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Personality traits and subjective well-being with regard to problem of infertility: The mediating role of implicit self-theories and life-engagement

Abstract: In integrated approaches to personality (McAdams & Pals, 2006; McCrae & Costa, 1999), it is possible to examine relationships between personality traits, beliefs as characteristic adaptations, and subjective well-being. This research aimed to verify if implicit self-theories (belief about stability of human nature) proposed by Dweck (2000) and life-engagement proposed by Scheier et al. (2006) play a mediating role in relationships between personality traits and satisfaction with life. The relationships were examined with respect to infertility problem. A sample of 120 adults (aged 26–48; $M = 36.60$; $SD = 4.82$; 50% women) participated in the research. The mediation hypotheses were examined, and furthermore, four groups of couples were compared in terms of measured variables. The groups were: couples with (1) cured and (2) uncured infertility and couples who were not infertile and (3) have and (4) do not have children. Life-engagement mediated the relationship between Conscientiousness and satisfaction with life in the whole sample. The belief about stability of human nature mediated relationships between subjective well-being and Conscientiousness, Agreeableness, Neuroticism, and Extraversion only among couples with an infertility problem.

Keywords: personality trait, subjective well-being, implicit self-theories, life-engagement, infertility

The integrated personality model by McAdams and Pals (2006) distinguishes three main levels concerning constructs derived from different, complementary psychological theories. The first, the most basic level, comprises dispositional traits, usually brought to personality traits from the Big Five model by McCrae and Costa (1999). The second level contains characteristic adaptations, including beliefs about oneself, other people, and the world. These beliefs are cognitive constructs that regulate behaviour, ways of thinking and direction of interpreting life experiences. The beliefs also condition affective functioning. They are developed on the basis of dispositions and are modified (much more than dispositions) by social and environmental factors over the course of one's life span, also as a result of life events. The first, the most individualized level of personality model, concerns life stories as well as content of self and identity. It often has a narrative form and displays in personal, spoken or written tales. The level of dispositional traits and level of characteristics adaptations were also proposed

in a model by McCrae and Costa (1999; McCrae, Gaines, & Wellington, 2012) that in fact was the first integrated model of personality that can provide a theoretical ground for predicting emotions and behavior resulting from personality traits and beliefs. According to the model proposed by McCrae and Costa, characteristic adaptations also involve complex self-concept and personal myths, and similarly to the model proposed by McAdams and Pals, these adaptations depend on dispositional traits, and even on biological bases. They are also affected by environmental influences. Both theoretical models enable designing research examining connections between levels of personality, and also relationships between personality and well-being.

Previous research showed that constructs from each of the mentioned personality levels are connected with well-being (DeNeve & Cooper, 1998; Diener, Suh, Lucas, & Smith, 1999; Judge, Heller, & Mount, 2002). However, there are still many dependency relationships to be verified and revealed. The present research aimed to verify if and

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how dispositional traits affect subjective well-being with a mediating role of selected beliefs. Additionally, struggling with infertility as a contextual factor was considered in this research. We considered couples with cured and uncured infertility, and also couples not struggling with infertility, including having and not having children.

Subjective well-being reflects the extent to which people think and feel that their life is going well (Lucas & Diener, 2009). Much research has revealed that many beliefs (from the second level of the personality model), e.g., self-esteem, self-efficacy, are positively correlated with subjective well-being (Diener, Oishi, & Lucas, 2009). There are also less known, although empirically verified beliefs, that are associated with satisfaction with life. Among them there are beliefs about stability/malleability of human nature and life-engagement. The first of these beliefs was proposed as a psychological construct by Dweck (1996, 2000; Dweck, Chiu, & Hong, 1995) and concerns the degree of treating human characteristics (traits, character, abilities, competencies) as stable, difficult to change or on the contrary – as changeable, can be developed and enhanced. This second pole of the dimension is also named mindset into development (Dweck, 2000). The belief about stability narrows or even closes one's cognitive perspective of potential changes, improvement of oneself, and working on one's own limitations. A strong belief about stability becomes especially detrimental when the individual perceives oneself as weak, incapable, diseased, not efficient enough etc. Low self-esteem, which includes a strong belief about stability, may generate many motivational and affective problems, that can be linked with a decrease of subjective well-being. Analogically, a strong belief about malleability (changeability) of human nature entails a subjective perspective of change and development and encompasses the hope that things are going to turn out better. Because the belief about stability is grounded on anxiety toward change and negative emotionality (Dweck, 2000; Lachowicz-Tabaczek, 2004), it is supposed to arise from Neuroticism as a dispositional trait (Spinath, Spinath, Riemann, & Angleitner, 2003). Thus, it is hypothesized that Neuroticism influences subjective well-being by mediation of belief about stability of human nature. A similar mediation model is proposed between Openness, as well as Extraversion – with the difference that Neuroticism is probably positively related to the belief about stability and negatively related to satisfaction with life (H1); Openness and Extraversion are negatively related to belief about stability and positively associated with satisfaction with life (respectively H2 and H3).

