Association Between Age, Distress, and Orientations to Happiness in Individuals With Disabilities

Alexandra L. Terrill
University of Utah

Rachel Müller
Swiss Paraplegic Research, Nottwil, Switzerland

Mark P. Jensen and Ivan R. Molton
University of Washington

Catherine Ipsen and Craig Ravesloot
University of Montana

Purpose/Objective: To determine how age and distress are associated in individuals with disabilities, and how happiness and its components (meaning, pleasure, and engagement) mediate or moderate this relationship. ***Research Method/Design:*** These were cross-sectional analyses of survey data from 508 community-dwelling adults with a variety of self-reported health conditions and functional disabilities. Measures included the Orientations to Happiness Questionnaire and items from the Behavior Risk Factor Surveillance System. ***Results:*** Greater distress was associated with lower global happiness in both mediation and moderation models. The mediation model showed that middle-aged participants (age: 45–64) scored lowest in global happiness, and the effect of age on distress was partially mediated by happiness. None of the happiness components mediated the relationship of age on distress. The moderation model showed a significant interaction effect for age and global happiness on distress, where younger participants low on happiness were significantly more distressed. Of the three happiness components, only meaning was significantly associated with distress. There was a significant interaction between age and meaning, where participants who were younger and scored low on the meaning scale reported significantly higher distress. ***Conclusions/Implications:*** Findings from this study lay groundwork for the development of clinical interventions to address distress in individuals with functional disabilities. Middle-aged and younger people with disabilities may be particularly affected by lower levels of happiness and might benefit from psychological interventions that focus on increasing overall well-being and providing meaning and purpose in life.

Keywords: positive psychology, orientations to happiness, disability, psychological distress

Impact and Implications

• Although prior research suggests that vulnerability to distress may vary with age, very little work has specifically investigated emotional well-being across age groups in individuals with disability, and even less is known about how happiness and its three components (i.e., pleasure, meaning, and engagement) impact individuals aging with chronic and disabling medical conditions. This study is among the first to examine the relationship between age, distress, and happiness in adults with disabilities.

• Our study confirms that individuals with functional disabilities who are middle-age and younger tend to report more psychological distress than those who are older. Happiness, and, in particular, the meaning component of happiness, is significantly associated with an individual's distress.

• Clinical interventions that include a focus on increasing overall happiness and providing meaning may be useful for treating distress in individuals with disabilities.

Introduction

Serious and potentially disabling chronic medical conditions, such as arthritis, diabetes, or multiple sclerosis, are associated with poorer quality of life, and may create an increased risk for depression and decreased emotional well-being (Bombardier, Ehde, Stoelb, & Molton, 2010; Gettings, 2010; Mehnert, Krauss, Nadler, & Boyd, 1990). Because the prevalence of these chronic medical

conditions and disability increases with age (Wolff, Starfield, & Anderson, 2002), one might therefore expect to see correspondingly higher rates of distress in older populations. However, empirical findings over the last few decades have suggested that this is not the case. With the exception of the people aged 85 and older, old age tends to be associated with *less* negative affect, lower rates of depression and anxiety, and increased life satisfaction despite declines in physical functioning (for review, see Charles & Carstensen, 2010). This phenomenon has been described as the "paradox of aging" (e.g., Charles & Carstensen, 2010), and highlights the importance of aging as a process of gradual adaptation. However, much of the work that documents enhanced emotional well-being in older adulthood has not included individuals who were middle-aged. In fact, being middle aged (45–64 years) appears to be associated with *more* distress relative to being a younger or older adult (e.g., Keyes et al., 2014). This finding makes the most sense when seen from the perspective of the life span developmental model of aging, in which certain periods of adulthood are associated with greater physical and psychosocial demands than others (Charles & Carstensen, 2010). Middle age is often a period when career and family responsibilities peak, whereas retirement is typically associated with a decrease in stress and an increase in well-being (Butterworth et al., 2006; Silver, 2010). For individuals with a physical disability, middle-age can also be a time when secondary symptoms such as fatigue and pain increase, thereby compounding effects on functioning and potentially increasing distress (Cook, Molton, & Jensen, 2011; Molton et al., 2014; Molton et al., 2014). Despite the importance of this age period as a time of increased vulnerability to distress in persons with disabilities, very little work has specifically investigated rates of emotional well-being in middle-aged individuals with physically disabling conditions. Therefore, a primary aim of this study was to examine the association between age and distress in this population.

Regardless of age, when distress is associated with disability, psychosocial interventions may provide some relief of symptoms (e.g., Hind et al., 2014; Mehta et al., 2011). Many traditional psychological approaches focus on altering or decreasing maladaptive cognitions and behavioral patterns, or—as is the case for 'third wave' cognitive–behavioral interventions—emphasize the context or function of cognitions and behaviors that contribute to pathology. Although there is a growing evidence base for the efficacy of these approaches in general (Hofmann, Sawyer, & Fang, 2010; Okumura & Ichikura, 2014), they have also been criticized as focusing on deficits and the absence of negative mood states as a treatment objective. Such approaches may thereby miss important aspects of an individual's functioning, including their strengths and resources. Rather than focusing on negative mood, complementary "positive psychology" treatment approaches are based on enhancing psychological strengths and resources that an individual can use to increase happiness and well-being (Seligman, Steen, Park, & Peterson, 2005). One framework for understanding components of happiness as treatment targets comes in the Orientations to Happiness (OTH) model (Peterson, Park, & Seligman, 2005). This model describes three key orientations that contribute to happiness: (a) *pleasure*, which is based on hedonism and involves enjoyable experiences that often produce positive emotions (Seligman, Rashid, & Parks, 2006); (b) *meaning*, which results from people feeling connected to something greater than themselves and

using their strengths for perceived higher purpose (Seligman et al., 2006); and (c) *engagement*, which involves becoming fully engaged and absorbed in activities, achieving a "flow" state that is an optimal balance between skill and challenge (Csikszentmihalyi, 1990; Seligman, 2002). To measure OTH, Peterson, Park, and Seligman (2005) developed the Orientations to Happiness Questionnaire (OTHQ), and found that all three subscales (assessing pleasure, meaning, and engagement) were empirically distinct, and predicted satisfaction with life. However, when considered individually, meaning and engagement orientations were found to be more robustly associated with life satisfaction than a pleasure orientation (Peterson, Park, & Seligman, 2005). This finding was replicated in a number of large follow-up studies across various countries (Park, Peterson, & Ruch, 2009; Vella-Brodrick, Park, & Peterson, 2009). Meaning, specifically, has been consistently linked with well-being, more positive affect, and decreased likelihood of physical and psychological problems (e.g., Battista & Almond, 1973; Sone et al., 2008).

