Goals to change oneself:

A state and trait perspective on self-regulated personality development in adulthood

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Abstract

What factors drive adult personality development? Several theoretical perspectives have been offered that propose different sources of influence on personality development, such as genetic and environmental factors, developmental tasks, life events, and peers. From a systems perspective, developmental tasks, life events, and peers constitute more or less external factors of influence on personality development. However, at some point, many of these external influences will be translated by the individual into the form of a deliberate goal to change the self. Exploring this idea, researchers have by now become increasingly interested in the roles of motivation and self-regulation for personality development. Research findings support the assumption that goals to change one's personality traits play an important role in shaping current thoughts, feelings, and behaviors, and thus potentially influence even the developmental pattern of personality traits over time. The overall aim of this dissertation is to investigate processes of personality trait development from a micro- and a macro-perspective while focusing on goals as driving mechanisms in intentional personality development. This overall aim was accomplished by implementing an experience-sampling design within the broader timeframe of longitudinal data collection as well as capturing personality and goal characteristics at multiple time-points.

After a general theoretical introduction (chapter 1), the second chapter presents *macro-perspective* findings on motivational determinants of personality trait development with respect to mean-level changes as well as inter-individual differences in change. The analyses carried out in this dissertation yielded support for the effect on personality trait change both of goals to change oneself and of broader major life goals. These results establish investment in goals at different levels of the definitional hierarchy as underlying processes of personality development. While short-term goals to change oneself exerted influence on short-term changes, major life goals were predictive of more long-term trait changes.

The experience-sampling study presented in the third chapter addresses developmental processes at the micro-level and examines both unique and interaction effects of change goal characteristics on trait-related behavior. It builds on previous research that identified different social role contexts as relevant predictors of trait-related behavior. My results indicate that the importance and perceived feasibility of personal goals functioned as underlying micro-processes that may explain the effects of social roles on trait-related behavior. Findings that close the gap between analyses from the micro- and macro-perspective seem to suggest that there are behavioral investment effects on mean-level changes in corresponding personality traits.

In sum, the research findings from this multiple-time-scale design confirm the meaningful influence of deliberate goals on both variability in personality-related behavior and development of personality traits. Thus, the results point to the relevance of the recently suggested perspective on personality development that highlights self-regulation and motivational factors as important driving forces of personality development.

The fourth chapter will give a critical reflection and theoretical integration of my overall results and indicate profitable areas for future research. The dissertation is rounded off by a general conclusion in the fifth chapter.

Zusammenfassung

Welche Faktoren steuern die Persönlichkeitsentwicklung im Erwachsenenalter? Diverse theoretische Perspektiven betonen unterschiedliche Einflussquellen auf die Persönlichkeitsentwicklung, wie zum Beispiel genetische Faktoren und Umwelteinflüsse, Entwicklungsaufgaben, Lebensereignisse und Gleichaltrige. Ausgehend von einer systemischen Perspektive stellen Entwicklungsaufgaben, Lebensereignisse und Gleichaltrige mehr oder weniger externe Einflussfaktoren auf die Entwicklung dar. Zu einem gewissen Ausmaß werden jedoch viele dieser externen Einflüsse von der Person in ein bewusstes Ziels die eigene Persönlichkeit zu verändern übersetzt. Dieser Idee folgend interessieren sich Forscher zunehmend für die Rolle von Motivation und Selbstregulation in der Persönlichkeitsentwicklung. Bisherige Forschungsbefunde stützen die Annahme, dass Ziele zur Veränderung von Persönlichkeitseigenschaften eine wichtige Rolle in der Ausgestaltung von Gedanken, Gefühlen und Verhalten spielen, und somit eventuell sogar die Entwicklungsverläufe von Eigenschaften über die Zeit beeinflussen. Das übergreifende Ziel dieser Dissertation ist die Untersuchung von Prozessen der Persönlichkeitsentwicklung aus der Mikro- und Makroperspektive. Dabei werden Ziele als steuernde Mechanismen von intentionaler Entwicklung in den Fokus gestellt. Dieses übergreifende Ziel konnte erreicht werden durch die Realisierung eines Experience-Sampling Designs im Rahmen einer längsschnittlichen Erhebung sowie durch die wiederholt gemeinsame Erfassung von Persönlichkeitsmerkmalen und Veränderungszielen.

Im Anschluss an eine allgemeine theoretische Einleitung (Kapitel 1), präsentiert das zweite Kapitel Befunde zu motivationalen Determinanten der Persönlichkeitsentwicklung aus der Makroperspektive: Sowohl Mittelwertsveränderungen als auch inter-individuelle Unterschiede in der Veränderung von Persönlichkeit werden hier diskutiert. Die Analysen lieferten Bestätigung für bedeutsame Effekte sowohl von Veränderungszielen als auch von breiteren Lebenszielen auf die Entwicklung von Persönlichkeitseigenschaften. Investitionen in Ziele auf unterschiedlichen Abstraktionsebenen stellten sich als zugrunde liegende Prozesse der Persönlichkeitsveränderung heraus. Während die vergleichsweise kurz- bis mittelfristigen Veränderungsziele Einfluss auf kurzfristige Eigenschaftsveränderungen ausübten, zeigten sich breite Lebensziele erfolgreich in der Vorhersage von längerfristigen Persönlichkeitsänderungen.

Die Experience-Sampling-Studie (Kapitel 3) adressiert Entwicklungsprozesse auf der Mikro-Ebene und untersucht sowohl die einzelnen als auch die Interaktions-Effekte von Zielmerkmalen auf persönlichkeitsrelevantes Verhalten. Die Studie baut auf Befunden auf, dass soziale Rollen als bedeutsame Prädiktoren für persönlichkeitsrelevantes Verhalten wirken. Meine Ergebnisse zeigen, dass die Wichtigkeit und die wahrgenommene Erreichbarkeit persönlicher Ziele als Mikro-Prozesse fungieren, die die Effekte sozialer Rollen auf persönlichkeitsrelevantes Verhalten erklären können.

Weitere Befunde, die die Lücke zwischen Mikro- und Makroperspektive schließen, legen Effekte von Verhaltensänderungen auf Mittelwertsveränderungen in den entsprechenden Persönlichkeitseigenschaften nahe.

Zusammenfassend lässt sich festhalten, dass die Befunde aus dem realisierten *multiple-time scale* Design den bedeutsamen Einfluss von bewussten Zielen bestätigen – sowohl auf das Ausmaß an Variabilität in Persönlichkeits-relevantem Verhalten als auch auf die Entwicklung von Persönlichkeitseigenschaften. Damit betonen die Ergebnisse die Relevanz einer aktuellen Perspektive, die Selbstregulation und motivationale Faktoren als wichtige Einflüsse auf die Persönlichkeitsentwicklung betont.

Das vierte Kapitel beinhaltet schließlich eine kritische Reflexion und theoretische Integration meiner übergeordneten Befunde und zeigt einträgliche Bereiche für zukünftige Forschung auf. Die Dissertation wird abgerundet durch eine allgemeine Zusammenfassung und Schlussfolgerung im fünften Kapitel.

1. Introduction and overview

Do people want to change their personality? According to the current range of popular self-help books or online forums the answer to this question is likely "yes": There is an abundant supply of guides and online self-help tools designed to help change one's habits for good. Titles such as "Changing Your Life by Changing Your Habits: The Power Of Making Habits And Breaking Habits" (Becker, 2014) or wikis like "5 Ways to Change Your Whole Personality" (2014) reflect people's ambitions to change personality traits and even suggest that people *can actually* change their traits. A huge number of self-help programs promise improvements in socially desired traits such as emotional stability or productivity.

From the scientific point of view, researchers have argued that people who are dissatisfied with certain aspects of their lives – including their personality traits – may develop goals to change themselves because they believe that such changes might resolve their dissatisfaction (Baumeister, 1994; Kiecolt, 1994). Lately, these earlier theoretical assumptions have re-attracted scientific interest, and an increasing number of theorists focus on the roles of motivation and self-regulation for personality development (e.g., Denissen & Penke, 2008; Hennecke, Bleidorn, Denissen, & Wood, 2014; Hoyle, 2006; Hoyle & Sherrill, 2006; Morf, 2006). They propose that goals to change one's personality traits play an important role in shaping current thoughts, feelings, and behaviors and potentially even influence the developmental pattern of personality traits over time (e.g., Hennecke et al., 2014).

