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**Changeability of personality traits and attitudes toward traits
in short time intervals**

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GENERAL DESCRIPTION OF THE WORK

The relevance of the research topic. In the context of the dispositional approach to personality, the issue of trait stability remains controversial: do traits change after adolescence? For many years researchers have believed that they do not: the stability of personality traits in adulthood has not been questioned and therefore has rarely been studied [for example, see Roberts et al., 2008]. Extant longitudinal studies confirm that personality traits change in childhood and adulthood [e.g. McCrae & Costa, 2008; Roberts et al., 2008; Specht et al., 2011], although the range of changes is small [McCrae & Costa, 2008; Roberts et al., 2017].

Long-term changes in traits are usually associated with changes in social roles due to age [Roberts et al., 2008], as well as different life circumstances. But how exactly do changes in traits occur: immediately after life events, or gradually accumulating [Roberts et al., 2017]? Are personality traits changeable in short time intervals and, if so, to what extent will these changes be observed with self-reporting personality tests?

Surprisingly, it remains poorly understood which circumstances of life lead to the change of personality traits. At the moment, there are several studies in which experts are trying to find out what circumstances of life influence changes in traits [Briley & Tucker-Drob, 2014; Jackson et al., 2012; Marsh et al., 2013; Specht et al., 2011; Zimmermann & Neyer, 2013, etc.]; however, as a rule, these studies are longitudinal, which means that they are long, comparative, and non-experimental from the methodological viewpoint. The results of longitudinal studies are difficult to interpret unequivocally as they do not accurately explain the causes of traits' variability in adulthood and their individual results are either not reproducible [e.g. Twenge, 2001] or controversial [e.g. Costa et al., 2000; Roberts et al., 2002]. Studying personality at short-time intervals can help answer questions about the characteristics and causes of trait variability. Short-term changes may occur due to random fluctuations or as a result of situational factors. Among these may be the information impact associated with a particular trait. Today, psychological information (including that of personality traits) has become an important part of the media landscape, through blogs, postings, popular

scientific journalism, etc. The influence of such information on peoples' judgements on traits of their personality and behavior has been practically not studied. But is it possible to change personality traits through a single information intervention, and if so, how stable these changes are?

On the one hand, this issue is important from the conceptual point of view; the variability of traits and the ways in which they can be changed (for example, by pharmacological influence or persuasion) can tell us a lot about the nature of traits and their stability. On the other hand, this seems important to us from a practical perspective: understanding the mechanism of personality traits' variability can be useful within, for example, frameworks of psychotherapy, personnel management, and correctional pedagogy.

Extant experimental literature has previously demonstrated that interventions can alter personality traits in short time intervals [see Roberts et al., 2017]. These works confirm the influence of the environment on the variability of traits. A serious limitation of these studies is that they were conducted mainly on clinical samples; in most cases, they did not study personality traits, but, contrariwise, anxiety or depression. Therefore, any changes in the taxonomies of traits (e.g., the “Big Five”) were considered a side outcome. Findings from a limited number of studies on non-clinical samples [see Roberts et al., 2017] also tentatively confirm that personality traits can change.

When studying the variability of traits, self-reports are normally used. Therefore, it remains unclear whether these results tap into changes in personality traits as one's motivational and behavioural trends [Fleeson, 2001] or otherwise in people's opinions about those traits (that is, in McCrae and Costa's terms, “characteristic adaptations”), and one's implicit personality theory [McCrae & Mõttus, 2019]. In other words, it is possible that the influence does not characterize the trait itself, but rather one's opinion on or attitude toward the trait. At the same time, the attitude toward the trait, in comparison with the widespread popularity of the construct of traits, remains understudied. Finally, changes in the self-reporting of traits may generally be associated with measurement error when using self-reporting tests [McCrae & Costa, 2008, p.

168], e.g., with a change in social desirability of certain responses during repeated measurements.

It has been empirically shown that social attitudes are a sufficiently malleable construct that can change under persuasive argumentation in short time intervals. There are several models of social attitude change, with the Elaboration Likelihood Model (ELM) by Petty and Cacioppo [Petty & Cacioppo, 1986] and the Heuristic-Systematic Model (HSM) by Chaiken and Eagly [Chaiken et al., 1989] among the most influential. Both models posit two major routes to persuasion that lead to changes in attitudes. The former, central route (in terms of ELM) requires considerable efforts from the recipient, but also makes it possible to change even strong attitudes. On the other hand, the latter, peripheral route is based on biologically significant, emotive cues (for example, physical attractiveness of a communicator or her or his social status) and requires little effort from the recipient; this route is effective only in relation to rather "weak" attitudes and gives mainly a "short-term shift" in the respondent's opinion.

The attitudes toward traits are defined as one's bipolar (positive/negative) social appraisals of existing behavioral and motivational trends; appraisals that are stored in semantic memory, without direct reference to any individual, including the respondents themselves [Shchebetenko, 2014, p. 132]. A number of studies have previously demonstrated that this construct uniquely and incrementally contributes to variation in one's actions and life events, beyond respective traits [Balabina, 2015; Mishkevich, 2018; Shchebetenko & Tyutikova, 2015; Shchebetenko, 2016a, 2017b, etc.]. But how malleable the attitude toward trait is? Under what conditions is it possible to change this attitude? Will the traits change in this case, given the covariance of traits with attitudes toward them?

In this dissertation, we investigate the variability of personality traits and attitudes toward them in short time intervals. Empirically, this problem is studied in the context of persuasive reasoning as a possible cause of the variability. In particular, personality traits may vary in line with the route of information processing [Cacioppo & Petty, 1986; Petty et al., 2015; Chaiken et al., 1989]: "peripheral", i.e., more superficial and

heuristic, or "central", i.e., deeper and more systematic. In addition, social desirability as a possible contributor to this variability is explored.

Among five global personality traits, in this study, we focused on extraversion. The reason for that was twofold. First, the traits are believed to be analogous within the five-factor model (FFM) framework and have, on average, a similar level of genetic determination [e.g., More et al., 2010; Vernon et al., 2008, etc.]. On the other hand, experimental studies show that, among the five traits, extraversion and neuroticism are volatile the most [Roberts et al., 2017, p. 130]. Extraversion has been more weakly associated with social desirability than neuroticism [see, for example, Ones et al., 1996], and respondents' attitudes toward extraversion have demonstrated consistent predictive validity [e.g. Balabina, 2015; Mishkevich & Shchebetenko, 2017; Shchebetenko, 2016a, etc.] and strong correlations with the trait [Shchebetenko, 2014] – as opposed to the attitudes toward neuroticism and conscientiousness.

Degree of elaboration of the research topic. Many studies, including meta-analytical ones, have addressed the variability in personality traits [e.g. Akhmetova & Slobodskaya, 2013; Bleidorn et al., 2009; Briley & Tucker-Drob, 2014; Costa, et al., 2000; Jackson et al., 2012; Lucas & Donnellan, 2009; Marsh, et al., 2013; Neyer & Lehnart, 2007; Roberts et al., 2006; Roberts, 2009; Soto et al., 2011; Specht et al. 2011; Twenge, 2001; Zimmermann & Neyer, 2013 etc.]; however, as mentioned above, for the most part, these works were either longitudinal or comparative.