Very little is known about how happiness and its three components (i.e., pleasure, meaning, and engagement) impact individuals aging with chronic and disabling medical conditions. Findings from studies examining adjustment following spinal cord injury suggest that generating meaning or purpose in life is associated with increased psychological well-being and improved adjustment to disability (deRoon-Cassini, de St. Aubin, Valvano, Hastings, & Horn, 2009; Thompson, Coker, Krause, & Henry, 2003). If, as in the case in previous research, happiness orientations such as meaning predict psychological functioning, then this information would be very useful in designing interventions for those with disability. A second aim of this study was therefore to determine the extent to which happiness and its subscales (engagement, meaning, pleasure) mediate or moderate the hypothesized relationship between age and distress.

Method

Participant Recruitment

We recruited participants through a population-based mailing sent to a randomly generated list of 10,000 households in a midsized Western U.S. city. Recruitment letters asked participants to self-identify into the study if the recipient or someone in the household was 18 years or older and endorsed any of the following screener items: serious difficulty walking or climbing stairs; difficulty dressing or bathing; difficulty doing errands alone, such as visiting a doctor's office or shopping because of a physical condition; being deaf or having serious difficulty hearing; being blind or having difficulty seeing even when wearing glasses.

Eligible and interested participants completed and returned an enclosed response card to receive the baseline questionnaire of the longitudinal survey and informed consent form. We conducted a repeated mailing two weeks following the first mailing to all households that included additional information about small monetary stipends for completing each of four questionnaires included in the longitudinal survey ($5 for completion of the first survey; $10 for each subsequent survey). All study procedures were approved by the Institutional Review Board of the local university.

We utilized Dillman's tailored survey design method for survey follow-up (Dillman, Smyth, & Christian, 2009), which included a

reminder letter sent two weeks after the original survey, followed by a replacement survey at four weeks and then a final replacement survey enclosed in a priority envelope at six weeks. Of the 601 return postcards, 532 participants completed the baseline survey. Based on U.S. Census data for the study location, approximately 13% of the population has a disability. At 2.2 persons per household, our estimated eligible study population was 2,948 individuals, which indicates a 19% response rate. However, of the 532 participants who completed the baseline survey, five participants failed to complete the informed consent, two withdrew from the study, and one survey arrived late; these were excluded from the final database. In addition, 16 participants were missing data on distress (our primary outcome), and were excluded from the analyses.

Measures

Demographics. We collected basic demographic information including age, sex, race/ethnicity, education, and income.

Medical conditions. Participants were provided with a list of health conditions and problems, including asthma, diabetes, arthritis, vision problems, and hearing problems. The list also included a free response option ("Other"). See Table 1 for a complete list of conditions.

Distress. We assessed distress using three items from the Behavior Risk Factor Surveillance System (Behavioral Risk Factor

Table 1
Mean and Standard Deviation Statistics for Distress

	n (%)	Distress M (SD)
Total sample	508 (100)	28.94 (27.60)
Age group		
<45 years	75 (14.8)	33.19 (27.94)
45–64 years	210 (41.3)	36.23 (28.93)
>65 years	221 (43.5)	20.35 (23.63)
Gender		
Male	203 (40.0)	28.18 (27.49)
Female	305 (60.0)	29.44 (27.71)
Health conditions		
Arthritis or rheumatism	290 (57.0)	31.19 (28.17)*
Vision problems	250 (48.0)	31.88 (28.79)
Hearing problems	176 (33.8)	27.35 (27.33)
Fracture, bone or joint injury	110 (21.7)	35.85 (27.73)**
Migraine headaches	82 (16.1)	43.96 (29.11)**
Diabetes	85 (16.7)	31.53 (27.24)
Fibromyalgia	73 (14.4)	42.87 (27.87)**
Asthma	64 (12.6)	39.45 (30.11)**
Cancer	27 (5.3)	30.74 (29.96)
Spinal cord injury	21 (4.1)	34.67 (28.60)
Stroke problem	20 (3.9)	28.40 (26.06)
Traumatic brain injury	19 (3.7)	38.63 (23.62)
Intellectual disability	17 (3.3)	39.65 (28.15)
Multiple sclerosis	12 (2.4)	36.33 (31.42)
Epilepsy	12 (2.4)	23.33 (25.17)
Paralysis	11 (2.2)	27.64 (29.35)
Amputation	8 (1.6)	34.50 (31.42)
Cerebral palsy	4 (0.8)	28.50 (30.74)
Muscular dystrophy	0 (0.0)	
Other health conditions	138 (27.2)	35.73 (30.09)**

* Significantly different from participants without this health condition; $p < .05$. ** Significantly different from participants without this health condition; $p < .005$.

Surveillance System operational and user's guide—Version 3.0, 2005). Participants rated the number of days (from 0 to 30 days) they (a) experienced stress, depression, and problems with emotions (distress); (b) felt sad, blue, or depressed (depression); and (c) felt worried, tense, or anxious (anxiety). The total distress score is a composite of these three items, with total distress scores for the sample ranging from 0 to 90 (with 0 indicating no distress on any days and 90 distress on all days). Cronbach's alpha for the three items comprising distress in the current sample indicated excellent internal consistency (.91).

