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Measuring Long-Distance Romantic Relationships: A Validity Study

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Abstract

This study investigated aspects of construct validity for the scores of a new long-distance romantic relationship measure. A single-factor structure of the long-distance romantic relationship index emerged, with convergent and discriminant evidence of external validity, high internal consistency reliability, and applied utility of the scores. Implications for counselors are discussed.

Keywords

long-distance relationships, validity study, geographically close relationships

Long-distance romantic relationships (LDRs) are interesting and puzzling, and "people want to know. . . 'Do they work?'" (Stafford, 2005, p. 29). Because the partners voluntarily live and work in distal geographical locations and then reunite (e.g., every other weekend) to be together, LDRs violate scholarly and lay assumptions that physical proximity is essential to relational quality (Stafford, 2005). Nonetheless, research suggests that LDRs are as satisfying and stable as geographically close relationships (GCRs; Stafford, 2005; Stafford & Reske, 1990; Roberts & Pistole, 2009). Counselors need such research-based knowledge (vs. inaccurate assumptions) to provide effective services to LDR or potential LDR partners. LDR research is, however, relatively sparse and mostly empirical, though a few studies have used uncertainty (Dainton & Aylor, 2001), idealization (Stafford, 2005; Stafford & Merolla, 2007; Stafford, Merolla, & Castle, 2006; Stafford & Reske, 1990), and attachment (Pistole, Roberts, & Mosko, 2010; Roberts & Pistole, 2009) theory. Also, LDRs/GCRs are identified via categorical data, which limits the scope of research design and analysis in related studies. In an attempt to advance the research on LDRs, the purpose of this study is to examine the factor structure of the LDR index and provide evidence of the external aspect of its validity.

Defining LDRs

In research and anecdotal accounts, people usually self-define as in an LDR or a GCR (Aylor, 2003). LDR status may be based on physical geography (i.e., partners not living in the same city; Helgeson, 1994), miles traveled (Carpenter & Knox, 1986; Holt & Stone, 1988; Schwebel, Dunn, Moss, & Renner, 1992), or miles and time traveled (Knox, Zusman, Daniels, & Brantley, 2002). LDR status may also reflect the partners spending two (Holmes, 2004) or four (Rabe, 2001) nights apart during

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the work week, with other criteria (e.g., partners have separate residences and pursue a career) sometimes specified (Bunker, Zubek, Vanderslice, & Rice, 1992; Gerstel & Gross, 1982; Govaerts & Dixon, 1988; Jackson, Brown, & Patterson-Stewart, 2000; Johnson, 1987; Magnuson & Norem, 1999). LDR status is also determined by participant responses to a forced-choice LDR/GCR item: (a) "My partner lives far enough away from me that it would be very difficult or impossible for me to see him or her every day" (Guldner & Swensen, 1995, p. 316; see also Guldner, 1996; Stafford & Merolla, 2007; Stafford, Merolla, & Castle, 2006) or (b) "Do you consider this a long-distance relationship?" (Van Horn et al., 1997, p. 27). Researchers may include prompts for each choice (e.g., "not able to see each other, face to face, on a frequent basis" vs. "able to see each other face-to-face, frequently"; Dellmann-Jenkins, Bernard-Paolucci, & Rushing, 1994, p. 214; see also Dainton & Aylor, 2001). Recently, Cameron and Ross (2007) used telephone area codes to verify partners' self-reported LDR/GCR status.

These methods capture subjective reality (Stafford, 2005) but are vulnerable to potential inexactness and misclassification. The liability of subjective classification is illustrated by a college classroom anecdote. After a male graduate student said he was in a GCR, his classmates challenged his classification, saying that he was in an LDR, because he and his wife worked in different towns, kept two residences, and were so far apart that they could be physically together only on the weekend. Indeed, some participants, separated by 80 (Dellmann-Jenkins et al., 1994) and 250 (Van Horn et al., 1997) miles, have reported as being in a GCR, though both mileages could easily be a barrier to daily physical togetherness. Furthermore, partners may not know the mileage between their locations, and time apart depends on the travel method (e.g., airplane, car). Finally, even relational partners may "disagree as to whether or not their relationship is, or ever has been, a long-distance one" (Stafford, 2005, p. 28).