At the same time, B. Roberts and colleagues found 207 quasi-experimental studies conducted over the last 50 years that measured at least one of the Big Five personality traits as dependent variables in short time intervals [Roberts et al., 2017]. 20 out of these studies were performed on non-clinical samples.

Empirical evidence confirms the possibility of changing social attitudes through persuasive argumentation [e.g. Bohner et al., 1995; Chaiken et al., 1989; Crano & Prislin, 2006; Petty & Cacioppo, 1986; Petty & Wegener, 1998; Teeny et al., 2016; Ziegler & Diehl, 2003, et al.]. Several theoretical models for changing attitudes by argumentation have been developed and validated [e.g. Chaiken et al., 1989; Petty & Cacioppo, 1986].

The concept of attitudes toward traits [Shchebetenko, 2014] was introduced in the framework of the five-factor theory (FFT) by McCrae and Costa [McCrae et al., 2008]. The attitudes toward traits are assumed to be a reflexive kind of characteristic adaptation, which is a key construct for the FFT. The attitudes toward traits has been shown to possess a theoretically sensible factor structure; A questionnaire measuring these attitudes has demonstrated acceptable construct and predictive validity [Balabina, 2015; Mishkevich, unpublished.; Shchebetenko, 2014, 2016b, 2016a, 2017a, 2017b; Shchebetenko & Tyutikova, 2015].

The **object** of the study is personality traits and attitudes toward them.

The **subject** of the study is the short-term variability of personality traits and attitudes toward them.

The **aim** of this study was to examine the variability in personality traits and attitudes toward them in short time intervals. Empirically, the problem was solved in the context of persuasive argumentation as a possible cause of this variability. Experimental manipulations were developed to target extraversion as a focal personality characteristic in this study.

The tasks of the study:

1. To analyze extant literature on FFM and FFT, social attitudes (in particular, attitudes toward traits), and the variability in personality traits and attitudes toward them.
2. To assess internal consistency, test-retest reliability, and factor validity of the Big Five Inventory (BFI; an instrument measuring the traits) and the BFI version that measures attitudes toward personality traits (ABFI).
3. To determine the degree and direction of changes in extraversion and the attitudes toward it due to persuasive argumentation in short time intervals; to study the autoregressive effects of previous measurements of a trait and attitude toward it on subsequent measurements of these characteristics.
4. To examine the variability in personality traits and attitudes toward them in short time intervals when arguing for or against extraversion with an emphasis on the peripheral route of information processing (Study 1).

5. To examine the variability in personality traits and attitudes toward them in short time intervals when arguing for or against extraversion with an emphasis on the central route of information processing (Study 2).
6. To determine the role of social desirability, as a factor that distorts the validity of the self-reporting tests, in the variability in the traits and attitudes toward them (Study 2).

The general hypothesis of the study: The variability in attitudes toward traits in short-term time intervals is a function of persuasive arguments conveyed in a message about extraversion; on the contrary, the variability in personality traits is not affected by such persuasive arguments.

Empirical hypotheses:

1. In short time intervals, persuasive argumentation regarding extraversion affects the social attitude toward it. In particular, if arguments (elaborated by both "peripheral" and "central" routes of information processing) were in favor of extraversion, the attitude becomes more positive, whereas counterarguments make the attitude more negative.
2. In short time intervals, persuasive argumentation regarding extraversion does not affect the variability of this trait.
3. Under the above conditions, when social desirability is controlled, personality traits do not change statistically significantly.
4. Under the above conditions, when social desirability is controlled, the attitudes toward personality traits change statistically significantly.

Procedure and samples. Two independent studies were conducted. Four hundred people participated in Study 1. Subsequently, several participants were excluded from the analysis; therefore, the final sample of Study 1 comprised of 363 students aged from 17 to 24 ($M = 19.10$; $SD = 1.05$), including 112 men (30.9%). Overall, 320 students of Perm universities aged 16 to 24 years ($M = 19.08$; $SD = 1.03$) took part in Study 2, including 75 men (23.4%).

Both studies administered similar procedures. In particular, within a quasi-experimental framework of the studies, three repeated measurements were carried out

with a time interval of four-six weeks. Before the second measurement (T2), a manipulation of the arguments in favor or against extroversion was conducted. Studies 1 and 2 differed in terms of the various procedures for manipulating arguments (see below for more details).

The total sample across both studies included 683 students of Perm universities. The participants did not studied psychology as a major. Their ages ranged from 16 to 24 years ($M = 19.09$; $SD = 1.04$); the total sample included 187 men (27.4%).

The theoretical premises of the study consisted of dispositional theories of personality traits [Goldberg, 1981, 1983, 1990; Gurven et al., 2013; John et al., 2008; McCrae & Costa, 1997] including the five-factor models and theory [McCrae et al., 2000] and the model of reflexive characteristic adaptations [Shchebetenko, 2014, 2016, 2017].

The study was based on research of social attitudes [Gulevich, 2007; Ajzen, 2001; Fazio, 1995; Katz & Stotland, 1959; Maio & Haddock, 2014; Petty & Wegener, 1998; Rosenberg & Hovland, 1960; Smith, 1947; Zanna & Rempel, 1988] including the ELM [Petty & Cacioppo, 1986] and HSM [Chaiken et al., 1989] models.

Methodology. The study included elements of experimental and quasi-experimental designs. The Russian version [Shchebetenko, 2014] of the BFI [John et al., 1991, 2008] and the ABFI questionnaire [Shchebetenko, 2014] were used. In the Study 2, included points of a lie scale from the Big Five Questionnaire (BFQ-2) [Caprara, et al., 2007] in the Russian adaptation [Osin et al, 2015] was added to the BFI.

The experimental manipulation of an extraversion argument was performed via the content of a short video lecture which described positive vs. negative properties of this trait (Study 1) or by involving the participants in self-argumentation by asking them to develop five arguments in favour or against extraversion (Study 2). The sample of Study 2 also included a control group that should have produced five arguments for a topic irrelevant to personality traits (namely, differences between intelligence models).

We used the following types of data analysis: descriptive statistics, Cronbach's α criterion, Pearson correlation analysis, confirmatory factor analysis, exploratory structural equation modeling, manifest autoregressive models, t -test for independent

samples, one-way analysis of variance, repeated measures analysis of variance, post hoc Fisher least-squares comparison, and covariance analysis.

The scientific novelty of the study. For the first time, the attitude toward extraversion was shown to be a strong attitude, which change is possible more likely via the central route of information processing (in terms of ELM model) than via the peripheral route. We found that the variability of social attitudes toward extraversion under the “central” self-argumentation condition may not depend on social desirability of a respondent. The study shows the stability of personality traits in relatively short time intervals (2—3 months), as well as their stability in relation to peripheral and central processing of information about these traits. Mean-level changes in traits across short time intervals became statistically insignificant when controlling for social desirability.

