The Relational Health Indices:
Confirming Factor Structure for Use With Men

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The psychometrics of the Relational Health Indices (RHI) were previously established in a sample of young women (Liang, Tracy, Taylor, Williams, Jordan, & Miller, 2002a). The current study explored the use of the RHI with men by examining the generalizability of the measure's factor structure and convergent validity in 140 male and 406 female college students. Confirmatory factor analyses revealed that for each of the three indices (i.e., close friend, mentor, and community relationships), the embedded dimensions of engagement/empathy, authenticity, and empowerment were not empirically distinct; a single factor model fit well and the factor structure was invariant across sex for each index. The indices demonstrated good internal consistency across sex, and correlations between the RHI and convergent validation scales were significant and in the direction hypothesized.

The *Relational-Cultural Model* (RCM) is rooted in the seminal work of Jean Baker Miller, who presented a new conceptualization of human development in her book *Toward a New Psychology of Women* (Miller, 1976). In contrast to traditional psychological theories that conceive of separation-individuation as the ultimate goal of development (Erikson, 1968), RCM theorists posit that all psychological growth and development occurs in the context of growth-fostering relationships (Jordan, Kaplan, Miller, Stiver, & Surrey, 1991; Jordan, 1997; Miller & Stiver, 1997; Walker & Rosen, 2004; Jordan, Walker, & Hartling, 2004; Robb, 2006). Based on clinical data, growth-fostering relationships have been defined as those characterized by: (a) mutual engagement/empathy (i.e., perceived mutual involvement, commitment, and attunement to the relationship); (b) authenticity (i.e., the process of acquiring knowledge of self and the other and feeling free to be genuine in the context of the relationship); and (c) empowerment/zest (i.e., the experience of feeling personally strengthened, encouraged, and inspired to take action) (Jordan, 1997; Miller & Stiver, 1997).

Research on relationships has supported a link between these relational qualities and positive psychological outcomes/growth. For example, studies on closeness and empathy indicate that mutual engagement may mediate stress and depression and is associated with self-esteem, self-actualization, cooperation, low interpersonal distress, and relationship satisfaction (Beeber, 1998; Burnett & Demnar, 1996; Gawronski & Privette, 1997; Schreurs & Buunk, 1996; Shulman & Knafo, 1997). Authenticity is associated with being liked, increased liking of others, and motivation in relationships (Collins & Miller, 1994; Kay & Christophel, 1995). Empowerment is linked with positive affect, meaningful activity, and creativity (Hall & Nelson, 1996; Spreitzer, 1995).

The presence of this combination of qualities - mutual empathy, engagement, authenticity, and engagement - in a relationship has been termed Relational Health (Liang, Tracy, Taylor, Williams, Jordan, & Miller, 2002a). As evidenced in clinical data, Relational Health has been shown to bolster one's sense of self-worth and vitality, validate one's identity, reinforce one's knowledge of self and others, and instill a

desire for further connection (Jordan, 1992, 1997; Miller & Stiver, 1997). Moreover, applications of the RCM are rapidly expanding to address a broad-range of psychological and social issues, including psychotherapy, inpatient treatment, substance abuse, chronic illness, depression, trauma, eating disorders, mother-daughter relationships, HIV prevention, racism, sexism, and classism (Amaro, 1995; Covington, 1998; Finkelstein, 1996; Hartling & Ly, 2000; Nelson, 1996; Riggs & Bright, 1997).

Unfortunately, empirical research on the RCM has suffered from two major limitations. The first limitation is the lack of empirical measures reflecting the model's essential concepts (Liang et al., 2002a). The second is the lack of studies aimed at applying the model to men, in contrast to the growing body of literature examining the RCM as it pertains to women (Liang, Tracy, Kauh, Taylor, & Williams, 2006; Liang et al., 2002a; Liang, Tracy, Taylor, & Williams, 2002b). This paper describes a study in which a recent, empirical measure designed to assess growth-fostering relationships is applied to men, in an initial examination of the generalizability of the measure's factor structure and validity across sex. This measure, called the Relational Health Indices (RHI; Liang et al., 2002a), has previously been validated in a sample of women. The current study attempts to extend this work by contributing to the paucity of literature on the RCM among men, and represents a starting point from which to explore what growth-fostering relationships may mean to men, and how to measure growth-fostering relationships in men.

The Relational-Cultural Model and Men

In keeping with its feminist roots, the development of theory and research on the RCM has primarily focused on women thus far. This work has at times suggested that men are less "relational" than women, or that they somehow value or need relationships less than their female counterparts (Chu, Porche, & Tolman, 2005; Gilligan, 1982; Mansfield, McAllister, & Collard, 1992). Yet other evidence supports the contrary position: 1) men in fact rely on and need relationships as much as do women, and 2) relational qualities similar to those proposed by the RCM are relevant across gender (Baumeister & Leary, 1995). Indeed, Baumeister's theory of

belongingness argues that all individuals, regardless of gender, experience a need to belong, and a specific need for trusting, mutual relationships; these relational experiences are believed to be necessary for the psychological development and well-being of both men and women (Baumeister & Leary, 1995). Similarly, Bergman (1996) has argued that the RCM qualities may be just as relevant for men as for women, and that engaged, authentic, and empowering relationships are conducive to men's psychological health and well-being. More recently, a relationally-based measure of adolescent masculinity has been developed that is founded on the belief that adolescent males seek out and rely on close, meaningful relationships for well-being and identity development (Chu et al., 2005). Chu and colleagues (2005) assert that male-male relationships are so essential to the development and well-being of young men that they often behave according to masculine norms specifically in order to seek out and preserve their peer relationships, and to avoid being cast out of social groups, which provide support and identity. Indeed, more empirical evidence is needed to understand the qualities of relationships that positively impact the psychological development and health of men.