Before providing an overview of empirical findings on the patterns and mechanisms of personality trait development, I first introduce some basic concepts related to personality and the assessment of stability and change in personality psychology. In order to portray goals as a driving factor for adult personality development, I introduce the construct of goals to change oneself, embedding it into hierarchies of more traditional goal constructs. Based on this overview, I hope to be able to show how research can integrate trait and state perspectives on personality development. The chapter is rounded off by an overview of the structure of the present thesis.

1.1 The hierarchical structure of personality

There is more to personality than traits. This is one essential tenet of the *contemporary framework for studying persons* proposed by Dan McAdams (McAdams, 1996; McAdams & Pals, 2006). According to this conceptual framework there are three levels that help organize the construct of personality and accumulated knowledge about it. The left part of Figure 1 illustrates the hierarchical structure of personality containing those constructs that are addressed within the present work (the

concept of personality states is introduced in section 1.8). Culturally shaped and developing patterns of *dispositional traits* are located at the bottom level (level 1). They are viewed as the most fundamental differences between individuals that appear very early in life, provide dispositional signatures for persons, and account for stability across the lifespan (e.g., Costa & McCrae, 1988, 1994; McCrae & Costa, 2008; Srivastava, John, Gosling, & Potter, 2003). Relatively broad consistencies across situations and time, they can be recognized in the behavior of other persons (e.g., Borkenau & Liebler, 1992; Dobewall, Aavik, Konstabel, Schwartz, & Realo, 2014; Riemann & Angleitner, 1993). Dispositional traits are also referred to as *basic tendencies* (McCrae & Costa, 2008) or *core traits* (Asendorpf & van Aken, 2003). There is a strong consensus that the Five-Factor Model, which includes neuroticism, extraversion, openness, agreeableness, and conscientiousness, captures the plethora of trait descriptions well (FFM; Goldberg, 1990; John & Srivastava, 1999; McCrae & Costa, 1987; Ostendorf, 1990).

The mid-level of personality (level 2) is represented by *characteristic adaptions* which comprise "a wide range of motivational, social-cognitive, and developmental adaptations, contextualized in time, place, and/or social role" (McAdams & Pals, 2006, p. 208). Several approaches to personality explicitly or implicitly state that characteristic adaptions are more amenable to environmental influences than are traits, that they are more changeable over time or due to interventions, and that they are more involved in situation-based intra-individual processes of personality functioning than broad traits are (McAdams & Pals, 2006). Characteristic adaptions are also referred to as *personal action constructs* (Little, 1999) or *surface traits* (Asendorpf & van Aken, 2003). So far, there is no Big Five-like list of characteristic adaptations, but commonly accepted representatives are goals, motives, values, beliefs, schemas, mental representations of significant others, developmental tasks and other aspects of individual personality that are related to motivational, social-cognitive, and developmental processes (McAdams & Pals, 2006).

Finally, the top-level of personality (level 3) comprises *integrative life narratives* that individuals construct to provide their lives with coherent meaning. The narrative identity reflects what individuals infer from internalized life narrations.

Hierarchy of personality constructs   **Hierarchy of motivational constructs**

top-level

| | personality
states | | | goals for immediate
actions + dicrete events | | top-level |

(Fleeson, 2001)

mid-level

| | goals to change one's
personality traits | | mid-level |

(Hudson & Roberts, 2014)

core traits	basis tendencies	Dispositional traits		major life goals	

bottom-level

(Asendorpf & van Aken, 2003)   (McCrae & Costa, 2008)   (McAdams, 1996)   (e.g. Winell, 1987)   bottom-level

Figure 1. Personality and motivational constructs of the present work matched at similar levels of abstraction.

In their recent work Kandler, Zimmermann and McAdams (2014) reviewed findings about core and surface traits (i.e., dispositional traits and characteristic adaptations) with regard to the criteria of temporal stability, heritability, causation, and shared genetic variance. They concluded that so far there is no strong evidence to justify the assumption that traits are "more basic" than goals, interests and other characteristic adaptations. Instead of conceptualizing personality within a strictly hierarchical framework in which surface traits are based on core traits, they suggest conceptualizing constructs from both levels as *distinct but equally important features of psychological functioning*. Hence, they call for longitudinal research that focuses on the developmental sequence of different characteristics as well as on the direction of causation between them.

Within this dissertation I consider the developmental interplay of personal goals (characteristic adaptations) and personality traits (dispositional traits). In particular, I suggest that investment in important and feasible personal goals constitutes a driving factor in personality development that adds to the understanding of processes of stability and change in personality. That is, I focus on the patterns and processes of personality trait change that occur in the context of goal investment. The present dissertation relies on the definition of personality traits as inter-individual differences in behavior, thoughts, and feelings that are relatively stable over time and across situations (cf., e.g., McCrae & Costa, 2008; Roberts, Wood, & Caspi, 2008). Furthermore, in my studies personality traits are considered and assessed in terms of the FFM (Goldberg, 1993; John, Naumann, & Soto, 2008). The next sections give a brief overview of current theoretical and empirical research on personality

development to provide the theoretical background for the further operationalization of stability and change.

1.2   Approaches to stability and change in personality

Stability and change should, however, be comprehended as multimodal conceptions as they come in many different forms and can even occur simultaneously. Rather than opposites, stability and change should be considered as two distinct but interrelated sides of the same coin. Researchers interested in personality trait development, differentiate between at least five concepts of stability and change, either referring to the population or the individual level (e.g., Caspi & Roberts, 2001; Roberts et al., 2008; Roberts, Donnellan, & Hill, 2013; Robins, Fraley, Roberts, & Trzesniewski, 2001; Wrzus & Lang, 2010). Focusing on the population level, *rank-order* (or differential) change describes the degree to which relative differences between individuals remain stable over time; that is, it discusses to what extent individuals maintain their relative position to each other. *Mean-level* change addresses the extent to which the level of a single personality trait changes (i.e. increases or decreases) in a group of individuals over time. When mean-level change is related to the average trait change in individuals of the same age, it is often termed *normative* as it describes a general age trend. Lastly, *structural* change refers to the variance of interrelated patterns among traits over time. At the individual level, *ipsative* change reflects changes in the relative ordering of traits within a person over time, while *individual-level* change describes each single individual's pattern of decreasing, increasing, or not changing at all on any given trait (Denissen, van Aken, & Roberts, 2011; Roberts et al., 2008; Specht et al., 2014).

Each approach to the capture of personality change is associated with specific statistical estimation techniques. As the focus of the present dissertation is on personality change at the population level, I will briefly sketch how mean-level changes and inter-individual differences in change have generally been quantified in personality research. Studies on mean-level trait change analyze population shifts to lower or higher trait scores over time. By contrast, inter-individual differences in change can be quantified in at least two ways: First, longitudinal correlations in trait scores refer to the degree of stability and change across time in the relative positions (or rankings) of individuals within a population (e.g., Denissen et al., 2011; Roberts et al., 2008; Specht et al., 2014). Second, slope variances from latent change and latent growth curve models reflect inter-individual differences in change trajectories. It should be noted, however, that both types of change are related, but can also be independent of one another. Imagine a case where variance in a single trait measure decreases or increases over time: This implies inter-individual differences in change trajectories, but it does not necessarily result in rank-order changes. On the other hand, individuals may change their relative

standings to each other on a single trait without displaying systematic intra-individual change trajectories (cf. Specht et al., 2014).

For the purpose of this dissertation, I understand personality development in terms of "systematic changes in personality traits that are relatively enduring (i.e. last for several months and years)" (Specht et al., 2014, p. 217). Furthermore, the term "development" will be used interchangeably with "change". Finally, neither term as used in this dissertation implies any direction of change; that is, personality change or development is not without fail directed towards a positive level due to adjustment or maturation.

1.3 Personality trait development across the lifespan: Patterns and mechanisms

While some theoretical positions originally claimed that much of intrinsic personality maturation is completed around the age of 30 (*hard plaster hypothesis*; McCrae & Costa, 2008; Srivastava et al., 2003; Terracciano, Costa, & McCrae, 2006), a substantial number of studies has by now ample evidence for the patterns of change in adult personality development (for meta-analytic overviews, see Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006). Moreover, it would seem that personality trait change is present even in old and very old age (Berg & Johansson, 2014; Kandler, Kornadt, Hagemeyer, & Neyer, 2015; Lucas & Donnellan, 2011; Roberts & DelVecchio, 2000; Specht, Egloff, & Schmukle, 2011), which is consistent with the notion that individuals remain *open systems* throughout their lifespan (e.g., Baltes, 1997; Baltes, Lindenberger, & Staudinger, 2006). Essentially, personality development is lifelong phenomenon and individuals are amenable to change processes throughout their lives.