The second belief considered in this research, life-engagement, was proposed by Scheier and colleagues (2006). It concerns one's purpose in life, defined as the extent to which a person thinks that his or her life is worth engaging in some activities. It is a component of self-regulation processes and is based on two elements that are important in creating behavior: (a) the ability to identify valued goals and (b) the perceptions that these goals are attainable. When people perceive goals as personally important and worth engaging in, their

motivation to achieve them not only increases the chances for success, but also during the process of achieving these goals subjective well-being is higher than when people have a lack of purpose in their activities (Carver & Scheier, 2005). Life-engagement forms during life experiences and through reflection, although probably it has some dispositional ground. Thus, Conscientiousness and Neuroticism may impact life-engagement and through a mediating role, impact subjective well-being. Conscientiousness is positively related to life-engagement and increases satisfaction with life (H4); and Neuroticism is negatively related to life-engagement and decreases satisfaction with life (H5).

In this research, we assumed that both the belief about stability of human nature and life-engagement are mediators in the relationships between personality traits (Big Five) and subjective well-being among people with infertility problems, both in the case of cured and uncured illness. Parenthood is for many adults one of the major tasks and transitions during life, for both women and men (Deka & Sarma, 2010). Most research has focused on indirect psychological consequences of struggling with infertility. These kinds of research show that non-fulfilment of a wish for a child is associated with emotional collapse with an increase of anger, depression, anxiety and feelings of worthlessness. Furthermore, couples with uncured infertility often experience social stigma, alienation, and sense of loss (Nachtigall, Becker, & Wozny, 1992; Raque-Bogdan & Hoffman, 2015). In general, among infertile couples women experience higher level of distress (anxiety, depression, hostility, cognitive disturbances) than their male partners, both women and men experience feelings of defectiveness, incompetence, and sense of loss (Anderson, Sharpe, Rattray, & Irvine, 2003; Galhardo et al., 2013; Slade, O'Neill, Simpson, & Lashen, 2007; Wright et al., 1991). Compared with the general population norm, both infertile women and men, before successful treatment, display lower levels of subjective well-being (Greil, 1997). This arises from the significance of an unattained life aim of having and bringing up a child. Treatment of infertility requires much effort and determination, which is probably conditioned by dispositional traits, beliefs about self, others, and the world, as well as personal value systems and personal life story (in other words, all three levels of personality).

The problem of infertility as a contextual factor, with its psychological consequences, may be a significant moderator of the relationships between variables taken into account in the present research. It can be treated as a specific factor that makes the expectations of positive change (becoming pregnant and having children) especially important, and maybe even central for subjective well-being. Also, life-engagement often becomes oriented toward efforts in application of medical indications, including appropriate diet, life style, physical activity and regular taking medications. When couples perceive a deep sense in these efforts (having a purpose) and belief that they will be successful (belief about changeability, not stability), they engage in them more. These two beliefs may play a mediating role between personality and subjective

well-being. In that way the presented research is an element of broader research project concerning relationships between different levels of personality and well-being. The general project aims to verify two general hypotheses: (1) specific adaptations mediate the relationships between personality traits and well-being dimensions, (2) environment or personal factors moderate the relations between personality and well-being. For the first hypothesis, the belief about stability of human nature and life-engagement are the specific adaptations. For the second hypothesis, the experience of an infertility problem, including successful and unsuccessful treatment (and efforts that are invested in treatment) may be a moderator of the examined models.

