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Personality Prior to Disability Determines Adaptation: Agreeable Individuals Recover Lost

Life Satisfaction Faster and More Completely

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Abstract

Personality prior to the onset of illness or disability may help individuals psychologically

adjust once an illness or disability has occurred. Previous research has shown that following

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. We suggest that pre-disability personality will determine the speed

and extent of the adaptation. We initially obtained personality measures of 11,680

individuals, 307 of which became disabled over the following four year time period. We

show that although becoming disabled has a severe impact on life satisfaction, this effect is

significantly moderated by pre-disability personality. After four years moderately agreeable

individuals had life satisfaction levels 0.32 standard deviations higher than moderately

disagreeable individuals. Agreeable individuals adapt more quickly and fully. Extra support

may be needed for disagreeable people experiencing disability.

Keywords: AGREEABLENESS, SUBJECTIVE WELL-BEING, DISABILITY,

ADAPTATION, HEALTH

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Personality predicts both the onset of health problems and illness behaviors amongst

healthy people (Vollrath, 2006). Personality also predicts life satisfaction amongst people

with illnesses (e.g., Cloninger and Zohar, 2011). However, previous research hasn't tested

whether personality prior to the onset of chronic illness or disability explains whether people

adapt differently to their new life circumstances (that is, whether prior-personality interacts

with the onset of illness to predict an outcome, rather than simply correlates with an outcome

post-onset). Assessing personality prior to the onset of illness is essential as personality is

likely to change post-onset, and thus any associations between personality and functioning

may simply be a reflection of the illness having previously determined the personality.

In the present paper we examine whether personality prior to disability influences

psychological adaptation after the disability occurs. On average, becoming disabled has a

strong negative impact on an individual's life satisfaction, and the ability to psychologically

adapt and regain lost life satisfaction tends to be at best partial (e.g., Lucas, 2007; Oswald &

Powdthavee, 2008). There is, however, often a large amount of individual variation in the

data. Personality shapes the way individuals react within certain situations or environments

(Paunonen et al., 2003) and as such the well-being response following particularly adverse

situations could be personality dependent. It has been suggested that some personality traits

have a direct influence on well-being whereas others may influence well-being more

indirectly through person by situation interactions (DeNeve & Cooper, 1998). Research in

other fields, for example, has shown that conscientious individuals experience the largest

drops in life satisfaction following unemployment (Boyce et al., 2010) and that the effect of

an income increase on life satisfaction also depends on personality (Boyce and Wood, 2011).

We therefore hypothesize that personality may influence psychological reactions to disability

and may determine the extent and speed with which people adapt.

This study focuses on an initial sample of 11,680 people who provide complete measures of personality at Time 1. The large sample permits prospective personality measures for 307 people who subsequently become disabled over the course of the study period. We find that more agreeable people regain lost life satisfaction following disability faster and more completely than those less agreeable. This conforms to research showing that agreeableness is particularly relevant to health since it predicts various health behaviors (Booth-Kewley & Vickers, 1994; Ingledew & Brunning, 1999) and also has positive associations with perceptions about health among the old (Jerram & Coleman, 1999). Our findings have applied importance and suggest that health care professionals should be aware that disagreeable individuals will need greater help and support if they are to regain their lost quality of life.

<div align="center">Method</div>

Participants and procedure

The initial sample included 11,680 people participating in the German Socio-Economic Panel Study (GSOEP), a nationally representative longitudinal cohort study sample of German households, with questions relevant for this analysis included in the 2004, 2005, 2006, 2007, 2008 and 2009 waves (see Haisken-De New and Frick, 1998 for sampling information). All participants completed a life satisfaction measure across all years and personality measures in 2004. Between 2005 and 2009, 307 individuals (162 males, 145 females, age 17 to 86, $M = 56.79$, $SD = 13.42$) became disabled; this sub-sample formed the primary focus of the analysis, with the remainder of the sample only used for a robustness check.

Measures

Disability: Each year participants were asked whether they were "officially certified as having a reduced capacity to work or being severely handicapped." Official certification is based in German disability law and accredited by an independent medical assessment.