Orientation to Happiness. We assessed orientation to happiness using six items from the 18-item Orientations to Happiness Questionnaire (OTHQ; Peterson et al., 2005). The OTHQ asks participants to rate items such as "My life has a lasting meaning" (*meaning*), "For me, the good life is the pleasurable life" (*pleasure*), and "I am always very absorbed in what I do" (*engagement*) on a 5-point Likert scale (*very much unlike me* to *very much like me*). Validity and reliability of the OTHQ have been found acceptable (Chen, 2010; Chen, Tsai, & Chen, 2010; Peterson et al., 2005; Ruch, Harzer, Proyer, Park, & Peterson, 2010). For the present study, we selected two items from each subscale (assessing meaning, pleasure, and engagement) to shorten the survey and minimize participant burden. We chose the items based on highest corresponding factor loadings identified in a previous study (Peterson et al., 2005). To confirm that the six selected items of the OTH measure the three latent variables the OTHQ was designed to assess, we performed a principal component analysis using an oblimin (oblique) rotation with Kaiser normalization, which allows for correlation between factors. The results confirmed a three-factor solution, labeled *meaning*, *pleasure*, and *engagement*, with 80% explained variance. For purposes of our study, we used both the individual subscales (two item scores added for each subscale) and global happiness (composite of three subscales) in the analyses. Total scores for subscales ranged from 2 to 10 for all subscales and 6 to 30 for the global happiness scale. Cronbach's alpha for the six items comprising global happiness in the current sample indicated good internal consistency (.71).

Statistical Analyses

We first computed descriptive statistics using SPSS (Version 18; SPSS Inc., 2009) to describe the sample. Next, prior to hypothesis testing, we performed a series of analysis of variances (ANOVAs) and *t* tests to identify potential confounding variables in our model (i.e., demographic or medical variables associated with distress). We then evaluated the proposed mediation (Figures 1 and 2) and moderation (Figures 3 and 4) models via structural equation modeling (SEM), using the Mplus statistical program (Mplus v.7.11; Muthén & Muthén, 1998–2012). SEM is a statistical technique that allows for the creation of latent variables (in our case, *happiness* and *distress*), which are conceptual variables that are not measured directly but estimated from measured variables (e.g., OTH subscales and Behavior Risk Factor Surveillance System items, respectively). SEM includes measurement (i.e., intercorrelations among measured variables) and structural modeling (i.e., relationships among latent variables). For testing the measurement and structural models we used maximum likelihood estimation (Enders & Badalos, 2001). We evaluated global model fit for all models using the following criteria (Hu & Bentler, 1999):
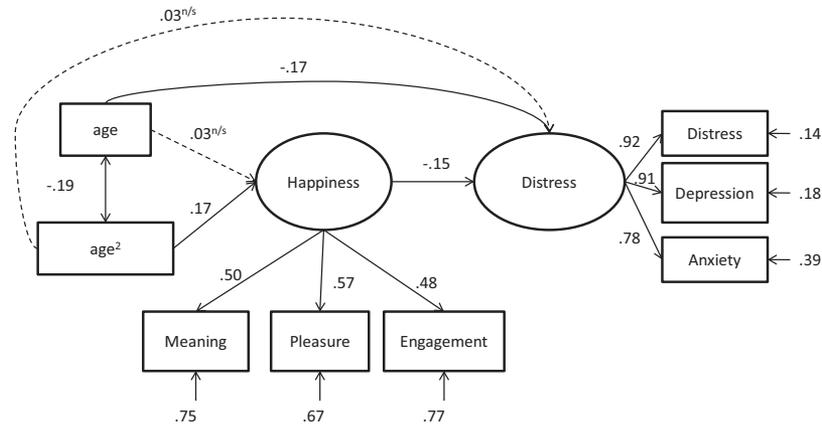
Figure 1. Mediation model for global happiness.

(a) Comparative Fit Index (CFI) > .95 (CFI >.90 is conventionally considered adequate; Hooper, Coughlan, & Mullen, 2008); (b) root mean square error of approximation (RMSEA) < .06; and (c) standardized root mean square residual (SRMR) < .08, 4. χ^2/df <5 (Taylor & Todd, 1995). Because several factors emerged as being significantly associated with distress in the above-mentioned ANOVAs and t tests, we ran regression analyses on the relevant factors (e.g., arthritis) and distress and used residuals of the resulting regression equation as dependent variables in our mediation and moderation models in order to control for this.

For the mediation models, we tested effects of happiness and happiness subscales in separate models. Model 1 included happiness as a latent variable mediating the relationship between age and distress. Model 2 incorporated the three happiness subscales meaning, pleasure, and engagement separately as observed variables (i.e., sum scores of each subscale). Because previous studies have demonstrated that distress is intensified in middle age (e.g., Alschuler et al., 2013; Molton et al., 2014) we hypothesized the existence of both linear and curvilinear (i.e., U-shaped) relationships of chronological age with distress and happiness in our models. As such, we included paths from centered versions of age and age-squared to each of the latent factors. Where a significant curvilinear relationship was detected, we performed follow-up testing by dividing age into our three age groups (<45, 45–64,

and >65) to determine the nature of the relationship. We assessed mediation by testing the significance of total indirect effects.

For the moderation models, we again tested happiness and happiness subscales in separate models. Model 3 included happiness as a latent variable moderating the relationship between age and distress (i.e., the interaction effect of Happiness × Age was examined). Model 4 included the three happiness subscales separately as observed variables. To interpret any interaction effects that emerged in the moderation models (between age, happiness score or happiness subscale scores, and distress), we created three groups of happiness (Aiken & West, 1991): Lowest happiness (one standard deviation below the mean or less), mean happiness (one standard deviation below to one standard deviation above the mean), and highest happiness (one standard deviation above the mean or more). We then graphed the regression slopes between age and distress for each of the three happiness groups.