Method

Participants

Participants included 60 couples (120 adults), aged 26–48 ($M=36.60$; $SD=4.82$), 50% females. Four groups were distinguished: 15 couples with cured infertility, 15 couples with uncured infertility, 15 couples without infertility problems with children, 15 couples without infertility problems and no children. In this research project, suffering from infertility means at least 3 years of treatment (according to World Health Organization's definition of infertility based on at least 24 months of trying to get pregnant). Either during or after treatment, if a woman manages to get pregnant, it is considered a cured infertility problem situation. When treatment is still not successful, it is considered an uncured infertility problem situation. Couples without infertility problems are comparative groups.

Measures and statistical procedures

Personality traits (Big Five)

To measure personality traits (Big Five), the NEO-FFI by Costa and McCrae (1992) with the Polish adaptation by Zawadzki et al. (1998) was used. The NEO-FFI is a 60-item inventory, 12 items for each personality traits, with a five-point answer scale. The method has sufficient reliability: Cronbach's α for the Polish adaptation are from .68 (for Openness and Agreeableness) to .82 (for Conscientiousness) (Zawadzki et al., 1998). In the

presented research Cronbach's α 's are from .73 (for Openness) to .90 (for Neuroticism).

Subjective well-being

To measure subjective well-being, the Satisfaction with Life Scale (SWLS) by Diener et al. (1985) with the Polish adaptation by Juczyński (2001) was used. The SWLS is a 5-item tool, with a seven-point Likert response scale: from 1 – *strongly disagree* to 7 – *strongly agree*. Reliability is satisfactory: Cronbach's α in the original version is .87, for the Polish adaptation .81. In this research Cronbach's α is .88.

Belief about stability of human nature

To measure belief about stability of human nature, the Implicit Theories Scale (WSS) by Dweck et al. (1995) translated into Polish by Lachowicz-Tabaczek (2004) was used. The WSS is an 8-item scale, with a six-point answer scale: from 1 – *strongly disagree* to 6 – *strongly agree*. The Cronbach's α of the original version ranges from .90 to .96, the Polish version from .71 to .86. In this research Cronbach's α is .90.

Life-engagement

To measure life-engagement, the Life Engagement Test (LET) by Scheier et al. (2006), translated by Bąk, Jankowski and Oleś (2015) (there is no full Polish adaptation) was used. The LET is a 6-item scale, with a five-point response scale: from: 1 – *strongly disagree* to 5 – *strongly agree*. Cronbach's α of the original version ranges from .72 to .87. In this research Cronbach's α is .79.

Results

The first step of statistical analysis was examining the correlations between measured variables in the group with infertility problems and without infertility problems. On the basis of existing correlations there will be examined mediatory models, provided for hypotheses. Table 1 presents correlation coefficients, separately for couples with infertility problems and those without.

Table 1. Correlation coefficients for couples with infertility problems ($N=60$; upper triangular matrix) and couples without infertility problems ($N=60$; lower triangular matrix)

	1	2	3	4	5	6	7	8
1. Neuroticism		-.61***	.11	-.45***	-.28*	.41**	-.50***	-.64***
2. Extraversion	-.43**		-.17	.22	.40**	-.36**	.41**	.44***
3. Openness	-.08	.32*		.19	-.30*	.01	-.22	-.09
4. Agreeableness	.13	-.03	.27*		.36**	-.47***	.34**	.48***
5. Conscientiousness	-.04	-.12	-.27*	.15		-.51***	.63***	.38**
6. Belief about stability	.24	-.17	-.02	-.18	-.13		-.68***	-.65***
7. Life-engagement	-.18	-.04	-.03	.27*	.37**	-.15		.68***
8. Satisfaction with life	-.20	-.01	-.17	.01	.29*	-.06	.35**	

* $p < .05$; ** $p < .01$; *** $p < .001$.

On the basis of these results, problems with infertility (*vs* lack of this problem) moderate relationships between dispositional traits, considered beliefs and satisfaction with life as well as subjective well-being. Differences within intensity of examined relationships are very aquiline. Among couples with infertility problems, the correlations between traits (especially Neuroticism, Conscientiousness and Agreeableness), beliefs and satisfaction with life are stronger than among couples without infertility problems. In fact, in the second group there are almost any significant correlations, except some with Conscientiousness. Based on this initial analysis, it was reasonable to verify mediation models only for the group of couples with infertility problems and one mediation model (with Conscientiousness and life engagement) among all research participants.