The theoretical contribution of the study connects to further development of the five-factor theory of personality. The findings on the greater stability of personality traits and the variability in attitudes toward traits indirectly confirm the tenets of the five-factor theory about innate nature of the traits and acquired nature of the characteristic adaptations, including attitudes toward traits. The results show that the central processing of argumentation in favour or against certain personality traits can influence the attitudes toward those traits in short time intervals. On the contrary, the peripheral processing of arguments, according to the data obtained, does not affect the variability of social attitudes toward traits. It was not established that the central and peripheral processing of arguments can influence the variability of self-reporting traits in a short-time interval.

The practical implications of the study.

The possibility of changing people’s attitudes toward the traits through argumentation and self-argumentation has been demonstrated. Given the connection of attitudes toward traits with various life outcomes, we consider this result important for psychotherapy and applied social psychology. The results of the study can be used in the context of psychotherapy and pedagogy.

The reliability and validity of the measurements are ensured by the theoretical premises of the study, the adequacy of its methodology, and high statistical power of hypotheses testing due to psychometric quality of the instruments used and sufficient sample sizes. The mathematical data processing was performed using MS Excel 2016, IBM SPSS 23.0, AMOS SPSS 22.0.0., and MPlus 8.2 software.

Items to defend:

1. The attitudes toward extraversion are a more malleable construct than the extroversion trait. This was confirmed by the variability of the attitude toward it under the persuasive argumentation in short time intervals of 8-12 weeks. This was also demonstrated by the results of autoregressive modeling: extraversion values were more predicted by the values of previous extraversion measurements than by the previous values of attitudes toward extraversion.
2. Changes in attitudes were observed due to the central processing of arguments and were not observed due to the peripheral processing of arguments. However, even when the central processing was conducted, the changes in attitudes proved to be unsustainable, and there was a partial "rollback" to their initial values. It means that the attitude toward trait is a subjectively important phenomenon, the changeability of which most likely comes from significant efforts, involvement of the individual and, presumably, the repetitive central processing of arguments.
3. Attitudes toward personality traits (the Big Five model) can change over the course of 8-12 weeks, regardless of the persuasive arguments provided during this period. However, the observed changes can be fully or partially explained by the covariance of attitudes toward traits with social desirability. Exceptions are the changes in attitudes toward extraversion and openness that were independent of social desirability. It should be taken into account that extraversion was a focal experimental trait in this study.
4. Personality traits do not change over the course of several weeks against the background of central and peripheral argumentation. However, empirically, the mean values of self-reporting traits can change over several weeks, probably due to relevant behaviour. For example, the self-reported openness to experience may be reduced as

a result of a cognitively difficult task. However, this effect seems to be eliminated by social desirability.

Approbation of the study. The main results of the work were presented at the International Conference “Ananievskiye chteniya 2016. Psychology: Yesterday, Today, Tomorrow” (St. Petersburg, 2016), the All-Russian Conference “Procedures and Methods of Experimental Psychological Research” (Moscow, 2016), the fifth biennial Conference for the Association for Research in Personality (Sacramento, California, USA, 2017), the All-Russian Conference “XXXII Merlin Readings: Abilities. Talent. Individuality” (Perm, 2017), the All-Russian jubilee scientific conference “Fundamental and Applied Research in Modern Psychology: Results and Perspectives” (Moscow, 2017), the 19th European Conference on Personality (Zadar, Croatia, 2018), the All-Russian Scientific Conference “Human Psychology as a Subject of Knowledge, Communication and Activity” (Moscow, 2018), the 3rd World Conference on Personality Psychology (Hanoi, Vietnam, 2019). The findings were discussed at a methodological seminar of the Developmental Psychology Department of Perm State University (Perm, 2016). Several aspects of the thesis were supported by grants of RFBR № 18-013-00096 and № 18-313-00034.

Structure of the thesis. The thesis consists of an introduction, three chapters, a conclusion and a list of references, including 188 titles, 34 out of them were in Russian; as along with seven appendices. The text includes 26 tables and 13 figures. The total thesis text comprises of 162 pages.

THE MAIN CONTENT OF THE THESIS

The **Introduction** reflects on the relevance of the research; describes the extent of the previous research on the problem; describes the object, subject, goals, and tasks of the research; formulates the general and empirical hypotheses; describes the empirical, theoretical and methodological bases of the research as well as the methods, scientific novelty, theoretical and practical significance of the research; and determines the items submitted for defense.

The first chapter, “**Theoretical and methodological basis for the study of the variability of personality traits and attitudes toward traits in short time intervals**” is devoted to a theoretical analysis of approaches to the study of personality traits, social attitudes, the variability of personality traits, and attitudes toward traits.

The first paragraph, “*Dispositional approach to personality*,” describes different approaches to personality within the framework of dispositional theory (the approaches of G. Allport, R. Cattell, and H. Eysenck), and one of the personality traits, extraversion, is considered in detail. The FFM by McCrae and Costa [McCrae & Costa, 2008] and the model of reflective characteristic adaptations [Shchebetenko, 2015] are further discussed.

The “*Different approaches to the theory of personality traits*” section describes the basic theories within the framework of the dispositional approach. The basic premises of Allport’s trait theory [Allport & Allport, 1921; Allport, 1966] are described. The views of Cattell on the structure and organization of personality [Cattell, 1946] are analyzed. The differences between Cattell’s and Eysenck’s approaches to the study of personality are discussed. The section describes the basic premises of the personality theory of Eysenck [Eysenck, 1967, 1982]. The section discusses the beginning of the Big Five theory and its validity for different cultures, including the Russian one.

The extraversion personality trait is further discussed in detail. The development of views on extraversion, going back to Jung’s works [Jung, 1921/1995]. The specifics of extraversion in the theory by Eysenck [Eysenck & Eysenck, 1963, 1985] and the biological basis of the trait are discussed. The features and structure of extraversion in the five-factor personality theory are considered [Costa & McCrae, 1992].

In the “*Five-factor model of personality and reflexive characteristic adaptations*” section, the main provisions of the FFT [McCrae & Costa, 2008] are discussed. The structure of personality in this model is analyzed: personality traits are postulated to be completely inherent and form so-called “basic tendencies,”; another structural component of FFT, “characteristic adaptations” develops under external influences and basic tendencies; characteristic adaptations provide specific conduct in which the traits are manifested, that is, they mediate the influence of traits on human behavior [McCrae

& Costa, 2008]. Next, the views of several authors [McAdams & Pals, 2006; DeYoung, 2015], on characteristic adaptations are discussed. The model of reflective characteristic adaptations [Shchebetenko, 2015] is further described.

The second paragraph, “*Social attitudes toward traits*,” reviews the history of the research of social attitudes; the definitions of the attitudes, their structure and functions; and theoretical premises and backgrounds for the concept of attitudes toward traits, its definition and several evidences on its predictive validity.