Consistent with Baltes's (1997) lifespan approach, Roberts and Wood (2006) proposed a set of principles that was derived from theoretical and empirical work on personality development (see also Roberts et al., 2008; Roberts et al., 2013). The *Plasticity Principle* (Roberts, 1997) describes personality traits as open systems that are amenable to environmental influences at any age. This notion constitutes the theoretical basis on which the further principles are based. First, the *Cumulative Continuity Principle* captures the empirical finding that personality traits become increasingly stable with age while rank-order consistency is highest at around 50 (e.g., Roberts & DelVecchio, 2000). These meta-analytical findings were extended by results from recent large-scale studies: An inverted U-shaped trajectory of rank-order consistency was shown for each of the Big Five traits, with peaks between ages 40 and 60 (Lucas & Donnellan, 2011; Specht et al., 2011; Wortman, Lucas, & Donnellan, 2012). How can this trend of increasing stability be explained? One explanation is provided by the *Identity Development Principle*, which holds that increasing personality consistency is driven by processes of developing, committing to, and maintaining a

coherent identity (e.g., Roberts & Caspi, 2003). A further explanation for increasing rank-order stability is expressed within the *Role Continuity Principle,* which refers to enduring social roles (rather than enduring environments) as one of the driving mechanisms that facilitates stability in personality over time.

Despite increasing rank-order stability with age, a meta-analysis of longitudinal studies revealed significant mean-level changes in personality traits in adulthood (Roberts et al., 2006) which have often been labeled as personality maturation (cf. *Maturity Principle*; Roberts & Wood, 2006). This multi-trait developmental pattern comprises increases in Emotional Stability, agreeableness, and conscientiousness and has been supported by recent large-scale studies (e.g., Lucas & Donnellan, 2011; Specht et al., 2011). Trait changes in the direction of maturity seemingly facilitate the fulfillment of social roles that are important in assuming adult responsibilities (e.g., Caspi, Roberts, & Shiner, 2005; Roberts, Caspi, & Moffitt, 2003). Hence, investments in age-graded social roles which are outside the current definition of the self (e.g., getting married, becoming parents, or entering work life) represent determinants of mean-level patterns of trait development in general and of greater maturity in particular (cf. *Social Investment Principle*; Roberts & Wood, 2006).

Resting upon the concept of inter-individual differences in change, several studies have shown that some individuals deviate from the mean-level maturation trajectory with respect to the direction, the rate and the time of change (e.g., Jackson, Thoemmes, Jonkmann, Lüdtke, & Trautwein, 2012; Lüdtke, Trautwein, & Husemann, 2009; Zimmermann & Neyer, 2013). Examining individual differences in change is crucial for the detection and determination of potential influences on personality trait development (e.g., Roberts, Helson, & Klohnen, 2002). Drawing on the general observation of increasing rank-order stability until age 50, it seems unlikely that individual differences in the experience of certain life events as well as resulting deviations from normative mean-level trajectories arise completely arbitrarily. However, with the concept of cumulative continuity in mind, one would expect patterns of individual trait development that augment or amplify existing trait constellations. This issue is captured by the *Correspondsive Principle* which states that life experiences intensify those personality characteristics that had led individuals to those experiences in the first place (Roberts & Wood, 2006).

After this brief sketch of the principles of personality development, the question arises next as to the concrete mechanisms that induce the effects of individual-level personal goals on personality traits. As early as 1999, Caspi and Roberts (see also Roberts et al., 2008) stated four generic mechanisms that explain personality trait development. However, they formulated their mechanisms for the context of *normative* life transitions. Normative life transitions refer to major events that are encountered by most members of a society during predefined developmental phases, like engaging

in a romantic relationship or entering work life, and are accompanied by shared social scripts that include explicit behavior expectancies (e.g., Roberts, Wood, & Smith, 2005). According to Caspi and Roberts (1999) normative personality trait change may occur in response to (1) expectations, demands, and contingencies in newly occupied social roles, come about by (2) watching oneself behaving differently, or (3) learning from significant others (i.e., copying their behavior) or (4) changing one's behavior according to feedback from others. These four mechanisms can be easily incorporated into the two prominent theories on personality development that focus on how environmental factors influence trait stability and change in adulthood: Both the paradoxical theory of personality coherence (Caspi & Moffitt, 1993) and the neo-socioanalytic theory (Roberts & Wood, 2006) emphasize the relevance of social roles (cf. first mechanism) for personality development. According to Caspi and Moffitt (1993), change is initiated when individuals enter new and demanding environments in which existing behavior is no longer appropriate and in which explicit information about how to behave adaptively is provided simultaneously. Such information may be typically provided by commonly shared role expectations and demands. Though this would seem paradoxical at first, the theory does not predict personality change when individuals enter new environments which provide *no* guidelines or demands for behaving "correctly": Caspi and Moffitt argue that pre-existing individual differences will be accentuated, when pressure to behave is strong but information on role-appropriate behavior is limited. Similarly, within their neo-socioanalytic theory, Roberts and Wood (2006) posit that personality may change in reaction to the investment in and commitment to age-graded social roles (cf. *social investment principle*). Neo-socioanalytic theory is a general theory of personality (development), which relies on the informed and integrative incorporation of traits and social situations, and is linked to principles of personality development that have been empirically derived (see above).

However, despite the accumulating evidence that even motivational constructs like goals (which can be interpreted in a broader sense as *non-normative* internal life experiences) affect the development of traits over time (e.g., Bleidorn et al., 2010), theoretical conceptions of the mechanisms that cause their effects on personality change have been lacking so far. Denissen, van Aken, Penke, and Wood (2013) have, however, recently proposed a self-regulation perspective on *how* trait change may take place (see also Denissen, Penke, & Wood, 2013). Their theory of self-regulated personality development (self-regulation theory, SRT) expands the social investment principle by specifying the regulatory processes that establish how people modify their behavior to meet role expectations and how these changes become sufficiently habitual to be judged part of their personality.

In the following section I will first outline SRT's view on how personality develops (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013). Further, I will consider how the general change

mechanisms proposed by Caspi and Roberts (1999) and the regulatory mechanisms as understood in SRT can be related to each other.

1.5   Goals to change oneself

Although research on personality development has recently begun to take motivational and self-regulational factors into account (e.g., Bleidorn et al., 2010; Lüdtke et al., 2009; Roberts et al., 2008), Hudson and Roberts (2014) were the first to study individuals' goals to change their personality traits explicitly and systematically. Their work builds on previous research in *possible selves* and *desired selves* (e.g., Higgins, 1987; Markus & Nurius, 1986). Desired selves are typically assessed using an idiographic response format where individuals freely generate a list of personality qualities that they wish to have. In a second step they rate the degree to which they already have such qualities. Many people reported "self-discrepancies" (Higgins, 1987), that is, a discrepancy between their *actual* selves (their personality qualities at the moment) and their *desired* selves (their ideal personality qualities). Recently, assessing individuals' change goals[1] in a nomothetic way, Hudson and Roberts (2014) demonstrated that the majority have indeed goals to change some aspects of their personality, and that these change goals can be easily organized within the framework of the Big Five personality factors (Goldberg, 1993). However, inconsistent with the authors' assumptions, data from their daily diary studies revealed that change goals were unrelated to everyday behavior when the influence of traits was controlled for. So, why did change goals fail to show an association with daily behavior? Hudson and Roberts (2014) offer the interpretation that the time spent on data collection covered only a snapshot at the *beginning* of the process of changing oneself. At that point individuals might indeed be strongly committed to their change goals but might simultaneously still exhibit the "old" behaviors as they begin only now to learn and/or implement new behaviors. Consequently, change goals should predict *future* behaviors and traits, rather than *concurrent* behaviors and traits.