Life Satisfaction: Life satisfaction was measured using a one-item scale across all six years. Participants were asked "how satisfied are you with your life, all things considered?" and responded to this question on 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 the scale was standardized with a mean of zero and standard deviation of one across the sample. This single item scale, although typical for large data sets, is a limitation of the study and may result in an underestimation of the true effect size. Lucas and Donnellan (2007), however, show that the reliability of the life satisfaction measure in the GSOEP is at least .67.

Big-Five personality measures: A 15-item scale was used to determine participants' 2005 pre-disability personality levels. The questionnaire was based on a shortened version of the Big-Five Inventory (John et al., 2008). There were three items for each of the five personality traits and individuals were asked to indicate the degree to which 15 statements, each beginning with "I see myself as someone who…", applied to them. Specifically, the measure assesses openness (e.g., "is original, comes up with new ideas"), conscientiousness (e.g., "does a thorough job"), extroversion (e.g., "is communicative, talkative"), agreeableness (e.g., "has a forgiving nature") and neuroticism (e.g., "worries a lot). Responses for each statement were given on 7-point scales, from 1 (*does not apply to me at all*) to 7 (*applies to me perfectly*). Across each personality dimension all three scores, after appropriate reverse coding, were aggregated. Each scale was then standardized with a mean of zero and standard deviation of one across the entire sample. This short-scale was developed specifically for use in the GSOEP and each dimension in the short-scale correlates at least $r = .88$ with the corresponding sub-scale of the full Big-Five Inventory (Donnellan and Lucas, 2008) to which it has comparable psychometric properties (Gerlitz and Schupp, 2005).

Demographic controls: Age, gender, educational background, marital status, household income and employment status. In some instances there were missing values so these were re-coded with sample wide averages.

Analysis

We use a multilevel approach to analyze the level-one effect of disability on life satisfaction (LS) across all time-points (t) from 2005 to 2009. To understand adaptation we construct a measure that indicates the number of years an individual has been disabled at each time-point. Participants are either not currently disabled or have been disabled for one year, two years, three years or four years (Dyrs). To capture adaptation we explore a quadratic equation and include both the linear and square of this variable. We include in our sample only those individuals that become disabled and remained so for at least two years. Should an individual then recover (i.e., not register as disabled) then their subsequent data points are not included in the sample. This resulted in 1,479 individual data points from the 307 individuals that became disabled. Measures of personality, (P), taken in 2005, are then used as person specific (i) level-two predictors to determine whether the level-one effect of becoming disabled on satisfaction (at t) is moderated by any aspect of an individual's pre-disability level of personality. The individual's life satisfaction in 2004 is used as an additional person-specific level-two predictor and this gives our basic model shown in equation 1.

$$(1) \qquad LS_{it} = \gamma_{00} + \gamma_{10}LS_i + \gamma_{20}P_i + \gamma_{01}Dyrs_{it} + \gamma_{02}(Dyrs^2)_{it}$$

$$+ \gamma_{11}P_i \bullet Dyrs_{iit} + \gamma_{12}P_i \bullet (Dyrs^2)_{it} + \sigma_{i1}Dyrs_{it} + \sigma_{i2}(Dyrs^2)_{it} + \sigma_{i0} + \varepsilon_{it}$$

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 predicting yearly life satisfaction from number of years disabled ($b = -0.20$, $p < .01$) and its squared equivalent ($b = 0.04$, $p < .01$) (plus 2004 life satisfaction as a covariate). As shown in Figure 1, left panel, in general disability lead to decreases in life satisfaction with some adaptation by year 4. This effect, however, was personality dependant.

[INSERT FIGURE 1 HERE]

To test for an interaction between personality and disability we followed Aiken and West's (1991) recommendations for moderation analysis, performing a 2-step multi-level regression; initially controlling for the main effects of all personality traits and previous life satisfaction as well as their interaction with disability (but not including demographic control variables). In the first step a baseline model was estimated with prior life satisfaction, the main effect of personality and years disabled and as shown in Table 1 Regression 1 only prior life satisfaction was significant. In the second step a model was estimated additionally containing personality-disability interaction terms that were a product of sample-wide standardized Big-Five personality scores and disability variables. This step significantly improved fit ($\chi^2(df = 10, n = 1,479) = 19.25, p < .05$) with both agreeableness and neuroticism significantly interacting with years disabled to predict life satisfaction. The effects of neuroticism, however, were not stable or unique, failing the robustness checks below, whilst agreeableness represented a stable finding.

