


Personality Prior to Disability Determines Adaptation: Agreeable Individuals Recover Lost Life Satisfaction Faster and More Completely

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Abstract

Personality traits prior to the onset of illness or disability may influence how well an individual psychologically adjusts after the illness or disability has occurred. Previous research has shown that after the onset of a disability, people initially experience sharp drops in life satisfaction, and the ability to regain lost life satisfaction is at best partial. However, such research has not investigated the role of individual differences in adaptation to disability. We suggest that predisability personality determines the speed and extent of adaptation. We analyzed measures of personality traits in a sample of 11,680 individuals, 307 of whom became disabled over a 4-year period. We show that although becoming disabled has a severe impact on life satisfaction, this effect is significantly moderated by predisability personality. After 4 years of disability, moderately agreeable individuals had levels of life satisfaction 0.32 standard deviations higher than those of moderately disagreeable individuals. Agreeable individuals adapt more quickly and fully to disability; disagreeable individuals may need additional support to adapt.

Keywords

agreeableness, subjective well-being, disability, adaptation, health, personality

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Personality predicts both the onset of health problems and illness behaviors among healthy people (Vollrath, 2006). Personality also predicts life satisfaction among people with illnesses (e.g., Cloninger & Zohar, 2011). However, previous research has not tested whether personality differences prior to the onset of chronic illness or disability can account for differences in people's adaptation to their new life circumstances. Assessing personality prior to the onset of illness or disability is essential because personality is likely to change postonset; thus, any postonset associations between personality and functioning may simply be a reflection of the effects of illness or disability on personality.

In the research reported here, we examined whether personality prior to disability influences psychological adaptation after disability occurs. On average, becoming disabled has a strongly negative impact on an individual's life satisfaction, and the ability of people to psychologically adapt and regain lost life satisfaction after becoming disabled tends to be partial at best (e.g., Lucas, 2007; Oswald & Powdthavee, 2008). There is, however, a large amount of individual variation in the data. Personality shapes how individuals react in certain situations or environments (Paunonen, Haddock, Forsterling, & Keinonen, 2003), and changes in well-being following

particularly adverse situations could therefore depend on an individual's personality. It has been suggested that some personality traits have a direct influence on well-being, whereas other traits influence well-being more indirectly through interactions with the situations an individual experiences (DeNeve & Cooper, 1998). Recent research has shown that conscientious individuals experience the largest drops in life satisfaction following unemployment (Boyce, Wood, & Brown, 2010) and that the effect of an increase in income on life satisfaction depends on personality (Boyce & Wood, 2011). We therefore hypothesized that personality may influence psychological reactions to disability and may determine the extent and speed of people's adaptation to disability.

We examined personality traits in a sample of participants from a nationally representative, longitudinal study. Individuals in the initial sample of 11,680 participants provided complete measures of personality at Time 1. Because of the large sample, the data provided prospective measures of personality

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for 307 participants who subsequently become disabled over the course of the study. We found that among the individuals who became disabled, more agreeable people regained lost life satisfaction faster and more completely than less agreeable people. This finding is consistent with research showing that agreeableness is particularly important to health because it predicts various health-related behaviors (Booth-Kewley & Vickers, 1994; Ingledew & Brunning, 1999) and has positive associations with perceptions about health among elderly people (Jerram & Coleman, 1999). Our findings suggest that health care professionals should be aware that disagreeable individuals who become disabled will need greater help and support than agreeable individuals will if they are to regain more of their lost life satisfaction.

Method

Participants and procedure

The initial sample comprised 11,680 participants in the German Socio-Economic Panel Study (GSOEP), a nationally representative, longitudinal cohort study of German households; questions relevant for our main analysis were included in the 2004, 2005, 2006, 2007, 2008, and 2009 waves of the GSOEP (see Haisken-DeNew & Frick, 1998, for sampling information). All participants completed a life-satisfaction measure every year and completed personality measures in 2005 (Time 1). After 2005 and until 2009, 307 participants (162 males, 145 females) ages 17 to 86 ($M = 56.79$ years, $SD = 13.42$) became disabled; in our analysis, we concentrated on this subsample and used the remainder of the sample only to check the robustness of our results.

Measures

Disability. In each year of the GSOEP, participants were asked whether they were “officially certified as having a reduced capacity to work or being severely handicapped.” Official certification was based in German disability law and accredited by an independent medical assessment.