The present dissertation accepts the interpretation of Hudson and Roberts (2014) that change goals should predict future *traits* and uses a longitudinal design to examine whether individuals' change goals predict changes in personality traits over time. With respect to the authors' assumption that change goals should predict future (vs. concurrent) aggregates of *behaviors*, I want to propose an alternative point of view: I argue that the degree to which change goals exert influence on behaviors varies over time (i.e., within months, weeks or even within the same day). To give an example, imagine a young man who invests in reaching the goal of becoming more extraverted over the course of several weeks. During these weeks there may be several situations in which this generally

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[1] Throughout this work, the term "change goals" always refers specifically to goals to change *personality traits*.

important goal fades as other goals become more important. It seems rather unlikely that one can successfully predict daily behavior aggregated over two weeks from a one-time assessment of change goals (Hudson & Roberts, 2014). Just because individuals report goals to change themselves, this does not mean that this goal is salient during the days in the sense that it guides behavior. If one is interested in investigating the association between change goals and *concurrent* behaviors, it is necessary to assess *both* the momentary importance of that goal and the momentary behaviors at each measurement occasion. This is the reason why I employ an experience-sampling design in combination with multilevel analyses in this thesis to explore the within-person relationship between change goals and personality relevant behavior.

Although goals and related constructs are ubiquitous in psychological research, a comprehensive taxonomy of goals is still missing. However, there is a strong consensus that goals can be described along a hierarchical framework in which stable higher order goals embrace contextualized sub-goals which, in turn, can be broken down into specific goals associated with immediate actions (Austin & Vancouver, 1996). In the following section, I will first discuss the hierarchical framework of goals and then try to integrate the goal constructs of the present thesis into that framework.

The hierarchical structure of goals

Goals can be generally defined as "internal representations of desired states, where states are broadly construed as outcomes, events, or processes" (Austin & Vancouver, 1996, p. 338). According to this broad definition, internal representations of desired states can range from biological "goals" (e.g., a set point for body temperature) to complex cognitive representations of aspired outcomes such as career success. Also, temporal reference frames of goals can range from a specific moment to the whole lifespan (Austin & Vancouver, 1996; Izard, 1993).

As the wide definition quoted above notes, goals can be construed at different levels of broadness and described hierarchically. This hierarchical framework ranges from fairly stable global aspirations and values at the bottom-level, through more contextualized midlevel goals to specific ones associated with immediate behavior at the top-level. As Figure 1 shows, the hierarchies of personality and goal constructs can roughly be matched regarding levels of abstraction of the constructs. Conceptually, it is considered meaningful to compare personality and motivational units at similar levels of abstraction (Roberts & Robins, 2000). Please note, that Figure 1 presents a subjective selection of motivational constructs with a focus on goal concepts commonly studied in the personality domain (for a more comprehensive review on goal constructs in psychology see Austin & Vancouver, 1996). Within this dissertation I focus on two types of goals located at different levels of the hierarchy. This will allow me to compare the effects of different-level motivational units

on personality development and to examine whether these effects operate at different levels of abstraction of personality and at different time points in the temporal progress of trait development.

First, I address the role of midlevel goals (i.e., goals to change oneself) in personality trait development. Midlevel goals are cognitive-motivational units that are strongly embedded in individuals' everyday life and can be described as reflecting "individuals' conscious intentions to shape or adapt to their current environment or life situation" (Roberts, O'Donnell, & Robins, 2004, p. 541). They are assumed to exert influence over the course of several days or months (for a review, see Cantor & Zirkel, 1990; Emmons, 1997). It should be noted, however, that although the hierarchical arrangement of goal constructs seems well established, the placement of specific classes of goals is not (Austin & Vancouver, 1996). The recent construct of *goals to change oneself* (Hudson & Roberts, 2014) is mainly defined by its content which can yet be formulated at different levels of abstractness (e.g., "becoming more extraverted" versus "talking to strangers at a friend's party"). However, due to the constructs conceptual proximity to *possible selves* and *desired selves* (e.g., Higgins, 1987; Markus & Nurius, 1986)*,* it seems reasonable to locate change goals at the midlevel of the hierarchy – independently of an idiographic or nomothetic assessment mode.

Second, the role of major life goals for personality trait development should be examined in the present dissertation. Major life goals can be described as a broad goal construct (Roberts & Robins, 2000) that reflects "a person's aspirations to shape his or her life context and establish general life structures such as having a career, a family, and a certain kind of lifestyle" (Roberts et al., 2004, p. 542). In contrast to contextually embedded midlevel goals, major life goals refer to a longer timeline, influence persons' lives over years and express what people generally want to achieve in their lives. Success in one's job would be an example of a major life goal, while successfully finishing advanced education or finishing a job project in time would be corresponding midlevel goals. Unlike these latter, major life goals have typically been assessed using normative importance ratings of standardized lists of goals (e.g., Bleidorn et al., 2010; Lüdtke et al., 2009; Pöhlmann & Brunstein, 1997; Roberts et al., 2004; Roberts & Robins, 2000). Thus, a further issue for the present research is the exploration of long-term major life goals that may help in predicting changes in personality traits.

Organizing goals by content

Up to this point the discussion has focused on the hierarchical structure of the goal domain, regardless of other aspects. However, it is also necessary to examine whether there is a taxonomy for life goals in terms of their content, such as exists with the FFM (Goldberg, 1993; John et al., 2008; McCrae & John, 1992) for personality traits. In personality psychology and even beyond, the FFM serves as a descriptive taxonomy of personality traits and provides a framework to organize the large

number of personality characteristics into five broad content categories (cf. Big Five; Goldberg, 1993). In the last 15 years, only few studies have answered to the call by Roberts and Robins (2000) to develop and establish taxonomies for life goals (e.g., Grouzet et al., 2005). Thus there is no well-established consistent life goal taxonomy that can serve the same function in the motivation domain as the FFM does in the personality domain.

In previous studies major life goals have usually been assessed using importance ratings of several theoretically derived categories which can be subsumed under the two broader domains of agency and communion (e.g., Bakan, 1966; Bleidorn et al., 2010; Kasser & Ryan, 1996; Pöhlmann & Brunstein, 1997; Sheldon & Cooper, 2008). Agency relates to ambitions regarding efficiency and effectiveness in the interaction with the material and social environment. It manifests in strivings for power, achievement, fame, or variation in life. Communion, on the other hand, comprises ambitions that focus on establishing and maintaining satisfying relationships and manifests in strivings for close relationships, affiliation, community, or altruism. The communion-orientated life goals of affiliation and intimacy are of primary importance for the present study, as they are relevant for and in line with the midlevel change goals of the study participants. The life goals of intimacy and affiliation are assumed to capture quite well participants' change goals and are thus included in the study to examine whether they also predict changes in neuroticism and extraversion. While midlevel change goals were thought to influence short-term personality trait changes (i.e., over the first three months of the course of the study), major life goals were assumed to predict trait changes in the long run (i.e., over the whole study course of nine months).

1.6   Change goals as driving factors in adult personality development

In their SRT, Denissen and colleagues (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) suggest that trait change may occur in response to changes in *reference values*. Reference values can be expressed as personal goals or social norms, but also as biologically based hedonic preferences. With respect to the change of personality traits, reference values define the direction and content of change. While some personality traits are clearly socially valued in and of themselves (e.g., conscientiousness; Dunlop, Telford, & Morrison, 2012), others are more idiosyncratic values for people who are dissatisfied with certain aspects of their lives (e.g., a person who is distressed by an unsatisfactory social life may assume that increased levels of extraversion will solve their problems – and accordingly formulate the goal to become more extraverted). According to Denissen and colleagues (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) a second route to trait change may be via changes in self-regulation capacity. Self-regulatory mechanisms are defined as "reactions that are strategically performed to decrease discrepancies between a person's current state and some referent standard" (Denissen, van Aken, et al., 2013, p. 256; Carver & Scheier, 1998).