Not surprisingly then, Stafford (2005) notes that LDR and GCR merge as concepts rather than reflecting sharply distinct constructs. For instance, LDRs and GCRs are both a relational structure that romantic partners choose to maintain their relationship and also fulfill career opportunities (Stafford, 2005). In addition, both LDRs and GCRs, as romantic relationships, would be characterized by attachment bonding (Bowlby, 1969; Mikulincer & Shaver, 2007). Yet LDR, not GCR, partners report separation distress consistent with attachment system activation (Guldner, 1996; Pistole, 2010). Attachment-related distress feelings and thoughts manifest when impending or actual partner separations are of sufficient distance and duration to signal that the partner may not be accessible when needed (Bowlby, 1973). Although GCR partners separate for daily work/study, they are geographically proximal enough to be accessible if needed (Pistole, 2010). Therefore, the geographic distance, which would trigger attachment responses and adjustments, appears to be central in distinguishing LDRs and GCRs. This specific characteristic is reflected in previous methodology for determining LDR status, for example, in questions about (a) mileage and travel time required for the partners to be physically together and (b) whether physical contact is accessible when desired. Thus, we expect that a set of items that capture the central criterion would measure LDRs with strong internal consistency of scores.

Evidence of the External Aspect of Validity of LDR Measure

The external aspect of validity of a construct includes convergent and discriminant evidence, as well as evidence of criterion relevance and applied utility (Messick, 1995). In this study, the LDR measure scores are expected to demonstrate applied utility by classifying people into self-report forced-choice LDR/GCR categories with high accuracy. In addition, theory suggests that distal locations and travel are a barrier to LDR partners spending

time together. Specifically, research found that LDR (vs. GCR) college students were together significantly less often (Dellmann-Jenkins et al., 1994), had significantly less face-to-face contact (Stafford & Merolla, 2007), and were physically together "on average only once every 23 days" (Guldner & Swensen, 1995, p. 318). Therefore, high scores on an LDR measure should be associated with LDR partners spending less time together and GCR partners spending more time together. That is, LDR scores would be negatively related to "time together."

To provide discriminant evidence of validity, the LDR scores should have a weak or near-zero correlation with scores on other constructs. Theoretically, the relationship is important to the partners in both LDRs and GCRs, as is consistent with both being romantic attachment relationships. Although no LDR study has directly assessed relational importance, most studies on related concepts have not found significant LDR/GCR differences for satisfaction, intimacy, commitment, or trust (Dellmann-Jenkins et al., 1994; Guldner & Swensen, 1995), though Holt and Stone (1988) reported lower satisfaction for college students "over 250 miles apart for more than 6 months" (p. 140). Some studies have found that LDR versus GCR dyads were higher on satisfaction, communication quality, and love (Stafford & Merolla, 2007; Stafford & Reske, 1990); and in qualitative studies, LDR individuals commented positively on closeness, trust, commitment, and love (Arditti & Kauffman, 2001; Mietzner & Lin, 2005). These findings are consistent with the relationship being important to both LDR and GCR partners. We expect, then, that scores on an LDR measure would have a weak or near-zero relationship with scores of relational importance, thereby indicating that the two are measuring different constructs.

Also, the quality (i.e., secure, dismissing, preoccupied, fearful styles) of the attachment to the partner is a different construct than LDR/GCR status. Attachment quality, or style, influences the person's typical response to separation distress. For instance, persons who are preoccupied in their attachment exaggerate separation signals and distress, whereas persons who are dismissing in their attachment suppress separation signals and emotion. Although distress behaviors may be more frequent or visible in LDRs because of the separation–reunion cycle, there is no reason to expect that attachment style would be linked to LDRs versus GCRs. For example, research suggests that the attachment styles are represented in similar proportions in LDRs and GCRs (Pistole, Roberts, & Chapman, 2010; Pistole, Roberts, & Mosko, 2010; Roberts & Pistole, 2009), though it consistently finds attachment style differences for satisfaction, intimacy, commitment, and trust (Mikulincer & Shaver, 2007). It seems, then, that attachment style is a different construct than LDR/GCR status, and there would not be significant attachment style differences for scores on an LDR measure.

In summary, the purpose of this study is to examine the factor structure of the LDR index and provide evidence supporting the external aspect of its validity. Because geographic distance requiring travel for physical contact is a central defining feature of LDRs versus GCRs, we expect that the structural aspect of validity will be supported by the LDR scores fitting a one-factor structure and having strong internal consistency reliability. The external aspect of LDR index validity is addressed by (a) evidence of applied utility related to self-reported LDR/GCR classification, (b) convergent evidence collected through the relationship between LDR scores and the time that LDR partners are spending together, and (c) discriminant evidence collected through (weak or near-zero) relationship between the LDR measure and scores on relational importance, as well as no significant attachment style differences on LDR scores.