Below are examined mediation models between selected traits and satisfaction with life, with the mediating role of life-engagement and belief about stability of human nature.

Because of the significant correlation coefficients between Conscientiousness, life-engagement and satisfaction with life among all research participants, also in couples without infertility problems, we verified one holistic mediation model involving these three variables.

Figure 2. Mediation model involving Conscientiousness, satisfaction with life, and life-engagement as a mediating belief, among couples with infertility problems and without infertility problems (N = 120)

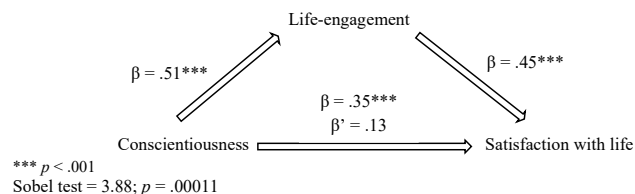
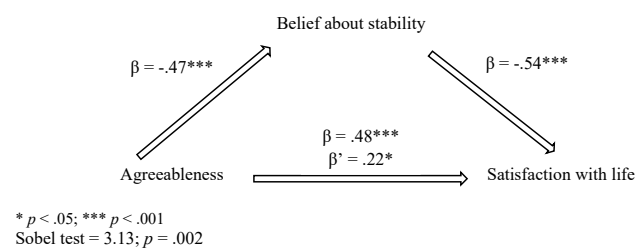
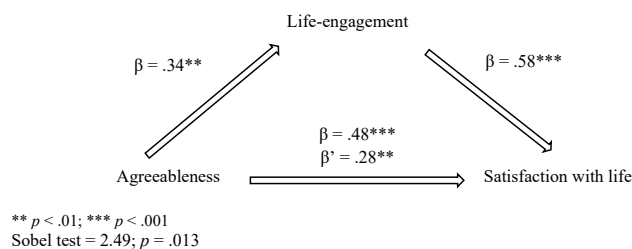
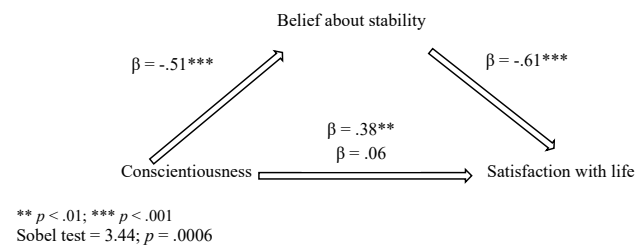
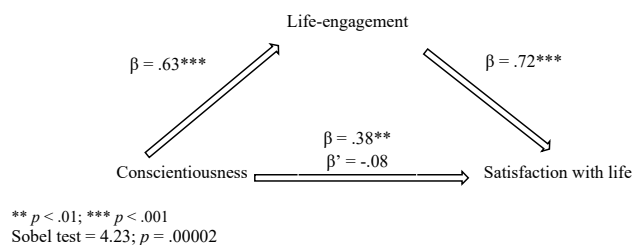
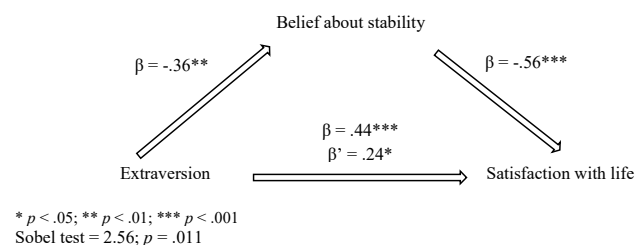
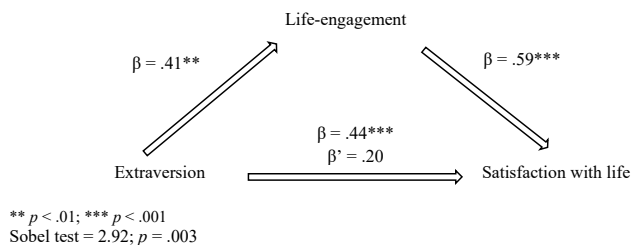
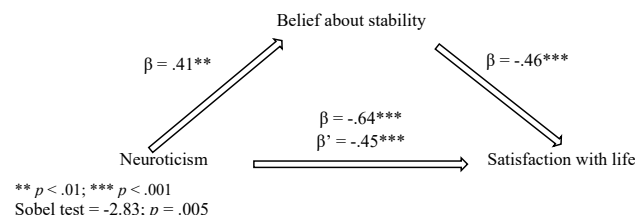
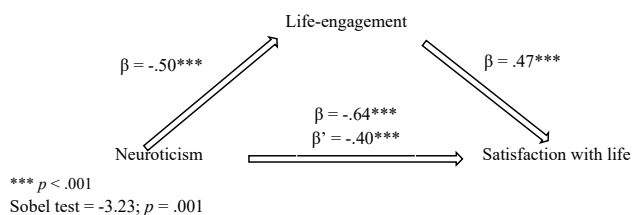