The “*Social attitudes*” section reviews the history of the social attitudes research, dating back to the introduction of the concept by Thomas and Zanetsky in 1918, followed by the first studies of the attitudes, the studies by Hovland and colleagues, the transition to the cognitive paradigm in the study of attitudes, including the theories by Festinger and by Aizen and Fishbein, along with modern trends in the research of the attitudes. Next, we discuss the structure of the attitudes and their functions.

In the “*Conceptualization of the construction of attitude toward traits*” section, a reflexive kind of characteristic adaptations is analyzed, namely the attitude toward a trait. The attitudes toward traits are defined as one’s bipolar (positive/negative) social appraisals of existing behavioral and motivational trends; appraisals that are stored in semantic memory, without direct reference to any individual, including the respondents themselves [Shchebetenko, 2014, p. 132]. Theoretical and empirical premises of this concept are considered. Measurement of attitudes toward traits, the construct’s structure, its construct validity, and the difference from other phenomena (connections and similarities/differences between the personality traits themselves) are further discussed. The author raises the problem of the constructive validity of the attitudes toward traits in connection with the conceptual similarity between this construct and that of values and value orientations. Afterwards, empirical evidences on predictive validity of attitudes toward traits are analyzed [Balabina, 2015; Shchebetenko & Tyutikova, 2015; Shchebetenko, 2016, 2017].

The third paragraph, “*Variability of traits and attitudes toward traits*,” presents different approaches to the variability of attitudes due to persuasive argumentation, as well as the variability of personality traits in different time intervals.

The “*Variability of personality traits in different time intervals*” section depicts the extant empirical findings on mean-level changes for all traits in middle and late adulthood. The limitations of the presented studies are analyzed and models that try to explain the reasons for changing personality traits in adulthood are discussed. The social personality model [Roberts & Woods, 2006; Roberts & Jackson, 2008], which explains the development of personality through the influence of the environment is considered; the empirical findings confirming this theory are presented and reviewed. Some premises of the FFM by McCrae and Costa [McCrae & Costa, 2008] are reviewed, according to which the effect of the environment on the change of traits is denied, except for the case when the environment changes the biological basis of traits and the variability of traits is related to “maturation.” Experimental studies of personality trait variability are discussed; it is concluded that the available research data are insufficient and difficult to interpret unambiguously. Further, possible measurement errors during repeated measurements of personality traits are analyzed; the STARTS model [Anusic et. al., 2012; Anusic & Schimmack, 2016], the impact of social desirability on self-reporting instruments [Paulhus, 2017] are discussed, and predictors of high social desirability are provided [Osin, 2011]. It is concluded that social desirability may decrease between measurements due to changes in situational factors (for example, stress levels). As a consequence, this may affect the discrepancy between the original answers of the participants and the answers they give in subsequent measurements.

In the “*Variability of attitudes, ELM and HSM models,*” the main models of attitude changes are considered. The basic conditions of successful persuasion according to the results of Hovland and colleagues are described; the ELM [Petty & Cacioppo 1986] and HSM [Chaiken et al. 1989] models are analyzed in detail. The main theoretical premises behind these models are discussed and the similarities and differences between the central and peripheral paths, as well as the heuristic and systematic, modes of information processing are reviewed and analyzed.

In the conclusion of the first chapter, the hypotheses of the study are put forward and their justifications are given.

In the second chapter, **“Planning, organization, and performance of the study,”** the sample, methodology, experimental design, and psychometric properties of the questionnaires are reported.

The first paragraph, **“Organization of the study,”** contains a detailed description of the sample of both studies; the methodology and research design are described. The quasi-experimental design included three stages in both studies: At the first stage, the participants filled out the BFI and ABFI questionnaires and other tests that were not analyzed in this study. Four-six weeks later, at the second stage, the argumentation manipulation for/against extraversion was conducted; immediately after that the BFI and ABFI questionnaires were again completed by the participants. Afterwards, four-six weeks later, at the third stage, the participants once again completed BFI and ABFI questionnaires. Finally, the participants were thanked and fully debriefed. The argumentation of Study 1 was based mainly on the cues of the peripheral information processing, which did not require any effort from the recipient [Petty, Cacioppo, 1986; Crano, Prislin, 2008]. By contrast, Study 2 stimulated cues of the central route which required effortful processing. In Study 1, the participants were randomly split into two equal groups. To manipulate the arguments, a short film lecture was shown to the participants. The lecture told about either negative or positive aspects of extraversion, to either subgroups, respectively. In Study 2, the participants were randomly tasked with arguing either for extraversion, against it, or with regard to an irrelevant topic (control group). All three conditions included a text and two questions. The first two conditions contained the same text with a definition of extraversion and a description of a “definite” extrovert and introvert. The text was compiled considering all the facets of extraversion [Costa & McCrae, 1992]. The text for the control group described two approaches to intelligence: intelligence as a single-factor phenomenon, and as a set of multiple mental abilities. Upon reading the text, the participants were asked to answer the following question (in two variants): “Imagine that your friend thinks that being an extrovert (*introvert*) is good. Try to convince her or him that it is otherwise better to be an introvert (*extrovert*). Give at least five arguments.” The following instructions were given to the control group: “Imagine that your friend believes that intelligence consists

of many independent “intellects.” Try to convince him or her that intelligence is one common factor. Give at least five arguments.” Thus, the “central processing” of information on extraversion was activated by means of situationally increased involvement of the participants into the subject (cf., the classical experiment by Petty, Cacioppo, & Schumann, 1983).

The paragraph “*Psychometric properties of the questionnaires*” presents psychometrics of the BFI and ABFI. The BFI subscales had from acceptable to high internal consistency (Cronbach’s alpha from .71 to .83), whereas the ABFI scale had sufficient internal consistency (from .66 to .76). The BFI and ABFI subscale revealed at least acceptable retest reliability. Three alternative confirmation factor analysis (CFA) models were built for each of the questionnaires and three models were tested by exploratory structural modeling (ESEM). In both cases, the model consistent the most with the data was the one that took into account the presence of two latent higher-order factors and a covariance of the questionnaire items corresponding to the five traits. This reflects the theorization on the presence of five personality traits combined into two higher-order factors, “plasticity” and “stability,” [DeYoung, 2015]. These results provide evidence on the factorial validity of BFI and ABFI.

The third chapter, “**Empirical study of the changeability of personality traits and attitudes toward them,**” describes the results of two empirical studies on the variability of personality traits and attitudes toward traits in short time intervals.

In the first paragraph, “*Stability of characteristics of extraversion: autoregressive models*” describes the results of the study on the variability of the extraversion and attitudes toward it using manifest autoregressive models. Two models were built. Model 2 had good fit indices and was substantially better than Model 1. It included first-order and second-order autoregressive effects, i.e., the impact of all previous measurements of extraversion on subsequent measurements of the trait was assessed. At the same time, the cross-lagged effect of the attitude toward extraversion at trait extraversion was also assessed. A similar model was evaluated for social attitude toward extraversion as an endogenous variable. Both the extraversion and the attitude showed sufficient temporal stability by testing the autoregressive models. It was shown that the trait was mainly

predicted by its previous measurements, whereas the attitude toward extraversion was mostly predicted by its previous measurements. At the same time, the trait was more explained by previous measurements as compared to the attitude, which means that the trait was more temporarily stable than the attitude. The cross-lagged effects were weaker though at times statistically significant. It means that a person's perception on his or her trait extraversion may depend in part on his or her previous social attitude toward extraversion. Similarly, the attitude toward extraversion may depend in part on previous self-reported extraversion. These effects should be considered as artifacts that require their further explicit research.