Method

Participants and Procedure

The sample (N = 741) consisted of 213 men and 526 women with a mean age of 22.70

years (*SD* = 6.15). Dating status was 102 (13.8%) serious/live together, 586 (79.1%) steady partner, 21 (2.8%) date regularly, 14 (1.9%) date casually, and 14 (1.9%) not dating; 85 (11.5%) were married, 624 (84.2%) not married, and 29 (3.9%) divorced, widowed, or separated. The majority of the sample was White (*n* = 634, 85.6%), with 33 (4.5%) African American, 18 (2.4%) Hispanic/Latino(a), 24 (3.2%) Asian American, and 30 (4.0%) Other. Education was reported as 60 (8.1%) high school, 149 (20.1%) first year undergraduate, 137 (18.5%) sophomore, 164 (22.1%) junior, 96 (13.1%) senior, and 134 (18.1%) graduate. Based on self-report, 329 (44.4%) were in LDRs and 412 (55.6%) in GCRs. Unequal *n* is because of nonsystematic missing data.

This sample was obtained as a part of three other LDR studies, which included 13 items for this study placed near the end of the survey packets. Two studies (maintenance Time 1, $N = 232$, and Time 2, $N = 142$, and investment, $N = 129$) obtained data through web surveys at a large Midwest university. Recruitment consisted of posting the studies' URLs to a psychology research site, a faculty webpage, a professional organization Listserv, and other university units (e.g., women's resource center). The third study ($N = 238$) used a paper-and-pencil packet completed in college classrooms at another Midwest university. The maintenance Time 1, investment, and paper-and-pencil data were collected during a 2-year time frame, with the maintenance Time 2 data collected 4 years later via an e-mail to a men's residence hall and two e-mail recruitment messages sent by the registrar to a random selection of students. The current study's sample is constituted, therefore, from four data groups, with study-specific characteristics reported elsewhere (Pistole, Roberts, & Chapman, 2010; Pistole, Roberts, & Mosko, 2010; Roberts & Pistole, 2009). The current study's hypotheses are not examined elsewhere, though attachment style and LDR/GCR were used in the analysis of other hypotheses. Furthermore, because of not knowing how many people saw the recruitment messages, we are unable to determine a return rate for the surveys. The majority of responses occurred when the URLs were first submitted or activated, with fewer responses being recorded across time.

Measures

Attachment style. The Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) crosses Bowlby's (1988) positive and negative model of self and other to form four prototypical attachment styles. Participants select one of the four paragraphs according to how typical the description is of the self in important romantic relationships: (a) the secure paragraph includes "I am comfortable depending on others and having others depend on me"; (b) dismissing reads as "I am comfortable without close emotional relationships"; (c) preoccupied is characterized as "I want to be completely emotionally intimate with others, but I find that others are reluctant to get as close as I would like"; and (d) fearful is described as "I sometimes worry that I will be hurt if I allow myself to become too close to others." The RQ scores test–retest reliability, up to 4 years, was $r = .70$ to $.75$, $p < .05$ (Levy, Blatt, & Shaver, 1998), with scores prototype rating reliability of $r = .87$ to $.95$ (Bartholomew & Horowitz, 1991). The validity of RQ scores has been widely supported by research (Mikulincer & Shaver, 2007). The discriminant aspect of validity was supported by interview questions, assessing the degree to which participants matched each of the four attachment styles, correctly classifying 92% of the sample, including 86% of the secure group, 94% of the fearful group, and 100% of the preoccupied and dismissing groups. Other support for construct validity was derived from the secure and dismissing (i.e., both theoretically described as having a positive self-model) differing from the preoccupied and fearful (i.e., both congruent with a negative self-model) scores on measures of self-concept and sociability.

LDR index. In developing items for an LDR measure, we examined the previous methods

Table 1. Original LDR, TT, and RI Items

Long-distance relationship index
1. My partner does not live in my close geographical area.
2. My partner lives far enough away from me that it would be very difficult or impossible for me to see him/her every day.
3. I consider my relationship to be a long-distance/commuter relationship.
4. My partner & I live apart from each other at least 2 nights each week.
5. We are employed/attend college in different cities, and each maintains a consistent residence in the city in which we are employed/go to school.[a]
6. My partner & I are unable to see each other, face-to-face, on a frequent basis.
7. I live 25 miles or more from my partner.
Time together
1. How much time do you spend together?
2. Extent to which you could have contact with your partner if you wanted.
Relationship importance
1. What is the extent of your commitment to your relationship and partner?
2. How serious is your relationship?
3. This relationship is extremely important to me.
4. How satisfied are you with your relationship?