Figure 1. Mediation models involving traits, satisfaction with life, and mediatory beliefs among couples with infertility problems (N = 60)



The conducted analyses enable verification of the hypotheses. Hypotheses H1, H3 and H5 were confirmed only among couples with infertility problems. H2 (concerning Openness) was rejected. H5 (concerning Conscientiousness and life-engagement as a mediator) was confirmed among all research participants, both couples with infertility problems and without.

Because the above analyses show that the problem of infertility moderates the relationships between traits, beliefs and satisfaction with life, it is also possible that successful vs unsuccessful treatment of infertility (as a significant experience in human life) differentiates level of traits, beliefs and subjective well-being among adults. A comparative analysis (ANOVA with post hoc tests) was done. Four groups were compared. The results are presented in Table 2.

The results show that couples with uncured infertility display the lowest satisfaction with life among the groups. However, couples with cured infertility problems had the highest belief about changeability of human nature (reversed pole of belief about stability) and the highest life-engagement. Moreover, there were also differences in dispositional traits, especially Neuroticism.

Discussion

The most significant results of this research concern the mediating role of life-engagement between Conscientiousness and satisfaction with life. The higher the level of Conscientiousness, the higher the level of life-engagement, and then, the higher the level of life-engagement, the higher the level of satisfaction with life. This model was confirmed both among couples with infertility and without infertility problems. Generally, Conscientiousness as a trait reflects a motivational human characteristic (how they plan and realize goals, how ambitious the chosen goals are, their endurance and determination) positively affecting subjective well-being, but this relation is stronger when life-engagement is higher. In other words, when people are convinced that their goals are worthy of achieving and worth the effort and sacrifices, then their Conscientiousness leads to more satisfaction with life than when they do not see much purpose in their activities. The meaning of life and particularly goals as a specific adaptation mediate the relation between Conscientiousness as a disposition

Table 2. Comparisons of level of traits, beliefs and satisfaction with life between couples with infertility problems and without, both with and without children

	1. Couples with uncured infertility (N=30)		2. Couples with cured infertility problem (N=30)		3. Couples without infertility, no children (N=30)		4. Couples without infertility, have children (N=30)		Differences
	M	SD	M	SD	M	SD	M	SD	
Neuroticism	28.00	7.52	18.23	7.38	20.27	9.39	20.27	8.03	1 > 2 *** 1 > 3 *** 1 > 4 ***
Extraversion	24.70	5.71	29.33	6.28	27.53	6.17	26.90	5.64	1 < 2 **
Openness	26.37	5.74	25.30	5.11	28.80	6.22	23.50	5.53	3 > 4 *** 3 > 2 *
Agreeableness	24.07	7.35	30.73	6.52	27.10	8.01	25.00	5.90	2 > 1 *** 2 > 4 ** 2 > 3 *
Conscientiousness	28.53	7.19	32.27	7.83	30.13	5.52	32.53	5.89	1 < 2 * 1 < 4 *
Belief about stability	29.90	5.95	23.37	4.25	27.43	6.37	27.00	5.40	2 < 1 *** 2 < 3 ** 2 < 4 * 4 < 1 *
Life-engagement	22.00	3.10	25.43	2.67	22.80	2.75	23.77	3.53	2 > 1 *** 2 > 3 ** 2 > 4 * 4 > 1 *
Satisfaction with life	16.20	4.05	23.50	4.84	21.63	4.31	22.00	4.81	1 < 2 *** 1 < 3 *** 1 < 4 ***