Operationalizing Relational Health: Present Limitations.

In addition to the paucity of studies on men, research on growth-fostering relationships has been limited in a variety of ways. First, much of the past work (Genero et al., 1992) has focused exclusively on certain types of dyadic relationships, such as peer friendships or romantic relationships. The limited focus on dyadic relationships in relational literature is problematic, given that there are a variety of types of relationships, and men and women may value these types differently. In fact, one study found that, although men intensely value their peer relationships, they are more likely than women are to seek out and benefit from relationships that are more group-oriented, or based on collective identity (Seeley, Gardner, Pennington, & Gabriel, 2003).

Another limitation to existing work is that many measures of relationship quality have tended to reflect behavioral manifestations of intimacy, such as talking with a friend or partner

(Shumway & Wampler, 2002), rather than underlying qualities, such as a sense of trust. This limitation may bias the research toward female-oriented ways of expressing important underlying qualities of relationships (Kelly & Hall, 1992; Prager, 1995; Twohey & Ewing, 1995). Indeed, self-disclosure and talking about the relationship are often considered signs of true intimacy, even though for men, doing activities together may be another meaningful way that men develop and maintain intimacy (Pollack, 1999). Even if behavioral expressions of Relational Health may differ between men and women, it is possible that the underlying qualities of Relational Health may be more constant across sex. To test this possibility, measures are needed that reflect underlying *qualities* of intimacy—authenticity, engagement/empathy, and empowerment/zest—that the RCM identifies as being sought after and needed by both men and women, rather than examine *behaviors* as the sole indicators of Relational Health.

The Relational Health Indices (RHI)

To address the existing lack of empirical measures of Relational Health, Liang and colleagues (2002a) developed an instrument called the Relational Health Indices (RHI) designed to assess engagement/empathy, authenticity, and empowerment/zest in three contexts: close friend, mentor, and community relationships. Examining Relational Health across three relational contexts allows for a more complex and nuanced picture, which is important given that people simultaneously engage in various types of intimate and meaningful relationships. The psychometric properties of the Relational Health Indices were initially tested in a sample of young women; and the Relational Health Indices were found to be reliable, valid, and useful measures of growth-fostering relationships (Liang et al., 2002a). Specifically, the factor analyses confirmed a three subscale structure, supporting the theory-based proposition that individuals make distinctions based on three types of relational qualities: engagement/empathy, authenticity, and empowerment. The internal consistency investigation suggested good reliability for each of the three composite

indices (i.e., close friend, mentor, and community) and the authenticity, engagement/empathy and empowerment subscales. Finally, the significant positive correlations between the RHI and measures assessing similar constructs provided evidence of the RHI's convergent validity.

Applying the RHI to Men

The Relational Health Indices may be apropos for use with men for two major reasons. The first is that the indices measure the experience of underlying qualities of relationships, which, as mentioned above, may be more similarly relevant across gender than behaviors or specific functions of a given relationship assessed with previous measures. In other words, because the Relational Health Indices are designed to focus on the *experience* of relationships, rather than solely on *outward manifestations or behaviors*, these indices may be more suited to measuring the growth-fostering connections of men than other, more limited measures of close relationships. For example, the one other published measure based on RCM concepts, the Mutual Psychological Development Questionnaire (MPDQ; Genero et al., 1992), is an assessment based on impressions during verbal interactions with a partner. Similarly, a proposed measure of couple relationships, The Couple Behavior Report (CBR) focuses solely on behaviors, such as saying hello to one's partner (Shumway & Wampler, 2002). The RHI, on the other hand, includes attitudinal assessments in more general context (e.g., "I can be genuinely myself with my mentor", "I feel understood by my friend", and, "I feel a sense of belonging to this community"). In this way, the RHI items were not designed to focus solely on gender specific behaviors, but rather underlying experiences that may be relevant across gender.

The second reason that the RHI may be particularly useful for work with men is that the RHI measures growth-fostering qualities across three domains: close friend, mentor, and community. This allows for the examination of variations in the *type* of relationships that men may value most, rather than assuming that men do not value or benefit from relationships if they have low levels of one type of

relationship. It is important to note that both men and women consistently rank peer relationships as highly important to them -- eclipsing even the salience of their relationships with their own parents and other family members, particularly in late adolescence and emerging adulthood (Corsaro & Eder, 1990; Windle, 2000; Wood, Vinson, & Sher, 2001). Similarly, young men and women consistently identify mentor figures as playing a major role in their lives (Blyth, Hill, & Smith, 1982; Garbarino, Burston, Raber, Russell, Crouter, 1978). Thus, the RHI provides the opportunity to examine RCM qualities in the context of a variety of relationships relevant for both males and females.

The Present Study

This study attempted to address simultaneously the lack of empirical measures reflecting the Relational-Cultural Model's concepts and the lack of studies aimed at applying the model to men by expanding the development of the Relational Health Indices. Specifically, the RHI items and validity measures were administered to both college-age men and women to examine the generalizability of the RHI's factor structure, as well as to replicate evidence for its reliability and convergent validity across sex. Comparing the RHI's factor structure across sex to confirm measurement invariance is a logical prerequisite to conducting substantive cross-sex comparisons of the RHI (e.g., tests of group mean differences, invariance of structural parameter estimates) (Vandenberg & Lance, 2000). It was expected that the RHI's factor structure would be similar for men and for women. Moreover, we expected that the measure would demonstrate reliability and convergent validity across sex.

