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Trait Empathy as a Predictor of Individual Differences in Perceived Loneliness^{1,2}

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Summary

Loneliness has been shown to be inversely correlated with empathy in younger adults. The present study extends previous research by investigating the association between empathy and loneliness across the adult lifespan and examining the role of relevant demographic and personality factors. 110 community-dwelling adults (18 to 81 years old) completed the UCLA Loneliness Scale and the Empathy Quotient. Empathy scores were inversely associated with rated loneliness and predicted 8.7% of variance in loneliness scores after accounting for sex, age, relationship status, education, and neuroticism. The Social Skills factor of the Empathy Quotient was the strongest predictor of the association between empathy and loneliness. Previous research is extended by the finding that rated loneliness was inversely associated with empathy scores across the adult lifespan. Underlying this relationship may be negative perceptions of personal social proclivity as a function of difficulty understanding the mental states of others and high trait neuroticism.

Loneliness and objectively being alone are only partly related. Loneliness is the psychological suffering associated with perception of social isolation present in up to 20% of the population (Davis & Smith, 1998). Feeling lonely is related to a variety of health issues and illnesses including cardiovascular and sleep disorders, depression, and Alzheimer's disease (Cacioppo, Hawkley, Berntson, Ernst, Gibbs, Stickgold *et al.*, 2002; Paul, Ayis, & Ebrahim, 2006; Hawkley, Masi, Berry, & Cacioppo, 2006; Wilson, Krueger, Arnold, Schneider, Kelly, Barnes, *et al.*, 2007).

The psychological mechanisms underlying the experience of loneliness are only partially understood. Current research suggests that the roots of loneliness may lie in the inaccurate perception of one's own social ability potentially leading to dissociation between perceived

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and objective social skills. Lonely individuals show high rates of social anxiety and neuroticism, and perceive their social interactions to be negative (Segrin & Kinney, 1995; Russell, 1996). They report their relationships to be of poor quality whether expressed as opinions about room- and dorm-mates (Cacioppo, Ernst, Burleson, McClintock, Malarkey, Hawkey, *et al.*, 2000) or satisfaction in romantic relationships (Flora & Segrin, 2000). Yet these critical perceptions may be unwarranted. During unstructured conversations in which participants were unaware of being observed and videotaped, socially anxious people did not display poor social skills (as rated by the investigators) or differences in the extent of their behavioral involvement in the conversation (e.g., gaze and gesture frequency; Segrin & Kinney, 1995).

It is not clear why lonely people perceive their social abilities to be poor when their social skills are rated by others as normal. One hypothesis is that lonely people are less accurate in perceiving thoughts and feelings of others, a capacity often referred to as empathy (Davis, 1979). Hence, a lonely person may not accurately detect a partner's appreciation of their social interaction. Since lonely people often show high neuroticism and social anxiety (Segrin & Kinney, 1995; Russell, 1996), they may conclude that the quality of the social interaction is poor.

In the present study, clarifying the psychological underpinnings of loneliness by investigating its association with empathic ability was a general focus. Empathy is a multidimensional construct that includes one's aptitude for understanding the intentions and feelings of others (cognitive empathy; Kerr & Speroff, 1954) as well as vicariously sharing their emotional experiences (emotional empathy; Mehrabian & Epstein, 1972; Davis, 1983).

Previous researchers have reported differences in loneliness and empathy as a function of sex, age, relationship status, neuroticism, and education (Borys & Perlman, 1985; Russell, 1996; Schieman & Van Gundy, 2000; Pinquart & Sörensen, 2003; Bailey, Henry, & Von Hippel, 2008). Sex differences in loneliness are typically found when measured explicitly using items that include the term loneliness, and in this case women generally report higher loneliness scores than men (Borys & Perlman, 1985; Pinquart & Sörensen, 2003). When loneliness is assessed indirectly on a multi-item questionnaire (e.g., the UCLA Loneliness Scale) by asking the individual to report feelings of relational closeness, two findings have emerged: typically there are no statistically significant differences between the sexes (Pinquart & Sörensen, 2003), but in some studies men reported more loneliness than women (Russell, 1996). One interpretation of these seemingly disparate findings is that for women it is more socially acceptable to admit loneliness, so this is captured by explicit measurement while the loneliness experienced by men may be better measured indirectly. Because generally women score higher on self-report empathy scales, sex should be considered when examining associations between loneliness and empathy (Davis, 1979; Baron-Cohen & Wheelwright, 2004).