Life satisfaction. Life satisfaction was measured with one item each year for all 6 years. Participants responded to the question “How satisfied are you with your life, all things considered?” using an 11-point scale from 0 (*totally unhappy*) to 10 (*totally happy*). Participants used the full range of the life-satisfaction scale ($M = 6.23$, $SD = 2.03$), and responses were standardized ($M = 0$, $SD = 1$) across the sample. The use of a single-item scale, although typical for large data sets, is a limitation of this study and may have resulted in an underestimation of the true effect size. Lucas and Donnellan (2007), however, have shown that the reliability of the GSOEP’s life-satisfaction measure is at least .67.

Big Five personality measures. A 15-item questionnaire was used to determine participants’ levels of personality traits in

2005 (i.e., predisability personality). The questionnaire was a shortened version of the Big Five Inventory (John, Naumann, & Soto, 2008). Individuals were asked to indicate the degree to which 15 statements (each beginning with “I see myself as someone who . . .”) applied to them. The 15 items on the questionnaire consisted of 3 items for each of the Big Five personality traits: openness (e.g., “is original, comes up with new ideas”), conscientiousness (e.g., “does a thorough job”), extraversion (e.g., “is communicative, talkative”), agreeableness (e.g., “has a forgiving nature”), and neuroticism (e.g., “worries a lot”). Participants responded to each statement on a 7-point scale from 1 (*does not apply to me at all*) to 7 (*applies to me perfectly*). Scores were reverse-coded where appropriate. For each personality dimension, the three scores were then aggregated, and these sums were standardized ($M = 0$, $SD = 1$) across the entire sample. This short scale was developed specifically for use in the GSOEP, and each dimension of the short scale correlates ($r \geq .88$) with the corresponding subscale of the full Big Five Inventory (Donnellan & Lucas, 2008); the psychometric properties of the Big Five Inventory and the short scale are comparable (Gerlitz & Schupp, 2005).

Demographic controls. In our analysis, we controlled for age, gender, educational background, marital status, household income, and employment status. In instances in which values were missing, we used samplewide averages.

Analysis

We use a multilevel approach to analyze the Level 1 effect of disability on life satisfaction (LS) across all time points (t) from 2005 to 2009. To assess adaptation, we constructed a measure that indicated the number of years an individual had been disabled at each time point. Participants were classified either as not being currently disabled or as having been disabled for 0 years, 1 year, 2 years, 3 years, or 4 years ($Dyrs$) at each time point. To capture adaptation, we used a quadratic equation including both the linear term and the square of this variable. We included in our sample only individuals who had become disabled and remained disabled for at least 2 years. Data points for individuals who became disabled but recovered within 2 years (i.e., they were no longer registered as disabled) were not included in the sample. This procedure yielded 1,479 data points from the 307 individuals who became disabled. Measures of personality (P) taken in 2005 were used as person-specific (i) Level 2 predictors to determine whether the Level 1 effect of becoming disabled on satisfaction at each time point was moderated by any aspect of an individual’s predisability levels of personality traits. Individuals’ level of life satisfaction in 2004 was used as an additional person-specific Level 2 predictor. This process resulted in our basic model:

$$LS_{it} = \gamma_{00} + \gamma_{10}LS_i + \gamma_{20}P_i + \gamma_{01}Dyrs_{it} + \gamma_{02}Dyrs_{it}^2 + \gamma_{11}P_i \cdot Dyrs_{it} + \gamma_{12}P_i \cdot Dyrs_{it}^2 + \sigma_{i1}Dyrs_{it} + \sigma_{i2}Dyrs_{it}^2 + \sigma_{i0} + \epsilon_{it} \quad (1)$$

Person-specific slopes and intercept errors are captured by the σ terms, and ϵ captures the overall model error. By controlling for life satisfaction in 2004, γ_{01} and γ_{02} are interpretable as changes in life satisfaction following each year of disability, and γ_{11} and γ_{12} represent the personality-disability interaction effects.

Results

To test for general adaptation to disability (irrespective of personality), we first ran a regression analysis predicting yearly life satisfaction from number of years disabled, $b = -0.20, p < .01$, and the square of the number of years disabled, $b = 0.04, p < .01$ (2004 life satisfaction was included as a covariate). As shown in the left panel of Figure 1, disability generally led to decreases in life satisfaction, although there was some adaptation by Year 4. This effect, however, was dependent on personality.