Results

Participant Characteristics

Participants were predominantly white (96%) and female (60%). Mean participant age was 62 years ($SD = 16.25$); although ages ranged from 19 to 99 years, the majority of participants (85%)
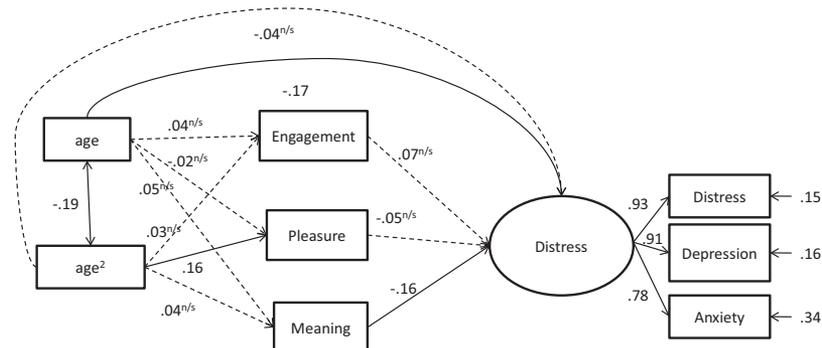

Figure 2. Mediation model for happiness subscales (engagement, pleasure, and meaning).
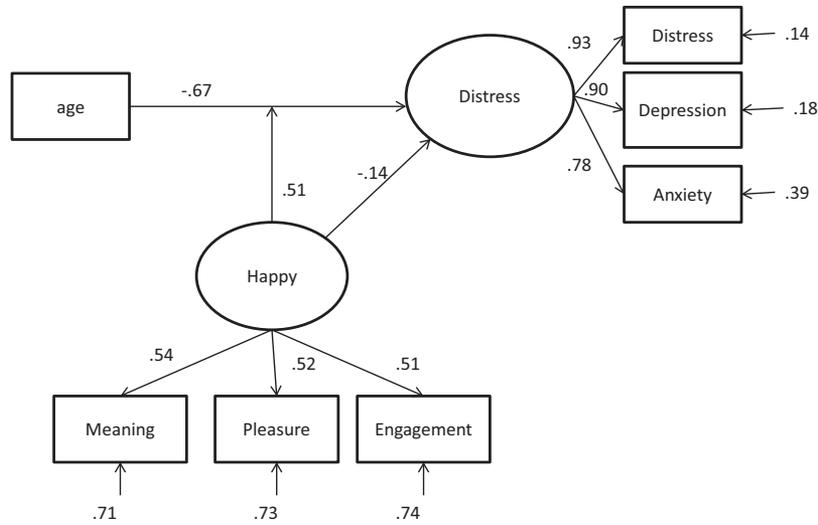
Figure 3. Moderation model for global happiness.

were 45 years old or older. There were no significant differences between men and women on global happiness, or the pleasure or flow subscales of happiness ($ps > .14$); however, women scored significantly higher on the meaning component of happiness, $t(494) = 4.04$, $p < .001$.

Distress

Table 1 shows means and standard deviations for distress. There were significant differences in distress between age groups in our sample, $F(2, 503) = 20.39$, $p < .001$. Post hoc analyses show that participants who were middle aged (45 to 64 years) and younger (under 45) reported significantly greater distress than those who were 65 years or older, $ps < .001$. There were no significant differences in distress between men and women, $t(506) = -.50$, $p = .61$, or between middle aged and younger participants, $t(292) = -.64$, $p = .52$. Of the most commonly reported health conditions, participants with fibromyalgia, $t(507) = 4.70$, $p < .001$, migraine headaches, $t(507) = 5.56$, $p < .001$, asthma, $t(507) = 3.31$, $p = .001$, vision problems, $t(507) = 2.35$, $p < .001$, and/or arthritis or rheumatism, $t(507) = 2.18$, $p = .03$, reported

significantly more distress than participants who did not have these conditions. Furthermore, participants with two or more of these conditions endorsed significantly greater distress ($M = 41.37$, $SD = 27.80$) than participants with one ($M = 27.31$, $SD = 27.62$) or none of these conditions ($M = 21.55$, $SD = 24.06$), $F(2, 505) = 19.86$, $p < .001$. We found no significant differences in distress for other commonly reported health conditions, including hearing problems, diabetes, cancer, or spinal cord injury.

Happiness and Distress Models

Because having certain medical conditions was associated with significantly greater distress in our analyses above, we ran regression analyses on the relevant conditions and distress and used residuals of the resulting regression equation as dependent variables in our mediation and moderation models in order to control for this. For a list of the medical conditions examined, refer to Table 1.

Mediation models. Model fit for the mediation model for global happiness was acceptable (see Figure 1), $\chi^2(16) = 38.76$, $p = .001$, $\chi^2/df = 2.42$, CFI = .98, RMSEA = .05 (90% CI [.03,
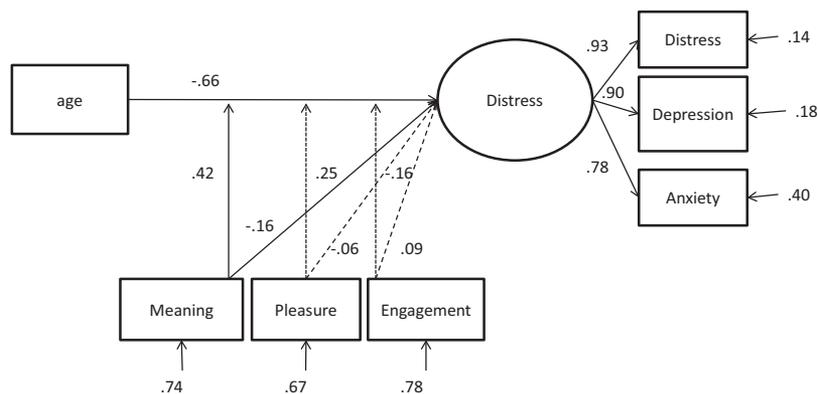

Figure 4. Moderation model for happiness subscales (meaning, pleasure, and engagement).

.07]), SRMR = .04. Variables in the model accounted for 5% of variance in distress. Distress was significantly associated with age ($\beta = -.17$, $p < .001$), with younger participants reporting greater distress. Global happiness was significantly and inversely associated with distress ($\beta = -.15$, $p = .02$); participants who scored higher in happiness reported significantly less distress. Results suggested a curvilinear relationship between age and happiness ($\beta = .17$, $p = .009$), with middle-aged participants scoring significantly lower on happiness than either younger or older participants. There was a trend for total indirect effects from age-squared to distress ($\beta = -.02$, $p = .09$), suggesting that for middle-aged participants, the effect of age on distress may be partially mediated by happiness.