Older adults report slightly more loneliness than younger adults, this difference being larger in those with mean age 80 years (Pinquart & Sörensen, 2003). A small number of studies report reduced empathy in later life, but further research is needed for definitive evidence (Schieman & Van Gundy, 2000; Bailey, Henry, & Von Hippel, 2008). Higher loneliness is generally reported by single persons than those in relationships (Pinquart & Sörensen, 2003) and lonely people have higher ratings of neuroticism than people who are not lonely (Stephan, *et al.*, 1988; Russell, 1996). Whereas older adults as a group have lower education than younger adults (Smith, 1997), higher education has been shown to potentially "preserve" empathy among older people (Schieman & Van Gundy, 2000).

In previous studies of the association between empathy and loneliness, researchers have primarily included younger adults and children, and loneliness has typically not been assessed by the standard measure of loneliness, the UCLA loneliness scale (Davis, 1983; Kalliopuska, 1986; Margalit & Ronen, 1993; Bailey, *et al.*, 2008; Shaver & Brennan, 1991; Russell, 1996). The association between loneliness and empathy has been shown in undergraduate students (Davis, 1983; Kalliopuska, 1986) and high school children with mental retardation (Margalit & Ronen, 1993). The only study that has assessed this association in older adults (i.e., 65 to 87 years) included a younger adult sample, but did not include a lifespan sample, thus those in the middle range of adulthood were not included (Bailey, *et al.*, 2008). Furthermore, in the majority of these studies loneliness was not assessed using the UCLA loneliness scale (Margalit & Ronen, 1993; Bailey, *et al.*, 2008; Kalliopuska, 1986) which is considered to be the standard measure of loneliness in the field (Shaver & Brennan, 1991). Instead, in previous studies loneliness was measured through open-ended questions such as, "What is loneliness?" (Kalliopuska, 1986), or through questionnaires designed to measure a construct related to loneliness but not loneliness specifically (e.g., social participation; Bailey, *et al.*, 2008). Although Davis (1983) measured loneliness using the UCLA Loneliness Scale, an earlier version of the scale was used (Russell, Peplau, & Cutrona, 1980) which has since been revised to Version 3 to improve item wordings (Russell, 1996).

The current study extends previous research by measuring the association between empathy and loneliness in adults ranging across the adult lifespan (i.e. early, middle, and late adulthood) and using a standard measure of loneliness, the UCLA Loneliness Scale Version 3. Sex, age, relationship status, education, and neuroticism were accounted for to isolate the specific association between the two variables of interest. It was hypothesized that empathy would be inversely associated with loneliness. It was also hypothesized that empathy would explain differences in loneliness after accounting for sex, age, relationship status, education, and neuroticism.

Method

Participants ($N=110$, 61 women, 92.7% Euro-American) were community-dwelling adults and university students who responded to advertising from a daily hospital newsletter typically read by hospital employees, university students, patients, and visitors. The study was described as measuring cognitive function through behavioral tasks and questionnaires. Participants in this study were part of a larger research study on empathy and social outcome in healthy adults and patients with brain damage (Beadle, 2009). Ages ranged from 18 to 81 years ($M= 35.6$, $SD=18.5$). Participants were in a relationship or married (60%) or single (including widowed, 40%). Mean years of education was 15.3 ($SD=2.5$).

Procedure

Written informed consent was obtained from all study participants before completing self-report questionnaires alone in an experimental testing room. A Research Assistant checked in with each participant every 25 minutes to answer any questions that may have come up while the participant was completing the questionnaires. The study was conducted in accordance with Institutional and Federal Human Subjects regulations.