To test for an interaction between personality and disability, we followed Aiken and West’s (1991) recommendations for moderation analysis. We performed a two-step multilevel regression in which we controlled for the main effects of all personality traits and of previous levels of life satisfaction, as well as their interaction with disability. In this analysis, which we refer to as Regression 1, we did not include demographic control variables. In the first step, a baseline model was estimated with prior life satisfaction in 2004, the main effect of personality in 2005, and years disabled as predictors (see Table 1). In the second step, the model included personality-disability interaction terms that were a product of samplewide

standardized Big Five personality scores and disability variables. This step significantly improved model fit, $\chi^2(10, N = 1,479) = 19.25, p < .05$, with both agreeableness and neuroticism significantly interacting with the number of years disabled to predict life satisfaction. However, although robustness checks showed that the effect of agreeableness was unique and stable, the effect of neuroticism was not; more conservative tests showed no effect of neuroticism.

The right panel of Figure 1 illustrates the effect of disability on the life satisfaction of individuals with moderately low (1 SD below the mean) and moderately high (1 SD above the mean) levels of agreeableness. Life satisfaction decreased sharply in the 1st year of disability, and there were further drops in life satisfaction in the 2nd year. However, after 2 years of disability, the life satisfaction of moderately agreeable individuals began to steadily improve, and such individuals showed signs of complete adaptation by Year 4. In contrast, the life satisfaction of moderately disagreeable individuals tended to worsen during the same time period. By Year 4, moderately agreeable individuals had levels of life satisfaction 0.32 standard deviations higher than the levels of moderately disagreeable individuals.

In Regression 2 (see Table 1), we repeated the analysis and included demographic control variables in the model. There are a number of factors that may correlate with an individual’s personality traits and that could act as potential confounds or mediators. For instance, levels of personality traits tend to increase with age (Donnellan & Lucas, 2008), as does the likelihood of becoming disabled. There are gender differences in personality (Costa, Terracciano, & McCrae, 2001), and the