Model fit for the mediation model with all three subscales (meaning, pleasure, engagement) as potential mediators for distress was borderline (see Figure 2), $\chi^2(13) = 115.63$, $p < .001$, $\chi^2/df = 8.89$; CFI = .91, RMSEA = .12 (90% CI [.10, .14]), SRMR = .07. Variables in the model accounted for 6% of variance in distress. Age was significantly and inversely associated with distress ($\beta = -.17$, $p < .001$). Of the three subscales, only meaning was significantly associated with distress ($\beta = -.16$, $p = .001$). There were no significant associations between pleasure and distress ($\beta = -.05$, $p = .33$) or engagement and distress ($\beta = .07$, $p = .35$). Results suggested a curvilinear relationship between age and pleasure ($\beta = .16$, $p < .001$), with middle aged participants scoring significantly lower on the pleasure scale; however, neither engagement nor meaning were significantly associated with age. There were no significant indirect effects; therefore, none of the happiness subscales mediated the relationship of age on distress.

Moderation models. Fit for the moderation model for global happiness was acceptable (see Figure 3), $\chi^2(17) = 36.06$, $p = .005$, $\chi^2/df = 2.12$, CFI = .98, RMSEA = .05 (90% CI [.03, .07]), SRMR = .04. Variables in this model accounted for 6% of variance in distress. Distress was significantly and inversely associated with happiness ($\beta = -.14$, $p = .003$) and age ($\beta = -.67$, $p = .001$). There was a significant interaction effect for age and global happiness on distress ($\beta = .51$, $p = .02$); being younger strengthened the relationship between happiness and distress and younger participants who were low in happiness were significantly more distressed.

When the happiness subscales were included in the moderation model, model fit to data was borderline (see Figure 4), $\chi^2(26) = 138.02$, $p < .001$, $\chi^2/df = 5.31$, CFI = .90, RMSEA = .09 (90% CI [.08, .11]), SRMR = .06. The model accounted for 8% of variance in distress. Distress was significantly and negatively associated with age ($\beta = -.66$, $p = .003$). Of the three happiness subscales, only meaning was significantly associated with distress ($\beta = -.16$, $p < .001$). There was a trend for engagement and distress ($\beta = .09$, $p = .08$), but no significant association was found for pleasure and distress ($\beta = -.06$, $p = .22$). None of the happiness subscales were significantly associated with age (all ps > .10). There was a significant interaction between age and meaning ($\beta = .42$, $p = .02$). Specifically, being younger strengthened the effect of meaning on distress. Participants who were younger and low on the meaning scale reported significantly higher distress. There were no significant interaction effects between age and pleasure ($\beta = .25$, $p = .19$) or age and engagement ($\beta = -.16$, $p = .38$).

Discussion

We examined the relationship between age and distress in a sample of individuals with functional disabilities and determined the extent to which happiness and its subscales (assessing engagement, meaning, and pleasure) mediate or moderate this relationship. Middle-age and younger adults in our sample reported the greatest distress, consistent with previous findings (Alschuler et al., 2013; Molton et al., 2014). One possible explanation for this is that managing a disability may be more challenging when it is an "off-time" life event, that is, an event that is not typical for younger individuals (Neugarten & Hagestad, 1976). Also, middle-age and younger adults may have more life demands relative to resources, which may make managing a disability more taxing. This idea is consistent with the life span development model of aging (Charles & Carstensen, 2010).

In our study we also found that among the most commonly reported medical conditions, distress was highest among participants with fibromyalgia, migraine headaches, and/or asthma, relative to other conditions. Similar findings have consistently been reported about the association between these conditions and depression, anxiety, and general psychological distress (e.g., Fiest, Currie, Williams, & Wang, 2011; Kalaydjian & Merikangas, 2008; Scott et al., 2007). Furthermore, managing two or more of these conditions poses additional burden, which is reflected in the finding (based on results from our ANOVA) that these participants reported 1.5 times more distress than participants with just one of these conditions, and nearly twice as much distress as participants with other conditions.

Based on results from our global happiness (total score) mediation model, middle-age participants scored lower on overall happiness, and lower happiness was associated with more distress. However, the effect of happiness orientation on distress was small (Cohen, 1992). In comparison, results from our model that included the happiness subscales assessing pleasure, meaning, and engagement suggest that although middle-age was found to be associated with lower pleasure, age was not significantly associated with the other happiness domains, and only meaning was associated with distress (again, with small effect size). Whereas there was a trend for total happiness partially mediating the relationship between age and distress, the individual components did not. Overall, the findings suggest that for middle-aged individuals, for whom happiness is lowest, a treatment approach that addresses pleasure and meaning in particular might be more beneficial than one that targets a single happiness orientation.

Results from our moderation models suggest that the relationship between age and distress depends on the happiness of the individual. Similar to the mediation model, the direct effect of happiness on distress was small; however, the interaction effect of age and happiness on distress was large (Cohen, 1992). Specifically, younger participants (in our study, this included those middle-aged and younger) who were low on happiness were significantly more distressed. An examination of the happiness components indicated that the happiness domain most responsible for these effects was that assessing meaning.

Given that meaning emerged as being a prominent component of happiness specifically associated with distress in our sample (and especially for our middle-aged participants), it is worth noting that purpose in life or meaning-making have consistently been

represented in aging, chronic illness, and disability literature as being associated with greater well-being (Holm & Severinsson, 2013; Moreno & Stanton, 2013; Reker & Wong, 2012; Ryff, 2014). Having meaning (also known as eudaemonic well-being) or meaning-making may be particularly important for health and overall well-being because it is fundamentally anchored in how a person negotiates life challenges (Park, 2010; Ryff, 2014). Moreover, the loss of meaning may result in hopelessness, helplessness, and demoralization (Robinson, Kissane, Brooker, & Burney, 2014). Therefore, the meaning component of happiness may represent an important focal target for intervention.