Measures

Participants were assessed using the UCLA Loneliness Scale Version 3 (Russell, 1996), the Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004), and the NEO Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992).

UCLA Loneliness Scale—The UCLA Loneliness Scale measures subjective perception of loneliness or social isolation (Russell, 1996). The UCLA Loneliness scale consists of 20 items in which individuals respond to the statements by indicating on a 4-point scale whether they 1: Never, 2: Rarely, 3: Sometimes, or 4: Always feel in the manner listed in the statement. One example of an item on the scale is, “How often do you feel that there is no one you can turn to?” Some items are reverse scored. To calculate a total score, items are summed. The possible range of scores is 20 to 80, with higher scores indicating greater loneliness. This scale has shown high internal consistency (ranging from $\alpha=.89$ to $.94$) and test-retest reliability (over one year, $r=.73$; Russell, 1996). Students have been reported to score between 20 and 74 ($N=487$, $M=40.08$, $SD=9.50$; Russell, 1996) and the elderly between 20 and 59 ($N=284$, $M=31.51$, $SD=6.92$; Russell, 1996).

Empathy Quotient—The Empathy Quotient assesses perceptions about one’s ability to empathize, or adopt the mental perspective of others (example item: “I find it easy to put myself in somebody else’s shoes”; Baron-Cohen & Wheelwright, 2004). Factor analysis showed that items load onto three main factors (i.e., Cognitive Empathy, Emotional Reactivity, and Social Skills; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004). Empathy scores range from 0 to 80, with higher scores indicating greater empathy. This questionnaire has high internal consistency ($\alpha=.85$) and test-retest reliability (one year, $r=.97$; Muncer & Ling, 2006). Reported means on this scale have ranged from 42 to 46 in younger and older adults (younger adults: Muncer, $N=362$, $M=42.5$, $SD=10.8$; Lawrence, Study 1: $N=53$, $M=46.2$, $SD=10.6$; older adults: Bailey, $N=49$, $M=46$, $SD=15.7$; Lawrence, *et al.*, 2004; Muncer & Ling, 2006; Bailey, *et al.*, 2008).

NEO-FFI Neuroticism—Because loneliness has been associated with neuroticism (Russell, 1996), this personality facet was measured using the NEO-FFI, a well-established measure of personality (Costa & McCrae, 1992). This questionnaire is highly reliable in its measurement of neuroticism, as measured by internal consistency ($\alpha=.86$) and test-retest reliability (.87; Costa & McCrae, 1992).

Analysis

To examine the association between loneliness, demographic, and personality factors in the present sample which previous studies have shown to be correlated with loneliness (i.e. sex, age, education, relationship status, and neuroticism) Pearson’s product moment correlations were computed. Continuous variables consisted of loneliness, age, education, and neuroticism while dichotomous variables included sex and relationship status. The category ‘in a relationship’ included individuals in a committed relationship or married, and the category ‘single’ included single, widowed, or divorced individuals. The primary hypothesis that loneliness is indirectly associated with empathy was examined using a Pearson’s product moment correlation. To investigate the extent to which empathy explains unique variation in loneliness, a multiple regression model was computed using loneliness as the dependent variable and age, sex, education, relationship status, Neuroticism, and Empathy as predictors. To further understand how different aspects of empathy correlate with loneliness, the association between each Empathy Quotient factor (i.e., Cognitive Empathy, Emotional Reactivity, and Social Skills) and loneliness was examined through Pearson’s product moment correlations. To examine which empathy factor explained the most unique variance in loneliness, a multiple regression model was conducted using loneliness as an outcome variable and age, sex, education, relationship status, Neuroticism, Cognitive Empathy, Emotional Reactivity, and Social Skills as predictors.

Results

Participants scored between 20 to 65 on the UCLA Loneliness Scale and 17 to 73 on the Empathy Quotient (see Table 1 for means and standard deviations). Loneliness showed a significant direct association with scores on Neuroticism (Table 1). Empathy was significantly associated with sex, with women reporting higher Empathy (Table 1). No other association between Empathy or Loneliness scores and personality or demographic variables reached statistical significance.