In the next paragraph “*Comparison of subgroups before argumentation*,” a comparison was made between the positive extraversion and positive introversion groups at T1, i.e., before the argument manipulation. The two groups in Study 1 did not significantly differ in the parameters measured. In Study 2, the assumptions for the analysis of variance were first tested; consequently, one observation which showed an extreme value on the neuroticism subscale was removed. Afterwards, at T1, no statistically significant differences were found between the two experimental groups and the control group.

The paragraph “*Study 1. Presentation of arguments in the video lecture*” describes the results of Study 1. The peripheral processing of the positive vs. negative message, which consisted in passive watching the video lecture on extraversion, did not have a significant impact on this trait (Fig. 1). However, there was a tendency to change the *attitude* toward it: significant differences were found between T1 and T3 for the positive-introversion group (Fig. 2). An effect of argumentation was also obtained for the attitude toward agreeableness: those who watched the lecture about advantages of introversion reported more negative attitudes toward agreeableness, whereas those who watched the lecture about the advantages of extraversion did not change significantly in their attitudes toward agreeableness.

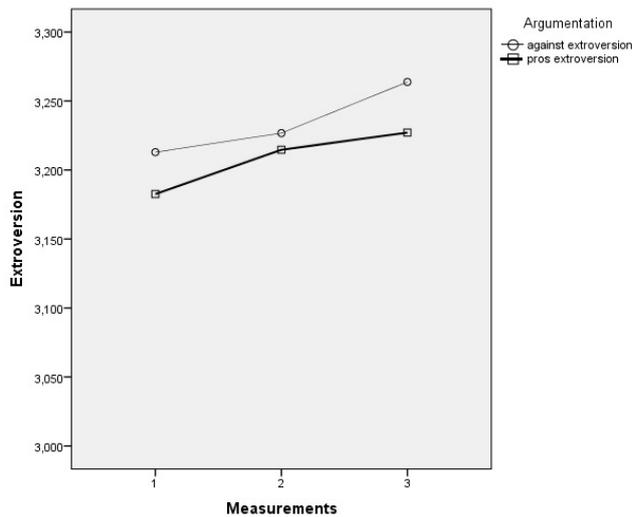


Figure 1. Statistically insignificant changes in extraversion depending on the argumentation and time of measurement (Study 1).

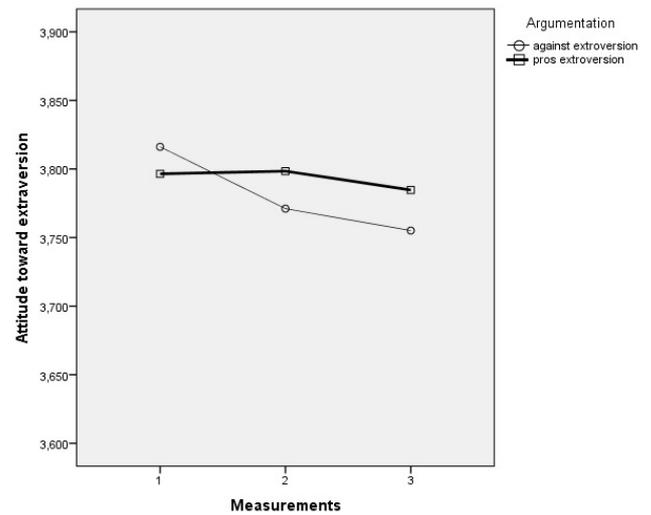


Figure 2. Statistically insignificant changes in the attitude toward extraversion depending on the argumentation and time of measurement (Study 1).

We believe that the similarity in findings for attitudes toward two different traits under the argumentation in favor of extraversion can be explained by a “ceiling” effect: the attitudes toward agreeableness and extraversion were on average positive initially and further argumentation in favor of extraversion was limited by this initial positivity.

Thus, the argumentation affected the attitude toward agreeableness, although it was not intended. This result can be explained in terms of peripheral processing. In particular, passive watching an extraversion lecture did not help to identify the nuances that distinguish this trait from other traits. Consequently, it is possible that the participants interpreted the lecture on extraversion broadly as a lecture on a "good person at all". In particular, based on the negative argumentation, the participants could conclude that being a "good" person and being pleasant in communications is "bad", "as psychologists believe," which explains the negative impact of argumentation regarding extraversion on the attitude toward agreeableness. However, it remains unclear why this effect manifested itself only in relation to the attitude toward agreeableness, but not the other three Big Five traits.

Significant changes in self-reported neuroticism were also found (Fig. 3). These changes were not moderated by the argumentation; therefore, in our view, they were caused by methodological issues of repeating measurements. For example, the situation

of "psychological testing" may possibly activate an impression of *clientness*; that is, a role of the participants in this situation had negative meaning: "I'm being studied by the psychologists, because something is wrong with me." However, within a few months of repeated measurements, the respondents may accustom to this situation. This, as a consequence, could reduce the average value of self-reported neuroticism from T1 to T3.

Finally, significant changes were observed with regard to the attitudes toward conscientiousness, emotional stability, and openness. They became more socially negative from T1 to T3, regardless of the argumentation. Since these were the main effects, there is a good reason to believe that it was caused by the procedure itself. Similar to the neuroticism case, the participants could enter a negative "state of the subject of evaluation," leading them to report socially desirable attitudes toward the traits. However, with repeated measurements, this condition could weaken, which lead to a negative trend in the attitudes toward traits, in this sense, to more adequate attitudes. It is worth reiterating that these results on neuroticism and attitudes toward four personality traits are explorative, that is, these findings should be explicated and replicated.

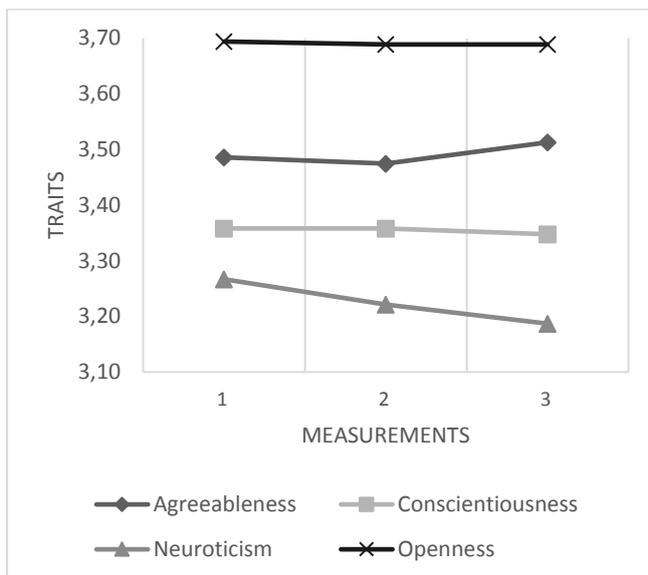


Figure 3. Of the four personality traits, only neuroticism statistically significantly changed across the measurements (Study 1).