* $p < .05$; ** $p < .01$; *** $p < .001$.

and subjective well-being, which is coherent with other research on relationships between personality, meaning in life and well-being (e.g., Ho, Cheung, & Cheung, 2010; Park, Park, & Peterson, 2010; Steger, Kashdan, Sullivan, & Lorentz, 2008).

Life-engagement is also a mediator of satisfaction with life and Neuroticism, but only in couples with infertility problems. The higher the level of Neuroticism, the lower the level of life-engagement, and then, the higher the level of life-engagement, the weaker the negative impact of Neuroticism on satisfaction with life. Neuroticism reflects an emotional style of processing particular situational stimuli and holistic life events, affecting life-engagement and determining satisfaction with life. However, the more the individual struggling with infertility sees the purpose of life and value of engagement in it (despite unfavorable dispositions), then the satisfaction with life is higher and the impact of Neuroticism is buffered. Among couples with infertility, Neuroticism may play a specific role, because as other research revealed, experiencing infertility increases anxiety, depression, feeling of worthlessness and vulnerability to stress (Greil, 1997; Nachtigall et al., 1992; Raque-Bogdan & Hoffman, 2015). These changes may persist for a long time, maybe until successful treatment or even longer. Although Neuroticism as a dispositional trait is relatively stable, specific life events and experiences, especially that are subjectively important and associated with personal desires, may modify its level (Caspi, Roberts, & Shiner, 2005). There is also research that indicates that a few months after a critical life event the level of traits returns to its baseline (Diener, Lucas, & Scollon, 2006). However, experiencing infertility is not a momentary point in time, but often lasts for years. In the face of this kind of experience, the level of Neuroticism may change for much longer. Then, if we gather couples with cured and uncured infertility, we have a differentiated group not only with respect to dispositional traits but also beliefs and satisfaction with life. A wide range of measured variables may be factors explaining why mediation models involving Neuroticism, Extraversion and Agreeableness turned out to be positively verified among couples with infertility problems, but not positively verified among couples without infertility problems.

The relations between Extraversion and Agreeableness, and satisfaction with life among couples with infertility are mediated by life-engagement in a similar way. The higher the level of Extraversion and Agreeableness, the higher the level of life-engagement, and then, the higher the level of life-engagement, the higher the level of satisfaction with life. Extraversion and Agreeableness are the most interpersonal dimensions of the Big Five. It can be especially important when we take into account that treatment of infertility requires trusting doctors or other specialists and obeying medical, dietary, psychological, physical or other indications. In this context especially, Agreeableness may play a crucial role, and as a trait it can determine not so much directly subjective well-being, as rather chances for successful treatment, and then it can result in increase of satisfaction with life. The effect is stronger

when the level of life-engagement is higher. So, again, being convinced about a valuable purpose of a chosen activity and meaning in life is a mediator of the relations between traits and subjective well-being among couples with infertility experience.

The belief about stability of human nature turned out to be the second significant mediator that was examined. This kind of belief mediates relationships between Conscientiousness, Neuroticism, Agreeableness, and Extraversion as traits and satisfaction with life as a display of subjective well-being among couples with infertility problem (the cured and uncured together). Generally, the belief about stability of human characteristics handicaps well-being and in the face of efforts to cure infertility, get pregnant and have children, a belief that human possibilities to change oneself are limited mediates the impact of dispositional traits on satisfaction with life. Similar to life-engagement, the belief about stability is the strongest mediator in a model comprising Conscientiousness. Perhaps this trait is a very specific factor in the context of not only treatment of infertility, but maybe also treatment of other illness, including somatic ones. In all cases where adherence to medical indications is a requirement to achieve goals, the power of motivation, determination, dutifulness and systematicity are necessary. According to the Information-Motivation-Behavioral skills (IMB) model proposed by Fisher, Fisher, Amico and Harman (2006), motivation is one of three main explanatory components of adherence to medical indications and affects effectiveness of therapy. Conscientiousness determines the kind and power of motivation for adherence to indications, so in turn increases the chances of effective treatment of infertility, what as an achievement of personally important goal (get pregnant and having a child) enhances satisfaction with life. The research revealed that this mechanism proceeds via belief about changeability of human nature (reversed pole of belief about stability) and life-engagement. A weak belief about possibilities of changes and a weak belief about worthiness of efforts, goals and chosen activity suppress the positive impact of Conscientiousness on satisfaction with life.

