538	.173	.078	.488	.242	.622

Table D18

Factor 1 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_38	.660	.958	.210**
Retain_40	.643	.958	.296**
Retain_55	.680	.957	.239**
Retain_61	.728	.957	.225**
Retain_77	.662	.958	.186**
Retain_91	.741	.957	.209**
Retain_93	.670	.958	.189**
Retain_95	.696	.957	.208**
Retain_97	.650	.958	.274**
Retain_98	.701	.957	.195**
Retain_100	.780	.956	.229**
Retain_108	.768	.956	.270**
Retain_112	.684	.957	.175**
Retain_113	.777	.956	.263**
Retain_114	.790	.956	.295**
Retain_120	.770	.956	.300**
Retain_123	.592	.958	.227**
Retain_126	.678	.958	.299**
Retain_129	.757	.957	.247**
Retain_140	.734	.957	.265**
Retain_151	.651	.958	.231**
Retain_153	.666	.958	.289**

Table D19

Factor 2 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_6	.752	.942	.069*
Retain_11	.650	.944	.035
Retain_14	.766	.942	.204**
Retain_15	.798	.941	.129**
Retain_16_R	.653	.944	.074*
Retain_18	.627	.945	.050
Retain_19	.790	.941	.123**
Retain_32_R	.711	.943	.171**
Retain_45	.675	.944	.136**
Retain_65	.756	.942	.127**
Retain_72	.675	.944	.201**
Retain_78	.646	.944	.149**
Retain_84	.649	.944	.118**
Retain_89	.527	.947	.158**
Retain_130	.577	.946	.026
Retain_143_R	.733	.942	.069*
Retain_148	.837	.940	.035

Table D20

Factor 3 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_1	.539	.886	.208**
Retain_51	.715	.873	.345**
Retain_60	.725	.873	.318**
Retain_70	.701	.874	.334**
Retain_87	.681	.876	.256**
Retain_89	.703	.874	.322**
Retain_92_R	.585	.883	.320**
Retain_127	.590	.882	.294**
Retain_136	.573	.883	.286**
Retain_152_R	.459	.890	.304**

Table D21

Factor 4 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_3	.559	.856	.192**
Retain_7	.536	.859	.282**
Retain_26	.524	.861	.291**
Retain_36	.639	.849	.098**
Retain_48	.679	.846	.099**
Retain_56	.578	.854	.130**
Retain_81	.635	.849	.137**
Retain_115	.681	.844	.142**
Retain_125	.607	.851	.220**

Table D22

Factor 5 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_13_R	.670	.819	.242**
Retain_37_R	.644	.824	.291**
Retain_63_R	.677	.818	.279**
Retain_102_R	.611	.830	.289**
Retain_133_R	.596	.834	.264**
Retain_146_R	.611	.830	.270**

Table D23

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses for 40 Retained COM Items: Total Sample

Velicer's Eigenvalues	Random Data Eigenvalues
17.0053	**1.420307**
3.8043	**1.379204**
1.9985	**1.343336**
1.4773	**1.313553**
1.1337	1.287060
.9107	1.261991
.7713	1.238084
.7475	1.214901
.6944	1.193304
.6292	1.173914
.5818	1.154931
.5757	1.134148
.5560	1.114131
.5501	1.097491
.5002	1.079531
.4869	1.062806
.4683	1.045978
.4454	1.027224
.4386	1.011271
.4120	.993929
.4060	.977506
.3888	.960285
.3790	.945375
.3589	.928864
.3574	.913469
.3307	.897605
.3222	.881043
.3202	.866307
.3127	.849789
.3026	.834833
.2940	.819614
.2816	.802627
.2718	.786139
.2593	.769957

.2262	.715740
.2028	.697175
.1864	.673745
.1204	.646014

Table D24

Factor Loadings for 40 Retained COM using Total Sample

Item		Factor				Communalities
		1	2	3	4	
Retain_6	6. I get a lot of enjoyment out of competition.	.783	.168	.071	.132	.664
Retain_11	11. I enjoy setting and beating goals through competition.	.620	.076	.072	.313	.494
Retain_13_R	13. I don't really care if I get beat in a competition.	.320	.208	.670	-.132	.611
Retain_14	14. I am a competitive person.	.699	.342	.264	.083	.683
Retain_15	15. I enjoy competing against others.	.803	.226	.082	.137	.721
Retain_16_R	16. I do not find competition self-fulfilling.	.654	.088	.268	.140	.527
Retain_19	19. I love the thrill of competition.	.774	.192	.097	.197	.685
Retain_32_R	32. Competing doesn't really matter to me. R	.654	.270	.376	.053	.645
Retain_36	36. I can improve my competence by competing.	.473	.133	.070	.629	.642
Retain_37_R	37. I don't care if other people are better at things than I am.	.102	.252	.733	-.049	.614
Retain_38	38. I always have to be the best at things.	.140	.529	.450	.045	.504
Retain_45	45. I perform better when I compete against others.	.614	.209	.115	.284	.514
Retain_48	48. Competition allows me to measure my own success.	.447	.092	.185	.636	.647
Retain_51	51. Winning makes me feel superior to others.	-.015	.323	.589	.360	.581
Retain_60	60. I like being the best compared to other people.	.072	.384	.615	.320	.634
Retain_63_R	63. Losing in a competition wouldn't bother me. R	.243	.211	.718	-.068	.623
Retain_65	65. Competition motivates me.	.652	.167	.187	.377	.630
Retain_70	70. Being the best makes me feel powerful.	.022	.329	.562	.350	.547

Retain_77	77. Other people comment on how competitive I am.	.536	.619	.046	-.027	.673
Retain_78	78. I like to challenge others.	.562	.398	.085	.142	.501
Retain_81	81. Competition allows me to judge my level of competence.	.326	.109	.053	.716	.634
Retain_89	89. I get a lot of enjoyment out of beating an opponent.	.269	.380	.487	.222	.503
Retain_91	91. I think about competition a lot.	.444	.584	.238	.099	.605
Retain_92_R	92. Winning does not make me feel superior to others.	.117	.156	.570	.293	.449
Retain_93	93. I think a lot about ways to win.	.359	.579	.196	.115	.515
Retain_95	95. I view almost every situation as a way to prove that I am better at things than others.	.108	.706	.196	.188	.584
Retain_98	98. Others notice that I am competitive.	.566	.631	.090	-.032	.728
Retain_100	100. For as long I can remember, I have wanted to outperform others.	.271	.680	.324	.154	.666
Retain_108	108. I enjoy beating others in almost every area in life.	.112	.690	.416	.136	.680
Retain_112	112. Other people notice how much I have to dominate others in a competition.	.312	.716	.063	-.013	.614
Retain_113	113. I put a lot of effort into beating others at things.	.308	.675	.311	.160	.672
Retain_114	114. It is important for me to outperform others.	.193	.647	.426	.250	.700
Retain_115	115. I use competition as a way to prove something to myself.	.363	.252	.193	.562	.549
Retain_120	120. I like to be better than others at almost everything.	.117	.706	.387	.143	.682
Retain_129	129. I try to be the best person in the room at almost anything.	.125	.730	.299	.148	.660
Retain_133_R	133. I wouldn't mind finishing in last place in a competition.	.215	.148	.630	.038	.467
Retain_136	136. I would want to win to gain recognition from others.	.055	.275	.471	.343	.418
Retain_140	140. No matter what, I try to be better than others at things.	.204	.666	.313	.107	.595
Retain_143_R	143. I would rather not compete. R	.787	.098	.106	.108	.651
Retain_148	148. I love to compete.	.792	.339	.165	.099	.779

Table D25

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses for 37 Retained COM Items: Total Sample

Velicer's Eigenvalues	Random Data Eigenvalues
15.9507	**1.402229**
3.6120	**1.358576**
1.9213	**1.323667**
1.4716	**1.291582**
1.0294	1.265790
.9028	1.241699
.7444	1.218495
.6828	1.194079
.6634	1.174126
.5915	1.152543
.5661	1.133716
.5528	1.113346
.5286	1.092369
.5059	1.075139
.4693	1.057457
.4467	1.040001
.4298	1.022594
.4197	1.003473
.3904	0.985725
.3873	0.968550
.3741	0.953369
.3655	0.936643
.3533	0.920934
.3335	0.904275
.3221	0.887132
.3169	0.871646
.3098	0.854688
.3030	0.838220
.2818	0.820218
.2728	0.803026
.2595	0.786354
.2514	0.769988
.2418	0.751331