Note: LDR = long-distance romantic relationship; TT = time together; RI = relationship importance.
[a]The paper-and-pencil study included the words "attend college" rather than "employed."

used to identify and operationally define LDRs. To cover the domain and have scores reflect the content aspect of validity, we accessed LDR research with college student and dating samples as well as dual-career commuter relationship research with married and community samples. Both terms (i.e., LDRs and commuter relationship) refer to partners who separate for days or weeks to work/study and then reunite periodically for physical togetherness. This search resulted in seven items (e.g., "My partner does not live in my close geographical area"; Table 1). Although the item content relevance had been tested by being used in previous studies, a panel of experts (i.e., one faculty and three graduate students familiar with LDRs) examined each item for content, more specifically, resonance with LDR experience, consistency with LDR literature, and functional importance to discriminating LDRs from GCRs. In the resulting LDR index, items were rated on a 7-point Likert-type scale from 1 = *strongly agree* to 7 = *strongly disagree.* Higher scores indicate an LDR and lower scores indicate a GCR.

Time together (TT) and relational importance (RI). We developed an additional six items to reflect TT and RI (Table 1). These items were also reviewed by the experts. Two items addressed TT (e.g., "How much time do you spend together?"). Four items addressed RI (e.g., "How satisfied are you with your relationship?" and "This relationship is extremely important to me."). These six items were rated on a 7-point scale, with the item on importance rated from 1 = *strongly agree* to 7 = *strongly disagree*, and the other five items rated from 1 = *not at all* to 7 = *very much.* Higher scores indicate higher levels of time spent together or relationship importance.

As the six items were developed to tap on two dimensions, TT and RI, we conducted a confirmatory factor analysis (CFA), using the computer program AMOS 17.0, to provide evidence of structural validity. The data were not multivariate normal; so we used the asymptotic distribution-free (ADF) estimation procedure, which was appropriate as our sample size is more than 10 times the number of estimated parameters (n = 13). The chi-square was significant, $\chi^2(8, N = 741) = 584.28$, $p < .0001$, which suggests an inadequate fit of the data to the model (Byrne, 2010). In addition, the modification indices

suggested that an importance item (i.e., "How satisfied are you with your relationship?") cross-loaded with the two TT items. Theoretically, people who are highly satisfied with their relationship likely find it very important and spend a lot of time together. However, both theory and research indicate that GCR partners spend more time together than LDR partners (Stafford & Merolla, 2007). We decided, therefore, that the item confounds the indices when studying LDRs. We deleted the item and conducted a second CFA, with two items for TT and three items for RI. The chi-square value for this model was still statistically significant, $\chi^2(4, N = 741) = 9.94$, $p < .05$, but closer to being nonsignificant. The standardized root mean square residual (SRMR) was .02 (SRMR < .06 indicates a good fit). The adjusted goodness-of-fit (AGFI) was .96 (AGFI > .95 indicates a good fit). The comparative fit index (CFI) was .98 (CFI > .95 indicates a good fit). The root mean square of approximation (RMSEA) was .05, with a 90% confidence interval (CI) from .00 to .08 (RMSEA < .05, with a 95% CI entirely below .08, indicates a good fit). Finally, the HOELTER Critical *N* was greater than 200 at the .05 and .01 levels (707 and 989, respectively), indicating that the sample size is satisfactory. Because the data indicated a satisfactory fit of the data to the model, we used the two-item TT and three-item RI scores. Cronbach's α of internal consistency reliability was .73 for the TT scores and .86 for the RI scores.

Additional analyses provided evidence of the external aspect of validity for the RI and TT scores. An independent sample *t*-test, using the self-reported category of LDR or GCR status, revealed a significant difference for TT, $t(739) = 16.15$, $p < .001$, with higher scores for GCRs ($M = 11.77$, $SD = 2.28$) than LDRs ($M = 8.27$, $SD = 3.58$). This provides some evidence of the external aspect of validity for the TT scores because research indicates that GCR partners spend more time together than LDR partners (Stafford & Merolla, 2007). An additional evidence in this regard was provided by results from an analysis of variance (ANOVA) indicating nonsignificant attachment differences for TT. Indeed, as attachment styles reflect security and distress management differences in relationships, rather than the amount of time spent with the partner, the finding of nonsignificant attachment-style differences for TT scores is consistent with theory. Additional ANOVA results revealed significant attachment-style differences for RI, $F(3, 737) = 16.58$, $p < .001$. Bonferroni post hoc tests indicated that the dismissing style, characterized by dismissing the importance of attachment and keeping attachment information suppressed, was lower than the other three styles on RI. This finding is consistent with attachment theory, thus providing an additional evidence for the external aspect validity for the RI scores. As a whole, these findings provide some support for the validity of the TT and RI scores used in this study.