Association of Loneliness with Empathy

Empathy was indirectly correlated with Loneliness (Table 1). A multiple regression analysis investigating Loneliness as a function of personality and demographic variables (age, sex, education, relationship status, Neuroticism, and Empathy) explained 46% of the variance in Loneliness (Table 2). Empathy uniquely explained 8.7% of the variance in Loneliness after controlling for other predictor variables, including Neuroticism which explained 25.2% of the variance in Loneliness. This analysis showed that relationship status explained a statistically significant amount of variance in Loneliness, but in the opposite direction from some previous studies, as persons in a relationship reported more loneliness than single persons (see Table 2).

Association of Loneliness with Empathy Quotient Factors

The association between each factor of the Empathy Quotient (i.e., Cognitive Empathy, Emotional Reactivity, and Social Skills) and Loneliness was examined. Cognitive Empathy, Emotional Reactivity, and Social Skills were all statistically significantly associated with ratings on the UCLA Loneliness Scale (Table 3). Next a multiple regression model was used to assess which empathic factor explained more unique variance in Loneliness scores. The overall model explained 47.6% of the variance ($F_{8,109} = 11.45, p < .001$). Of the three empathy factors, Social Skills was the strongest predictor of loneliness in comparison to Emotional Reactivity, and Cognitive Empathy (Table 4).

Discussion

Extending previous literature primarily investigating younger adult populations, the present study demonstrated that empathy is indirectly related to loneliness across the adult lifespan. In particular, the Social Skills factor of the Empathy scale was the strongest predictor of Loneliness scores, which corroborates previous studies showing that lonely people perceive their social skills to be poor (Segrin & Kinney, 1995; Russell, 1996). One caveat in the interpretation of the present study's findings is that empathy was measured using a self-report questionnaire, which does not reflect whether participants who perceive themselves to have low empathy also exhibit low empathy behaviorally. However, many self-report measures of empathy have high validity and reliability (Davis, 1979; Baron-Cohen & Wheelwright, 2004; Lawrence, *et al.*, 2004), and the Empathy Quotient in particular has been associated with a valid behavioral measure of empathy (the Eyes Task; Lawrence, *et al.*, 2004). Further, older adults' perceptions of the self show similar predictive value of health outcomes relative to objective measures (Blazer, 2008). Nevertheless, in future studies researchers should explicitly investigate the association between behavioral and self-report measures of empathy and loneliness across the adult lifespan to establish convergent validity as well as measure other distinct personality constructs to assess discriminant validity (Campbell & Fiske, 1959).

Previous research has shown a robust association between loneliness and neuroticism (Stephan, *et al.*, 1988; Russell, 1996). The current study corroborated previous literature

showing that lonely people also have high ratings of neuroticism across the lifespan. Relationship status has also been associated with loneliness (Pinquart & Sörensen, 2003). A meta-analysis investigating loneliness in middle-age and older adults showed that people who are single are more likely to be lonely than people who are married (Pinquart & Sörensen, 2003). Contrary to previous studies, in the present study, participants in a relationship had a higher mean score on the UCLA Loneliness Scale than the group of singles. One potential explanation is that this study did not specifically investigate participants' relationship histories. In fact, a previous study showed that single older adults who have had a high number of failed relationships tended to have greater current loneliness scores (Peters & Liebroer, 1997). Another possibility could be that the quality of the relationships in the current sample may differ from previous studies. It has been shown that married individuals may experience loneliness as a function of the relationship quality, for example feelings of 'being misunderstood' or 'not needed,' or external causes such as 'travel[ing] often' have been documented as potential reasons for feeling lonely (Tornstam, 1992). Further, Gottman has theorized that loneliness is one of the later steps of a failing longer term relationship or marriage (Gottman, 1993), and older adults are more likely to be involved in a long term relationship.