Clinical Implications

Our results have important implications for the development of clinical interventions to address distress in individuals with functional disabilities. According to our findings, overall happiness, and, in particular, the meaning component of happiness, is significantly associated with an individual's distress. Individuals living with disability who are middle-aged and younger may be especially negatively affected by lower levels of happiness and could benefit the most from psychological interventions that focus on increasing overall happiness and providing meaning and purpose in life.

A recent shift from traditional cognitive–behavioral therapy (CBT) to "third wave" CBT interventions, may provide a means to not only reduce depression or distress but also enhance components of happiness through its use of mindfulness and focus on values-based action. Although support for increasing happiness or well-being in these types of interventions is limited (as outcomes typically focus on ameliorating negative mood states), there is some evidence that suggests that attending to and intentionally inducing positive mood states through mindfulness and focus on values-based action may promote happiness and well-being (e.g., Garland et al., 2010). Behavioral activation interventions may also be well-suited for increasing well-being and happiness, because treatment focuses on participating in activities (and especially pleasurable, reinforcing activities) which has been shown to enhance well-being (Mazzucchelli, Kane, & Rees, 2010).

Positive psychology interventions may offer another modality for increasing happiness and well-being. Positive psychology interventions have been effectively applied to various populations (e.g., Casellas-Grau, Font, & Vives, 2014; Casellas-Grau, Font, & Vives, 2014; Cohn & Fredrickson, 2010; Giannopoulos & Vella-Brodrick, 2011; Moran & Nemec, 2013; Seligman et al., 2005) and to treat a variety of conditions and symptoms, including depression (Pietrowsky & Mikutta, 2012; Seligman et al., 2006; Sin & Lyubomirsky, 2009), and anxiety (Fava et al., 2005). Two recent meta-analyses showed that positive psychology interventions significantly increase subjective and psychological well-being and decrease depressive symptoms (Bolier et al., 2013; Sin & Lyubomirsky, 2009). Furthermore, the beneficial effects of positive psychology interventions have been shown to be relatively sustainable for up to six months or longer (Bolier et al., 2013; Seligman, Steen, Park, & Peterson, 2005).

Theory and research suggest that pleasure, meaning, and engagement together contribute to increased well-being and achieving the "full life" better than each orientation separately (Peterson et al., 2005; Vella-Brodrick et al., 2009). Other research has found

that although all three orientations may be important to well-being, targeting all three orientations in one intervention does not necessarily equate to greater well-being (Giannopoulos & Vella-Brodrick, 2011). Rather, it may be most effective to target the orientation(s) that is lowest to help the individual diversify in his or her pursuit of happiness. In our case, this would indicate that interventions that focus on meaning and purpose in life might be most beneficial in enhancing wellbeing for middle-age and younger individuals with functional disabilities. Psychotherapeutic interventions that focus on meaning-making (logotherapy; e.g., van der Spek et al., 2014) or integrate meaning-making into CBT (Ameli & Dattilio, 2013) could potentially be useful; however, research on efficacy of these types of interventions in adults with disability is largely lacking.

Limitations

This study has several limitations that should be considered when interpreting the results. First, the cross-sectional design of the study limits our ability to establish directionality of effects or causality in our models. Longitudinal and experimental research is needed to determine whether changes in happiness orientation impacts overall distress or vice versa. Second, the study sample consisted primarily of non-Hispanic Whites who live in one mid-sized city, thus limiting generalizability to other populations and locations. In addition, there may be response bias in our sample, with individuals who are healthier being more likely to respond to survey study invitations and complete surveys. Our sample also contained a large proportion of individuals with chronic conditions such as fibromyalgia and migraine that are frequently associated with negative emotional states, which may have contributed to bias. In addition, participants in the youngest age group (<45 years) were underrepresented in our study. Thus, replication of these findings in other samples would be required in order to establish their generalizability. Finally, because there are not yet age cut-offs for classifying individuals as "young," "middle aged," or "elderly" that are used by all researchers, the cut-offs used for this classification in any one study are somewhat arbitrary; it is possible that different age categorization might yield somewhat different results.

Conclusions

Research on psychological interventions that target happiness and wellbeing, especially as applied to individuals with chronic medical conditions and disability, is still in its early stages. Middle-aged individuals with disability may be at greater risk for distress, and our findings highlight meaning as a particularly important component of happiness. Findings from our study provide important preliminary information essential to developing novel and effective interventions to decrease distress in persons with disabling chronic medical conditions.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks: Sage.

Alschuler, K. N., Jensen, M. P., Sullivan-Singh, S. J., Borson, S., Smith, A. E., & Molton, I. R. (2013). The association of age, pain, and fatigue with physical functioning and depressive symptoms in persons with

spinal cord injury. *The Journal of Spinal Cord Medicine, 36,* 483–491. http://dx.doi.org/10.1179/2045772312Y.0000000072

Ameli, M., & Dattilio, F. M. (2013). Enhancing cognitive behavior therapy with logotherapy: Techniques for clinical practice. *Psychotherapy, 50,* 387–391. http://dx.doi.org/10.1037/a0033394

Battista, J., & Almond, R. (1973). The development of meaning in life. *Psychiatry, 36,* 409–427.

Behavioral Risk Factor Surveillance System operational and user's guide - Version 3.0 (2005). Retrieved 10/14/2013, from http://www.cdc.gov/brfss/pdf/userguide.pdf

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health, 13,* 119–139. http://dx.doi.org/10.1186/1471-2458-13-119

Bombardier, C. H., Ehde, D. M., Stoelb, B., & Molton, I. R. (2010). The relationship of age-related factors to psychological functioning among people with disabilities. *Physical Medicine and Rehabilitation Clinics of North America, 21,* 281–297. http://dx.doi.org/10.1016/j.pmr.2009.12.005

Butterworth, P., Gill, S. C., Rodgers, B., Anstey, K. J., Villamil, E., & Melzer, D. (2006). Retirement and mental health: Analysis of the Australian national survey of mental health and well-being. *Social Science & Medicine, 62,* 1179–1191. http://dx.doi.org/10.1016/j.socscimed.2005.07.013