Demographic items. Participants provided their sex, age, educational status, dating/marital status, and ethnicity. In addition, they self-reported either LDR or GCR relational status, following directions stating that some romantic partners live in the same geographic area and some do not and that we wanted to know more about GCRs and LDRs.

Statistical Analysis

We examined the factor structure and the external aspect of validity for the self-report LDR measure under the unified treatment of construct-based validity (Messick, 1995). Unless specified differently, the statistical analyses were conducted using SPSS 17.0. Initial analyses were to describe the sample and the variables (e.g., attachment style frequencies; the relatedness of the seven LDR items) and to test whether the validity analyses needed to control for (a) web versus paper-and-pencil method, (b) data groups, or (c) demographic categories (e.g., ethnicity, sex, education, marital/dating status). Because of the large sample size, we expected the items to have significant mean differences on the demographic variables and decided to control for variables with an effect size above .10.

Table 2. Summary of MANOVA Tests for Differences Among Demographic Categories on LDR Items

Variance Source	Wilks's Λ	Omnibus *F*	df_1	df_2	η^2
Web versus paper	.97	3.39***	7	733.00	.03
Data group	.87	5.18***	21	2099.59	.05
Dating status	.77	6.89***	28	2619.05	.07
Marital status	.83	10.04***	14	1458.00	.09
Ethnicity	.93	2.03**	28	2626.26	.02
Education	.86	3.21***	35	3064.85	.03
Sex	.99	0.82	7	731.00	.01

*$p < .05$. **$p < .01$. ***$p < .001$.

In the primary analyses, we first used AMOS 17.0 to conduct a CFA, expecting that a single-factor model will fit the data on the seven LDR items, thereby providing evidence for the structural aspect of validity. We also expected Cronbach's alpha coefficient of internal consistency reliability to be sufficiently high. To examine applied utility, in collecting evidence of the external aspect of validity for the LDR index (Messick, 1995), we conducted a logistic regression analysis, which does not assume normal distribution of the data (e.g., Tabachnick & Fidell, 2007). We expected the LDR index scores to classify participants into self-selected LDR/GCR categories. Because of the large sample size (more than 50 cases per item), we used the SELECT procedure, which conducts a cross-validation and yields a less biased result (e.g., Tabachnick & Fidell, 2007; Wright, 2000). Also, we correlated the LDR index and TT scores, expecting that the LDR index and TT scores would be in a moderate negative relationship. Furthermore, we correlated the LDR index and RI scores, expecting a weak (or close to zero) correlation. Finally, we investigated the mean attachment style differences for the LDR index scores, expecting nonsignificant results.

Results

Preliminary Analyses

In initial analyses, attachment style frequencies were 309 (41.7%) securely attached, 111 (15.0%) dismissing, 98 (12.2%) preoccupied, and 223 (30.1%) fearful, which is consistent with previous research. As the LDR items were positively correlated (*r*s ranged from .57 to .94), multivariate analysis of variance (MANOVA) was used to test for differences among categories of demographic variables on the set of seven LDR items (e.g., Dimitrov & Rumrill, 2005). As shown in Table 2, the significant *F* values were associated with small effect sizes (less than .10), and there was not a statistically significant difference for sex on the LDR items. Therefore, we did not control for demographic variables in the follow-up analyses.

Factor Structure of LDR Index

Because the data did not meet the assumption of multivariate normality, we conducted an ADF CFA, which is appropriate for nonnormal distributions (Byrne, 2010). We chose ADF because we use the computer program AMOS, where the maximum-likelihood estimate for normal distributions does not provide a Satorra–Bentler scaled chi-square (SB χ^2). The SB χ^2 is the usual maximum-likelihood χ^2 divided by a scaling correction to better approximate chi-square under nonnormality (Satorra & Bentler, 1999, 2001). Also, our sample size ($N = 741$) is above the recommended size of 10 times the estimated parameters (here, $10 \times 14 = 140$) for trustworthy ADF results (Byrne, 2010).

Under the ADF, the chi-square value was statistically significant, $\chi^2(14, N = 741) = 28.05$,

Table 3. Logistic Regression Analysis for LDR/GCR Status Classifications (N = 741)

Item and Its Number	B	*SE*	Wald	Odds Ratio	95% CI for Odds Ratio	
					Lower	Upper
1. Partner not in close area	.05	.19	0.07	1.05	0.73	1.52
2. Very difficult to see daily	.38	.16	5.41*	1.46	1.06	2.01
3. Relationship is LDR	.77	.16	23.28***	2.15	1.58	2.93
4. Live apart at least 2 nights	–.04	.16	0.07	0.96	0.71	1.30
5. Employed/college and reside in different cities	.29	.12	5.30*	1.331	1.04	1.70
6. Unable frequent face-to-face	–.08	.16	0.29	0.92	0.68	1.25
7. Live 25+ miles apart	.34	.13	6.83**	1.41	1.09	1.82

Note: LDR = long-distance romantic relationship; GCR = geographically close relationship. LDR items, *df* = 1. Items are paraphrased (see Table 1 for complete text).
*$p < .05$. **$p < .01$. ***$p < .001$.