.2320	0.732182
.2066	0.710412
.1884	0.686921
.1210	0.657503

Table D26

Factor Loadings for 37 Retained COM using Total Sample

Item		Factor				Communalities
		1	2	3	4	
Retain_6	6. I get a lot of enjoyment out of competition.	.783	.165	.066	.155	.669
Retain_11	11. I enjoy setting and beating goals through competition.	.606	.079	.069	.346	.498
Retain_13_R	13. I don't really care if I get beat in a competition.	.311	.217	.687	-.083	.623
Retain_14	14. I am a competitive person.	.698	.340	.263	.114	.684
Retain_15	15. I enjoy competing against others.	.805	.226	.071	.154	.728
Retain_16_R	16. I do not find competition self-fulfilling.	.641	.093	.273	.186	.528
Retain_19	19. I love the thrill of competition.	.772	.193	.085	.213	.686
Retain_32_R	32. Competing doesn't really matter to me. R	.647	.272	.385	.093	.649
Retain_36	36. I can improve my competence by competing.	.443	.142	.061	.663	.660
Retain_37_R	37. I don't care if other people are better at things than I am.	.095	.266	.736	-.012	.621
Retain_45	45. I perform better when I compete against others.	.603	.216	.108	.306	.515
Retain_48	48. Competition allows me to measure my own success.	.413	.105	.181	.674	.669
Retain_51	51. Winning makes me feel superior to others.	-.028	.361	.557	.350	.564
Retain_60	60. I like being the best compared to other people.	.059	.414	.587	.321	.622
Retain_63_R	63. Losing in a competition wouldn't bother me. R	.232	.222	.726	-.034	.631
Retain_65	65. Competition motivates me.	.634	.173	.182	.411	.635
Retain_70	70. Being the best makes me feel powerful.	.012	.367	.532	.335	.530
Retain_77	77. Other people comment on how competitive I am.	.547	.613	.039	-.025	.677
Retain_78	78. I like to challenge others.	.565	.401	.068	.137	.503
Retain_81	81. Competition allows me to judge my level of competence.	.294	.127	.041	.735	.645
Retain_91	91. I think about competition a lot.	.441	.593	.233	.108	.612

Retain_92_R	92. Winning does not make me feel superior to others.	.097	.191	.555	.306	.448
Retain_93	93. I think a lot about ways to win.	.359	.589	.184	.114	.523
Retain_95	95. I view almost every situation as a way to prove that I am better at things than others.	.107	.713	.181	.189	.588
Retain_98	98. Others notice that I am competitive.	.576	.626	.083	-.025	.731
Retain_100	100. For as long I can remember, I have wanted to outperform others.	.269	.688	.312	.166	.671
Retain_108	108. I enjoy beating others in almost every area in life.	.111	.705	.395	.132	.682
Retain_112	112. Other people notice how much I have to dominate others in a competition.	.321	.713	.053	-.023	.614
Retain_113	113. I put a lot of effort into beating others at things.	.310	.686	.290	.159	.677
Retain_114	114. It is important for me to outperform others.	.187	.661	.402	.259	.701
Retain_115	115. I use competition as a way to prove something to myself.	.339	.265	.182	.588	.563
Retain_120	120. I like to be better than others at almost everything.	.118	.718	.367	.147	.686
Retain_129	129. I try to be the best person in the room at almost anything.	.129	.738	.278	.147	.661
Retain_133_R	133. I wouldn't mind finishing in last place in a competition.	.205	.152	.629	.058	.464
Retain_140	140. No matter what, I try to be better than others at things.	.204	.670	.301	.112	.594
Retain_143_R	143. I would rather not compete. R	.782	.095	.112	.141	.653
Retain_148	148. I love to compete.	.793	.328	.154	.111	.773

Table D27

Factor Loadings for Final Retained COM using Total Sample

Item	Factor Loadings			
	1	2	3	4
6. I get a lot of enjoyment out of competition.	.783	.165	.066	.155
11. I enjoy setting and beating goals through competition.	.606	.079	.069	.346
14. I am a competitive person.	.698	.340	.263	.114
15. I enjoy competing against others.	.805	.226	.071	.154
16. I do not find competition self-fulfilling. R	.641	.093	.273	.186
19. I love the thrill of competition.	.772	.193	.085	.213
32. Competing doesn't really matter to me. R	.647	.272	.385	.093
45. I perform better when I compete against others.	.603	.216	.108	.306
65. Competition motivates me.	.634	.173	.182	.411
78. I like to challenge others.	.565	.401	.068	.137
143. I would rather not compete. R	.782	.095	.112	.141
148. I love to compete.	.793	.328	.154	.111
77. Other people comment on how competitive I am.	.547	.613	.039	-.025
91. I think about competition a lot.	.441	.593	.233	.108
93. I think a lot about ways to win.	.359	.589	.184	.114
95. I view almost every situation as a way to prove that I am better at things than others.	.107	.713	.181	.189
98. Others notice that I am competitive.	.576	.626	.083	-.025

100. For as long I can remember, I have wanted to outperform others.	.269	.688	.312	.166
108. I enjoy beating others in almost every area in life.	.111	.705	.395	.132
112. Other people notice how much I have to dominate others in a competition.	.321	.713	.053	-.023
113. I put a lot of effort into beating others at things.	.310	.686	.290	.159
114. It is important for me to outperform others.	.187	.661	.402	.259
120. I like to be better than others at almost everything.	.118	.718	.367	.147
129. I try to be the best person in the room at almost anything.	.129	.738	.278	.147
140. No matter what, I try to be better than others at things.	.204	.670	.301	.112
13. I don't really care if I get beat in a competition. R	.311	.217	.687	-.083
37. I don't care if other people are better at things than I am. R	.095	.266	.736	-.012
51. Winning makes me feel superior to others.	-.028	.361	.557	.350
60. I like being the best compared to other people. R	.059	.414	.587	.321
63. Losing in a competition wouldn't bother me. R	.232	.222	.726	-.034
70. Being the best makes me feel powerful.	.012	.367	.532	.335
92. Winning does not make me feel superior to others. R	.097	.191	.555	.306
133. I wouldn't mind finishing in last place in a competition.	.205	.152	.629	.058
36. I can improve my competence by competing.	.443	.142	.061	.663
48. Competition allows me to measure my own success.	.413	.105	.181	.674
81. Competition allows me to judge my level of competence.	.294	.127	.041	.735
115. I use competition as a way to prove something to myself.	.339	.265	.182	.588

Table D28

Factor 1 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_6	.773	.934	.069*
Retain_11	.623	.939	.035
Retain_14	.764	.934	.204**
Retain_15	.822	.932	.129**
Retain_16_R	.649	.938	.074*
Retain_19	.798	.933	.123**
Retain_32_R	.715	.936	.171**
Retain_45	.666	.937	.136**
Retain_65	.737	.935	.127**
Retain_78	.624	.939	.149**
Retain_143_R	.750	.934	.036
Retain_148	.840	.931	.113**

Table D29

Factor 2 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_77	.695	.942	.186**
Retain_91	.739	.941	.209**
Retain_93	.670	.943	.189**
Retain_95	.685	.942	.208**
Retain_98	.730	.941	.195**
Retain_100	.779	.939	.229**
Retain_108	.751	.940	.270**
Retain_112	.701	.942	.175**
Retain_113	.783	.939	.263**
Retain_114	.769	.940	.295**
Retain_120	.763	.940	.300**
Retain_129	.748	.940	.247**
Retain_140	.716	.941	.265**

Table D30

Factor 3 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_13_R	.612	.853	.242**
Retain_37_R	.647	.849	.291**
Retain_51	.656	.848	.345**
Retain_60	.682	.845	.318**
Retain_63_R	.652	.849	.279**
Retain_70	.623	.852	.334**
Retain_92_R	.554	.859	.320**
Retain_133_R	.541	.861	.264**

Table D31

Factor 4 Item-Total Correlations and Social Desirability Correlations

Item	Item-Total *r*	α if Item Deleted	MC-SDS *r*
Retain_36	.693	.789	.098**
Retain_48	.704	.789	.099**
Retain_81	.704	.785	.137**
Retain_115	.621	.827	.142**

Table D32

Factor 1 Subscale Correlations

Item	Factor 1	Factor 2	Factor 3	Factor 4
Retain_6	**.814****	.473**	.305**	.490**
Retain_11	**.681****	.374**	.274**	.539**
Retain_14	**.808****	.646**	.491**	.515**
Retain_15	**.854****	.525**	.330**	.487**
Retain_16_R	**.707****	.445**	.372**	.489**
Retain_19	**.834****	.508**	.343**	.515**
Retain_32_R	**.769****	.609**	.534**	.488**
Retain_45	**.724****	.487**	.363**	.529**
Retain_65	**.777****	.512**	.421**	.616**
Retain_78	**.689****	.561**	.375**	.443**
Retain_143_R	**.797****	.434**	.302**	.485**
Retain_148	**.874****	.636**	.423**	.521**