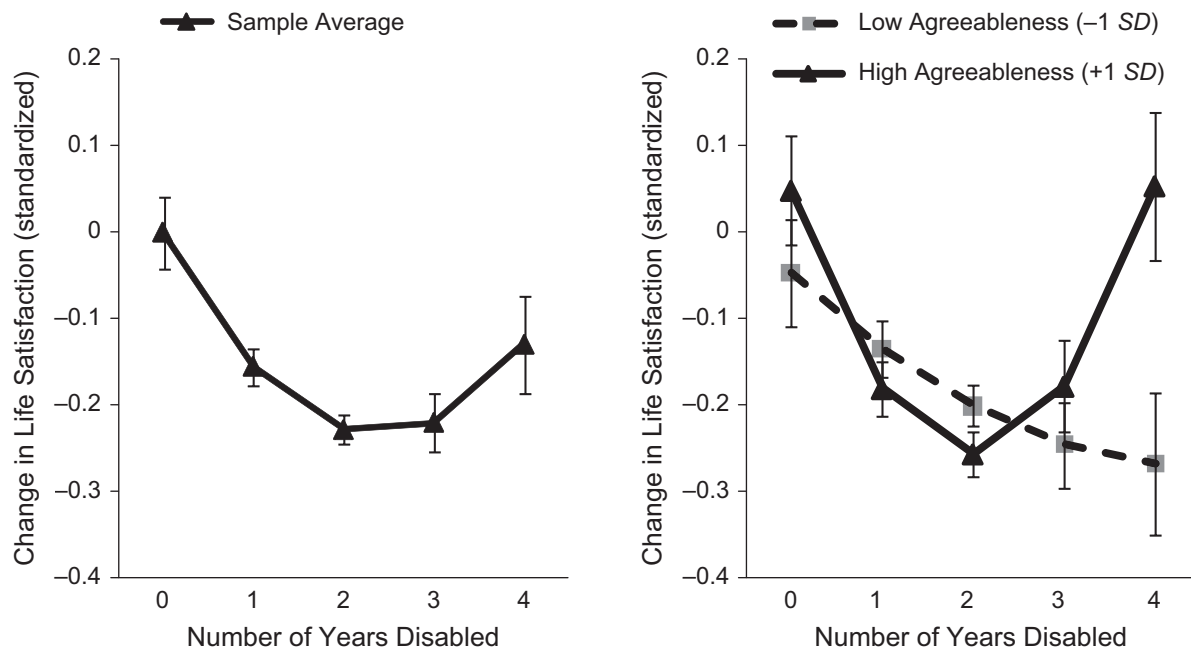


Fig. 1. Change in life satisfaction as a function of number of years disabled in a sample of 307 disabled individuals. The graph on the left shows the average change for the entire sample; the graph on the right shows the average change (indicated by results from Regression 1) separately for participants with high agreeableness (1 SD above the mean) and for participants with low agreeableness (1 SD below the mean). Error bars indicate standard errors calculated according to the recommendations of Aiken and West (1991).

Table 1. Multilevel Analyses of the Effect of Disability on Life Satisfaction as Moderated by Big Five Personality Traits

Step and predictor	Regression 1			Regression 2		
	<i>b</i>	<i>SE b</i>	β	<i>b</i>	<i>SE b</i>	β
Step 1						
Life satisfaction in 2004	0.59	0.04	0.59**	0.55	0.04	0.55**
Openness at Time 1	-0.00	0.04	-0.00	0.01	0.04	0.01
Conscientiousness at Time 1	-0.03	0.04	-0.03	-0.03	0.04	-0.02
Extraversion at Time 1	0.04	0.04	0.04	0.03	0.03	0.03
Agreeableness at Time 1	0.02	0.04	0.02	0.04	0.04	0.04
Neuroticism at Time 1	-0.03	0.03	-0.03	-0.01	0.03	-0.01
Years disabled	-0.20	0.04	-0.26**	-0.10	0.09	-0.13
Years disabled ²	0.04	0.01	0.19**	0.03	0.03	0.12
Step 2						
Life satisfaction in 2004	0.59	0.04	0.59**	0.54	0.04	0.54**
Openness at Time 1	0.01	0.04	0.01	0.03	0.04	0.03
Conscientiousness at Time 1	-0.03	0.04	-0.03	-0.05	0.04	-0.05
Extraversion at Time 1	-0.02	0.04	-0.02	-0.02	0.04	-0.02
Agreeableness at Time 1	0.05	0.04	0.05	0.07	0.05	0.07
Neuroticism at Time 1	-0.08	0.04	-0.08	-0.07	0.04	-0.07
Years disabled	-0.20	0.04	-0.26**	-0.12	0.09	-0.16
Years disabled ²	0.04	0.01	0.21**	0.04	0.03	0.18
Openness at Time 1 × Years Disabled	-0.04	0.05	-0.07	-0.07	0.05	-0.13
Openness at Time 1 × Years Disabled ²	0.01	0.01	0.07	0.02	0.01	0.12
Conscientiousness at Time 1 × Years Disabled	0.01	0.05	0.03	0.04	0.05	0.07
Conscientiousness at Time 1 × Years Disabled ²	-0.01	0.01	-0.04	-0.01	0.01	-0.06
Extraversion at Time 1 × Years Disabled	0.08	0.05	0.14	0.09	0.05	0.17
Extraversion at Time 1 × Years Disabled ²	-0.01	0.01	-0.08	-0.02	0.01	-0.11
Agreeableness at Time 1 × Years Disabled	-0.10	0.05	-0.20*	-0.11	0.05	-0.20*
Agreeableness at Time 1 × Years Disabled ²	0.03	0.01	0.20*	0.03	0.01	0.21*
Neuroticism at Time 1 × Years Disabled	0.10	0.04	0.19*	0.09	0.04	0.16
Neuroticism at Time 1 × Years Disabled ²	-0.02	0.01	-0.09*	-0.02	0.01	-0.10

Note: Time 1 refers to 2005, the time at which predisability personality was measured. No additional controls were included in Regression 1. In Regression 2, we controlled for the Time 1 (i.e., predisability) effects of age, gender, educational background, marital status, and household income in addition to the interaction of all of these control variables with the disability variables. In addition, Regression 2 controlled for employment status and household income at each time point. Both regressions were performed using 1,479 data points from 307 individuals who became disabled at some point within 4 years after Time 1.