As regulatory mechanisms can be improved by practice, individuals are able to optimize and automate their regulatory behavior (Mauss, Bunge, & Gross, 2007). Thus, personality maturation across the lifespan can be explained by improved (i.e., trained) self-regulation capacity and investments in the goal (i.e., reference value) to become more mature (which can be established as a societal norm or as a desirable trait development in and of itself). This also points out that individuals must have sufficient self-regulatory resources to meet their reference values. It should be noted, however, that self-regulation processes can be automatic and unconscious as well as deliberate and conscious (Mauss et al., 2007). Similarly, reference values can refer to a wide array of motivational constructs like needs, motives, concerns or values – all of which vary in their degree of consciousness (e.g., implicit vs. explicit motives; McClelland, Koestner, & Weinberger, 1989). Motivation literature distinguishes between fairly conscious and unconscious personal goals (for an overview see Freund, 2003): While conscious goals can be deliberately articulated by individuals, unconscious goals are not readily accessible. There are two different forms of unconscious personal goals: First, goals that had previously been conscious and then have been automatized trough repeated activation (Bargh & Gollwitzer, 1994), and second, the unconsciously occurring comparison to age-graded social expectancies which might result in positive or negative self-evaluation and corresponding goals to change or maintain own behaviors (e.g., Mussweiler & Bodenhausen, 2002). Collating theoretical notions on desired self-regulational trait changes (Denissen, van Aken, et al., 2013; Hudson & Roberts, 2014), I conclude that a deliberately *changed reference value* for a certain personality trait can be termed as a *goal to change oneself* in the sense of Hudson and Roberts (2014).

Relying on literature on emotion regulation (Gross & Thompson, 2007), Denissen and colleagues (Denissen, van Aken, et al., 2013) discussed a set of five self-regulatory mechanisms that help individuals to achieve desired states. They assumed that regulatory mechanisms can be trained and may be involved in changes in personality traits. First, people can select or deselect situations depending on certain situational features. To give an example, imagine a shy young man who strives for the reference value of becoming more extraverted. He may explicitly seek social situations that provide opportunities to practice extraverted behaviors like going to a friend's party where there are several others to talk to. Second, individuals can not only select or deselect entire situations, but modify individual situational characteristics that are linked to undesired outcomes. The young man at the party may, thus, consciously consort with several others he still does not know instead of avoiding contact with others. Exposing himself to the presence of other party guests may help to achieve his goal to behave more extraverted. Third, people can direct their attention either to the increase in the hedonic value of a situation or to the facilitation of a long-term goal (e.g., by ignoring an aversive situational feature or explicitly focusing on positive or functional stimuli). The young man, again, may try to look away from unsettling or intimidating remarks from others – possibly because

he already has become aware that he readily interprets others' remarks as unsettling due to a negative interpretation bias. Furthermore, he may focus on the positive feeling of enjoying free time with others at a party. Fourth, individuals are able to modify their appraisals or interpretations of given situational features. Our young man may try to put his negative interpretation of others' remarks into question as well as to check and eventually to revise them. Furthermore, if he initially still perceives social situations with several unknown others as inconvenient and stressful, he can redefine stress as a challenge. Fifth, individuals can try to suppress their first reaction to a relevant situational feature. For instance, the shy man might experience discomfort or even anxiety when consorting with several other party guests, but refrains from behaviorally expressing his discomfort (e.g., by avoiding conversation with others or even by leaving the situation). Following the perspective of Denissen and colleagues (Denissen, van Aken, et al., 2013), these five mechanisms constitute a basis for inter-individual differences in personality as they moderate the extent to what goals and desired states are successful in the prediction of related behaviors.

The integration of the generic change mechanisms (cf. Caspi & Roberts, 1999) and the specific mechanisms outlined within the self-regulation perspective allow this conclusion: Sufficient self-regulatory capacity may be a necessary prerequisite for performing the last three mechanisms proposed by Caspi and Roberts (1999). Only if we are able to consciously regulate our own behaviors, are we able to watch ourselves behaving in a different way, to copy others' behavior, or to change own behaviors according to feedback. Furthermore, the desirability of traits as well as the self-regulatory capacity can be seen as important moderators of mean-level change in behaviors in the first place and in traits in the second place. Reference values and self-regulatory capacity may explain why there are changes in some but not other traits, or for some but not other individuals. To illustrate: Imagine young people who are members of a gang, their reference values may be tied to risky or criminal behaviors (since those behaviors may be rewarded by their peer group), while same-aged youths who are not part of such a gang pursue goals related to conscientious and ambitious behaviors that will enable them to successfully graduate school. However, also among the latter group of youths, there may be individuals with a low self-regulation capacity resulting in fewer or slower behavioral changes, which in turn makes trait change less likely. Finally, in the context of self-regulated personality change, the first general mechanism should be re-formulated with respect to the kind of factor that triggers change: According to the self-regulation perspective personality trait change may occur in response to changes in internal factors, namely in reference values (i.e., goals to change oneself) or in self-regulation capacity. Moving on to perspectives that focus on how environmental factors influence personality development, the neo-socioanalytic theory emphasizes the meaningful impact of social roles on personality (Roberts & Wood, 2006). Similarly, the paradoxical theory of personality coherence stresses social expectations and pressures as driving

factors for change while defining driving factors in general at a more abstract level: Change is initiated when people enter new and demanding environments in which familiar behaviors are no longer adaptive, but in which information about how to behave adaptively coincidently exists (Caspi & Moffitt, 1993). Thus, the generic change mechanisms can be adapted to each of the three theories presented although these theories differ with respect to their emphases, i.e. what aspects of personality development they highlight and what factors that trigger change processes. It should be noted that the perspective of the present dissertation is on environmentally based and self-regulatory influences on personality. Consequently, what is not discussed is perspectives and mechanisms that focus primarily on the impact of biological factors on personality stability and change (e.g., McCrae & Costa, 2008; Ormel, Riese & Rosmalen, 2012; Scarr & McCartney, 1983).

1.7   Integrating trait and state perspectives on personality development

The focus of this introduction to the research on personality development has so far been largely on the long-term development of personality traits. However, as early as 1966, Cattell proposed the conceptual distinction between development in relatively enduring *traits* and fluctuation in short-term *states*. Although this dichotomous conceptualization cannot be seen as comprehensive, it provides a useful structure for organizing research questions related to long- and short-term stability and change in personality. Research on developmental patterns of relatively enduring inter-individual difference dimensions is typically classified under the term of *trait development*. In contrast, short-term processes of intra-individual stability and change are usually studied under the term of *states*.

As noted earlier, conceptualizing change as a multidimensional concept – also in relation to the dimension of time – offers a rich field for research that addresses the fundamental aims of personality psychology: in other words, describing, explaining, and predicting stability and change across the lifespan and across situations from both the trait and state perspectives. In general, researchers interested in long- and short-term stability and change are concerned with the same higher-order research questions. Nonetheless, there are some significant differences between the two fields regarding the emphasis of topics and core questions. Researchers interested in the long-term perspective are especially concerned with the following issues: First, how does personality develop across the lifespan regarding mean-level changes, rank-order changes as well as within-person differences? Second, how do these changes become internalized? This question refers to the processes and mechanisms that promote stability and change in different periods of life. Finally, to what degree is stability and change in personality influenced by genetic and environmental factors?

In contrast, research addressing short-term stability and change starts with the question whether the amount of within-person fluctuation is substantial and whether individual differences between

persons regarding the amount of within-person variability exist. Based on this fundamental issue, further questions revolve around potential predictors of within-person changes in personality states as well as enduring personality variables accounting for inter-individual differences in within-person associations (e.g., Fleeson, 2007, 2012; Fleeson & Jolley, 2006).

Finding answers to most of these questions requires different forms of longitudinal data as well as sophisticated statistical techniques. Longitudinal designs in which assessment waves are spaced out over several years can be applied to examine trait development. In contrast, research on short-term stability and change calls for intensive longitudinal methods that include sequences of frequently repeated assessments during which a change process is anticipated to unfold within each individual (Bolger & Laurenceau, 2013). This form of data collection is also frequently referred to as *experience-sampling* (e.g., Hektner, Schmidt, & Csikszentmihalyi, 2007) or *ecological momentary assessment* (e.g., Shiffman, Stone, & Hufford, 2008). As early as almost 40 years ago, lifespan developmentalists contended the notion of individual differences in intra-individual change (Baltes, Reese, & Nesselroade, 1977), but it still took several years until suitable statistical techniques were invented (Mroczek, Almeida, Spiro, & Pafford, 2006). During the last three decades there has been tremendous increase in statistical methods and available software tools that allow for the analysis of the above-mentioned specific questions (e.g., Little, Preacher, Selig, & Card, 2007; Raudenbush & Bryk, 2002; Snijders & Bosker, 2012).