Table D33

Factor 2 Subscale Correlations

Item	Factor 1	Factor 2	Factor 3	Factor 4
Retain_77	.628**	**.748****	.408**	.403**
Retain_91	.605**	**.781****	.516**	.449**
Retain_93	.537**	**.724****	.460**	.380**
Retain_95	.384**	**.733****	.487**	.357**
Retain_98	.671**	**.778****	.445**	.423**
Retain_100	.539**	**.819****	.598**	.440**
Retain_108	.433**	**.792****	.627**	.352**
Retain_112	.475**	**.745****	.412**	.310**
Retain_113	.568**	**.820****	.581**	.443**
Retain_114	.503**	**.808****	.660**	.468**
Retain_120	.441**	**.803****	.620**	.366**
Retain_129	.429**	**.790****	.554**	.359**
Retain_140	.479**	**.761****	.547**	.357**

Table D34

Factor 3 Subscale Correlations

Item	Factor 1	Factor 2	Factor 3	Factor 4
Retain_13_R	.423**	.519**	**.712****	.295**
Retain_37_R	.295**	.493**	**.744****	.234**
Retain_51	.311**	.503**	**.749****	.329**
Retain_60	.396**	.593**	**.772****	.404**
Retain_63_R	.384**	.507**	**.746****	.279**
Retain_70	.346**	.521**	**.723****	.354**
Retain_92_R	.330**	.418**	**.662****	.334**
Retain_133_R	.355**	.429**	**.662****	.301**

Table D35

Factor 4 Subscale Correlations

Item	Factor 1	Factor 2	Factor 3	Factor 4
Retain_36	.594**	.416**	.327**	**.828****
Retain_48	.570**	.393**	.387**	**.833****
Retain_81	.473**	.354**	.302**	**.830****
Retain_115	.544**	.489**	.415**	**.809****

Table D36

Correlations Between COM and Other Measures of Competitiveness

Subscale	Factor 1	Factor 2	Factor 3	Factor 4
WOFO	.273**	.296**	.270**	.188**
WOFO_PU	-.129**	-.025	-.019	-.109**
WOFO_Work	-.111**	-.008	.087*	-.096**
WOFO_Mast.	.116**	.069*	-.005	.070*
WOFO_Com.	.536**	.550**	.463**	.420**
WOFO_None	-.116**	-.285**	-.247**	-.148**
MC_SDS	.148**	.298**	.420**	.146**
PDCA	.623**	.294**	.198**	.627**
MACH_IV	-.069*	-.294**	-.287**	-.094**
CI	.767**	.604**	.434**	.469**
CI_Emotion	.797**	.494**	.324**	.483**
CI_Argu.	.406**	.528**	.504**	.397**
CI_Games	.573**	.677**	.599**	.399**
CQ	.509**	.600**	.576**	.481**
CQ_IC	.483**	.693**	.630**	.462**
CQ_Goal	.252**	.123**	.162**	.219**
SOQ	.705**	.610**	.502**	.545**
SOQ_Com.	.752**	.588**	.426**	.524**
SOQ_Win	.527**	.684**	.695**	.456**
SOQ_Goal	.337**	.172**	.125**	.348**
HCA	.496**	.736**	.721**	.441**
CCAS	.304**	.601**	.504**	.239**
CCAS_Agg.	.208**	.433**	.367**	.146**
CCAS_Fasc.	.236**	.516**	.410**	.165**
CCAS_Wrk.O	.457**	.593**	.376**	.292**
CCAS_Pwr.O	.188**	.438**	.427**	.170**
CCAS_Indep.O	.235**	.530**	.511*	.236**

Table D38

Correlations between COM Factors, Participant Age and GPA

	Factor 1	Factor 2	Factor 3	Factor 4	Total_COM	Age	GPA
Factor 1	1	.655**	.474**	.667**	.849**	.001	.128**
Factor 2	.655**	1	.681**	.497**	.869**	.033	.065
Factor 3	.474**	.681**	1	.441**	.784**	-.089	.097*
Factor 4	.667**	.497**	.441**	1	.781**	.060	.184**
Total_COM	.849**	.869**	.784**	.781**	1	-.005	.140**
Age	.001	.033	-.089	.060	-.005	1	.109*
GPA	.128**	.065	.097*	.184**	.140**	.109*	1

Table D39

Eigenvalues Obtained in Velicer's and Horn's Parallel Analyses for Final Retained COM Items and Meta-analysis Scales

Velicer's Eigenvalues	Random Data Eigenvalues
5.6058	**1.184080**
1.6351	**1.129568**
.8889	1.090674
.6327	1.057392
.5445	1.026060
.4438	.998657
.3539	.966522
.3098	.935761
.2531	.909008
.2014	.871498
.1511	.830779

Table D41

Fisher Z Transformations between Correlations Measuring Machiavellianism and COM Factors

	Factor 1 -.069	Factor 2 -.294	Factor 3 -.287	Factor 4 -.087
Factor 1 -.069	-	4.71**	4.56**	.51
Factor 2 -.294		-	.15	4.24**
Factor 3 -.287			-	-4.09**
Factor 4 -.094				-

Table D42

Fisher Z Transformations between Correlations Measuring Social Desirability and COM Factors

	Factor 1 .148	Factor 2 .298	Factor 3 .420	Factor 4 .146
Factor 1 .148	-	-3.17**	-6.00**	.04
Factor 2 .298		-	-2.83**	3.25**
Factor 3 .420			-	6.10**
Factor 4 .146				-

Table D44

Fisher Z Transformations between Correlations Measuring GPA and COM Factors

	Factor 1 .128	Factor 2 .065	Factor 3 .097	Factor 4 .184
Factor 1 .128	-	.98	.49	-.89
Factor 2 .065		-	-.50	-1.88*
Factor 3 .097			-	1.39
Factor 4 .184				-

Table D45

Questionnaire Administration Order

1. Demographics
2. COM
3. WOFO
4. MC-SDS
5. PDCA
6. SOQ
7. MACH-IV
8. CQ
9. CI
10. HCA
11. CCAS

Appendix E

Discrimination Indices Calculations

Table E1
Newby-COM Scale Development Statistics: Discrimination Indices for Total Sample using Original Data

Item	U	L	D	1-D
1. Competing allows me to prove that I am the best.	95/103	28/72	.94 - .38 = .56	.44
2. I like to be better at things than others.	155/156	92/127	.99 - .72 = .27	.73
3. Competition is a way to demonstrate my competence.	147/153	73/128	.96 - .57 = .39	.61
4. I compete with others to improve myself.	139/147	80/128	.95 - .63 = .32	.68
6. I get a lot of enjoyment out of competition.	146/155	43/121	.94 - .36 = .59	.41
7. I compete with people even when they don't realize it.	142/155	35/138	.91 - .25 = .66	.34
8. I would do almost anything to make my opponent lose.	35/140	3/163	.25 - .02 = .23	.77
9. There is no point to competition.	155/158	81/120	.98 - .68 = .31	.69
10. I cannot learn anything new about myself by competing with others.	148/154	109/132	.96 - .83 = .14	.86
11. I enjoy setting and beating goals through competition.	147/151	79/125	.97 - .63 = .34	.66
12. I would like to try something difficult, even if I knew I wouldn't be the best.	133/151	136/157	.88 - .87 = .01	.99
13. I don't really care if I get beat in a competition.	123/144	19/140	.85 - .14 = .72	.28
14. I am a competitive person.	159/161	29/130	.99 - .22 = .76	.24
15. I enjoy competing against others.	149/156	36/113	.96 - .32 = .64	.36
16. I do not find competition self-fulfilling.	140/148	36/108	.95 - .33 = .61	.39
17. There is no unfair way to win.	21/141	13/140	.15 - .09 = .06	.94
18. Competition is a way for me to reach my goals.	143/147	63/134	.97 - .47 = .50	.50
19. I love the thrill of competition.	153/157	41/118	.97 - .35 = .63	.37
20. Competition is an opportunity to learn where my skills can be improved.	157/158	112/130	.99 - .86 = .13	.87
21. I enjoy competition only when there is a clear-cut winner and loser.	58/124	19/141	.47 - .13 = .33	.67
22. Competing does not allow me to demonstrate how superior my skills are.	138/148	53/78	.93 - .68 = .25	.75
24. Competing allows me to prove that my skills are better than others'.	10/134	6/148	.07 - .04 = .03	.97
26. I am constantly measuring my abilities in comparison to other people.	147/155	55/142	.95 - .39 = .56	.44
27. I don't care if I win, as long as I don't lose.	81/122	45/120	.66 - .38 = .29	.71
28. Competing does not allow me to demonstrate my superiority over others.	124/128	44/85	.97 - .52 = .45	.55
29. I would only compete when I knew I had a chance of winning.	51/140	34/145	.35 - .23 = .13	.87
30. Competition allows me to improve myself.	150/153	107/139	.98 - .77 = .21	.79
31. I would rather lose a competition that requires a great degree of skill than win at a competition that requires less skill.	91/126	65/103	.72 - .63 = .09	.91