Casellas-Grau, A., Font, A., & Vives, J. (2014). Positive psychology interventions in breast cancer. A systematic review. *Psycho-Oncology, 23,* 9–19. http://dx.doi.org/10.1002/pon.3353

Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology, 61,* 383–409. http://dx.doi.org/10.1146/annurev.psych.093008.100448

Chen, G. H. (2010). Validating the Orientations to Happiness Scale in a Chinese sample of university students. *Social Indicators Research, 99,* 431–442. http://dx.doi.org/10.1007/s11205-010-9590-y

Chen, L. H., Tsai, Y. M., & Chen, M. Y. (2010). Psychometric analysis of the Orientations to Happiness questionnaire in Taiwanese undergraduate students. *Social Indicators Research, 98,* 239–249. http://dx.doi.org/10.1007/s11205-009-9473-2

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155–159. http://dx.doi.org/10.1037/0033-2909.112.1.155

Cohn, M. A., & Fredrickson, B. L. (2010). In search of durable positive psychology interventions: Predictors and consequences of long-term positive behavior change. *The Journal of Positive Psychology, 5,* 355–366. http://dx.doi.org/10.1080/17439760.2010.508883

Cook, K. F., Molton, I. R., & Jensen, M. P. (2011). Fatigue and aging with a disability. *Archives of Physical Medicine and Rehabilitation, 92,* 1126–1133. http://dx.doi.org/10.1016/j.apmr.2011.02.017

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience.* New York. Harper and Row.

deRoon-Cassini, T. A., de St. Aubin, E., Valvano, A., Hastings, J., & Horn, P. (2009). Psychological well-being after spinal cord injury: Perception of loss and meaning making. *Rehabilitation Psychology, 54,* 306–314. http://dx.doi.org/10.1037/a0016545

Dillman, D., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: Wiley.

Enders, C., & Badalos, D. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8,* 430–457. http://dx.doi.org/10.1207/S15328007SEM0803_5

Fava, G. A., Ruini, C., Rafanelli, C., Finos, L., Salmaso, L., Mangelli, L., & Sirigatti, S. (2005). Well-being therapy of generalized anxiety disorder. *Psychotherapy and Psychosomatics, 74,* 26–30. http://dx.doi.org/10.1159/000082023

Fiest, K. M., Currie, S. R., Williams, J. V., & Wang, J. (2011). Chronic conditions and major depression in community-dwelling older adults. *Journal of Affective Disorders, 131*(1–3), 172–178. http://dx.doi.org/10.1016/j.jad.2010.11.028

Garland, E. L., Fredrickson, B., Kring, A. M., Johnson, D. P., Meyer, P. S., & Penn, D. L. (2010). Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clinical Psychology Review, 30,* 849–864. http://dx.doi.org/10.1016/j.cpr.2010.03.002

Gettings, L. (2010). Psychological well-being in rheumatoid arthritis: A review of the literature. *Musculoskeletal Care, 8,* 99–106.

Giannopoulos, V. L., & Vella-Brodrick, D. A. (2011). Effects of positive interventions and orientations to happiness on subjective well-being. *The Journal of Positive Psychology, 6,* 95–105. http://dx.doi.org/10.1080/17439760.2010.545428

Hind, D., Cotter, J., Thake, A., Bradburn, M., Cooper, C., Isaac, C., & House, A. (2014). Cognitive behavioural therapy for the treatment of depression in people with multiple sclerosis: A systematic review and meta-analysis. *BMC Psychiatry, 14,* 5–18. http://dx.doi.org/10.1186/1471-244X-14-5

Hofmann, S. G., Sawyer, A. T., & Fang, A. (2010). The empirical status of the "new wave" of cognitive behavioral therapy. *Psychiatric Clinics of North America, 33,* 701–710. http://dx.doi.org/10.1016/j.psc.2010.04.006

Holm, A. L., & Severinsson, E. (2013). A qualitative systematic review of older persons' perceptions of health, ill health, and their community health care needs. Advance online publication. *Nursing Research and Practice, 2013,* 1. http://dx.doi.org/10.1155/2013/672702

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *The Electronic Journal of Business Research Methods, 6,* 53–60.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55. http://dx.doi.org/10.1080/10705519909540118

Kalaydjian, A., & Merikangas, K. (2008). Physical and mental comorbidity of headache in a nationally representative sample of US adults. *Psychosomatic Medicine, 70,* 773–780. http://dx.doi.org/10.1097/PSY.0b013e31817f9e80

Keyes, K. M., Nicholson, R., Kinley, J., Raposo, S., Stein, M. B., Goldner, E. M., & Sareen, J. (2014). Age, period, and cohort effects in psychological distress in the United States and Canada. *American Journal of Epidemiology, 179,* 1216–1227. http://dx.doi.org/10.1093/aje/kwu029

Mazzucchelli, T. G., Kane, R. T., & Rees, C. S. (2010). Behavioral activation interventions for well-being: A meta-analysis. *The Journal of Positive Psychology, 5,* 105–121. http://dx.doi.org/10.1080/17439760903569154

Mehnert, T., Krauss, H. H., Nadler, R., & Boyd, M. (1990). Correlates of life satisfaction in those with disabling conditions. *Rehabilitation Psychology, 35,* 3–17. http://dx.doi.org/10.1037/h0079046

Mehta, S., Orenczuk, S., Hansen, K. T., Aubut, J. A., Hitzig, S. L., Legassic, M., . . . the Spinal Cord Injury Rehabilitation Evidence Research Team. (2011). An evidence-based review of the effectiveness of cognitive behavioral therapy for psychosocial issues post-spinal cord injury. *Rehabilitation Psychology, 56,* 15–25. http://dx.doi.org/10.1037/a0022743

Molton, I., Cook, K. F., Smith, A. E., Amtmann, D., Chen, W. H., & Jensen, M. P. (2014). Prevalence and impact of pain in adults aging with a physical disability: Comparison to a U.S. general population sample. *The Clinical Journal of Pain, 30,* 307–315. http://dx.doi.org/10.1097/AJP.0b013e31829e9bca