$p < .01$, which suggests an inadequate data fit of the model. However, given the sensitivity of the chi-square to sample size, the examination of other goodness-of-fit indexes suggested an adequate data fit of the model: SRMR = .02; AGFI = .996; CFI = .996; and RMSEA = .04, with 90% CI = (.018, .064). Furthermore, the consistent version of the information criterion (CAIC) of 139.11 (vs. 213.04 for the saturated model and 4453.33 for the independence model) and the Bayes information criterion of 125.11 (vs. 185.02 and 446.33) were lowest for the hypothesized model, thereby indicating that the model is likely to replicate with new data. The expected cross-validation index of .082 is very close to the saturated model's .076. Also, the HOELTER Critical *N* was greater than 200 at the .05 and .01 levels (485 and 597, respectively), which indicates that the sample size is satisfactory (Byrne, 2010). In sum, the fit indices suggest a reasonable data fit of the hypothesized single-factor model. Cronbach's α of internal consistency reliability for the sample data was .96.

External Aspects of Construct Validity for the LDR Index

Applied utility evidence. In collecting evidence of applied utility for the external aspect of validity, the LDR index scores from three data groups were used to classify participants into self-reported LDR/GCR categories using logistic regression analysis (the fourth data group was used as a Time 2 data set for a second classification). The omnibus chi-square test was statistically significant, $\chi^2(7, N = 478) = 703.81$, $p < .001$, thus indicating a statistical significance for the full logistic regression model versus a baseline model (e.g., see Dimitrov, 2009). The Hosmer–Lemeshow goodness-of-fit chi-square statistic was nonsignificant, $\chi^2(7, N = 478) = 8.03$, $p = .33$, which indicates a good data fit for the logistic regression model. The Nagelkerke R^2-like measure of effect size was .92 (see, e.g., Dimitrov, 2009). Furthermore, the model correctly classified 96.3% of GCRs, 98.3% of LDRs, 97.3% of the selected cases, and 100% of the Time 2 GCR and LDR cases. The regression coefficients, Wald statistics, and odds ratios indicate that four of the seven items contribute significantly to accurately classifying LDR/GCR status (see Table 3). Nonetheless, after examining the specific items, we elected to retain all seven items, partially for theoretical reasons and partially because the logistic regression results provide evidence of applied utility for the external aspect of validity of the LDR index scores.

Convergent evidence. In support of convergent evidence for the external aspect of validity, it was found that the LDR index scores

Table 4. Attachment Style Means and Standard Deviations for LDR Index ($N = 741$)

	Secure ($n = 309$)		Dismissing ($n = 111$)		Preoccupied ($n = 98$)		Fearful ($n = 223$)	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
LDR index	25.33	17.52	26.48	17.20	27.79	16.57	27.21	17.28

Note: LDR = long-distance romantic relationship. There were no statistically significant differences among the four means.

were significantly and negatively related to TT scores, $r = -.55$, $p < .001$. Thus, the LDR index and TT scores converge negatively and moderately, as expected and as is consistent with partners spending more time together in GCRs.

Discriminant evidence. In support of discriminant evidence of the external aspect of validity, it was found that there was a statistically significant, yet very low, negative correlation between the LDR index and the RI scores, $r = -.10$, $p < .01$. An additional discriminant evidence was provided by an ANOVA test, which indicated no differences in attachment style on the LDR index scores, $F(3, 737) = 0.78$, *ns*; $\eta^2 = .003$ (the descriptive statistics are provided in Table 4). This finding is consistent with the conception that the LDR/GCR status and attachment style are different constructs.

Discussion

This study examined the structural and external aspects of construct validity of a new LDR measure as conceptualized in the unified validity framework (e.g., Messick, 1995). With regard to the structural aspect of validity, the CFA-based analysis indicated that the LDR index scores fit a single-factor model and demonstrated high internal consistency reliability. The external aspect of validity was supported by evidence of applied utility, convergent evidence, and discriminant evidence. Specifically, the LDR index scores are consistent with a previous method of identifying LDRs/GCRs, as is reflected in the accurate classification of 96.3% of GCRs, 98.3% of LDRs, and 97.3% of the selected cases as well as 100% of the Time 2 GCR and LDR cases. Also, the LDR index scores were negatively and moderately related to TT scores, thus providing convergent evidence of validity for the LDR index scores. The finding is consistent with theory about the geographic barriers to LDR partners' physical togetherness and with research indicating that GCR (vs. LDR) couples spend significantly more time together (e.g., Stafford & Merolla, 2007).