32. Competing doesn't really matter to me.	152/156	14/132	.97 - .11 = .87	.13
34. I would rather other people fulfill their need for competition by beating me.	136/142	57/109	.96 - .52 = .43	.57
35. Competition allows me to judge how I am doing.	158/159	76/111	.99 - .68 = .31	.69
36. I can improve my competence by competing.	144/146	56/10	.99 - .52 = .46	.54
37. I don't care if other people are better at things than I am.	108/146	16/153	.74 - .10 = .64	.36
38. I always have to be the best at things.	99/126	9/152	.79 - .06 = .73	.27
40. Even when there is no competition, I like to compare myself to others to show I am the best.	100/133	15/151	.75 - .10 = .65	.35
41. I would rather improve my abilities than dominate an opponent.	103/126	143/148	.82 - .97 = -.15	1.15
42. Competition does not allow me to master any abilities.	144/149	61/104	.97 - .59 = .38	.62
43. I wouldn't mind coming second place to a person who is more skilled than I am.	121/149	154/157	.81 - .98 = -.17	1.17
44. I never try to be the best person on a team.	130/149	60/128	.87 - .47 = .40	.60
45. I perform better when I compete against others.	144/152	40/117	.95 - .34 = .61	.39
47. I don't believe that I will improve my skills by competing.	156/158	88/128	.99 - .69 = .30	.70
48. Competition allows me to measure my own success.	159/159	76/118	1.0 - .64 = .36	.64
49. The only point of competition is to beat others.	39/136	11/150	.29 - .07 = .21	.79
50. I like to compete against my own personal standards.	153/157	133/142	.97 - .94 = .04	.96
51. Winning makes me feel superior to others.	123/133	42/136	.92 - .31 = .62	.38
53. I wouldn't mind finishing in second place in a competition.	48/144	5/163	.33- .03 = .30	.70
54. I don't care if I win or lose, as long as I improve myself.	87/129	145/148	.67 - .98 = -.31	1.31
55. I think a lot about dominating others in a competition.	90/132	3/156	.68 - .02 = .66	.34
56. I put a lot of effort into winning in order to prove to myself that I can do something.	149/153	40/132	.97 - .30 = .67	.33
57. Competition is a way to dominate an opponent.	89/128	25/136	.70 - .18 = .51	.49
59. Competition teaches me nothing about myself.	158/161	131/142	.98 - .92 = .06	.94
60. I like being the best compared to other people.	137/146	26/133	.94 - .20 = .74	.26
61. I think a lot about winning.	121/135	6/154	.90 - .04 = .86	.14
62. Competing against others allows me to gain self-insight.	150/153	80/116	.98 - .69 = .29	.71
63. Losing in a competition wouldn't bother me.	130/149	20/152	.87 - .13 = .74	.26
64. I would rather win a competition that does not require a lot of skill than come second place in a competition that requires more skill.	36/130	17/117	.28 - .15 = .13	.87
65. Competition motivates me.	164/164	80/132	1.00 - .61 = .39	.61
67. Competing with others does not allow me to enhance my skill set.	155/160	94/109	.97 - .86 = .11	.89
68. I can learn a lot from a superior opponent.	157/162	145/156	.97 - .93 = .04	.96
69. Competition does not allow me to become more competent.	140/152	88/114	.92 - .77 = .15	.85
70. Being the best makes me feel powerful.	136/145	44/129	.94 - .34 = .60	.40

71. I hate coming second place to someone, even if I know they are more skilled.	65/146	6/152	.45 - .04 = .41	.59
72. I am determined to win.	156/156	12/115	1.00 - .10 = .90	.10
73. Competition does not allow me to gauge my success.	147/150	73/107	.98 - .68 = .30	.70
74. I would only compete if other people appreciated my success.	38/133	28/135	.29 - .21 = .08	.92
75. Competition does not allow me to judge my abilities.	155/158	95/122	.98 - .78 = .20	.80
76. Competing against others allows me to improve my skills.	159/160	113/133	.99 - .85 = .14	.86
77. Other people comment on how competitive I am.	94/127	3/158	.74 - .02 = .72	.28
78. I like to challenge others.	139/148	39/127	.94 - .31 = .63	.37
79. I would only compete if it were for a prize.	15/147	27/155	.10 - .17 = -.07	1.07
80. I cannot measure my own success by competing with others.	150/156	76/127	.96 - .60 = .36	.64
81. Competition allows me to judge my level of competence.	134/141	64/113	.95 - .57 = .38	.62
82. Anything less than first place is losing.	47/143	6/162	.33 - .04 = .29	.71
83. I would not care about dominating an opponent.	94/124	40/144	.76 - .28 = .48	.52
84. I get a lot of enjoyment from improving my standing in a competition.	163/164	81/120	.99 - .68 = .32	.68
85. I would do almost anything to prove my superiority over others.	42/126	2/158	.33 - .01 = .32	.68
87. I love to dominate over other people in a competition.	109/130	6/149	.84 - .04 = .80	.20
88. Winning allows me to demonstrate my capabilities.	161/162	78/120	.99 - .65 = .34	.66
89. I get a lot of enjoyment out of beating an opponent.	139/146	25/124	.95 - .20 = .75	.25
90. Competition gets my adrenaline pumping.	160/160	108/138	1.00 - .78 = .22	.78
91. I think about competition a lot.	90/120	3/160	.75 - .02 = .73	.27
92. Winning does not make me feel superior to others.	128/140	44/138	.91 - .32 = .60	.40
93. I think a lot about ways to win.	109/129	11/144	.84 - .08 = .77	.23
94. Winning makes me feel skilled.	161/162	78/120	.99 - .65 = .34	.66
95. I view almost every situation as a way to prove that I am better at things than others.	74/128	2/153	.58 - .01 = .57	.43
96. Competition does not allow me to reach my goals.	152/159	80/115	.96 - .70 = .26	.74
97. I would hate it if I got beat at something.	81/138	4/151	.59 - .03 = .56	.44
98. Others notice that I am competitive.	111/137	5/156	.81 - .03 = .78	.22
100. For as long I can remember, I have wanted to outperform others.	124/144	5/156	.86 - .03 = .83	.17
101. Competing against an opponent is a good opportunity to improve my skills.	163/163	93/130	1.00 - .72 = .28	.72
102. I do not feel the need to be better than others at anything.	149/152	49/138	.98 - .36 = .63	.37
103. I never use competition as an opportunity to improve myself.	162/163	100/133	.99 - .75 = .24	.76
104. It doesn't matter if you win or lose, but how you play the game.	84/123	144/148	.68 - .97 = -.29	1.29
106. Competing allows me to measure my own personal standards.	161/162	100/129	.99 - .78 = .22	.78
107. I never pay much attention to who is winning a competition.	155/161	82/127	.96 - .65 = .32	.68
108. I enjoy beating others in almost every area in life.	99/129	5/148	.77 - .03 = .73	.27