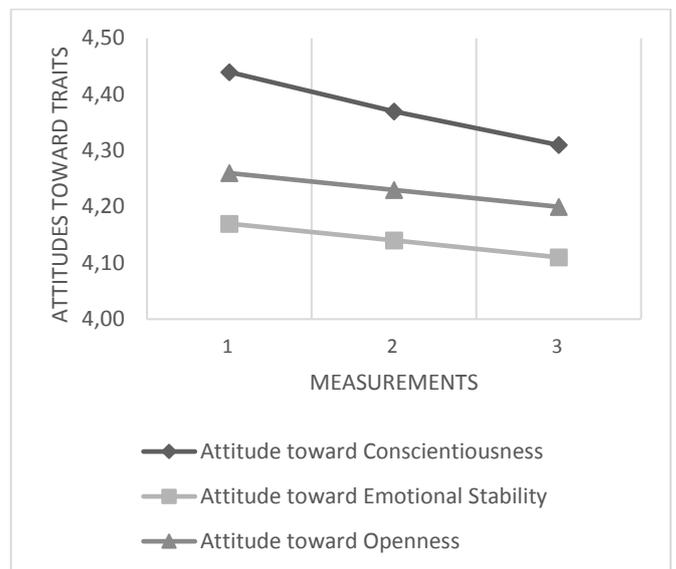


Figure 4. Statistically significant changes in the attitudes toward traits across time moments (Study 1). *Note:* For clarity, the attitude toward neuroticism is switched to the opposite scale, the attitude toward emotional stability.

Study 1 confirmed our assumptions about the greater stability of personality traits compared to attitudes toward traits, as shown by the lesser changes in the traits between time moments as compared to the attitudes toward traits. In addition, it was shown that the peripheral route of persuasion can lead to changes in the attitudes, including non-specific ones, outside of the target trait (in this case, extraversion). However, this effect has proved to be statistically weak and requires further investigation. In this regard, Study 2 modulated the situation of central message processing by means of high involvement of respondents.

In the paragraph “*Study 2. Involvement of subjects in argumentation,*” the results of the second study are given. In Study 2, we examined if the findings of Study 1 are reproduced when the participants were more involved in the argumentation process, i.e. when the central route is activated.

Extraversion did not change substantially across the central processing of positive vs. negative arguments regarding this trait. (Fig. 6). This result is consistent with Hypothesis 1.

Again, as in Study 1, the participants’ attitudes toward extraversion became more socially negative, but unlike Study 1, the attitude changed significantly not only across measurements, but also due to an interaction between the time moments and positive/negative argumentation (Fig. 7).

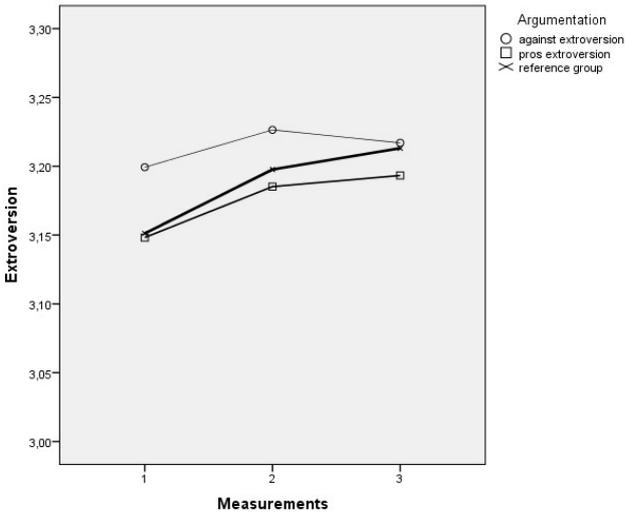


Figure 6. Statistically insignificant dynamics of extraversion across the measurements (Study 2).

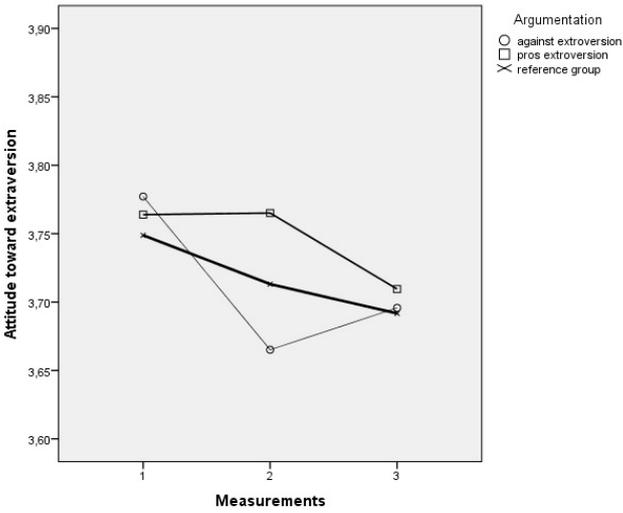


Figure 7. Statistically significant changes in attitude toward extraversion across time moments and various argumentation (Study 2).

This interaction mirrored nonlinear temporal changes in the positive-introversion group. At T2 (immediately after the argument exposure), there was an extremely strong increase in negative attitudes toward extraversion. This obviously resulted from the central processing of negative information about this trait. However, by T3 the effect of the experimental manipulation presumably went down, which led to a more positive attitude toward extraversion. Thus, a single episode of central processing was sufficient for a transient shift in the attitude. Future studies may examine whether attitudes toward traits change constantly through repetitive central processing.

In the positive-extroversion group during T2 (i.e., immediately after the exposure), the attitude remained stable as compared to T1. Usually, we observed a steady increase in socially negative attitudes toward the traits across the measurements; conversely, this stability could result from the experimental manipulation. In particular, in this group, the attitude toward extraversion may not become more negative as the participants produced arguments in favor of extraversion; however, by T3, this argumentation effect nearly disappeared, which led to an increase in negative attitudes toward extraversion in this group as well. Notably, in the control group, the attitude toward extraversion steadily became more negative across the measurements, which corresponds to the general negative trend in the attitudes.

The absence of non-specific effects on social attitudes toward non-extraversion traits was also important. In particular, in comparison to Study 1, Study 2 revealed no effect on the attitude toward agreeableness. This result is consistent with our abovementioned interpretation. The central route may allowed respondents to distinguish extraversion from other traits more effectively than the peripheral route; therefore, the central argumentation had no effect on the attitude toward an irrelevant trait, agreeableness.

Thus, the arguments based on central cues (Study 2) had an impact on the attitude toward extraversion. This effect was substantial in terms of effect size, but weak in temporal terms. Such "resistance" of this attitude can testify in favor of its strength [Krosnick & Petty, 1995; Howe & Krosnick, 2017]. If the attitudes toward personality traits represent strong attitudes, they should influence one's cognition and conduct

[ibid], as was preliminarily confirmed in several studies [e.g., Balabina, 2015; Shchebetenko & Tutikova, 2015; Shchebetenko, 2016].