This research aims to add to existing literature on the psychology of women as it compares to the psychology of men by providing a first step towards the creation of measures for examining the application of RCM to men's close friend, mentor, and community connections. That is, the RHI could be used as a base from which to conduct future exploratory and confirmatory work for: 1) developing items that are not overly biased

toward women's ways of expressing growth-fostering relationships, but also reflect men's ways of relating; and 2) assessing whether RCM concepts are as valued by men as they are by women. If this and future studies were to demonstrate that the RHI is equally appropriate for use with men and women, these studies would together provide a much needed elucidation of how the RCM applies to men, as well as add to the field's understanding of the universal or shared aspects of relationships that all people need and benefit from. Furthermore, a gender neutral measure of Relational Health is expected to be useful for practitioners and researchers alike who work with male and female clients and research participants, respectively.

Method

Participants

The total number of participants in the current survey study were 149 college men (ranging in age from 18-24, $M = 19.79$, $SD = 1.18$) and 406 women (age range = 17-32, $M = 19.63$, $SD = 1.19$) at a co-ed liberal arts college. Eighty-five percent of participants were White, 6% Asian, 4% Hispanic, 3% Black, and 2% a race or ethnicity other than those identified in the present study.
Only a subset of these participants (102 college men, age range: 18-24, $M = 19.59$, $SD = 1.15$; 243 women, age range: 18-32, $M = 19.60$, $SD = 1.36$) were included in the convergent validity study; the larger sample was used for the factor analyses. Of the 557 respondents who took the survey, 545 (98%) completed the peer friendship-related analyses and 529 (95%) completed the community-related analyses. Four hundred and fifty-seven participants (82%) were able to identify a mentor; this sub-sample of respondents was representative of the overall sample in terms of sex and racial/ethnic composition, class standing, age, GPA, measures of social class and SAT scores.

Procedure

After obtaining Institutional Review Board approval for our sample and procedure, we proceeded as follows.

Initial Exploration of Relevance of RHI Items to Men. As a preliminary examination of the applicability of the RCM concepts and RHI items to men, we conducted a series of focus

groups with young men, which were similar to those conducted with young women during the creation of the RHI. A researcher explained the focus group study to students in several classes at a university and at a high school in the Northeast. Male students in these courses were asked to volunteer for the groups. Students signed informed consent forms which explained that their responses would be confidential and anonymous.

Two groups each of male college and high school students with diverse ethnic backgrounds were convened. Their demographics were representative of the general student populations at their schools. Each focus group of six to eight members, facilitated by two trained research assistants, involved a single session lasting about 1 to 1.5 hours. Participants were asked to describe their relationships with mentors, close peer friends, and close groups or communities, including: 1) definitions (e.g., how would you define "a mentor"); 2) level of importance (e.g., do you have a mentor, and how important is s/he to you compared to your other relationships?); 3) relationship characteristics (e.g., describe the positive and negative aspects of your relationships with your mentor); and 4) ways of interacting in each relationship to reflect the qualities described (e.g., "since you say that your relationship with your friend is 'real and honest,' how does this show up in your relationship?"). Students also critically assessed the three RCM constructs (i.e., authenticity, engagement/empathy, empowerment) and the items in the Relational Health Indices for relevance to their real-life relationships. The participants spontaneously clarified and elaborated on each other's comments. At times, the facilitators directed participants to stay on task and to clarify their statements with prompts such as, "Can you give an example?" and "Does anyone have anything to add to that?" Each focus group ended when members had no more responses.

Findings from the focus groups served as an initial confirmation of the relevance and wording of the Relational Health Indices items. That is, participants found the items to be relevant to, and descriptive of, close friend, mentor, and community relationships. When asked whether they would suggest omitting or changing any of the items, no major edits were deemed absolutely necessary.

Survey study. Survey packets with the original RHI items, validity scales, and demographic information were distributed to students in four, large psychology courses at a co-ed college in the Northeast. Participation was voluntary and was elicited during the beginning of a class. Students signed informed consent forms which explained that their responses to the surveys would be confidential and anonymous. Respondents were offered extra credit for participation. Each participant was instructed to complete the entire survey in one sitting. All participants completed the RHI and demographic items, but only a subset received these items plus the convergent validity scales. Specifically, the first two classes received all of the study measures for the confirmatory factor analyses (CFA) and convergent validity analyses; the additional two classes were used only in the CFA to ensure an adequate male sample size for this statistical procedure.

Participants receiving the additional convergent validity scales submitted their responses on-line at a time and place of their choosing through a web-based survey hosted on a secure server at the university where the study was conducted. Software associated with the on-line questionnaire enabled participants to fill out a survey only once by tracking their student identification numbers, and kept their responses anonymous and confidential. Only the researcher could access this data. The other two classes filled out their surveys during class time.