109. I enjoy strategizing ways to win a competition.	142/149	53/133	.95 - .40 = .55	.45
111. I get no enjoyment out of competing.	160/162	98/122	.99 - .80 = .18	.82
112. Other people notice how much I have to dominate others in a competition.	56/116	2/159	.48 - .01 = .47	.53
113. I put a lot of effort into beating others at things.	114/127	4/151	.90 - .03 = .87	.13
114. It is important for me to outperform others.	126/140	4/152	.90 - .03 = .87	.13
115. I use competition as a way to prove something to myself.	154/159	49/125	.97 - .39 = .58	.42
116. I would like to compete even when a winner is not declared.	132/154	77/121	.86 - .64 = .22	.78
117. I cannot learn anything by competing against others.	161/161	126/137	1.00 - .92 = .08	.92
118. I would never purposely let someone else win.	63/148	33/136	.43 - .24 = .18	.82
119. Beating an opponent would give me no satisfaction.	159/161	111/125	.99 - .89 = .10	.90
120. I like to be better than others at almost everything.	110/134	5/148	.82 - .03 = .79	.21
121. I don't understand why people like to beat others in a competition.	156/161	87/119	.97 - .73 = .24	.76
122. It wouldn't matter to me who won a competition, as long as I learned a lot.	61/120	123/138	.51 - .89 = -.38	1.38
123. I hate to be second best.	80/148	5/146	.54 - .03 = .51	.49
125. I enjoy winning because it demonstrates that I am successful.	156/159	62/121	.98 - .51 = .47	.53
126. I compete with others, even though they don't know I am trying to beat them.	132/151	12/147	.87 - .08 = .79	.21
127. I get a lot of enjoyment from bringing down my opponent.	73/124	9/147	.59 - .06 = .53	.47
128. I don't really understand why people like to compete.	158/161	83/117	.98 - .71 = .27	.73
129. I try to be the best person in the room at almost anything.	101/136	2/150	.74 - .01 = .73	.27
130. I am constantly trying to beat my own record.	150/159	68/131	.94 - .52 = .42	.58
132. Nothing can be gained from competition.	162/164	134/139	.99 - .96 = .02	.98
133. I wouldn't mind finishing in last place in a competition.	153/160	68/141	.96 - .48 = .47	.53
134. I like to be the best, even on my own team.	144/148	22/123	.97 - .18 = .79	.21
135. Competition is silly.	160/161	95/125	.99 - .76 = .23	.77
136. I would want to win to gain recognition from others.	135/148	55/128	.91 - .43 = .48	.52
137. I would feel bad if I wasn't the best person in the room at something.	59/129	7/155	.46 - .05 = .41	.59
138. I feel bad if I win and others lose.	107/138	58/121	.78 - .48 = .30	.70
139. I don't care to be recognized for being competent or skilled.	144/151	81/124	.95 - .65 = .30	.70
140. No matter what, I try to be better than others at things.	110/133	9/147	.83 - .06 = .77	.23
142. I become upset when others demonstrate superior skills to me.	60/126	14/137	.48 - .10 = .37	.63
143. I would rather not compete.	144/154	42/123	.94 - .34 = .59	.41
144. I only compete when it's necessary to gain some outcome.	117/141	75/135	.83 - .56 = .27	.73
145. I totally lack the motivation to be better than others.	160/163	86/128	.98 - .67 = .31	.69
146. Being better than others doesn't matter to me.	149/154	28/129	.97 - .22 = .75	.25
148. I love to compete.	148/156	12/136	.95 - .09 = .86	.14
149. There is no such thing as an opponent.	154/157	120/131	.98 - .92 = .06	.94

150. I would rather other people dominate me in a competition.	161/161	118/129	1.00 - .91 = .09	.91
151. I can't stand to lose.	109/145	6/143	.75 - .04 = .71	.29
152. I don't care to be recognized for being better than others.	135/149	44/117	.91 - .38 = .53	.47
153. I notice that I compete even when others do not realize we are competing.	136/158	17/151	.86 - .11 = .75	.25

Table E2

Newby-COM Scale Development Statistics: Discrimination Indices for Student Sample using Original Data

Item	U Endorsed	U Total	L Endorsed	L Total	U Endorsed/ U Total	L Endorsed/ L Total	D Index	1-D
1	95	103	28	72	0.92	0.39	0.53	0.47
2	109	110	57	76	0.99	0.75	0.24	0.76
3	102	106	47	82	0.96	0.57	0.39	0.61
4	100	104	50	80	0.96	0.63	0.34	0.66
6	103	109	25	72	0.94	0.35	0.60	0.40
7	102	109	23	84	0.94	0.27	0.66	0.34
8	19	96	2	103	0.20	0.02	0.18	0.82
9	113	115	49	70	0.98	0.70	0.28	0.72
10	109	112	63	81	0.97	0.78	0.20	0.80
11	105	107	51	77	0.98	0.66	0.32	0.68
12	95	105	83	97	0.90	0.86	0.05	0.95
13	91	102	14	89	0.89	0.16	0.73	0.27
14	111	112	17	79	0.99	0.22	0.78	0.22
15	106	111	20	64	0.95	0.31	0.64	0.36
16	103	108	19	63	0.95	0.30	0.65	0.35
17	13	103	5	86	0.13	0.06	0.07	0.93
18	101	104	41	81	0.97	0.51	0.46	0.54
19	107	110	23	73	0.97	0.32	0.66	0.34
20	112	112	70	81	1.00	0.86	0.14	0.86
21	34	87	12	93	0.39	0.13	0.26	0.74
22	99	104	32	49	0.95	0.65	0.30	0.70
24	7	96	4	87	0.07	0.05	0.03	0.97
26	104	110	39	87	0.95	0.45	0.50	0.50
27	51	83	28	73	0.61	0.38	0.23	0.77
28	91	93	29	53	0.98	0.55	0.43	0.57
29	36	97	24	90	0.37	0.27	0.10	0.90
30	109	109	71	87	1.00	0.82	0.18	0.82

31	63	90	49	68	0.70	0.72	-0.02	1.02
32	108	111	9	80	0.97	0.11	0.86	0.14
34	98	103	36	70	0.95	0.51	0.44	0.56
35	111	112	51	69	0.99	0.74	0.25	0.75
36	100	101	34	61	0.99	0.56	0.43	0.57
37	77	103	10	91	0.75	0.11	0.64	0.36
38	67	88	5	96	0.76	0.05	0.71	0.29
40	67	93	7	91	0.72	0.08	0.64	0.36
41	76	89	90	91	0.85	0.99	-0.14	1.14
42	104	106	40	64	0.98	0.63	0.36	0.64
43	88	104	97	99	0.85	0.98	-0.13	1.13
44	87	104	37	78	0.84	0.47	0.36	0.64
45	104	111	24	70	0.94	0.34	0.59	0.41
47	112	113	54	78	0.99	0.69	0.30	0.70
48	113	113	47	70	1.00	0.67	0.33	0.67
49	22	95	7	95	0.23	0.07	0.16	0.84
50	108	112	80	87	0.96	0.92	0.04	0.96
51	86	94	28	82	0.91	0.34	0.57	0.43
53	33	101	0	103	0.33	0.00	0.33	0.67
54	64	94	91	92	0.68	0.99	-0.31	1.31
55	63	93	2	100	0.68	0.02	0.66	0.34
56	104	107	23	82	0.97	0.28	0.69	0.31
57	59	90	14	85	0.66	0.16	0.49	0.51
59	113	116	84	89	0.97	0.94	0.03	0.97
60	96	102	17	83	0.94	0.20	0.74	0.26
61	86	98	5	97	0.88	0.05	0.83	0.17
62	107	109	49	73	0.98	0.67	0.31	0.69
63	96	107	10	94	0.90	0.11	0.79	0.21
64	24	91	10	71	0.26	0.14	0.12	0.88
65	115	115	53	80	1.00	0.66	0.34	0.66
67	110	113	57	65	0.97	0.88	0.10	0.90
68	111	114	90	98	0.97	0.92	0.06	0.94
69	97	106	48	67	0.92	0.72	0.20	0.80
70	94	101	27	79	0.93	0.34	0.59	0.41
71	40	101	4	97	0.40	0.04	0.35	0.65

72	109	109	10	70	1.00	0.14	0.86	0.14
73	107	108	42	63	0.99	0.67	0.32	0.68
74	23	91	18	81	0.25	0.22	0.03	0.97
75	108	111	62	81	0.97	0.77	0.21	0.79
76	113	113	68	79	1.00	0.86	0.14	0.86
77	65	88	1	98	0.74	0.01	0.73	0.27
78	95	103	21	74	0.92	0.28	0.64	0.36
79	7	104	17	100	0.07	0.17	-0.10	1.10
80	107	111	47	81	0.96	0.58	0.38	0.62
81	91	97	34	64	0.94	0.53	0.41	0.59
82	24	101	4	103	0.24	0.04	0.20	0.80
83	65	86	23	88	0.76	0.26	0.49	0.51
84	114	115	46	70	0.99	0.66	0.33	0.67
85	25	91	1	98	0.27	0.01	0.26	0.74
87	76	90	3	89	0.84	0.03	0.81	0.19
88	115	116	42	72	0.99	0.58	0.41	0.59
89	97	102	15	75	0.95	0.20	0.75	0.25
90	114	114	65	83	1.00	0.78	0.22	0.78
91	69	89	1	99	0.78	0.01	0.77	0.23
92	90	99	27	79	0.91	0.34	0.57	0.43
93	76	92	6	91	0.83	0.07	0.76	0.24
94	111	112	62	83	0.99	0.75	0.24	0.76
95	44	88	2	95	0.50	0.02	0.48	0.52
96	111	113	50	68	0.98	0.74	0.25	0.75
97	53	94	3	97	0.56	0.03	0.53	0.47
98	73	94	1	97	0.78	0.01	0.77	0.23
100	85	100	2	97	0.85	0.02	0.83	0.17
101	114	114	54	78	1.00	0.69	0.31	0.69
102	109	112	22	82	0.97	0.27	0.70	0.30
103	115	116	61	80	0.99	0.76	0.23	0.77
104	60	84	91	93	0.71	0.98	-0.26	1.26
106	114	115	60	79	0.99	0.76	0.23	0.77
107	112	113	48	74	0.99	0.65	0.34	0.66
108	63	89	2	94	0.71	0.02	0.69	0.31
109	98	103	31	87	0.95	0.36	0.60	0.40