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

effect of disability may also differ by gender; these differences could explain the interaction effects. A number of additional factors, such as educational background, marital status, and household income, may correlate with personality and also aid the adaptation process. We therefore assessed the robustness of our results by controlling for both the effect of the predisability levels of these variables and the effect of their interaction with the number of years an individual was disabled. In addition, we controlled for the postdisability effects of household income and employment status, because reduced income and unemployment are likely to accompany disability and could explain some changes in levels of life satisfaction. As shown in Table 1, when we controlled for these variables, agreeableness still interacted with disability to predict life satisfaction, whereas neuroticism did not.

We performed several further checks on the robustness of our results. First, because the interaction effect was strongest in the 4th year of disability, we reran the results using data from only Years 0 through 3 to ensure that our results were not driven only by individuals who were disabled through Year 4; following this procedure, we still obtained a significant interaction between agreeableness and number of years disabled (Agreeableness × Years Disabled: $b = -0.16$, $p < .05$; Agreeableness × Years Disabled²: $b = 0.06$, $p < .01$).

Second, the apparent adaption effects may simply have been due to general changes in life satisfaction within the German population (cohort or year effects). To rule out this possibility, we conducted an analysis in which we compared the change in life satisfaction in the disabled group with the change in life satisfaction in a control group consisting of the

remaining (11,373) people in the sample. Individuals who were never disabled were coded as having 0 years of disability across all 5 years, and an additional dummy variable was included to differentiate them from individuals who did become disabled. The interaction between agreeableness and number of years disabled remained significant (Agreeableness \times Years Disabled: $b = -0.11, p < .05$; Agreeableness \times Years Disabled²: $b = 0.04, p < .01$).

Third, to control for the possibility that the people who became disabled had low levels of life satisfaction 3 years prior to disability, we reran the analysis using 2003 levels of life satisfaction as a covariate. Again there was the significant interaction between agreeableness and number of years disabled (Agreeableness \times Years Disabled: $b = -0.10, p < .05$; Agreeableness \times Years Disabled²: $b = 0.03, p < .05$). Taken together, the robustness analyses suggest that agreeableness robustly influenced adaptation to disability, a finding that was consistent across all models.

Discussion

Our results show that personality prior to disability influences the ways in which individuals psychologically react to disability. Previous studies have suggested that adaptation to disability is at best partial. However, these studies did not investigate the role of individual differences. In contrast, our results show that some people adapt fully to disability, whereas other people do not adapt. This finding held when we controlled for a number of potentially mediating factors and alternative explanations.

Our findings are consistent with previous research suggesting that agreeable individuals may be more likely than disagreeable individuals to uphold social conventions that are conducive to healthy behavior (Ingledeu & Brunning, 1999). Agreeable individuals may therefore be more likely than disagreeable individuals to follow instructions and advice following disability, and this tendency may have important psychological benefits. Agreeable people may also be able to develop or maintain higher levels of social support following disability. Agreeableness predicts the quality of friendships (Berry, Willingham, & Thayer, 2000) and may foster better-quality relationships than disagreeableness does (DeNeve & Cooper, 1998); such relationships, in turn, would positively influence mental health and health-related behaviors (Umberson & Montez, 2010). Agreeableness is also related to active coping among individuals diagnosed with diabetes (Lawson, Bundy, Belcher, & Harvey, 2010), and agreeable individuals may have better coping strategies than their disagreeable peers (Watson & Hubbard, 1996). The present research is the first to show that personality prior to disability influences subsequent adaptation to disability and shows that agreeableness is the key broad personality trait in this effect. We hope that this finding will initiate new research aimed at explaining why this effect occurs and at identifying mediating mechanisms.

Our study suggests that health professionals should be aware that disagreeable individuals may need additional support following disability to enable adaptation. This fact is important because disagreeable people normally attract *less* support than do agreeable people (e.g., Asendorpf & Wilpers, 1998), potentially creating a perversely ironic situation in which the people who need the most help will receive the least. More generally, our study suggests the need for an increased research focus on the effects of preexisting personality traits on subsequent response to illness and disability. Recent work in economics has focused on how personality interacts with events to determine well-being (Boyce et al., 2010; Boyce & Wood, 2011), and such findings can have important implications for health care policy. A greater focus on this interactive approach (or “resilience” approach; Johnson, Wood, Gooding, & Tarrrier, 2011) to health psychology has the potential to increase understanding of the psychology of illness and to aid health professionals in identifying the individuals most in need of support.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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