In addition, we explored differences between couples with cured and uncured infertility, and couples without infertility problems both with and without children. The analysis showed that couples with uncured infertility reported the lowest satisfaction with life, whereas couples with cured infertility had the highest life-engagement and the highest belief about changeability of human nature. Although the research at this stage was not longitudinal and there can not be formulated construal about changes, it can be supposed that experience of infertility as such, and then experience of successful or not successful treatment are significant differentiating factors in reference to subjective well-being and beliefs, and even traits. The question is – where exactly are causes of such huge differences, especially in terms of Neuroticism and Agreeableness? Perhaps these traits are in fact essentially primal and in some way determine what kind of situation (concerning health, education, family, occupation etc.) we face, or

maybe the situations really affect not only well-being and beliefs, but also dispositional traits. Then traits would become less dispositional than they were initially treated. It is a question for further research, especially the longitudinal ones, conducted in various groups, diversified with respect to kind of life situation and kind of activities taken as directed to fulfilment specific goal and life task.

The research suggests that among couples without infertility problems there are other situational and experience factors that probably moderate or mediate the influence of traits on satisfaction with life. Experience with infertility turned out to moderate the influence of Conscientiousness, Agreeableness, Neuroticism, and Extraversion on subjective well-being with a mediating role for belief about stability of human nature. At the same time the research shows that belief about stability of human nature plays a different role, depending on the participant sample. This kind of belief is especially important in the context of somatic and psychosomatic illness, when belief in the possibility for change in the form of recovery is a significant factor in mechanism headed for increase of well-being and maybe even for successful treatment. In this regard, the belief about changeability of human nature may be similar to self-efficacy as a regulatory belief. Although self-efficacy is a more agentic construct than belief about changeability, their functions are probably close enough for expecting positive changes. Just as self-efficacy enhances general persistence and efforts in attaining goals, positive emotions accompanying them, and coping with difficulties (Bandura, 2001), belief about changeability probably plays a similar role in the process of healthy treatment, including treatment of infertility. In other contexts, when situational factors are more differentiated, its role becomes more fuzzy. Some research revealed that belief about changeability is a protective factor for mental health, makes for coping with stress, enhances resilience (Miu & Yeager, 2015; Schleider, Abel, & Weisz, 2015). These connections can especially be important in the infertility context which demands endurance, constructive coping strategies and not giving up in the face of numerous failures with impregnation. Furthermore, fertility problems often entail social stereotyping or rebuff. In this regard, beliefs about changeability of human nature also may be an important protective factor and may reduce negative emotions and aggressive reaction, as it reduces among adolescent in response to social exclusion (Yeager, Trzesniewski, & Dweck, 2013). The belief about changeability of human nature probably works specifically, depending on age, situational and social context. In the present research, it was a mediator between traits and satisfaction with life only among couples with infertility.

In some, but not huge contrast to belief about changeability, life-engagement seems to be a more universal mediator – it functions both in couples with and without problems of infertility, however only in reference to Conscientiousness. How it was mentioned above, mechanism comprising such motivational variables as Conscientiousness and life-engagement probably leads to effective attaining of personally important (full of

subjective sense) life goals, and as a result it reinforces satisfaction with life. The other research revealed that relationships between traits and satisfaction with life differ depending on age, but regardless of developmental period, Conscientiousness is positively correlated with satisfaction with life, both among adolescents, adults, and older adults (Zalewska, 2018, in this volume). The other traits are connected with subjective well-being in various (or none) degree in different age groups. It displays that Conscientiousness is a trait that comparatively strong affect satisfaction with life, but in this process characteristic adaptations, such as belief about stability vs changeability of human nature and life-engagement play the mediatory role.

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