Many results revealed in Study 1 were reproduced in Study 2. Thus, self-reported neuroticism repeatedly decreased between the measurements. This finding allows us to assume that when self-reported neuroticism is measured only once, there may be an overestimation of its true value. An alternative explanation is also possible: across repeating measurements, self-reported neuroticism begins to decrease relative to its true value. On the other hand, Study 2 revealed a significant decline in openness, a trait also irrelevant to the extraversion argumentation; recall that this effect was not observed in Study 1. We assume that this change in openness was determined by the experimental manipulation employed. This effect is similar to that reported by Schwartz et al. [1991]. They studied the impact of ease of finding information on self-esteem, and observed that if the participants were asked to reproduce a large number of examples of the manifestation of traits in their behavior, they later reported a *decreased* level in those traits as compared to the participants who were exposed to a subjectively less complex task (to reproduce fewer examples). Perhaps in our study, when faced with a subjectively difficult task (to come up with at least five arguments on a given topic), the participants later estimated themselves as less creative or less inquisitive due to subjective complexity of the task. Opposite effects in personality trait change were observed during psychotherapeutic interventions aimed at increasing openness to experience. In particular, Jackson and colleagues [Jackson et al., 2012] found that a 16-week-long cognitive training for older persons increased their self-reported openness.

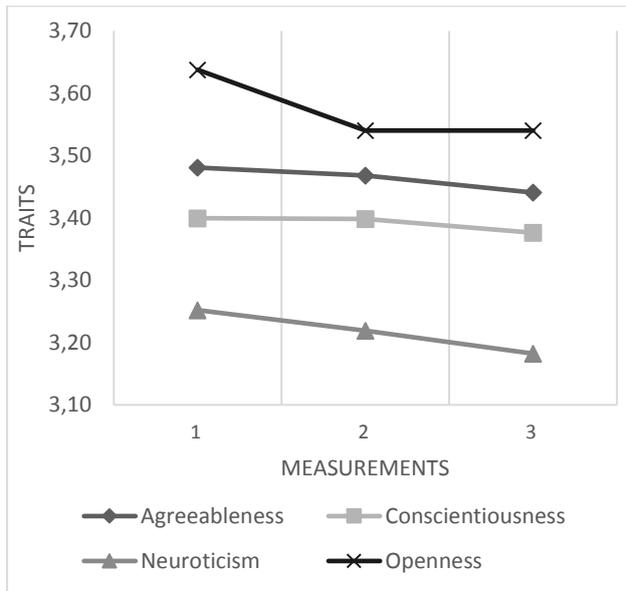


Figure 8. Neuroticism and openness statistically significantly changed across the measurements (Study 2).

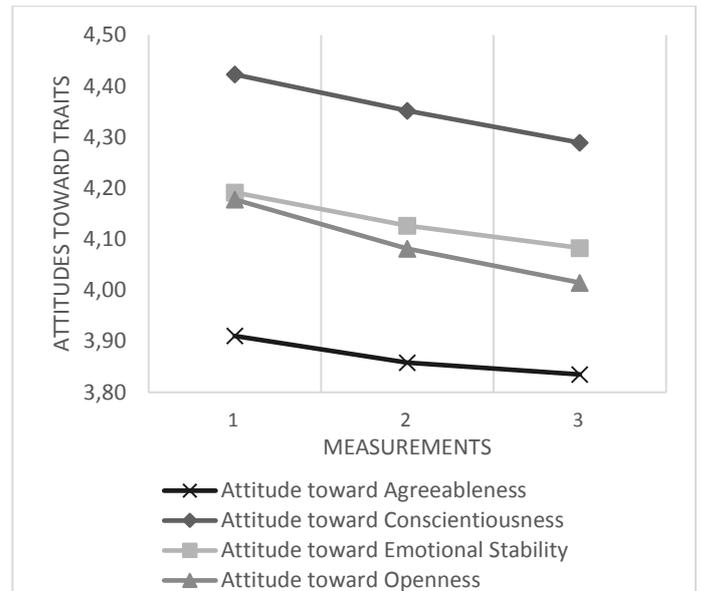


Figure 9. Statistically significant changes in the traits across the measurements (Study 2).
Note: The attitude toward neuroticism was reversed and is represented as the attitude toward emotional stability.

Another iterative effect was found for the attitudes toward the remaining Big Five traits: all of them shifted to the socially negative pole across the measurements, regardless of argumentation (Fig. 9).

Since the measurements were divided by a rather short period of time (i.e., four-six weeks), the probability that the attitudes toward traits and the traits themselves substantively changed for some reason other than the argumentation was negligible (especially with the replication). In this regard, we assumed that across the measurements these are the self-reported estimates of attitudes that change rather than the attitudes per se. Self-reporting tests measure both people's opinions on their attitudes (so-called explicit ones) and their implicit attitudes that operate at an associative level [Greenwald et al., 2002]. In a similar fashion, we can assume that at different time points, people can give more or less accurate estimates of their attitudes toward traits. In this case, presumably, at T1, the estimates of the attitudes deviated markedly from their true values. This could be due to factors such as social desirability. To test this assumption, we added a social desirability scale to the BFI at T1 of Study 2. The variance explained by social desirability eliminated the differences in attitudes toward all traits (except openness), as well as for self-reported neuroticism and

openness across the measurements. For the attitude toward openness, the difference between time moments remained significant even when social desirability was controlled. However, the Fisher criterion value for the main effect of time moments in this case decreased six times compared to the model with no control of social desirability.

Social desirability influenced not the variance of the attitudes and the traits themselves, but the variance of their variability, i.e., it made the variability of attitudes and traits insignificant. The observed variability did not result from time (or other factors associated with repeated measurements), but from social desirability before argumentation. It should be noted that observed amount of temporal variability was generally small. Generally speaking, the effect of social desirability, albeit limited in its size, was sufficient to make the changes between measurements insignificant.

In this regard, the interpretations of psychotherapy effects on reduced self-reported neuroticism across repeating measurements are of special interest (see the meta-analysis by Roberts et al., 2017). Based on our findings, we advise to control for social desirability of patients in such studies.

Another important result was the interaction between time moments and argumentation on the attitude toward extraversion which remained significant even after social desirability had been controlled. This finding confirms the hypothesis on the attitudes toward traits varying depending on positive vs. negative arguments with regard to those traits. However, this effect was more pronounced in the central processing condition rather than in the peripheral processing condition.

Of interest, the self-reported personality traits did not change because of these manipulations. In other words, a person's opinion on trends in his or her conduct and motivation may be sufficiently resistant to evaluative information about these trends.