Instrumentation

Relational Health. The Relational Health Indices (RHI; Liang et al., 2002a) is a 37-item questionnaire that assesses the perceived quality of dyadic and group relationships, as defined by characteristics of growth-fostering relationships set forth by the RCM. Survey respondents were asked to rate three relationships: 1) their closest friend or peer ("someone whom you feel attached to through respect, affection, and/or common interests, someone you can depend on for support and who depends on you"), 2)

someone who represented their most significant non-kin mentor ("someone who is older than you, more experienced than you, and guides you in some area of your life"), and 3) their college community. Sample items for the close peer friend, mentor, and community scales, respectively include: "After spending time together [with my friend], I feel energized," "I can be genuinely myself with my mentor," and "It seems as if people in this community really like me as a person." Ratings for each item were made using a Likert-type scale from "1=never" to "5=always" with high scores indicating the presence of growth-fostering qualities in close friend, mentor, and community relationships. The RHI subscales have been validated using data from an ethnically diverse sample of young women attending a women's college in the Northeast (Liang et al., 2002a). In this earlier validation study, the indices showed evidence of concurrent and convergent validity and high reliability ($\alpha = 0.85$, 0.86, & 0.90 for the peer friend, mentor, and community indices, respectively). Additional studies using the RHI have confirmed the significance of relational engagement/empathy, authenticity, and empowerment/zest to the relational and psychological health of young women from diverse backgrounds (Liang et al., 2002b; Liang et al., 2006).

In addition to the RHI, three previously validated measures that address constructs similar to the relational aspects assessed in the RHI were used to test convergent validity. These scales asked respondents to rate the same mentor and friend relationship they had rated for the RHI items.

Mentor relationships. The Mutual Psychological Development Questionnaire (MPDQ; Genero et al., 1992) is a 22-item measure that reflects RCM concepts including perceived mutuality in close relationships. The measure has been tested on men with good test-retest and internal reliability with alphas ranging from .87 to .93. The RHI differs from the MPDQ in two essential ways: 1) the RHI is not limited to querying about verbal interactions, and 2) the RHI assesses community relationships in addition to dyadic relationships. MPDQ items include items such

as, "[when we talk about things that matter to my mentor, I am likely to] be receptive" and are rated on a scale from "1 = never" to "6 = all the time." Higher scores indicate more closely connected and mutual relationships. The item sets for which average composite scores were created showed evidence of excellent reliability in our sample ($\alpha = 0.95$ and 0.89 for males and females, respectively).

Close peer friendships. The Quality of Relationships Questionnaire (QRI; Pierce, Sarason, Sarason, Solky-Butzel, & Nagle, 1997) was designed to assess the quality of three aspects of a dyadic relationship: support (7 items), depth (6 items), and conflict (13 items). It differs from the RHI in that it does not aim to assess underlying qualities such as authenticity, engagement/empathy, and empowerment. Items, such as "How positive a role does this person play in your life," were rated on a scale from "1 = not at all" to "4 = very much" with high scores indicating positive relationship quality. The reliability coefficients for the three QRI subscales ranged from 0.85 to 0.88 for males and from 0.82 to 0.90 for females in our study.

The Friend Support subscale of the Multidimensional Scale of Perceived Social Support (MSSUP; Zimet, Dahlem, Zimet, & Farley, 1988) is a 4-item measure of perceived social support from friends. Sample items including "my friends really try to help me" and "I can talk about my problems with my friends," are rated on a 4-point Likert scale (1=strongly agree to 4=strongly agree) with high scores indicating strong support. In past studies, the MSSUP has demonstrated good factorial validity and construct validity (Zimet et al., 1988), as well as good internal reliability for the Friend subscale ($\alpha = 0.85$). The reliability coefficients in our study sample were high for both males ($\alpha = 0.88$) and females ($\alpha = 0.92$).

Analyses

The purpose of this study was to apply the RHI to men as well as to women, with whom it was initially developed, and to develop a version of this instrument that shows evidence of measurement invariance across sex. The analysis models were all conducted in a structural equation modeling framework,

using the Mplus statistical package, version 4.0 (Muthén & Muthén, 1998). Due to the skew observed in the items, we used the WLSMV estimator (Satorra & Bentler, 1994), which is robust to violations of multivariate normality. The indicators were specified as continuous but censored from above.

The first task in this study was to assess the dimensionality of the items within each domain (i.e., peer friend, mentor, and community) for men and women separately. We hypothesized that the dimensions of Relational Health identified in the theoretical model underpinning the instrument development, namely, authenticity, engagement/empathy, and empowerment would be evident for both men and women. Using each set of items, we tested this hypothesis by conducting a series of confirmatory factor analysis for men and women separately. Since the original scale was developed with an all-female sample, we first fit the models to the women's data. Based on the results of these models, we identified items that performed well (loadings > 0.40) in the women's models and fitted the reduced item models to the men's data. Our core set of items were those that performed well in both the women's and men's models, both in terms of the overall model fit and the strength of the factor loadings and item reliability estimates.

Next, we hypothesized that Relational Health, as operationalized by the RHI, would contain a set of items with equivalent measurement properties across women and men. In order to establish the degree of measurement invariance across sex, we conducted a series of multiple group confirmatory factor models for each Relational Health domain. In these models, we first specified a model in which the measurement parameters (loadings and intercepts) were freely estimated in each sex group. Then, we estimated a model in which these measurement parameters were constrained to be equal across sex groups. Finally, we calculated the chi-square difference scores for each pair of nested models to determine whether the assumption of measurement invariance was tenable. If the assumption of measurement invariance resulted in a significant decrement in model fit,

we identified individual items likely to be sex non-invariant, using the discrepancy between the freely estimated measurement parameter estimates across sex and the derivative values associated with the measurement parameters. Through an iterative process, we arrived at a final set of items that demonstrated sufficient invariance across sex. Having identified a set of sex-invariant items for each relationship domain, we could compare the quality of relationships directly for women and men.

