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A Reliability Analysis of the Revised Competitiveness Index¹

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Summary. – This study examined the reliability of the Revised Competitiveness Index by investigating the test-retest reliability, inter-item reliability, and factor structure of the measure based on a sample of 280 undergraduates (200 females, 80 males) ranging in age from 18 to 28 ($M = 20.1$, $SD = 2.1$). The findings indicate that the Revised Competitiveness Index has high test-retest reliability, high inter-item reliability, and a stable factor structure. The results support the assertion that the Revised Competitiveness Index assesses competitiveness as a stable trait rather than a dynamic state.

A Reliability Analysis of the Revised Competitiveness Index

For more than a century, researchers have investigated competitive behavior from both dispositional and situational perspectives. For example, while Triplett (1897) discussed the role of dispositional or internal factors such as competitive instincts in sports, Deutsch (1949) emphasized the importance of situational or external factors by focusing on how the distribution of valued rewards can generate competitive behavior. More recently, researchers have examined competitive behavior as a personality trait linked to achievement motivation (Helmreich & Spence, 1978) and neuroticism (Ryckman, Hammer, Kaczor, & Gold, 1990). Based on this dispositional approach to competitive behavior, the Competitiveness Index (Smither & Houston, 1992; Houston, Harris, McIntire, & Francis, 2002;) was developed as a structured inventory designed to assess what Helmreich and Spence (1978) described as “a desire to win in interpersonal situations” (p. 4). Although the Competitiveness Index derives from a trait theory of competitive behavior, previous research has not systematically examined whether this assessment instrument measures a dispositional trait or a situational state.

The original index (Smither & Houston, 1992) consisted of 20 true-false items in three subscales: Emotion, Argument, and Games. Concerned about the internal consistency of the subscales, Houston et al. (2002) replaced the true-false format with a 5-point rating scale (strongly disagree to strongly agree) and abandoned 6 questions, including the Games subscale, associated with low inter-item reliabilities (Terry, 2000; Houston et al., 2002). The resulting revised Competitiveness Index (Houston et al., 2002) consisted of 14 items that can be used in total to measure overall competitiveness or can be divided into two separate subscales; Enjoyment of Competition (nine items) and Contentiousness (five items).

In both of its forms, the Competitiveness Index has been represented as a personality measure; the underlying assumption being that competitiveness is a stable and enduring trait

rather than a transient state. This assumption has received some support in that the Competitiveness Index has been used to differentiate amateur versus professional athletes (Houston, Carter, & Smither, 1997), nurses versus attorneys (Houston, Farese, & La Du, 1992), safe versus aggressive drivers (Harris & Houston, 2010), and females versus males (Houston, Harris, Moore, Brummett, & Kametani, 2005). While these studies provided evidence of predictive validity, Houston et al (2002) reported that the Revised Competitiveness Index is also correlated with other measures of competitiveness and need for achievement, a construct conceptually linked to competitiveness, which supports the construct validity of the measure. However, to establish the Revised Competitiveness Index as a measure of a stable personality trait (i.e., competitiveness), the test-retest reliability of the measure must be demonstrated. The present study is a test of this reliability and addresses an important gap in the validation process of the measure.

Method

Participants

Participants for the initial test group were 280 undergraduate students (200 women and 80 men). The retest sample consisted of 200 returning participants (146 women and 54 men).

The attrition rate of 29% may in part be due to the reliance on voluntary participation and the timing of the retesting during the later part of the semester. However, the retest sample had approximately the same demographics as the original test group: predominantly female (test = 71%, retest = 73%), predominantly White (86% for both groups), and ranging in age from 18 to 28 years (test: $M = 20.1$, $SD = 2.1$; retest: $M = 19.8$, $SD = 1.9$). An analysis of covariance controlling for age and gender did not yield a difference in Revised Competitiveness Index scores for those who returned for the retest and those who did not, $F(1, 276) = 0.41$, *ns*.

Measures

All participants completed a survey packet containing the Revised Competitiveness Index (Houston et al., 2002). Table 1 provides a list of scale items as well as subscales.

Since its inception, a number of studies have examined the reliability and validity of the Revised Competitiveness Index. Houston et al. (2002) reported that a principal component analysis on the 14 items using a varimax rotation yielded a two factor solution accounting for 54.1% of the explained variance. Examining scales based on these factors, the Revised Competitiveness Index had acceptable internal consistency for the Enjoyment of Competition (nine items, $\alpha = .90$) and Contentiousness subscales (five items, $\alpha = .74$), and for the overall the Revised Competitiveness Index (fourteen items, $\alpha = .87$). The overall scale was also positively correlated with other competitiveness measures, such as the Work and Family Orientation Questionnaire ($r = .55$), the Sports Orientation Questionnaire ($r = .62$) (Houston et al., 2002) and the Hypercompetitiveness Attitude Scale ($r = .53$) (Luchner, Houston, & Varley, 2007).