The right panel of Figure 1 illustrates the effect of disability on life satisfaction at moderately low (-1 *SD*) and moderately high (+1 *SD*) levels of agreeableness. The first year of disability results in sharp decreases in life satisfaction. In the second year there were further drops in life satisfaction. However, 2 years following the initial onset of disability the life satisfaction of those that are moderately agreeable steadily begins to improve, showing signs of complete adaptation by year 4. Contrastingly across the same period the life satisfaction of those that are moderately disagreeable tended to worsen. By year 4 moderately agreeable individuals had life satisfaction levels 0.32 standard deviations higher than moderately disagreeable individuals.

[INSERT TABLE 1 HERE]

Regression 2 in Table 1 repeats the analysis additionally including demographic control variables. There are a number of factors that may correlate with an individual's personality and could act as potential confounds or mediators. For instance, personality traits

tend to increase with age (Donnellan and Lucas, 2008), as does the likelihood of becoming disabled. There are gender differences in personality (Costa et al., 2001) and the effect of disability may also differ by gender which could explain any interaction effect. There are also a number of factors such as an individual's educational background, marital status and household income that may correlate with personality and also aid the adaptation process. We therefore examine the robustness of our results by controlling for both the pre-disability level effect of these variables and their interaction with the number of years an individual was disabled. In addition we control for the post-disability level effects of household income and employment status since reduced income and unemployment are likely to accompany disability and could explain some of the life satisfaction changes. As shown in Table 1 Regression 2 when controlling for these variables agreeableness still interacted with disability to predict life satisfaction whereas neuroticism did not.

We performed several further robustness checks on the results. First, as the interaction effect is strongest in the fourth year of disability, to ensure that our result wasn't driven only by individuals who reach a fourth year of disability we reran the results using only years 0 to 3 and still obtained the significant interaction effect for agreeableness (linear $b = -0.16$, $p < .05$; quadratic $b = 0.06$, $p < .01$). Second, the apparent adaption effects may simply have been due to general life satisfaction changes in the German population (cohort or year effects). To rule out this possibility we conducted an analysis where we compared the drops in life satisfaction of the disabled people to a control group of the remaining (11,373) people in the sample. Those never-disabled were coded as having 0 years of disability across all five years and an additional dummy variable was included to differentiate them from those who did become disabled. The agreeableness interaction again remained significant (linear $b = -0.16$, $p < .05$; quadratic $b = 0.06$, $p < .01$). Third, to allow for the possibility that the people who became disabled had lower life satisfaction three years prior to disability, we re-ran the analysis using 2003 levels of life satisfaction as a covariate. Again there was the significant agreeableness interaction (linear $b = -0.10$, $p < .05$; quadratic $b = 0.03$, $p < .05$). Taken

together, the robustness analysis suggested that agreeableness very robustly influenced adaptation to disability, a finding that was invariant to model specification.

Discussion

Our results show that personality prior to disability influences the extent to which individuals psychologically react. Previous studies into disability have suggested that adaptation is at best partial. However, previous studies did not investigate the role of individual differences. In contrast, we show that some people adaptation fully whereas others do not at all. This finding is robust to a number of potentially mediating controls and a number of alternative explanations.

The findings are consistent with previous research showing that agreeable individuals have regard for social conventions that are conducive to healthier behavior (Ingledew & Brunning, 1999). Agreeable individuals may therefore be more likely to follow instructions and advice following disability, which may have important psychological benefits. Agreeable people may also be able to develop or maintain higher levels of social support following disability. Agreeableness predicts friendship quality (Berry et al., 2000) and may foster better quality relationships (DeNeve & Cooper, 1998) which in turn influences mental health and health behavior (Umberson & Montez, 2010). Agreeableness is also related to active coping for individuals diagnosed with diabetes (Lawson et al., 2010) and agreeable individuals may have better coping strategies (Watson & Hubbard, 1996). The present research shows for the first time that personality prior to disability influences subsequent adaptation and shows agreeableness to be the key broad personality trait. It is hoped that this finding will initiate a new direction of research aimed at explaining why this effect occurs and identifying mediating mechanisms.