Finally, we wished to establish evidence of the construct validity of our sex-equivalent scale. Using the invariant measurement models, we conducted validity tests for both men and women: estimating correlations between the latent factor scores derived from the Relational Health items and existing measures we identified as measuring similar constructs. These models were conducted in a multiple groups structural equation modeling framework, constraining measurement parameters for the RHI to be equal across sex but allowing correlations among constructs to be freely estimated.

Results

The confirmatory factor analyses assessing the presence of relational dimensions revealed that the embedded subscales of authenticity, engagement/empathy, and empowerment shared so much variance (typically correlated from .90 - .99) that they were statistically indistinguishable in this sample, even creating convergence problems in several models. Because of this, we allowed the items to load on a single dimension – overall relationship quality.

The unidimensional factor models for the peer friend and community domains revealed that the reverse-scored items (one item in the peer friend index and three items in the community index) had weak factor loadings (< .30), even after accounting for the reverse-scoring as a method factor. These items were omitted from the core set of items to be used in the measurement invariance models. The fit statistics for the models are given in Table 1.

Measurement Invariance

Next, we conducted a series of multiple group confirmatory factor models for each Relational Health domain to test our hypothesis of measurement invariance across sex. Models not initially passing the invariance test were

Table 1. *Model fit indices assessing the measurement model separately by sex.*

	Females		Males
	Full Item Set	Reduced Item Set	Reduced Item Set
RHI-Close friend			
N	398	398	146
# of items	12	11	11
$\chi^{2\,a}$ (df)	107.86 (35) ***	51.31 (20) ***	52.53 (20) ***
$\chi^2_{DIFF}{}^{b}$(df)		0.07 (1) ^{ns}	
CFI ^{c}	0.99	1.00	0.99
WRMR ^{d}	0.84	0.84	0.89
RHI-Mentor			
N	334	No change	123
# of items	11		11
$\chi^{2\,a}$ (df)	149.43 (27) ***		49.42 (24) ***
$\chi^2_{DIFF}{}^{b}$(df)			
CFI ^{c}	0.95		0.97
WRMR ^{d}	0.92		0.55
RHI-Community			
N	382	382	139
# of items	14	10	10
$\chi^{2\,a}$ (df)	150.73 (33) ***	100.55 (21) ***	82.96 (15) ***
$\chi^2_{DIFF}{}^{b}$(df)		39.34 (3) ***	
CFI ^{c}	0.98	0.98	0.94
WRMR ^{d}	0.92	0.65	0.80

^{a} This is the Satorra-Bentler chi-square statistic, which is robust to violations in the multivariate normality assumption (Satorra & Bentler, 1994). Because of the adjustment made to the calculation of this statistic, the degrees of freedom for this statistic does not indicate the number of free parameters in the model.
^{b} Difference testing using robust chi-square statistics is not performed as a straightforward subtraction, as such a difference score is not distributed as a chi-square. Instead, a correction factor is used in the calculation of the difference test statistic and its associated degrees of freedom (Satorra, 2000). A significant chi-square difference test statistic represents a significant decrement in model fit from the less constrained to the more constrained model.
^{c} The CFI fit index has been shown to outperform the TLI and RMSEA in models with non-normal variables. A cutoff value of 0.96 or above has been recommended for these types of models (Yu, 2002).
^{d} The WRMR is the rough equivalent of the SRMR for non-normal data. A cutoff value of 0.90 or below is recommended (Yu, 2002) for a single group analysis. No simulations have been conducted to date to establish a WRMR cutoff level for a multiple groups analysis.
*** $p<0.001$

modified by omitting non-invariant items. The fit statistics for the initial and final models are given in Table 2.

RHI-Close Peer Friend. The initial confirmatory factor model of peer friendship quality did not pass the invariance test [χ^{DIFF2} (12) = 45.78, $p< 0.001$]. The freely estimated intercept for one item ("It is important to us to make our friendship grow") was nearly .5 units lower for males than for females, suggesting that men tend to endorse this item less strongly than women at the same level of relationship quality.

The intercept for a second item ("I feel positively changed by my friend") differed only by about .1 units. However, this item also

Table 2. *Model fit indices and chi-square difference scores assessing the degree of non-invariance of measurement parameters across sex.*

	Initial Invariant Model	Final Invariant Model
RHI-Close friend		
N_{Women}	399	403
N_{Men}	146	147
# of items	11	8
$\chi^{2\,a}$ (df)	138.91 (37) ***	69.46 (23) ***
$\chi^{2}_{\text{DIFF}}{}^{b}$(df)	45.78 (12) ***	21.16 (11) ^{ns}
CFI ^{c}	0.99	1.00
RHI-Mentor		
N_{Women}	334	335
N_{Men}	123	124
# of items	11	9
$\chi^{2\,a}$ (df)	18.14 (36) ***	80.09 (29) ***
$\chi^{2}_{\text{DIFF}}{}^{b}$(df)	32.34 (12) ***	12.26 (10) ^{ns}
CFI ^{c}	0.98	0.99
RHI-Community		
N_{Women}	390	No change
N_{Men}	139	
# of items	10	
$\chi^{2\,a}$ (df)	66.48 (24) ***	
$\chi^{2}_{\text{DIFF}}{}^{b}$(df)	13.06 (11) ^{ns}	
CFI ^{c}	0.99	