Previous research has yielded unclear findings about the association between sex and loneliness (Borys & Perlman, 1985), and in the present study no effect of sex on loneliness was found. Studies in which the term loneliness was explicitly used have found that women report higher scores on loneliness than men (Borys & Perlman, 1985). In contrast, indirect measurement of loneliness through a series of items describing the experience of loneliness without explicitly mentioning the term (e.g., the UCLA Loneliness Scale) often do not find sex differences. When differences are reported, these include higher ratings of loneliness for undergraduate men than undergraduate women, but no sex differences were found for elderly individuals (Borys & Perlman, 1985; Russell, 1996). Because the present study included a sample that ranges across most of the adult lifespan (18 to 81 years), sex effects found in only one age group (young adults), may not be evident using the analytic techniques applied in the current study. Future studies should examine effects of the interaction between sex and age on loneliness.

The present study did not find an effect of age on loneliness. Although it has been reported that older age is associated with greater loneliness (de Jong Gierveld & van Tilburg, 1999; Pinquart & Sörensen, 2003), there is also evidence for either an age-related decrease or no effect of older age on loneliness. A meta-analysis of 185 studies examining loneliness in middle-age and older adults ($M_{age} = 50$ yr.) found a small age-related effect on loneliness scores, with the oldest age group ($M_{age} = 81$ yr.) reporting the highest scores on loneliness (Pinquart & Sörensen, 2003). The opposite result was found for a large sample of undergraduate students, nurses, teachers, and elderly ($N=1,416$) in which the elderly group (age = 66 years) reported lower scores on perceived loneliness than students on the UCLA Loneliness Scale (Russell, 1996) which was not included in the meta-analysis by Pinquart and Sörensen (2003). Hence, previous research suggests that the association of age with loneliness is small and may depend on the characteristics of the sample. Further, the largest effect of age on loneliness has been documented for adults older than 80 years of age (Pinquart & Sorenson, 2003). This age bracket was not thoroughly sampled in the current study, as the oldest participant was 81 years of age. It is also plausible that severely lonely people did not respond to advertisements for the study because these persons may not typically seek out social interactions (including participating in research studies).

In conclusion, in the present study participants of ages across the adult lifespan who reported low scores on Empathy also had higher UCLA Loneliness Scale scores. This extends previous studies that have focused on the younger adult population (Davis, 1983;

Kalliopuska, 1986; Bailey, *et al.*, 2008). Participants with poor empathy have difficulty reading the emotions and thoughts of others (Baron-Cohen & Wheelwright, 2004) and thus may be unable to accurately detect others' emotional responses during their social interactions. If lonely people are not able to perceive the emotional reactions of others, they may rely on their personal impressions of their social skills. Previous studies have shown that a lonely person's impression of their social skills may have a negative bias which is influenced by high neuroticism (Stephan, *et al.*, 1988; Russell, 1996). Thus high neuroticism may be associated with negative impressions of personal social aptitude; when combined with a poor ability to understand the mental states of others, this may lead to higher loneliness. This view is supported by the finding that persons with high Loneliness scores in the present sample had high scores on Neuroticism and low scores on Empathy and Social Skills measures. Thus poor empathy, high neuroticism, and negative impressions of personal social skills may serve as potential mechanisms for loneliness in adults of various ages across the lifespan.