Molton, I. R., Terrill, A. L., Smith, A. E., Yorkston, K. M., Alschuler, K. N., Ehde, D. M., & Jensen, M. P. (2014). Modeling secondary health

conditions in adults aging with physical disability. *Journal of Aging and Health, 26,* 335–359. http://dx.doi.org/10.1177/0898264313516166

Moran, G. S., & Nemec, P. B. (2013). Walking on the sunny side: What positive psychology can contribute to psychiatric rehabilitation concepts and practice. *Psychiatric Rehabilitation Journal, 36,* 202–208. http://dx .doi.org/10.1037/prj0000012

Moreno, P. I., & Stanton, A. L. (2013). Personal growth during the experience of advanced cancer: A systematic review. *Cancer Journal (Sudbury, Mass.), 19,* 421–430. http://dx.doi.org/10.1097/PPO .0b013e3182a5bbe7

Muthén, L. K., & Muthén, B. O. (1998–2012). *MPlus user's guide.* Seventh ed. (5th ed.). Los Angeles, CA: Muthén & Muthén.

Neugarten, B. L., & Hagestad, G. O. (1976). Age and the Life Course. In R. Binstock & E. Shanas (Eds.), *Handbook of aging and social sciences* (pp. 35–55). New York: Van Nostrand-Reinhold.

Okumura, Y., & Ichikura, K. (2014). Efficacy and acceptability of group cognitive behavioral therapy for depression: A systematic review and meta-analysis. *Journal of Affective Disorders, 164,* 155–164. http://dx .doi.org/10.1016/j.jad.2014.04.023

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin, 136,* 257–301. http://dx.doi.org/10.1037/ a0018301

Park, N., Peterson, C., & Ruch, W. (2009). Orientations to happiness and life satisfaction in twenty-seven nations. *The Journal of Positive Psychology, 4,* 273–279. http://dx.doi.org/10.1080/17439760902933690

Peterson, C., Park, N., & Seligman, M. E. P. (2005). Orientations to happiness and life satisfaction: The full life versus the empty life. *Journal of Happiness Studies, 6,* 25–41. http://dx.doi.org/10.1007/ s10902-004-1278-z

Pietrowsky, R., & Mikutta, J. (2012). Effects of positive psychology interventions in depressive patients—A randomized control study. *Psychology, 3,* 1067–1073.

Reker, G. T., & Wong, P. T. P. (2012). Personal meaning in life and psychosocial adaptation in the later years. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories, research, and applications* (2nd ed., pp. 433–456). New York: Routledge.

Robinson, S., Kissane, D. W., Brooker, J., & Burney, S. (2014). A systematic review of the demoralization syndrome in individuals with progressive disease and cancer: A decade of research. *Journal of Pain and Symptom Management.* Advance online publication. http://dx.doi .org/10.1016/j.jpainsymman.2014.07.008

Ruch, W., Harzer, C., Proyer, R. T., Park, N., & Peterson, C. (2010). Ways to happiness in German-speaking countries: The adaptation of the German version of the orientations to happiness questionnaire in paper-pencil and internet samples. *European Journal of Psychological Assessment, 26,* 227–234. http://dx.doi.org/10.1027/1015-5759/a000030

Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and Psychosomatics, 83,* 10–28. http://dx.doi.org/10.1159/000353263

Scott, K. M., Von Korff, M., Ormel, J., Zhang, M. Y., Bruffaerts, R., Alonso, J., . . . Haro, J. M. (2007). Mental disorders among adults with

asthma: Results from the World Mental Health Survey. *General Hospital Psychiatry, 29,* 123–133. http://dx.doi.org/10.1016/j.genhosppsych .2006.12.006

Seligman, M. E. P. (2002). Positive psychology, positive prevention, and positive therapy. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 3–9). New York: Oxford University Press.

Seligman, M. E. P., Rashid, T., & Parks, A. C. (2006). Positive psychotherapy. *American Psychologist, 61,* 774–788. http://dx.doi.org/ 10.1037/0003-066X.61.8.774

Seligman, M. E.P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist, 60,* 410–421. http://dx.doi.org/10.1037/0003-066X.60.5 .410

Silver, M. P. (2010). Women's retirement and self-assessed well-being: An analysis of three measures of well-being among recent and long-term retirees relative to homemakers. *Women & Health, 50,* 1–19. http://dx .doi.org/10.1080/03630241003601111

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology, 65,* 467–487. http://dx.doi.org/10.1002/jclp.20593

Sone, T., Nakaya, N., Ohmori, K., Shimazu, T., Higashiguchi, M., Kakizaki, M., . . . Tsuji, I. (2008). Sense of life worth living (ikigai) and mortality in Japan: Ohsaki Study. *Psychosomatic Medicine, 70,* 709–715. http://dx.doi.org/10.1097/PSY.0b013e31817e7e64

SPSS Inc. (2009). *PAWS Statistics 18 for Windows* (Version 18). Chicago, IL: SPSS inc.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6,* 144–176. http://dx.doi.org/10.1287/isre.6.2.144

Thompson, N. J., Coker, J., Krause, J. S., & Henry, E. (2003). Purpose in life as a mediator of adjustment after spinal cord injury. *Rehabilitation Psychology, 48,* 100–108. http://dx.doi.org/10.1037/0090-5550.48.2 .100

van der Spek, N., Vos, J., van Uden-Kraan, C. F., Breitbart, W., Cuijpers, P., Knipscheer-Kuipers, K., . . . Verdonck-de Leeuw, I. M. (2014). Effectiveness and cost-effectiveness of meaning-centered group psychotherapy in cancer survivors: Protocol of a randomized controlled trial. *BMC Psychiatry, 14,* 22–30. http://dx.doi.org/10.1186/1471-244X-14-22

Vella-Brodrick, D. A., Park, N., & Peterson, C. (2009). Three ways to be happy: Pleasure, engagement, and meaning—Findings from Australian and US samples. *Social Indicators Research, 90,* 165–179. http://dx.doi .org/10.1007/s11205-008-9251-6

Wolff, J. L., Starfield, B., & Anderson, G. (2002). Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine, 162,* 2269–2276. http://dx.doi.org/ 10.1001/archinte.162.20.2269