[a] This is the Satorra-Bentler chi-square statistic, which is robust to violations in the multivariate normality assumption (Satorra & Bentler, 1994). Because of the adjustment made to the calculation of this statistic, the degrees of freedom for this statistic does not indicate the number of free parameters in the model.
[b] Difference testing using robust chi-square statistics is not performed as a straightforward subtraction, as such a difference score is not distributed as a chi-square. Instead, a correction factor is used in the calculation of the difference test statistic and its associated degrees of freedom (Satorra, 2000). A significant chi-square difference test statistic represents a significant decrement in model fit from the less constrained to the more constrained model.
[c] The CFI fit index has been shown to outperform the TLI and RMSEA in models with non-normal variables. A cutoff value of 0.96 or above has been recommended for these types of models (Yu, 2002).
 *** $p < 0.001$

showed evidence of non-invariance with respect to the factor loading, with the freely estimated loading for males (fully standardized loading = 0.63) estimated to be somewhat weaker than the estimate for females (fully standardized loading = 0.74). This suggests that personal enhancement is a slightly more important factor in a good friendship for women than for men, although both loadings were high in the absolute sense.

A third item showed evidence of non-invariance with respect to the factor loading ("I feel understood by my friend"). The freely estimated loading for males was higher than that for females by a good margin (fully standardized loadings of .69 & .53 for males and females, respectively). This suggests that a sense of being known is an important relationship quality indicator for men, perhaps more so than for women.

We omitted each of these items in turn until

Table 3. Parameter estimates obtained in the final invariance model – RHI-Close Peer Friend.

	Women (n=403)		Men (n=147)		Common
	β[a]	R²	β	R²	Intercept[b]
1. Even when I have difficult things to share, I can be honest and real with my friend.	0.56	0.32	0.46	0.21	4.283
2. After a conversation with my friend, I feel uplifted.	0.63	0.39	0.61	0.38	4.012
3. The more time I spend with my friend, the closer I feel to him/her.	0.62	0.39	0.59	0.34	4.234
4. My friendship inspires me to seek other friendships like this one.	0.41	0.17	0.43	0.18	3.818
5. I have a greater sense of self-worth through my relationship with my friend.	0.68	0.46	0.68	0.46	3.881
6. I can tell my friend when he/she has hurt my feelings.	0.47	0.22	0.51	0.26	3.664
7. My friendship causes me to grow in important ways.	0.71	0.50	0.69	0.48	3.866
8. After spending time together, I feel energized.	0.70	0.50	0.69	0.48	3.907

[a] Fully standardized factor loadings. All loadings are significant at the $p<0.001$ level.
[b] Intercept terms are unstandardized and assume a latent factor mean of zero for the men. The common intercept can be interpreted roughly as the grand mean of the item on the original 1 to 5 response scale.

Table 4. Parameter estimates obtained in the final invariance model – RHI-Mentor.

	Women (n=335)		Men (n=124)		Common Intercept[b]
	β[a]	R²	β	R²	
1. I can be genuinely myself with my mentor.	0.62	0.39	0.67	0.45	4.361
2. I believe my mentor values me as a whole person (e.g., professionally/academically and personally).	0.66	0.43	0.57	0.33	4.685
3. My mentor's commitment to and involvement in our relationship exceeds that required by his/her social/professional role.	0.59	0.35	0.66	0.44	4.148
4. My mentor shares stories about his/her own experiences with me in a way that enhances my life.	0.66	0.44	0.68	0.47	4.086
5. I feel as though I know myself better because of my mentor.	0.68	0.46	0.72	0.52	3.686
6. I try to emulate the values of my mentor (such as social, academic, religious, physical/athletic).	0.61	0.37	0.65	0.42	3.778
7. I feel uplifted and energized by interactions with my mentor.	0.73	0.53	0.78	0.60	4.052
8. My relationship with my mentor inspires me to seek other relationships like this one.	0.56	0.32	0.55	0.30	3.706
9. I feel comfortable expressing my deepest concerns to my mentor.	0.65	0.42	0.64	0.41	3.597
Factor score determinacy[c]	0.93		0.94		

[a] Fully standardized factor loadings. All loadings are significant at the $p<0.001$ level.

[b] Intercept terms are unstandardized and assume a latent factor mean of zero for the men. The common intercept can be interpreted roughly as the grand mean of the item on the original 1 to 5 response scale.

[c] The factor score determinacy represents an index of internal consistency for the latent factor that is roughly equivalent to Cronbach's alpha coefficient calculated from the raw scores.

the assumption of measurement invariance across sex was satisfied [$\chi DIFF2$ (11) = 21.16, ns]. The results of the final model are given in Table 3. Factor loadings ranged from .41 to .71 and the latent factor has good internal consistency for both men (α = .82) and women (α = .83). Item intercepts tended to be high, with an average of 3.96 on a 1 to 5 response scale. This gives evidence of a marked ceiling effect for the items in this scale. The estimated latent factor mean for women was significantly higher than for men ($zDIFF$ =.21, p < 0.001).

RHI-Mentor. The initial mentor model also failed to pass the test of invariance [$\chi DIFF2$ (12) = 32.34, p < 0.001]. The intercept of one item ("My mentor gives me emotional support and encouragement") was freely estimated lower for males than for females by about 0.3 units, suggesting that men rated mentor's emotional support slightly lower than women with the same level of underlying relationship quality. A second item ("My mentor tries hard to understand my feelings and goals") also showed evidence of a sex difference, with men endorsing the item less highly than women at the same level of relationship quality by almost .2 units. Once these two items were omitted, the model passed the test of the invariance assumption [$\chi DIFF2$ (10) = 12.26, ns]. The results of this model are given in Table 4.