Discriminant evidence was provided by the findings that (a) the LDR index scores had a low association with RI scores and (b) there were no attachment style differences on LDR index scores, which is consistent with theoretical predictions and research suggesting that the styles are represented in similar proportions in LDRs and GCRs (Pistole, Roberts, & Mosko, 2010; Roberts & Pistole, 2009). Provided next are some validation details at item level.

Four (out of seven) LDR items contributed uniquely to classification into LDR/GCR status. The most influential predictor, "I consider my relationship to be a long-distance/commuter relationship," is similar to a forced choice self-classification statement (e.g., Van Horn et al., 1997). The other three items were the following: "I live 25 miles or more from my partner," "My partner lives far enough away that it would be very difficult or impossible to see him/her every day," and "We are employed/attend college in different cities, and each maintains a consistent residence in the city in which we are employed/go to school" (in Table 1, these are Items 7, 2, and 5. All these three items concern an external barrier, that is, they imply enough geographical distance to require travel to see the partner.

For reasons of substantive representativeness and measurement adequacy, all seven items were retained for the LDR index. Moreover, the lack of significant unique contribution of three items (Items 1, 4, and 6) to LDR/GCR classifications can be partly because of the fact that the study sample was heterogeneous and comprised of persons who reported a range of relational and marital status: not dating; casual, regular, and steady dating; married; and previously married. For example, Item 4 ("Living apart at least 2 nights a week") may distinguish married/living together partners from dating partners; even steady daters may not expect physical togetherness every night. Somewhat similarly, Item 1 ("My partner does not live in my close geographical area") and Item 6 ("My partner & I are unable to see each other, face-to-face, on a frequent basis") may be viewed differently, based on personal expectations, preferences, and local norms. Not living in the close geographical area may be viewed by an LDR person as reflecting geographic distance, whereas a GCR person may view the item as meaning the partner lives in a different neighborhood or not within walking distance. In addition, both rural and urban partners may regularly date people who are not in the close geographic area but are perceived as within daily togetherness distance. For instance, the partner not living in the close geographical area might mean outside the city, in the country to some participants or, to other participants, mean "I have to drive across town for an hour, in traffic to see my partner." Furthermore, the item about being unable to see each other, face-to-face, on a frequent basis could be interpreted subjectively. GCR partners may think about not being able to see each other several times during the same day, whereas LDR partners may think about being unable to see each other daily.

Limitations

There are several limitations in this study. First, the data were obtained in three studies and four data collections, which is why we accounted for data group in analyses. In each of the data groups, responses to the other research items might have differentially influenced the responses to the items for this study (Worthington & Whittaker, 2006), as might the paper-versus-web methodology. In addition, we could not determine a return rate for the surveys; the data may be biased by participant self-selection based on computer skills or interest in the research topic. Second, the items were keyed on a Likert-type rating scale so that high scores indicated LDRs, and no GCR-specific items were included. Future researchers might add GCR items and balance the scoring key (e.g., with some reverse-scored items) to better represent GCR items in the measure. In addition, researchers might address if people think of themselves as in an LDR or in a GCR, that is, in a dichotomous position inconsistent with Likert-type ratings. Third, we developed our items from identifiers used in the LDR literature. In this way, we had an empirical, logical, and practical approach to items (Worthington & Whittaker, 2006). There could, however, be other items that would be useful to distinguish LDRs/GCRs. Researchers might start with focus groups of LDR and GCR partners to generate a larger set of items, which can then be reviewed by experts and pilot tested. Perhaps, the outcome would be a two- or three-factor model with scores that distinguish varied commitment (e.g., casual daters vs. serious daters vs. married couples) in or varied reasons (e.g., education/work vs. military) for LDRs. Finally, the analyses were conducted on data from mostly White participants in mostly nonmarried relationships. Future research should include a more diverse group of participants, including the following: married and nonmarried partners who have and have not completed their education; gay, lesbian, and bisexual partners; and partners from various ethnic groups.