Contemporary analytical methods can be meaningfully grouped into the two broad approaches of structural equation modeling (SEM) and multilevel modeling (MLM). Both approaches allow the flexible application to a variety of different specific research questions; nonetheless, they are differentially suited for different objectives. Techniques based on SEM primarily model data from variances and covariances of large samples. Thus, SEM is typically employed by researchers interested in long-term stability and change for analyzing longitudinal data with two or more equidistant measurements assessed in large samples. In contrast, MLM is well suited for analyzing data from intensive longitudinal studies where typically a small number of individuals participate in a large number of measurements. MLM is more flexible than SEM in handling missing data and dealing with unequal spacing between measurement occasions which are both common features of data from diary studies (Bolger & Laurenceau, 2013; Meredith & Tisak, 1990; Mroczek et al., 2006).

Within this dissertation I capitalized on the approaches of both SEM and MLM to examine a choice of the above-mentioned questions prevailing in the current research on long- and short-term stability and change in personality. In order to investigate the motivational micro- and macro-processes of personality trait change appropriately, I focused on different types of change, integrated different

kinds of research designs into one multiple-time-scale design, and employed a range of different analytic techniques.

1.8   The present dissertation

The overall aim of this dissertation is to provide a comprehensive perspective on goal-related processes of self-regulated personality development in adulthood, and to shed further light on the developmental interplay between goals and personality traits. The integration of motivational and personality constructs in one and the same research design allows for testing hypotheses related to the recently proposed self-regulation perspective on personality change.

Overall Design

Addressing the overall aim of the present thesis, I initiated a four-wave longitudinal study at Bielefeld University and followed individuals over nine months during and beyond their participation in a group training that helped them to successfully invest in their goals (see Figure 2). The implemented training program is a standardized intervention based on cognitive-behavioral therapy and addresses individuals with goals to change themselves as regards levels of neuroticism and extraversion (*Gruppentraining sozialer Kompetenzen, GSK*; Hinsch & Pfingsten, 2007). Participants volunteered to take part in the GSK training which particularly addressed shy and reserved people who had problems to establish and maintain satisfying relationships with others. In line with this, participants were more neurotic and less extraverted than the average person and generated change goals related to the decrease their in neuroticism and increase in their extraversion in order to better cope with social situations.

A baseline measurement had been combined with a briefing session one month before the program started. In a first step, participants formulated idiographically their training goals referring to the concept of personal projects (Little, 1983), and subsequently rated the characteristics of their goals (e.g., importance, feasibility) in a nomothetic fashion. In particular, participants listed the goals that were salient for them at that time and on which they actually aimed to work during the course of the training (e.g., "I want to become more assertive", "I want to become more self-confident in social situations"). The whole observation period encompassed four equally spaced measurement occasions where the complete goal and personality inventories were presented to all study participants. Special advantages of the chosen research design consisted in the establishment of participants' synchronized measurement occasions, although they had individual dates of training courses. In order to manage the implementation of eight two-month training courses, I trained master students in a one-year project seminar on empirical research. During the first semester they were taught the theory and practice of GSK courses. While pretest and posttest assessments were

combined with a personal appointment for briefing and evaluation of training participation, both follow-up assessments were realized as an online study. Additionally, three waves of intensive longitudinal data collection were administered before, in the middle, and after the training in order to capture goal characteristics as well as personality processes on a daily basis. Further details on the procedure and sample are presented in the method sections of the respective chapters.

This dissertation comprises two chapters (chapters 2 and 3) that address different aspects of the overall research and are based on a micro- and macro-perspective, respectively. Table 1 presents an overview of samples, measures, and the main analytical methods that are employed in the different chapters.

Adopting a macro-perspective on personality development

Chapter 2 adopts a macro-perspective and focuses on motivational determinants of personality trait development (see the upper part of Figure 2). First of all, I aimed to examine whether (self-regulated) change in personality traits is possible within such a relatively short period of time as several months. Based on the establishment of significant mean-level and rank-order changes in personality traits, the second chapter addresses the question whether personal goals to change oneself and/or major life goals are driving factors in personality development: Can people actually change their personality traits just because they want to? Goals to change oneself are conceptualized as mid-level goals, that is individuals' deliberate intentions to shape or to adapt to their current life situation (Roberts et al., 2004). Thus, they are hypothesized to be predictive of short-term change in personality traits (i.e., over the first three months of the course of the study). In contrast, broad major life goals reflect a longer timeline and are therefore hypothesized to be predictive of rather longer-term change in personality traits (i.e., over the whole course of the study of nine months).

I estimated latent change model which revealed that personal change goals predicted short-term mean-level changes in neuroticism and extraversion, while major life goals predicted long-term changes in neuroticism. Regarding rank-order consistency, cross-lagged models showed that life goals had an effect on later levels of both neuroticism and extraversion, while personality traits did not influence later levels of life goals. Overall, the findings demonstrated that goals serve as meaningful driving factors for personality trait development. Importantly, the timeframe in which goals influence traits seems to depend on the hierarchical level on which goals are defined.

Adopting a micro-perspective on personality development

Chapter 3 adopts the micro-perspective of personality development. Goals and personality were assessed as they unfold in peoples' daily lives by implementing an experience-sampling design.

Drawing on the classic current issues for research from a short-term perspective on personality states, I addressed the question whether current characteristics of personal goals to change oneself are related to individuals' trait-related behavior in daily life and whether higher-order goal constructs (i.e., major life goals) moderate this association.

MLM analyses yielded that the combination of high importance and high feasibility of change goals were positively associated with corresponding trait-related behavior. Life goals on the other hand had small and somewhat inconsistent moderating effects on the within-person relationship between change goals and personality states. The conclusion from these results seems to be that goals to change oneself capture psychologically relevant features of situational settings and thus provide behavioral guidance in situations in which they are "activated". Broader life goals that are in line with the narrower change goals may even intensify this goal-behavior-link, i.e., change goals may be even more strongly related to corresponding behavior when there is additional motivation from content-related major life goals.
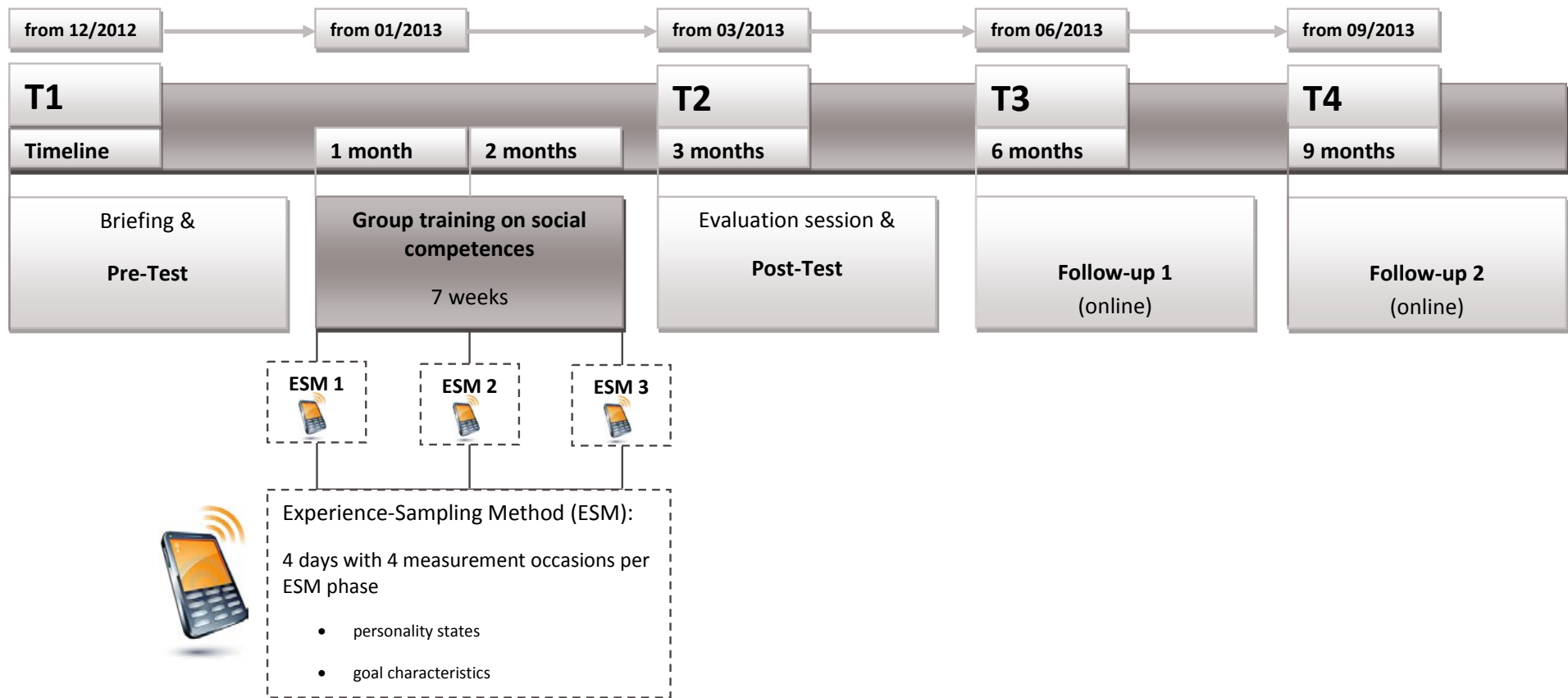
Figure 2. Study design integrating micro- and macro-perspective.