References

- Bailey PE, Henry JD, Von Hippel W. Empathy and social functioning in late adulthood. *Aging & Mental Health*. 2008; 12:499–503. [PubMed: 18791898]
- Baron-Cohen S, Wheelwright S. The empathy quotient: an investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*. 2004; 34:163–175. [PubMed: 15162935]
- Beadle, JN. PhD dissertation. Univer. of Iowa; 2009. The neuroanatomical basis of empathy: is empathy impaired following damage to the ventromedial prefrontal cortex?. Retrieved at <http://ir.uiowa.edu/etd/781>
- Blazer DG. How do you feel about ...? Health outcomes in late life and self-perceptions of health and well-being. *The Gerontologist*. 2008; 48:415–422. [PubMed: 18728291]
- Borys S, Perlman D. Gender differences in loneliness. *Personality and Social Psychology Bulletin*. 1985; 11:63–75.
- Cacioppo JT, Ernst JM, Burleson MH, McClintock MK, Malarkey WB, Hawkley LC, Kowalewski RB, Paulsen A, Hobson JA, Hugdahl K, Spiegel D, Bernston GG. Lonely traits and concomitant physiological processes: the MacArthur social neuroscience studies. *International Journal of Psychophysiology*. 2000; 35:143–154. [PubMed: 10677643]
- Cacioppo JT, Hawkley LC, Bernston GG, Ernst JM, Gibbs AC, Stickgold R, Hobson JA. Do lonely days invade the nights? Potential social modulation of sleep efficiency. *Psychological Science*. 2002; 13:384–387. [PubMed: 12137144]
- Campbell DT, Fiske DW. Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*. 1959; 56:81–105. [PubMed: 13634291]
- Costa, PT.; McCrae, RR. Revised NEO Personality Inventory and NEO Five Factor Inventory: professional manual. Odessa, FL: Psychological Assessment; 1992.
- Davis, MH. Dissertation Abstracts International. Vol. 40. Univer. of Texas; Austin: 1979. Individual differences in empathy: a multidimensional approach. Unpublished doctoral dissertation; p. 3480p. 7928276
- Davis MH. Measuring individual differences in empathy: evidence for a multidimensional approach. *Journal of Personality and Social Psychology*. 1983; 44:113–126.
- Davis, JA.; Smith, TW. General social surveys, 1972–1998: cumulative codebook. Chicago: National Opinion Research Center; 1998.
- de Jong Gierveld J, van Tilburg T. Living arrangements of older adults in The Netherlands and Italy: coresidence values and behavior and their consequences for loneliness. *Journal of Cross-Cultural Gerontology*. 1999; 14:1–24. [PubMed: 14617893]
- Flora J, Segrin C. Relationship development in dating couples: implications for relational satisfaction and loneliness. *Journal of Social and Personal Relationships*. 2000; 17:811–825.

- Golan O, Baron-Cohen S. Systemizing empathy: teaching adults with Asperger Syndrome or High-Functioning Autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology*. 2006; 18:591–617. [PubMed: 16600069]
- Gottman JM. A theory of marital dissolution and stability. *Journal of Family Psychology*. 1993; 7:57–75.
- Hawkley LC, Masi CM, Berry JD, Cacioppo JT. Loneliness is a unique predictor of age-related differences in systolic blood pressure. *Psychology and Aging*. 2006; 21:152–164. [PubMed: 16594800]
- Kalliopuska M. Empathy and the experiencing of loneliness. *Psychological Reports*. 1986; 59:1052–1054. [PubMed: 3823310]
- Kerr WA, Speroff BG. Validation and evaluation of the empathy test. *Journal of General Psychology*. 1954; 50:369–376.
- Lawrence EJ, Shaw P, Baker D, Baron-Cohen S, David AS. Measuring empathy: reliability and validity of the empathy quotient. *Psychological Medicine*. 2004; 34:911–919. [PubMed: 15500311]
- Margalit M, Ronen T. Loneliness and social competence among preadolescents and adolescents with mild mental retardation. *Mental Handicap Research*. 1993; 6:97–111.
- Mehrabian A, Epstein N. A measure of emotional empathy. *Journal of Personality*. 1972; 40:525–543. [PubMed: 4642390]
- Muncer SJ, Ling J. Psychometric analysis of the Empathy Quotient (EQ) scale. *Personality and Individual Differences*. 2006; 40:1111–1119.
- Paul C, Ayis S, Ebrahim S. Psychological distress, loneliness, and disability in old age. *Psychology, Health & Medicine*. 2006; 11:221–232.
- Peters A, Liefbroer AC. Beyond marital status: partner history and well-being in old age. *Journal of Marriage and the Family*. 1997; 59:687–699.
- Pinquart, M.; Sörensen, S. Risk factors for loneliness in adulthood and old age—a meta-analysis. In: Shohov, SP., editor. *Advances in psychology research*. Vol. 19. Huntington, NY: Nova Science; 2003. p. 111-143.
- Russell DW, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*. 1980; 39:472–480. [PubMed: 7431205]
- Russell DW. UCLA Loneliness Scale (version 3): reliability, validity, and factor structure. *Journal of Personality Assessment*. 1996; 66:20–40. [PubMed: 8576833]
- Schieman S, Van Gundy K. The personal and social links between age and self-reported empathy. *Social Psychology Quarterly*. 2000; 63:152–174.
- Segrin C, Kinney T. Social skills deficits among the socially anxious: rejection from others and loneliness. *Motivation and Emotion*. 1995; 19:1–24.
- Shaver, PR.; Brennan, KA. Measures of depression and loneliness. In: Robinson, JP.; Shaver, PR.; Wrightsman, LS., editors. *Measures of personality and social psychological attitudes*. Vol. 1. San Diego, CA: Academic Press; 1991. p. 195-290.
- Smith, TW. GSS Methodology Report. Chicago: National Opinion Research Center; 1997. Examining the relationship between educational attainment, age/cohort, and dependent variables.
- Stephan E, Fath M, Lamm H. Loneliness as related to various personality and environmental measures: research with the German adaptation of the UCLA Loneliness Scale. *Social Behavior and Personality*. 1988; 16:169–174.
- Tornstam L. Loneliness in marriage. *Journal of Social & Personal Relationships*. 1992; 9:197–217.
- Wilson RS, Krueger KR, Arnold SE, Schneider JA, Kelly JF, Barnes LL, Tang Y, Bennett DA. Loneliness and risk of Alzheimer disease. *Archives of General Psychiatry*. 2007; 64:234–240. [PubMed: 17283291]