In an applied perspective, the results obtained can be used within the framework of psychocorrection and pedagogy, because the attitudes toward traits are reported to be associated with various life outcomes (e.g., preferences in art [Shchebetenko & Tyutikova, 2015], academic achievements [Shchebetenko, 2017b; Mishkevich, 2019], sociometric status [Balabina, 2015], etc.). There is thus a possibility that, by changing

the attitudes toward traits of an individual, it is possible to affect his or her life outcomes as well. It is conventional for personality psychology to raise a question of changing personality traits via corrective actions. However, changes in the attitudes toward traits open up an intriguing prospect, given their incremental contribution to life outcomes.

The **Conclusion** summarizes the results of the study. This work was aimed to study the changeability of personality characteristics (traits and attitudes toward them) in short time intervals under varying conditions of information processing about these characteristics. It was shown that the attitudes toward traits can be changed via the central processing route, i.e. by involving the participants in the argumentation. The effect with regard to the attitude toward extraversion was quite pronounced, but short-lived. On the contrary, when the peripheral route was activated, i.e. when the message was passively processed, the attitude toward extraversion changed insignificantly: a post-hoc effect was observed only between T1 and T3. However, this effect of peripheral processing manifested itself in a non-specific way influencing the attitude toward agreeableness as well. In general, the peripheral processing produced weak and nonspecific effects. These results are consistent with the postulates of the ELM model [Cacioppo & Petty, 1986, 2012], which characterizes variation in social attitudes and opinions depending on two main routes of message processing. In addition, these findings provide evidence on the stability and strength [Krosnick & Petty, 1995; Howe & Krosnick, 2017] of the attitudes toward extraversion.

This study has confirmed a number of FFT tenets regarding the variability in personality traits. In particular, the study showed the stability of traits not only in relatively short time intervals of four-six weeks, but also their stability against an impact of argumentation. Conversely, the attitudes toward traits (a reflexive kind of characteristic adaptation) showed their *larger* mean-level changeability both across time moments and under various arguments. These facts indirectly support the FFM's postulates on heritability of the traits and acquired nature of characteristic adaptations; however, in this study, this variability was largely due to social desirability of the participants. This result is also consistent with the FFT premises [McCrae & Costa,

2008]. However, the mean-level changeability in the attitude toward extraversion — the focal trait of our research — remained substantial even when social desirability had been controlled, a result of fundamental importance. Thus, a number of factors that may lead to variations in personality traits in short time intervals include both social desirability and the processing of information about these traits.

The present work also has important methodological implications. For certain reasons, personality psychology builds upon the correlational design as opposed to the experimental design [Cronbach, 1957; Eysenck & Eysenck, 1980]. In this work, we tried to use a quasi-experimental approach in the personality context, which has been more characteristic of social and cognitive psychology rather than the trait theory. In fact, the most general objective of this study was to bring together two different approaches to the research of behavior — the theory of traits and the socio-cognitive paradigm. In this regard, we have set and solved a problem, which is rather typical for social and cognitive research. In other words, we examined a role of argumentation and self-argumentation. However, this problem was placed in a quite unusual context, the context of personality characteristics. In our view, this approach opens up interesting prospects for further research in this area.

General conclusions of the study:

1. According to the five-factor theory, personality consists of biologically conditioned basic tendencies, including traits, and characteristic adaptations that are driven mainly by social factors. It presumes that the former are stable across time moments, whereas the latter are more changeable. The characteristic adaptations include a wide range of skills, values, and attitudes. One of them could be attitudes toward traits. Two studies presented in this thesis have confirmed this assumption: the attitudes toward traits varied more intensely than personality traits; therefore, the former can be treated as a kind of characteristic adaptations.
2. The Russian-language versions of the BFI questionnaire as well as the BFI version measuring the attitudes toward traits showed adequate psychometric properties. Internal consistency and test-retest reliability of the subscales were good or adequate. The subscales of both questionnaires showed sufficient factor validity.

3. Manifest autoregressive models showed high temporal stability of extraversion and the attitude toward it. Extraversion was mainly predicted by previous measurements of this trait, while the attitude toward extraversion was predicted by previous scores on this attitude. At the same time, the trait was more stable than the attitude. Cross-lagged effects were substantial occasionally: the attitude toward extraversion predicted in several instances subsequent values of the trait itself, and vice versa, trait extraversion predicted future values of the attitude toward it.
4. The central processing of argumentation was stimulated via asking the participants to generate arguments in favor or against extraversion which led to a change in the attitude toward it. This effect was strong enough, but short in its duration. On the contrary, the peripheral processing of arguments about positivity/negativity of extraversion produced less pronounced and less specific effects influencing the attitude toward agreeableness. The peripheral processing produced longer but weaker effects revealed only in post-hoc comparisons between T1 and T3. In general, these results confirm the first empirical hypothesis about the influence of argumentation on the attitude toward extraversion.
5. Persuasive argumentation in both studies did not have a significant impact on the trait of extraversion, confirming thereby the second empirical hypothesis on stability of extraversion in short time intervals and under an influence of argumentation.
6. Across two studies, agreeableness, conscientiousness, and extraversion did not change significantly from measurement to measurement or due to an argumentation. At the same time, in both studies, neuroticism significantly decreased across the measurements— without any influence of argumentation. Study 2 revealed a significant decrease in trait openness after the experimental exposure, regardless of a type of the exposure. Conversely, in Study 1, openness did not change significantly across time moments. This result suggests a possibility of self-reported personality traits to vary in short time intervals. However, the nature of this variability has remained artefactual in this study and requires further research.
7. Variance related to social desirability made insignificant changes in self-reported neuroticism and openness across the measurements. These results confirm the third

empirical hypothesis on temporal stability of personality traits while controlling for social desirability. Returning to Conclusion 5, we assume that social desirability may contribute to short-term variability in self-reported traits.

8. The attitudes toward all traits shifted to the socially negative pole across the measurements, regardless of the argumentation presented. In Study 1, the attitude toward agreeableness changed from measurement to measurement under an argumentation. This result can be treated as accidental, as it would not be subsequently confirmed in Study 2. Variance explained by social desirability was sufficient to eliminate differences between measurements for attitudes toward all traits, except openness and extraversion. Given that the experimental manipulations were aimed at the attitudes toward extraversion, this fact confirms that the attitudes toward traits can vary depending on argumentation regarding a given trait. It also suggests an important contribution of social desirability to possible short-term variability in the attitudes. However, the result in terms of the attitude toward extraversion also suggests that the attitude may vary depending on the processing of the information presented about the trait.

Papers published by the author in leading peer-reviewed research journals and sources indexed by Scopus or Web of Science:

1. Mishkevich A. M. Personality traits and attitudes toward traits: relationships and differences // Psychology. Journal of Higher School of Economics (accepted for publication)
2. Mishkevich A. M., Shchebetenko S. A. Sex differences in the Big Five of personality: looking through the attitudes toward traits // Psychology. Journal of Higher School of Economics. 2018. Vol. 15, No. 3. pp. 562-572.
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Publications in journals on the list of HAC:

4. Mishkevich A. M. Personality traits as a predictor of high school students' academic performance // Actual problems of psychological knowledge. 2015. No 3. P. 69-79.
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