Table 1. Description of samples, measures, and main statistical analyses

Chapter	Sample	Main measures	Main statistical methods
Macro-perspective on personality trait development			
How much do we have personality change in our own hands? – Motivational determinants of personality development (Chapter 2)	mean-level changes: N = 97 young adults (T_1), measured at four measurement occasions (N_{T2} = 69; N_{T3} = 48; N_{T4} = 44)	Neuroticism Extraversion Agreeableness Conscientiousness goals to change oneself (idiographic), goal characteristics (nomothetic) major life goals	Latent change models (baseline and neighbour change)
	inter-individual differences in change: N = 97 young adults (T1), measured at two measurement occasions (N_{T2} = 69; N_{T3} = 48; N_{T4} = 44)	Neuroticism Extraversion major life goals	Latent cross-lagged models
Micro-perspective on personality trait development			
Intentional personality change from a micro-perspective: The interrelation between personal goals and personality states (Chapter 3a)	N = 49 young adults, measured at 48 measurement occasions on average (measurement occasions were evenly distributed among 3 waves of experience-sampling)	experience-sampling measures: - personality states (Neuroticism- and Extraversion-related behavior) - importance and feasibility of change goals	multilevel analyses (3-level model with confirmatory factor analysis at level 1)
		one-time measure: - major life goals	+ adding cross-level interactions
Bridging the gap: the role of personality-relevant behavior for the prediction of personality trait change (Chapter 3b)	N = 56 adults, measured at T_1 and T_2 as well as at the 3 waves of experience-sampling	Neuroticism Extraversion mean-levels of personality states at each of the 3 experience-sampling waves (Neuroticism- and Extraversion-related behavior)	Latent change models

2. To what extent can we influence personality change? – Motivational determinants of personality development

2.1 Introduction

The field of personality psychology has traditionally dealt with stable factors that capture inter-individual differences. Thus, the study of personality development is a relatively new research area. Nonetheless, in the last couple of years it has been established as a recognized sub-discipline. In his seminal publication of 1968 Mischel questioned the existence of stable differences between individuals and thereby marked a peak in the so-called person-situation debate, the discussion about the degree to which personality is consistent across situations and across time (Mischel, 1968). In response to his extreme skepticism and his emphasis on situational fluctuation, the field experienced a time of theoretical and empirical defense of the trait concept. As a side effect, research on the malleability and development of personality played only a minor role for several decades associated with low theoretical and empirical efforts to design studies and collect data capable of answering the question of stability and change in personality traits.

In particular, besides these theoretical considerations, it would seem that from a methodological point of view many of the complex questions about trait development can only be answered with data from large-scale longitudinal studies that contain multiple consistent measures of personality traits. These elaborate and expansive studies have been lacking for a long time. Some important precursors should, however, be mentioned in this context like the famous New Zealand Dunedin study (since 1972) or the Wisconsin Longitudinal study (since 1957). However, these studies either start in childhood and consequently have to deal with the issue of structural consistency of personality traits across childhood, adolescence and adulthood, or they typically assess traits with a maximum of two measurement occasions. The latter assessment procedure allows the mapping of linear change between two time points, it is true, but at least three measurement occasions are required for the examination of the shape of change trajectories following higher-order non-linear time-trends (e.g., Mroczek et al., 2006). Thus, non-linear change models allow the rates of change to differ across the study period. In the last three decades longitudinal studies were initiated that repeatedly measured personality traits as well as a variety of possible influencing factors (e.g., Helson & Wink, 1992; Huinink et al., 2011; Neyer & Asendorpf, 2001; Robins et al., 2001; Shock et al., 1984). It took even longer for large-scale representative studies to include repetitive personality trait measures (e.g., the Socioeconomic Panel; SOEP).

2.2 What factors drive adult personality development?

Responding to the current scientific interest in personality development, a growing body of research has successfully begun to identify possible factors that drive personality development (for an overview see Specht et al., 2014). In the following, I will briefly attend to the field's main questions currently under investigation and outline a selection of identified sources of influence on personality trait development.

First, as a basic source of influence on personality development, the roles of *genetic and environmental factors* have been identified (Bleidorn, Kandler, & Caspi, 2014). Recent behavior genetic studies drew on so-called biometric growth curve models (McArdle & Hamagami, 2003) that allow for the direct estimation of the genetic and environmental effects on the parameters of stability and change. These studies demonstrated that the stability of the Big Five traits was influenced by both genetic and nonshared environmental effects (e.g., Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009). In the study cited, genetic influences turned out to be somewhat more pronounced, but on average about one third of differences in stability of personality traits was attributed to influences of the nonshared environment. Earlier studies had led to the conclusion that stability is maintained by genetic influences while change seems mediated by environmental factors (e.g., McGue, Bacon, & Lykken, 1993). Recent findings by Bleidorn and colleagues (2009) indicate that this prevalent conclusion falls short of adequately capturing the genetic and environmental sources of stability and change in personality. More research into environmental sources of personality change is needed, especially employing designs that control for genetic effects and allow for the examination of the complex ways in which genes and environment interact.

Life events have been identified as a second meaningful source of influence on personality (Luhmann, Orth, Specht, Kandler, & Lucas, 2014). Adopting a narrow definition, major life events are considered time-discrete transitions that bring about a major change in status (e.g., employment status) and/or in social roles (Luhmann, Hofmann, Eid, & Lucas, 2012). A range of longitudinal studies that focused on the effects of major life events on personality development have been published over the last 15 years (e.g., Allemand, Gomez, & Jackson, 2010; Lüdtke, Roberts, Trautwein, & Nagy, 2011; Neyer & Asendorpf, 2001; Specht et al., 2011). Taken as a whole, these studies have shown that several major life events do indeed have an influence on the development of certain personality traits, thus supporting the intuitive idea that major transitions in life go along with meaningful changes in personality. In contrast, few events were identified which do not seem to influence personality (e.g., Costa, Herbst, McCrae, & Siegler, 2000; Specht et al., 2011). Nonetheless, there still remain unanswered questions regarding the timing of change processes. That is, when and at which rate do traits develop in response to the experience of major life events (Luhmann et al., 2014)?

Third, Hutteman and colleagues highlighted *developmental tasks* as a relevant source of influence on personality development (Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). They suggest that the life course is characterized by social expectations regarding when and how successfully discrete milestones are reached (e.g., finishing one's education or finding a romantic partner). Recent studies support the possibility that the (expected) timing of such milestones can be related to mean-level changes in personality (Bleidorn et al., 2013). In contrast, studies have only rarely been implemented on the qualitative aspect of developmental milestones (e.g., how well an individual adjust to the new role of employee or romantic partner). One reason might be that most studies focus on discrete developmental tasks or events and not on the individuals' adjustment to them, since the latter is more difficult to measure.

Peers and *social relationships* have been discussed as a fourth factor influencing personality development (Neyer, Mund, Zimmermann, & Wrzus, 2014; Lehnart, Wrzus, & Neyer, 2008; Reitz, Zimmermann, Hutteman, Specht, & Neyer, 2014). Researchers argue that peers hold normative expectations which possibly direct development in the way that members of one group become more alike than non-members. In line with the idea of peer influence, Zimmermann and Neyer (2013) demonstrated that social relationship dynamics constitute mediating mechanisms that account for the impact of life experiences (e.g., going abroad) on trait development.

Finally, and in contrast to the external sources of influence on personality development, Hennecke and colleagues focus on goals to change oneself as a promising candidate for driving trait development (Hennecke et al., 2014). In their three-part framework for self-regulated personality development (three-part self-regulation framework; 3-SRF), they propose that individuals might translate external influences into deliberate personal goals to change certain characteristics of the self in order to meet these internalized expectations. As the present work is based on this functional perspective of trait development, it will be discussed in more detail in the following section.