TABLE 1

Means, Standard Deviations, and Correlations Among Variables

Variable	M	SD	1	2	3	4	5	6
1. UCLA Loneliness	38.1	8.9						
2. Empathy Quotient	44.5	12.3	-.42 [†]					
3. NEO-FFI Neuroticism	30.2	7.7	.54 [†]	-.15				
4. Relationship status	NA		-.14	-.06	-.05			
5. Age, yr.	35.6	18.5	.02	-.09	-.15	.11		
6. Sex	NA		.11	-.26 [†]	-.15	-.02	-.10	
7. Education, yr.	15.3	2.5	.04	.05	-.12	.12	.35 [†]	-.11

* $p < .05$.[†] $p < .01$.

TABLE 2

Regression Model of Empathy on Loneliness

Predictor	B	β	MSE	p
Age	.03	.06	0.04	.48
Sex	-2.29	-.13	1.38	.10
Education	.49	.14	0.28	.09
Relationship status	2.79	.16	1.32	<.05
NEO-FFI Neuroticism	.61	.53	0.09	<.001
Empathy Quotient	-.23	-.32	0.06	<.001

Note.— $R^2 = .46$ ($p < .001$).

TABLE 3

Correlations Among Empathy Quotient Factors and Loneliness

Variable	1	2	3
1. UCLA Loneliness			
2. Cognitive Empathy	-.28*		
3. Emotional Reactivity	-.27*	.46 [†]	
4. Social Skills	-.51 [†]	.53 [†]	.42 [†]

*
 $p < .005$.[†]
 $p < .001$.

TABLE 4

Regression Model of Empathy Quotient Factors on Loneliness

Predictor	B	β	MSE	<i>p</i>
Age, yr.	.03	.07	0.04	.39
Sex	-2.26	-.13	1.44	.12
Education, yr.	.48	.13	0.28	.10
Relationship status	2.38	.13	1.32	.08
NEO-FFI Neuroticism	.56	.49	0.09	<.001
Cognitive Empathy	-.03	-.01	0.23	.88
Emotional Reactivity	-.31	-.13	0.22	.17
Social Skills	-.96	-.26	0.36	<.01

Note.— $R^2 = .48$, $p < .001$.