111	112	114	59	72	0.98	0.82	0.16	0.84
112	35	82	1	99	0.43	0.01	0.42	0.58
113	78	90	2	93	0.87	0.02	0.85	0.15
114	86	97	1	96	0.89	0.01	0.88	0.12
115	107	111	25	76	0.96	0.33	0.64	0.36
116	95	108	47	71	0.88	0.66	0.22	0.78
117	111	115	77	85	0.97	0.91	0.06	0.94
118	36	101	20	84	0.36	0.24	0.12	0.88
119	110	112	70	79	0.98	0.89	0.10	0.90
120	69	91	1	91	0.76	0.01	0.75	0.25
121	110	114	48	70	0.96	0.69	0.28	0.72
122	44	86	76	83	0.51	0.92	-0.40	1.40
123	51	102	3	91	0.50	0.03	0.47	0.53
125	110	113	35	74	0.97	0.47	0.50	0.50
126	93	106	7	93	0.88	0.08	0.80	0.20
127	45	83	3	93	0.54	0.03	0.51	0.49
128	111	113	48	69	0.98	0.70	0.29	0.71
129	61	93	2	93	0.66	0.02	0.63	0.37
130	105	112	39	81	0.94	0.48	0.46	0.54
132	116	116	86	88	1.00	0.98	0.02	0.98
133	110	114	42	88	0.96	0.48	0.49	0.51
134	99	103	11	76	0.96	0.14	0.82	0.18
135	113	113	54	73	1.00	0.74	0.26	0.74
136	95	103	33	80	0.92	0.41	0.51	0.49
137	34	90	4	96	0.38	0.04	0.34	0.66
138	76	100	40	76	0.76	0.53	0.23	0.77
139	103	106	49	72	0.97	0.68	0.29	0.71
140	75	92	1	91	0.82	0.01	0.80	0.20
142	40	87	4	82	0.46	0.05	0.41	0.59
143	101	109	22	75	0.93	0.29	0.63	0.37
144	86	102	43	81	0.84	0.53	0.31	0.69
145	111	114	54	78	0.97	0.69	0.28	0.72
146	106	110	14	77	0.96	0.18	0.78	0.22
148	104	111	6	85	0.94	0.07	0.87	0.13
149	107	110	74	79	0.97	0.94	0.04	0.96

150	115	115	73	79	1.00	0.92	0.08	0.92
151	72	99	2	91	0.73	0.02	0.71	0.29
152	97	107	23	66	0.91	0.35	0.56	0.44
153	96	111	9	94	0.86	0.10	0.77	0.23

Table E3

Newby-COM Scale Development Statistics: Discrimination Indices for Community Sample using Original Data

Item	U Endorsed	U Total	L Endorsed	L Total	U Endorsed/ U Total	L Endorsed/ L Total	D Index	1-D
1	40	41	15	43	0.98	0.35	0.63	0.37
2	44	44	34	50	1.00	0.68	0.32	0.68
3	43	45	25	45	0.96	0.56	0.40	0.60
4	38	42	30	47	0.90	0.64	0.27	0.73
6	41	44	18	48	0.93	0.38	0.56	0.44
7	38	44	12	53	0.86	0.23	0.64	0.36
8	15	43	1	59	0.35	0.02	0.33	0.67
9	41	42	31	49	0.98	0.63	0.34	0.66
10	38	41	45	50	0.93	0.90	0.03	0.97
11	41	43	28	48	0.95	0.58	0.37	0.63
12	37	44	52	59	0.84	0.88	-0.04	1.04
13	31	40	4	50	0.78	0.08	0.70	0.31
14	46	47	11	50	0.98	0.22	0.76	0.24
15	41	43	16	48	0.95	0.33	0.62	0.38
16	35	38	17	44	0.92	0.39	0.53	0.47
17	8	36	8	53	0.22	0.15	0.07	0.93
18	41	42	22	52	0.98	0.42	0.55	0.45
19	44	45	17	44	0.98	0.39	0.59	0.41
20	44	45	41	48	0.98	0.85	0.12	0.88
21	24	37	7	48	0.65	0.15	0.50	0.50
22	38	43	21	28	0.88	0.75	0.13	0.87
24	3	36	2	60	0.08	0.03	0.05	0.95
26	41	43	15	54	0.95	0.28	0.68	0.32
27	28	37	17	46	0.76	0.37	0.39	0.61
28	32	34	15	32	0.94	0.47	0.47	0.53
29	14	41	9	54	0.34	0.17	0.17	0.83

30	39	42	36	51	0.93	0.71	0.22	0.78
31	26	34	16	35	0.76	0.46	0.31	0.69
32	42	43	5	51	0.98	0.10	0.88	0.12
34	38	39	20	38	0.97	0.53	0.45	0.55
35	46	46	25	41	1.00	0.61	0.39	0.61
36	43	44	22	45	0.98	0.49	0.49	0.51
37	29	41	6	61	0.71	0.10	0.61	0.39
38	30	36	4	55	0.83	0.07	0.76	0.24
40	31	38	7	59	0.82	0.12	0.70	0.30
41	25	35	52	56	0.71	0.93	-0.21	1.21
42	38	41	21	39	0.93	0.54	0.39	0.61
43	32	43	56	57	0.74	0.98	-0.24	1.24
44	42	44	22	49	0.95	0.45	0.51	0.49
45	39	40	16	46	0.98	0.35	0.63	0.37
47	43	44	34	49	0.98	0.69	0.28	0.72
48	45	45	29	47	1.00	0.62	0.38	0.62
49	15	39	3	54	0.38	0.06	0.33	0.67
50	43	43	52	54	1.00	0.96	0.04	0.96
51	35	37	14	53	0.95	0.26	0.68	0.32
53	15	41	5	59	0.37	0.08	0.28	0.72
54	21	33	53	55	0.64	0.96	-0.33	1.33
55	25	37	1	55	0.68	0.02	0.66	0.34
56	44	45	17	49	0.98	0.35	0.63	0.37
57	28	36	11	50	0.78	0.22	0.56	0.44
59	43	43	46	52	1.00	0.88	0.12	0.88
60	39	42	8	49	0.93	0.16	0.77	0.23
61	34	36	1	56	0.94	0.02	0.93	0.07
62	42	43	30	42	0.98	0.71	0.26	0.74
63	32	40	9	57	0.80	0.16	0.64	0.36
64	12	38	7	45	0.32	0.16	0.16	0.84
65	47	47	26	51	1.00	0.51	0.49	0.51
67	43	45	37	44	0.96	0.84	0.11	0.89
68	45	47	54	57	0.96	0.95	0.01	0.99
69	42	45	39	46	0.93	0.85	0.09	0.91