LDR Index: Research and Practice Implications

The LDR index could contribute to the routine gathering of relationship status (i.e., LDR or GCR) data in relationship research and in

counseling services, leading to more refined knowledge about statistically and clinically significant LDR/GCR similarities and differences. Such knowledge would be useful to future research and to counselors providing preventive or remedial services to LDR, and possibly GCR, individuals and couples. For instance, researchers and counselors may assume that their GCR-based relationship knowledge can transfer to LDRs, but recent research (Roberts & Pistole, 2009) calls this presumption into question. In these studies, low attachment avoidance (i.e., comfort with proximity to the partner) predicted high LDR relational quality. In contrast, in previous research, attachment security, or low avoidance and low anxiety, predicted high GCR relational quality (Mikulincer & Shaver, 2007). Clearly, it is imperative that counselors be effectively informed by LDR research.

Using the LDR index may allow researchers to examine more sophisticated questions and obtain knowledge based on measurement rather than categorical classification. For instance, most studies do not find LDR/GCR relational quality differences. Nonetheless, there are some discrepant findings (e.g., for satisfaction). Although the discrepant findings might be because of items that assess physical togetherness (e.g., sexual relations), which is usually not satisfying in LDRs (Arditti & Kauffman, 2001), the discrepancy may also be because of some samples having participants who unintentionally misclassify their status. They may, for instance, find it impossible to see the partner every day but not consider the relationship an LDR. People who typically drive large distances may not recognize the LDR status as distinct or unique, unless responding to several items that provide more measurement precision.

To provide effective services, counseling professionals need to ascertain a person's LDR or GCR status. Because LDRs are common on college campuses (Stafford, 2005), the LDR index would be useful to provide college counselors with a quick assessment of clients' relational status. For example, a couple may not identify their relational status as an LDR, or they may disagree on whether they are in an LDR (Stafford, 2005). The LDR index items could lead to clarifying the LDR status and, then, be used by the counselor in assisting the couple to better understand their status, especially if linked to relational difficulties. For instance, an anxiously attached partner who comes to realize that he or she is in an LDR may better understand the partner's not being as accessible as desired, for example, "Oh, we're in an LDR . . . I guess it's the distance that prevents more togetherness." In addition, the LDR index might be useful for people who are considering an LDR. Talking about the items could make LDR realities more experience-near and possibly stimulate thinking about strategies for how to achieve a sense of closeness and psychological proximity, if and when they live miles apart.

Furthermore, counseling or counseling-related professionals (e.g., pastors) conducting college or community counseling groups or outreach/educational programs could use the LDR index as a preliminary screening tool for relationship-oriented groups or topics. Individuals and couples could discuss their screening results as an "ice breaker." In outreach or educational programs, the LDR index might, also, be used as a hands-on introduction to the topic of LDRs, one that engages group members in a discussion that normalizes LDRs, extends knowledge of their pros and cons, and combats myths. Even GCR partners may benefit. With LDR knowledge, GCR partners may better appreciate their togetherness or may become more understanding and supportive of LDR work colleagues.

As already noted, additional research on the LDR index is needed. Moreover, this study addresses only structural and external aspects of validity of the LDR index. Other aspects of the LDR validity (e.g., substantive and generalizability aspects) should also be addressed. It is important to know, for example, whether the LDR index scores are meaningful when separation is not voluntary, as when military partners are apart during low- and high-risk deployments.

Studies of educational programming using LDR index scores might also be informative to address the interpretability aspect of validity. Also, researchers may further investigate the items of the LDR index and their usefulness in various samples, for instance, nonmarried and married. The current literature seems to comprise research using LDR college student samples and dual-career commuter married/married-like samples. We think both samples reflect LDRs in that, whether dating or married, the partners have to cope with an attachment-related separation–reunion cycle. Thus, relationship knowledge may be more useful if including the diversity represented in both these types of samples. If so, then a single LDR index, versus married and nonmarried versions, may be beneficial, though this statement reflects a question for future research.

Conclusion

The hope is that this study will contribute to the literature with findings related to the structural and external aspects of validity of the LDR index. Initial evidence is provided that high scores on the LDR index may identify LDR status, whereas low scores identify GCR status, with high LDR index scores indicating that geographic distance is a barrier to daily physical togetherness. Historically, except in LDR literature, researchers have assumed GCRs as the default position and not queried LDR/GCR status in studies of romantic relationship quality and processes. Also, researchers have developed relational quality (e.g., closeness) measures without considering LDRs in the conceptualization. The LDR index, yielding interval (vs. categorical) data, can stimulate thinking about LDRs/GCRs and facilitate addressing questions that require more sophisticated analytic procedures. The brief and easily administered LDR index may also be useful for delivering counseling services, refining existing measures to account for LDR status, and developing a comprehensive relational knowledge base that addresses LDRs and GCRs.

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