The standardized factor loadings for this model ranged from .55 to .78 and the latent factor had good internal consistency (α = .86 for women and .87 for men). The intercept terms tended to be very high, with an average of 4.01. Unlike the closest peer friendship model, the latent factor means for men and women did not differ significantly (z_{DIFF} =.02, *ns*).

RHI-Community. The initial item set for relationship quality with a community required no revision to satisfy the invariance assumption [$\chi 2$ (11) = 13.06, ns]. The results of this model are given in Table 5. The item loadings were very strong, ranging from .56 to .80. The factor had good internal consistency (α = .91 for women and .88 for men). The intercepts for community relationship quality were much closer to the midrange of the response scale than were those for peer friendship and mentor relationship quality (*M* = 3.29) and the difference in latent factor means between men and women was not

significant (z_{DIFF} = .01, *ns*).

Validity Assessment

We assessed construct validity by calculating correlations between the RHI and existing measures selected for construct similarity, doing so separately by sex. We tested for sex differences in these correlations by means of a sex by relational health interaction term in a series of linear regression models predicting the validation constructs.

Convergent validation findings (Table 6) show that the mentor Relational Health index captures some of the same variance as does the MPDQ (mutuality) and QRI (support, depth, conflict). The convergence with our validation measures corresponds most highly with our measure of support quality (r males = .63, *p* < 0.01; r females = .63, p < .01), somewhat less so for mutuality and depth (r males = .56 and .57, r females = .52 and .43, respectively; all *p*s < .01), and least for conflict quality (r males = .31, *p*< .05; r females = .17, ns). Additionally, convergent validity appears to be higher for men across all four validation scales than for women, although these sex differences were not statistically significant. For each of the validation measures assessing mentor relationships, there is a marked ceiling effect in the female sample, in effect of constraining the correlations between the scale scores, assuming that the underlying distributions are normally distributed.

The association between the close peer friend Relational Health index and the MSPSS-Friend Subscale was significant and in the direction hypothesized for both men and women (r males = 0.63, *p* < .01; r females = .37, p < .01). The strength of this association differed significantly across males and females (dR = .34, SEdR = .12, p < .01), although, again this may reflect a stronger ceiling effect among women than men, rather than a substantively informative finding. Overall, the distributions of the RHI scales have much less skew than do the validation scales, suggesting that the RHI can be used to distinguish among individuals at the higher end of the continuum as well as at the lower end.

Discussion

The current study expands on Liang et al.'s (2002a) previous article on the development of the Relational Health Indices. This study

Table 5. Parameter estimates obtained in the final invariance model – RHI-Community.

	Women (n=390)		Men (n=139)		Common Intercept[b]
	β[a]	R²	β	R²	
1. I feel a sense of belonging to this community.	0.80	0.64	0.70	0.50	3.543
2. I feel better about myself after my interactions with this community.	0.80	0.64	0.73	0.53	3.486
3. If members of this community know something is bothering me, they ask me about it.	0.67	0.45	0.63	0.40	3.131
4. I feel understood by members of this community.	0.75	0.56	0.74	0.55	3.188
5. I feel mobilized to personal action after meetings within this community.	0.62	0.39	0.58	0.33	3.214
6. It seems as if people in this community really like me as a person.	0.71	0.50	0.65	0.42	3.633
7. I have a greater sense of self-worth through my connection with this community.	0.76	0.58	0.66	0.43	3.275
8. My connections with this community are so inspiring that they motivate me to pursue relationships with other people outside this community.	0.68	0.46	0.62	0.39	3.004
9. This community has shaped my identity in many ways.	0.65	0.42	0.56	0.32	3.326
10. This community provides me with emotional support.	0.76	0.58	0.73	0.54	3.140
Factor score determinacy[c]	0.96		0.94		

[a] Fully standardized factor loadings. All loadings are significant at the $p<0.001$ level.

[b] Intercept terms are unstandardized and assume a latent factor mean of zero for the men. The common intercept can be interpreted roughly as the grand mean of the item on the original 1 to 5 response scale.

[c] The factor score determinacy represents an index of internal consistency for the latent factor that is roughly equivalent to Cronbach's alpha coefficient calculated from the raw scores.

Table 6: *Correlations between selected RHI scales and convergent validation measures by sex and tests of sex differences in these associations.*

		n	R	d_R (SEd_R)[b]
		RHI-M (Mentor Relationships)[a]		
MPDQ				
	male	54	0.56**	
	female	156	0.52**	
				0.06 *(0.16)*
QRI-support				
	male	54	0.63**	
	female	155	0.63**	
				0.00 *(0.16)*
QRI-depth				
	male	54	0.57**	
	female	155	0.43**	
				0.19 *(0.16)*
QRI-conflict toler-ance				
	male	54	0.31*	
	female	155	0.17	
				0.15 *(0.16)*
		RHI-P (Close Peer Friendship)		
MSPSS-friend				
	male	99	0.63**	
	female	242	0.37**	
				0.34 *(0.12)* **

p< 0.05 ** *p*<0.01

[a] Scatterplots showed that two cases represented outliers in the calculation of the correlation scores with RHI-M and its validation scales among females. In these cases, the RHI-M scores were extremely low (< 2.0) and represented extreme scores in the RHI-M distribution. These were omitted in the calculation of the correlations above. No other outliers were found.