70	40	42	16	49	0.95	0.33	0.63	0.37
71	23	43	2	54	0.53	0.04	0.50	0.50
72	45	45	2	45	1.00	0.04	0.96	0.04
73	39	41	30	43	0.95	0.70	0.25	0.75
74	14	41	10	53	0.34	0.19	0.15	0.85
75	46	46	33	40	1.00	0.83	0.18	0.83
76	44	45	45	53	0.98	0.85	0.13	0.87
77	28	37	2	59	0.76	0.03	0.72	0.28
78	42	43	18	52	0.98	0.35	0.63	0.37
79	7	41	9	54	0.17	0.17	0.00	1.00
80	41	43	29	45	0.95	0.64	0.31	0.69
81	42	43	29	48	0.98	0.60	0.37	0.63
82	21	40	2	58	0.53	0.03	0.49	0.51
83	27	36	17	55	0.75	0.31	0.44	0.56
84	47	47	35	49	1.00	0.71	0.29	0.71
85	16	34	1	59	0.47	0.02	0.45	0.55
87	31	38	3	59	0.82	0.05	0.76	0.24
88	44	44	35	47	1.00	0.74	0.26	0.74
89	40	42	10	48	0.95	0.21	0.74	0.26
90	44	44	42	54	1.00	0.78	0.22	0.78
91	20	30	2	60	0.67	0.03	0.63	0.37
92	37	40	17	58	0.93	0.29	0.63	0.37
93	32	36	5	52	0.89	0.10	0.79	0.21
94	46	46	41	50	1.00	0.82	0.18	0.82
95	29	38	0	57	0.76	0.00	0.76	0.24
96	39	44	30	46	0.89	0.65	0.23	0.77
97	26	42	1	53	0.62	0.02	0.60	0.40
98	37	42	4	58	0.88	0.07	0.81	0.19
100	38	43	3	58	0.88	0.05	0.83	0.17
101	47	47	38	51	1.00	0.75	0.25	0.75
102	38	38	15	55	1.00	0.27	0.73	0.27
103	45	45	39	52	1.00	0.75	0.25	0.75
104	23	37	52	54	0.62	0.96	-0.34	1.34
106	45	45	39	49	1.00	0.80	0.20	0.80

107	42	47	33	52	0.89	0.63	0.26	0.74
108	34	38	3	54	0.89	0.06	0.84	0.16
109	43	45	21	45	0.96	0.47	0.49	0.51
111	46	46	38	49	1.00	0.78	0.22	0.78
112	20	33	1	59	0.61	0.02	0.59	0.41
113	35	36	2	57	0.97	0.04	0.94	0.06
114	38	41	3	56	0.93	0.05	0.87	0.13
115	45	46	23	48	0.98	0.48	0.50	0.50
116	35	44	30	49	0.80	0.61	0.18	0.82
117	44	44	48	51	1.00	0.94	0.06	0.94
118	25	45	13	51	0.56	0.25	0.30	0.70
119	47	47	40	45	1.00	0.89	0.11	0.89
120	39	41	4	57	0.95	0.07	0.88	0.12
121	45	46	38	48	0.98	0.79	0.19	0.81
122	16	32	47	54	0.50	0.87	-0.37	1.37
123	27	44	2	54	0.61	0.04	0.58	0.42
125	44	44	26	46	1.00	0.57	0.43	0.57
126	37	43	5	53	0.86	0.09	0.77	0.23
127	26	39	6	53	0.67	0.11	0.55	0.45
128	45	46	34	47	0.98	0.72	0.25	0.75
129	38	41	0	56	0.93	0.00	0.93	0.07
130	44	46	28	49	0.96	0.57	0.39	0.61
132	44	46	47	50	0.96	0.94	0.02	0.98
133	41	44	25	52	0.93	0.48	0.45	0.55
134	43	43	10	46	1.00	0.22	0.78	0.22
135	45	46	41	51	0.98	0.80	0.17	0.83
136	38	43	21	47	0.88	0.45	0.44	0.56
137	23	37	3	58	0.62	0.05	0.57	0.43
138	30	36	17	44	0.83	0.39	0.45	0.55
139	41	43	31	51	0.95	0.61	0.35	0.65
140	33	39	8	55	0.85	0.15	0.70	0.30
142	18	37	10	54	0.49	0.19	0.30	0.70
143	42	44	20	47	0.95	0.43	0.53	0.47
144	30	38	31	53	0.79	0.58	0.20	0.80

145	47	47	31	49	1.00	0.63	0.37	0.63
146	41	42	13	51	0.98	0.25	0.72	0.28
148	42	43	6	50	0.98	0.12	0.86	0.14
149	45	45	45	51	1.00	0.88	0.12	0.88
150	44	44	44	49	1.00	0.90	0.10	0.90
151	35	44	4	51	0.80	0.08	0.72	0.28
152	37	40	20	50	0.93	0.40	0.53	0.48
153	38	45	8	56	0.84	0.14	0.70	0.30

Appendix F

Syntax for Running Horn's Parallel Analysis and the Velicer's Test

Appendix F1

Syntax for Horn's Parallel Analysis

```
* Parallel Analysis program.

set mxloops=9000 printback=off width=80  seed = 1953125.
matrix.

* enter your specifications here.
compute ncases   = 886.
compute nvars    = 11.
compute ndatsets = 100.
compute percent  = 95.


* Specify the desired kind of parallel analysis, where:
  1 = principal components analysis
  2 = principal axis/common factor analysis.
compute kind = 1 .

****************** End of user specifications. ******************

* principal components analysis.
do if (kind = 1).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
          cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute evals(:,#nds) = eval(d * vcv * d).
end loop.
end if.

* principal axis / common factor analysis with SMCs on the diagonal.
do if (kind = 2).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
          cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute r = d * vcv * d.
```

```
compute smc = 1 - (1 &/ diag(inv(r)) ).
call setdiag(r,smc).
compute evals(:,#nds) = eval(r).
end loop.
end if.

* identifying the eigenvalues corresponding to the desired percentile.
compute num = rnd((percent*ndatsets)/100).
compute results = { t(1:nvars), t(1:nvars), t(1:nvars) }.
loop #root = 1 to nvars.
compute ranks = rnkorder(evals(#root,:)).
loop #col = 1 to ndatsets.
do if (ranks(1,#col) = num).
compute results(#root,3) = evals(#root,#col).
break.
end if.
end loop.
end loop.
compute results(:,2) = rsum(evals) / ndatsets.

print /title="PARALLEL ANALYSIS:".
do if   (kind = 1).
print /title="Principal Components".
else if (kind = 2).
print /title="Principal Axis / Common Factor Analysis".
end if.
compute specifs = {ncases; nvars; ndatsets; percent}.
print specifs /title="Specifications for this Run:"
 /rlabels="Ncases" "Nvars" "Ndatsets" "Percent".
print results /title="Random Data Eigenvalues"
 /clabels="Root" "Means" "Prcntyle"  /format "f12.6".

do if   (kind = 2).
print / space = 1.
print /title="Compare the random data eigenvalues to the".
print /title="real-data eigenvalues that are obtained from a".
print /title="Common Factor Analysis in which the # of factors".
print /title="extracted equals the # of variables/items, and the".
print /title="number of iterations is fixed at zero;".
print /title="To obtain these real-data values using SPSS, see the".
print /title="sample commands at the end of the parallel.sps program,".
print /title="or use the rawpar.sps program.".
print / space = 1.
print /title="Warning: Parallel analyses of adjusted correlation matrices".
print /title="eg, with SMCs on the diagonal, tend to indicate more factors".
print /title="than warranted (Buja, A., & Eyuboglu, N., 1992, Remarks on parallel".
print /title="analysis. Multivariate Behavioral Research, 27, 509-540.).".
print /title="The eigenvalues for trivial, negligible factors in the real".
```

```
print /title="data commonly surpass corresponding random data eigenvalues".
print /title="for the same roots. The eigenvalues from parallel analyses".
print /title="can be used to determine the real data eigenvalues that are".
print /title="beyond chance, but additional procedures should then be used".
print /title="to trim trivial factors.".
print / space = 1.
print /title="Principal components eigenvalues are often used to determine".
print /title="the number of common factors. This is the default in most".
print /title="statistical software packages, and it is the primary practice".
print /title="in the literature. It is also the method used by many factor".
print /title="analysis experts, including Cattell, who often examined".
print /title="principal components eigenvalues in his scree plots to determine".
print /title="the number of common factors. But others believe this common".
print /title="practice is wrong. Principal components eigenvalues are based".
print /title="on all of the variance in correlation matrices, including both".
print /title="the variance that is shared among variables and the variances".
print /title="that are unique to the variables. In contrast, principal".
print /title="axis eigenvalues are based solely on the shared variance".
print /title="among the variables. The two procedures are qualitatively".
print /title="different. Some therefore claim that the eigenvalues from one".
print /title="extraction method should not be used to determine".
print /title="the number of factors for the other extraction method.".
print /title="The issue remains neglected and unsettled.".

end if.

end matrix.


* Commands for obtaining the necessary real-data eigenvalues for
  principal axis / common factor analysis using SPSS;
  make sure to insert valid filenames/locations, and
  remove the '*' from the first columns.
* corr var1 to var20 / matrix out ('filename') / missing = listwise.
* matrix.
* MGET /type= corr /file='filename' .
* compute smc = 1 - (1 &/ diag(inv(cr)) ).
* call setdiag(cr,smc).
* compute evals = eval(cr).
* print { t(1:nrow(cr)) , evals }
 /title="Raw Data Eigenvalues"
 /clabels="Root" "Eigen."  /format "f12.6".
```

- end matrix.