This study suggests that health professionals should be aware that disagreeable individuals may need additional support following disability to enable adaptation. This is important as disagreeable people normally attract *less* support (e.g. Asendorpf & Wilpers,

1998), potentially creating a perverse irony where the people who most need the help will receive it the least. More widely, the study suggests the need for a greater focus within health research into the role of personality prior to illness. Recent work within economics has begun to focus on how personality interacts with events to determine well-being (Boyce and Wood, 2011; Boyce et al., 2010) and such findings can have important policy consequences. A greater focus on this interactive (or "resilience", Johnson et al., 2011) approach to health psychology has the potential to increase understanding of the psychology of illness and identify the individuals most in need of support.

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Table 1:

Multilevel Analyses of the Effect of Disability on Life Satisfaction Moderated by Big-Five Personality Traits

	Regression 1			Regression 2		
Dependent Variable:	Life satisfaction at T			Life satisfaction at T		
Independent Variables:	b	SE	β	b	SE	β
Step 1						
Life satisfaction in 2004 (T = 0)	0.59	0.04	.59**	0.55	0.04	.55**
Openness at T = 1	-0.00	0.04	-.00	0.01	0.04	.01
Conscientiousness at T = 1	-0.03	0.04	-.03	-0.03	0.04	-.02
Extroversion at T = 1	0.04	0.04	.04	0.03	0.03	.03
Agreeableness at T = 1	0.02	0.04	.02	0.04	0.04	.04
Neuroticism at T = 1	-0.03	0.03	-.03	-0.01	0.03	-.01
Disability variables						
Years Disabled at T	-0.20	0.04	-.26**	-0.10	0.09	-.13
Years Disabled at T Squared	0.04	0.01	.19**	0.03	0.03	.12
Step 2						
Life satisfaction in 2004 (T = 0)	0.59	0.04	.59**	0.54	0.04	.54**
Openness at T = 1	0.01	0.04	.01	0.03	0.04	.03
Conscientiousness at T = 1	-0.03	0.04	-.03	-0.05	0.04	-.05
Extroversion at T = 1	-0.02	0.04	-.02	-0.02	0.04	-.02
Agreeableness at T = 1	0.05	0.04	.05	0.07	0.05	.07
Neuroticism at T = 1	-0.08	0.04	-.08	-0.07	0.04	-.07
Disability variables						
Years Disabled at T	-0.20	0.04	-.26**	-0.12	0.09	-.16
Years Disabled at T Squared	0.04	0.01	.21**	0.04	0.03	.18

(table continues)

	Regression 1			Regression 2		
	Life satisfaction at T			Life satisfaction at T		
Dependent Variable:	b	SE	β	b	SE	β
Independent Variables:						
Interaction terms						
Openness at T = 1 x Years Disabled at T	-0.04	0.05	-.07	-0.07	0.05	-.13
Openness at T = 1 x Years Disabled at T Sq.	0.01	0.01	.07	0.02	0.01	.12
Conscientiousness at T = 1 x Years Disabled at T	0.01	0.05	.03	0.04	0.05	.07
Conscientiousness at T = 1 x Years Disabled at T Sq.	-0.01	0.01	-.04	-0.01	0.01	-.06
Extroversion at T = 1 x Years Disabled at T	0.08	0.05	.14	0.09	0.05	.17
Extroversion at T = 1 x Years Disabled at T Sq.	-0.01	0.01	-.08	-0.02	0.01	-.11
Agreeableness at T = 1 x Years Disabled at T	-0.10	0.05	-.20*	-0.11	0.05	-.20*
Agreeableness at T = 1 x Years Disabled at T Sq.	0.03	0.01	.20*	0.03	0.01	.21*
Neuroticism at T = 1 x Years Disabled at T	0.10	0.04	.19*	0.09	0.04	.16
Neuroticism at T = 1 x Years Disabled at T Sq.	-0.02	0.01	-.09*	-0.02	0.01	-.10

Notes: No additional controls were included in regression 1; Regression 2 controlled for both the level effect and disability interactions of age, gender, educational background, marital status, and household income measured before disability (T = 1). Additionally regression 2 controlled for employment status and household income at T. Both regressions are based on 1,479 individual data points that came from the 307 individuals who became disabled after T = 0 across five years; *p < .05 **p < .01

Figure 1: A longitudinal comparison of the life satisfaction of 307 disabled individuals across years of disability as moderated by sample-wide agreeableness levels. Error bars denote standard errors calculated according to Aiken and West (1991) at the appropriate year of disability and level of agreeableness