[b] Comparisons across sex of correlation coefficients were done by calculating confidence intervals about r, using Fisher's z transformations.

establishes the psychometrics of the RHI across sex which is relevant for the future assessment of Relational Health among men (for whom no previous measure of Relational Health has been created) and for comparisons between men and women. Specifically, results showed that the composite scores for each index (Mentor, Peer Friend, and Community) are internally consistent and show evidence of construct validity for both men and women. Further, the RHI's factor structure was generalizable across sex, satisfying an important prerequisite to using the Relational Health Indices for comparisons of men's and women's relationships. For this study's sample of male and female college students, we also found that the RHI's embedded dimensions (i.e., authenticity, engagement/empathy, empowerment) are highly correlated even though they are conceptually distinct (Liang et al., 2002a). The empirical relationships between each of the embedded dimensions is not surprising given that we would expect that the presence of each of these dimensions would make it more likely that other dimensions would be similarly present (i.e., high levels of authenticity in a relationship would lead to high levels of engagement or empathy). Interestingly, however, these findings stand in contrast with those from the previous study of college women at a single-sex institution where the dimensions were more statistically distinct. These different findings might be explained in that the previous study was conducted at the institution in which the RCM was first founded, perhaps contributing to a heightened awareness or sensitivity regarding these dimensions; indeed,

the ability to clearly distinguish between aspects or dimensions of relationships, such as authenticity, engagement, and empowerment, may be partly determined by level of relational sensitivity and awareness.

On the other hand, our results confirm that having a measure that examines all three relational contexts—mentor, close peer friend, and community—compared to other relational measures that assess only one relational context or domain, makes it more possible to glean the complexities of Relational Health in and across sex groups. For example, we found that whereas women rate their relationships with their best friends higher in relational quality than do men, the two groups do not differ in their ratings of mentor and community relationships. These findings are consistent with previous research that suggests that males may especially value belonging to a group or community whereas females may emphasize dyadic friendships more than do males (Baumeister & Sommer, 1997). The finding that both men and women similarly rate mentor relationships may indicate that mentor relationships, as operationalized in the RHI, are similarly thought of and valued across sex. Also, such findings suggest that the RHI, as expected, tap into the more non-sex specific aspects of mentor and community relationships.

Limitations and Future Directions

These initial psychometric data on the Relational Health Indices across sex are promising, and provide evidence for the generalizability of the factor structure and convergent validity of the Relational Health Indices in men and women. Yet, this work represents only a first foray into the development and use of measures fit for assessing men's relationships. Much additional research must be done to test the relevance and role of Relational Health in the psychological health and adjustment of men from diverse backgrounds and demographics. Suggestions for doing so follow below. First, more exploratory research followed by confirmatory work is needed to determine what is important in men's relationships compared to women's relationships, and whether the RHI adequately captures these qualities for men and women. Exploratory analyses might usefully involve

qualitative methods, such as interviews or focus groups, in which men are asked to describe the relational qualities they most value and ways in which these are manifest in friend, mentor, and community relationships. Based on these data, new items reflecting gender specific ways of relating could be included in the RHI. Confirmatory analyses could involve correlating RHI items with other criteria, such as relationship satisfaction in men versus women.

Second, most of the data were derived through self-report instruments. Common method variance may have strengthened the observed statistical associations (Bank, Dishion, Skinner, & Patterson, 1990). Additional studies should be done to include a variety of different assessment modes (e.g., interviews, observations, and other reports), along with reports from the other member(s) of the dyadic relationships and community relationships. Third, longitudinal data are also needed to provide information about developmental change within relationships or the across-time developmental significance of close peer friend, mentor, and community relationships. Fourth, while this study provides evidence that the RHI measures can be used with a fairly broad population, the generalizibility of these findings is still somewhat limited by the relatively homogenous nature of the sample; most participants were European-American, middle class college students. We cannot speculate from the findings of this study, for instance, about racial/ethnic, age, or cultural differences in the conceptualization and implications of healthy relationships. In addition, we are limited by the ways in which we defined the relationships in our study. We have not yet examined the structure and covariates of Relational Health in other important dyadic relationships, such as employer/employee, sibling, parent/child, or marital relationships, nor do we know about other important group relationships, as in workplace, classroom, or neighborhood groups. Future studies should explore how the RHI perform with diverse relationship types and among diverse populations. Moreover, the authors are currently conducting research to compare the

psychological and behavioral correlates of Relational Health across sex and other subpopulations.

Further research is needed to elaborate the utility of the RCM concepts for research in general and to enhance our understanding of the significance of Relational Health for men compared to women. At a basic level, researchers must recognize the distinctions and gender biases that exist among measures commonly used to assess relationship closeness. Moreover, empirical work needs to explore the impact of Relational Health on the psychosocial health and adjustment of men compared to women. For example, linking Relational Health to relevant men's outcomes (e.g., drug and alcohol abuse, academic and work success) may enable researchers to determine how specific aspects of Relational Health emerge within close peer friend, mentor and community relationships and ultimately influence men's adjustment.

In summary, there are a number of research directions that may prove useful in elucidating the role of Relational Health in men vs. women from various populations. The current study represents an approach for providing specific information about the generalizability of the factor structure and convergent validity of the Relational Health Indices to a men's sample in the U.S. The RHI assesses relationships with close friends, mentors, and communities that are characterized by growth-fostering characteristics as defined and operationalized by the RCM. Future research could extend this work to answer additional research questions, such as whether other relational qualities are of importance to men as opposed to women, in order to deepen our understanding of Relational Health across diverse samples and facilitate the development of more comprehensive theories of Relational Health and psychological adjustment.

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