Appendix F2

Syntax for the Velicer's Test

```
set printback=none width=80  seed = 1953125   mxloops=9000.


*  Velicer's Minimum Average Partial (MAP) Test.

*  There are two ways of running this program:

*  Method 1: You can enter a correlation matrix directly
   into the program (i.e., without having SPSS save and then
   read a matrix out file), as in the example below for
   Harman's data.  Simply use the command COMPUTE CR =
   to enter and name the data, as in the example.

*  Method 2: You can have the program read a correlation
   matrix that was saved by an SPSS procedure, as in the
   following examples:

*  correlation  var1 to var25
       / matrix out ('C:\data.cor')  / missing = listwise.
*  factor var= var1 to var25
       / matrix out (cor = 'C:\data.cor').

*  You must then use the same MATRIX OUT filename
   (e.g., 'C:\data.cor') in the MGET command within the
   program itself.  These commands are now merely
   comments and will not run unless the "*"s in the
   first collumns are removed.  Any other COMPUTE CR =
   statements must also be removed from the program
   (e.g., remove Harman's data in the example below).

matrix.

*  activate the next MGET command to read a correlation
   matrix created by SPSS.
* MGET /type= corr /file='C:\data.cor' .

* Harman's data (1967, p 80).
compute cr = {
 1.000 ,       .667  ,       .486  ,       .658  ,       .623  ,       .767  ,       .705  ,
 .496  ,       .304  ,       .536  ,       .252  ;
.667   ,       1.000 ,       .686  ,       .504  ,       .294  ,       .604  ,       .610  ,
 .736  ,       .601  ,       .550  ,       .123  ;
.486   ,       .686  ,       1.000 ,       .435  ,       .198  ,       .434  ,       .502  ,
```

```
 .721  ,  .504  ,  .463  ,  .162  ;
.658  ,  .504  ,  .435  ,  1.000  ,  .627  ,  .469  ,  .545  ,
 .441  ,  .239  ,  .420  ,  .219  ;
.623  ,  .294  ,  .198  ,  .627  ,  1.000  ,  .439  ,  .487  ,
 .194  ,  .035  ,  .352  ,  .270  ;
.767  ,  .604  ,  .434  ,  .469  ,  .439  ,  1.000  ,  .578  ,
 .483  ,  .388  ,  .510  ,  .183  ;
.705  ,  .610  ,  .502  ,  .545  ,  .487  ,  .578  ,  1.000  ,
 .548  ,  .312  ,  .608  ,  .263  ;
.496  ,  .736  ,  .721  ,  .441  ,  .194  ,  .483  ,  .548  ,
 1.000  ,  .697  ,  .485  ,  .097  ;
.304  ,  .601  ,  .504  ,  .239  ,  .035  ,  .388  ,  .312  ,
 .697  ,  1.000  ,  .336  ,  -.106  ;
.536  ,  .550  ,  .463  ,  .420  ,  .352  ,  .510  ,  .608  ,
 .485  ,  .336  ,  1.000  ,  .268  ;
.252  ,  .123  ,  .162  ,  .219  ,  .270  ,  .183  ,  .263  ,
 .097  ,  -.106  ,  .268  ,  1.000  }.

call eigen (cr,eigvect,eigval).
compute loadings = eigvect * sqrt(mdiag(eigval)).
compute nvars = ncol(cr).
compute fm = make(nrow(cr),2,-9999).
compute fm(1,2) = (mssq(cr)-nvars)/(nvars*(nvars-1)).
compute fm4 = fm.
compute fm4(1,2) = (msum(cr &**4)-nvars)/(nvars*(nvars-1)).
loop #m = 1 to nvars - 1.
compute biga = loadings(:,1:#m).
compute partcov = cr - (biga * t(biga)).
compute d = mdiag( 1 / (sqrt(diag(partcov))) ).
compute pr = d * partcov * d.
compute fm(#m+1,2) = (mssq(pr)-nvars)/(nvars*(nvars-1)).
compute fm4(#m+1,2) = (msum(pr &**4)-nvars)/(nvars*(nvars-1)).
end loop.

* identifying the smallest fm value & its location (= # factors).
compute minfm = fm(1,2).
compute nfacts = 0.
compute minfm4 = fm4(1,2).
compute nfacts4 = 0.
loop #s = 1 to nrow(fm).
compute fm(#s,1) = #s -1.
compute fm4(#s,1) = #s - 1.
do if ( fm(#s,2) < minfm ).
compute minfm = fm(#s,2).
compute nfacts = #s - 1.
end if.
do if ( fm4(#s,2) < minfm4 ).
```

```
compute minfm4 = fm4(#s,2).
compute nfacts4 = #s - 1.
end if.
end loop.

print /title="Velicer's Minimum Average Partial (MAP) Test:".
print eigval  /title="Eigenvalues" /format "f12.4".
print { fm, fm4(:,2) } /title="Average Partial Correlations"
 /clabels= " " "squared"   "power4" /format "f14.4".
print minfm /title="The smallest average squared partial correlation is"/format "f12.4".
print minfm4/title="The smallest average 4rth power partial correlation is"/format "f12.4".
print nfacts  /title="The Number of Components According to the Original (1976) MAP Test is".
print nfacts4 /title="The Number of Components According to the Revised (2000) MAP Test is".

end matrix.
```

* References.

* the original MAP test:
Velicer, W. F. (1976). Determining the number of components
from the matrix of partial correlations. Psychometrika, 41, 321-327.

* the revised (2000) MAP test i.e., with the partial correlations
raised to the 4rth power (rather than squared):
Velicer, W. F., Eaton, C. A., and Fava, J. L. (2000). Construct
explication through factor or component analysis: A review and
evaluation of alternative procedures for determining the number
of factors or components. Pp. 41-71 in R. D. Goffin and
E. Helmes, eds., Problems and solutions in human assessment
Boston: Kluwer.

* the present programs:
O'Connor, B. P. (2000). SPSS and SAS programs for determining
the number of components using parallel analysis and Velicer's
MAP test. Behavior Research Methods, Instrumentation, and
Computers, 32, 396-402.

Appendix G

Final Version of the

Competitiveness Orientation Measure (COM)

Appendix G1

The Competitiveness Orientation Measure (COM)

The following scale measures aspects of competitiveness. Please read each question carefully and try to answer as honestly as possible. Do not spend too much time on any one item; if trying to decide between two responses, choose the one that first comes to mind.

1 Strongly disagree
2 Slightly disagree
3 Neither agree nor disagree
4 Slightly agree
5 Strongly agree

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1. I like to be better than others at almost everything.
2. I get a lot of enjoyment out of competition.
3. Other people comment on how competitive I am.
4. I enjoy setting and beating goals through competition.
5. I don't care if other people are better at things than I am.
6. No matter what, I try to be better than others at things.
7. I am a competitive person.
8. I view almost every situation as a way to prove that I am better at things than others.
9. I can improve my competence by competing.
10. I put a lot of effort into beating others at things.
11. I love the thrill of competition.
12. Being the best makes me feel powerful.
13. I don't really care if I get beat in a competition.
14. Competition motivates me.
15. For as long I can remember, I have wanted to outperform others.
16. Competition allows me to judge my level of competence.
17. I do not find competition self-fulfilling.
18. I think a lot about ways to win.
19. I love to compete.
20. I enjoy beating others in almost every area in life.
21. Losing in a competition wouldn't bother me.
22. I enjoy competing against others.
23. It is important for me to outperform others.
24. I wouldn't mind finishing in last place in a competition.
25. I use competition as a way to prove something to myself.
26. I think about competition a lot.
27. Winning makes me feel superior to others.
28. I like to challenge others.
29. Other people notice how much I have to dominate others in a competition.
30. I like being the best compared to other people.
31. Competing doesn't really matter to me.

32. Competition allows me to measure my own success.
33. I would rather not compete.
34. I perform better when I compete against others.
35. I try to be the best person in the room at almost anything.
36. Winning does not make me feel superior to others.
37. Others notice that I am competitive.

Reversed Items

*5
*13
*17
*21
*24
*31
*33
*36

Competitiveness Dimensions

General Competitiveness: 2, 4, 7, 11, 14, 17, 19, 22, 28, 31, 33, 34.
Pervasive Competitiveness: 1, 3, 6, 8, 10, 15, 18, 20, 23, 26, 29, 35, 37.
Dominant Competitiveness: 5, 12, 13, 21, 24, 27, 30, 36.
Personal Enhancement Competitiveness: 9, 16, 25, 32.

**7, 22 (these items first occurred in the SOQ; Gill & Deeter, 1988).*