Participants also complete a brief demographic questionnaire requesting information on sex, age, and ethnicity.

Procedure

Participants were recruited from a variety of undergraduate psychology classes at a small private liberal arts college in the Southeast ($n = 136$) and a larger state university in the Midwest ($n = 144$). Since no attempt was made at random selection, participants represent a sample of convenience. Data collection at both locations occurred in a series of group administrations.

To reduce scheduling conflicts for participants, the time between test and retest ranged from 18 to 34 days ($M = 22.8$, $SD = 2.8$), with 91% of participants returning to retest three to four weeks following the original test.

Results

After an analysis of covariance controlling for age and gender indicated no difference in Revised Competitiveness Index scores between college and state university participants, $F(1, 276) = 0.40$, *ns*, all subsequent analyses combined scores from the two locations.

Initial analyses of the Revised Competitiveness Index pretest data ($N = 280$) replicated results reported by Houston et al. (2002). A principal component analysis using a varimax rotation yielded a two-factor solution accounting for 64.44% of the explained variance and corresponding to the Houston et al (2002) Revised Competitiveness Index subscales (see Table 1). Inter-item reliabilities (Cronbach's alpha) were in the acceptable range (McIntire & Miller, 2007) for the Enjoyment of Competition (nine items, $\alpha = .93$) and Contentiousness subscales (five items, $\alpha = .82$), and for the overall Index (fourteen items, $\alpha = .90$). Test-retest reliabilities ($N = 200$), calculated using Pearson product-moment correlation coefficients, were also in the acceptable range for the Enjoyment of Competition subscale ($r = .85$), the Contentiousness subscale ($r = .78$), and the overall Revised Competitiveness Index ($r = .85$).

Discussion

The results replicated the Revised Competitiveness Index factor structure and scale construction reported by Houston et al. (2002), and added new information about the reliability of the measure. Although the Revised Competitiveness Index is based on a conceptualization of competitiveness as a stable and enduring individual difference, previous research had not established the test-retest reliability of the index. The results support the reliability of the Revised Competitiveness Index, both in terms of internal consistency (i.e., inter-item) and consistency over time (i.e., test-retest). It should be noted that the stability of Revised Competitiveness scores does not preclude the potential for situational factors to influence

competitive behavior. As Houston, Kinnie, Lupo, Terry, and Ho (2000) demonstrated using a Prisoner's Dilemma game, even individuals with low competitiveness scores engage in competitive behavior in situations that are high in competitive conflict.

Finally, while the time interval (18 to 34 days) used for the test and retest analysis in this study was relatively brief, it is comparable to the 4 to 6 week intervals used in other studies designed to assess the stability of competitiveness measures (e.g., Gill & Deeter, 1988; Ryckman et al., 1990). However, given that personality traits are generally defined as stable and enduring, longitudinal research conducted over several years using a demographically diverse sample would provide the most compelling test of the Revised Competitiveness Index as a trait measure.

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TABLE 1

Factor Loadings and Scale Statistics for the Revised Competitiveness Index

Items by Factor	<i>M</i>	<i>SD</i>	Factors	
			1	2
Enjoyment of Competition (inter-item $\alpha = .93$, test-retest $r = .85$)	32.84	8.44		
1. I like competition.	3.85	1.08	.90	.04
2. I am a competitive individual.	3.79	1.15	.87	.09
3. I enjoy competing against an opponent.	3.70	1.45	.90	.00
4. I don't like competing against other people.*	3.54	1.21	.90	.05
5. I get satisfaction from competing with others.	3.51	1.14	.79	.10
6. I find competitive situations unpleasant.*	3.47	1.21	.83	.17
7. I dread competing against other people.*	3.90	1.09	.71	.24
8. I try to avoid competing with others.*	3.52	1.20	.79	.20
9. I often try to out perform others.	3.55	1.18	.50	.22
Contentiousness (inter-item $\alpha = .82$, test-retest $r = .78$)	15.10	4.66		
10. I try to avoid arguments.*	2.45	1.23	.20	.76
11. I will do almost anything to avoid an argument.*	3.26	1.29	.17	.76
12. I often remain quiet rather than risk hurting another person.*	2.71	1.21	-.02	.79
13. I don't enjoy challenging others even when I think they are wrong.*	3.50	1.61	.12	.73
14. In general, I will go along with the group rather than create conflict.*	3.18	1.20	.10	.73

*Items were reverse coded so higher scores indicate greater competitiveness.