2.3   The active role of the individual: Self-regulated personality development

An emerging line of theories (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013; Hennecke et al., 2014; Wood & Denissen, 2015) is taking a functional perspective on personality development and emphasizes the active role of the individual. In essence, this perspective treats an individual's traits as a *useful means to desired ends* and thus assumes that traits are calibrated by whether they are deemed useful for accomplishing desired ends. In order to explain stability and change in personality development, the functional perspective takes motivation and self-regulation processes into account. Denissen and colleagues (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) proposed with their SRT a novel theory explaining normative personality development as

well as determinants of rank-order differences in personality development. SRT is built on a model that links personality trait functioning with self-regulatory mechanisms. That is, the authors conceptualize personality traits as reflecting recurring contingencies between situational features and an individual's reactions. These recurring contingencies are thought to reflect the normative reactions of individuals to situational features (Denissen & Penke, 2008; Penke, Denissen, & Miller, 2007). Drawing on the assumptions of a cybernetic model (Carver & Scheier, 2002), Denissen and colleagues (Denissen, Penke, et al., 2013) argue that individuals hold certain conscious or unconscious reference values (e.g., needs, goals, values, norms) and the cybernetic system continually compares the individual's situation to the personal reference value (see Figure 3). It should be noted that this comparison can be conscious or unconscious (i.e., automatically performed). If discrepancies between the reference value and the current individual's situation are detected, the individual tries to modify the situational features and to realign them with his or her reference value ("primary reaction"). Furthermore, Denissen and colleagues (Denissen, Penke, et al., 2013) argue that people differ in their evaluations of their primary reactions. For example, many individuals may react with anger to a wrongful treatment, but they may differ in their evaluation of an angry primary reaction due to differences in their normative considerations (e.g., in some social environments or cultures the overt display of anger is disapproved of), in hedonic preferences (e.g., disliking anger), or in concerns about negative consequences of their primary reaction (e.g., thinking that angry reactions may put an important relationship partner off) (Lindenberg & Steg, 2007). To address these different evaluations of primary reactions, Denissen and colleagues included a second regulatory cycle ("secondary reaction") in their model: If a discrepancy between the actual and desired reaction is detected, secondary self-regulation reactions may be activated to reduce this discrepancy. Self-regulation processes may comprise suppression of the primary reaction, reappraisal or directing attention away from incongruent situational features, or selection or modification of the incongruent situation itself (Denissen, Penke, et al., 2013).
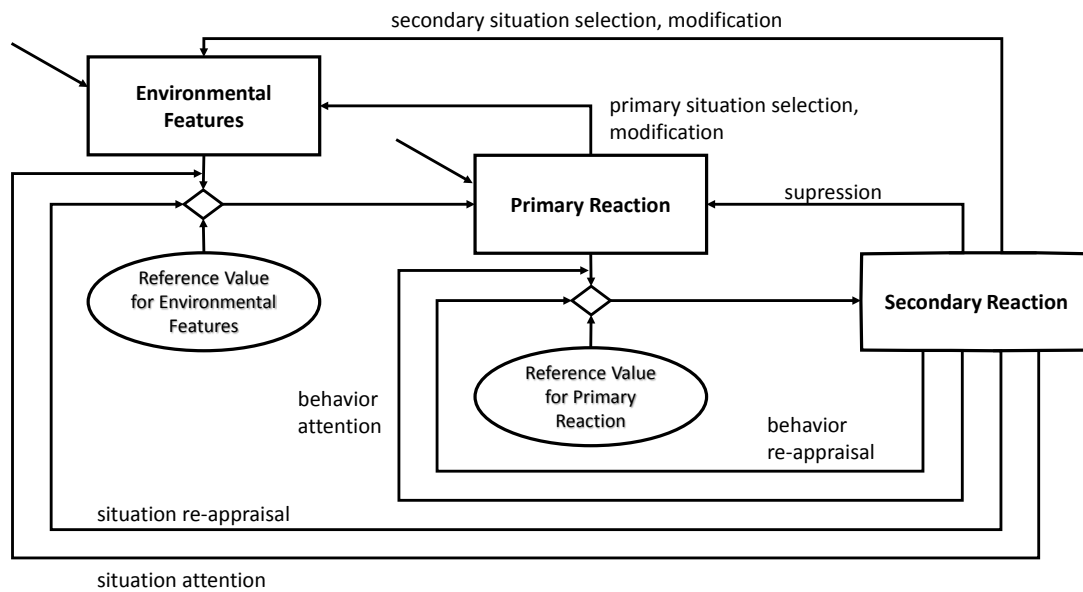
Figure 3. Cybernetic model of primary and secondary reactions to environmental features. Small diamonds represent the workings of a comparator, adapted from Denissen, Penke, & Wood (2013).

In their SRT, Denissen and colleagues use the regulatory model outlined above to explain how "short-term dynamics translate into long-term changes in traits" (Denissen, Penke, et al., 2013, p. 3). In particular, this novel theory can be used to explain the robust empirical finding of increases in mean-levels of Emotional Stability, agreeableness, and conscientiousness during much of adulthood (maturity principle; Roberts & Wood, 2006); that is, it explains why personality functioning aligns towards more mature reference values with age. The theory proposes four possible sources of personality maturation: First, situational and self-focused reference values converge towards more socially desirable values with age (e.g., successfully graduate from school or university to find a good job). Determinants of such a developmental shift in reference values could be normative expectations tied to certain age periods (Roberts & Wood, 2006), or age-related changes in life priorities (e.g., Carstensen, Isaacowitz, & Charles, 1999). Furthermore, an evolutionary perspective (Life History Theory; Kaplan & Gangestad, 2005) explains the age-related change of reference values with human beings' striving for maximizing fitness benefits: expending effort on reproduction during adulthood (versus growth or learning in childhood and adolescence) provides maximal fitness benefits. However, these investments in the lives of others surely require more mature levels of personality characteristics and thus help explain why reference values could converge to more mature values with increasing age.

Second, according to the SRT individuals become more mature with age, as they increasingly rely on situation selection or niche picking (Penke, 2010). In particular, social norms favoring increasing levels of Emotional Stability, agreeableness, and conscientiousness during adulthood should be

related to a preference for situations that enhance the probability of these socially desired reactions. For example, young adults are expected by their social environment to carry on their profession conscientiously when they enter work life. As a consequence and to meet social expectations, young adults might prefer situations and behaviors that facilitate living up to these social norms (e.g., visiting parties only at the weekend, going to bed early). There is first evidence from research on emotion regulation that older people do indeed rely on situation selection more often than younger people (Rovenpor, Skogsberg, & Isaacowitz, 2013). The phenomenon of an increase in niche picking with age can also serve to explain increasing rank-order stability across adulthood: Individuals who have found "their niches" usually experience a high degree of person-environment fit, which is associated with stability of personality traits (Roberts & Robins, 2004).

As a third source of increasing maturity with age, Denissen and colleagues (Denissen, Penke, et al., 2013) discuss the optimization of regulatory mechanisms. They argue that with increasing practice, the execution of regulation strategies may become automated and thus less effortful and faster (Mauss et al., 2007; Neal, Wood, & Quinn, 2006). A further explanatory approach to the optimization of regulatory mechanisms with age focuses on the phenomenon of wisdom. It is common knowledge, wisdom is associated with age (Heckhausen, Dixon, & Baltes, 1989), which suggests the hypothesis that for older people wisdom facilitates an individual's choice and optimal execution of self-regulation strategies. However, while there is evidence that seems somewhat inconsistent with findings that demonstrate no age-related increases in wisdom (Mickler & Staudinger, 2008; Smith & Baltes, 1990), other research tends to confirm the hypothesis (Grossmann et al., 2010).

Finally, it has been proposed that individuals mature in their personality traits due to increases in self-control strength, i.e., regulatory improvements in domain-unspecific self-control capacity (Muraven & Baumeister, 2000) which results from the brain maturation of the frontal lobe regions (e.g., Dahl, 2004).

Up to this point, the explanatory power of the SRT has been demonstrated with respect to the normative phenomenon of increasing maturity in personality across age (e.g., Roberts et al., 2006; Specht et al., 2011). In contrast to normative trait change, the focus of the present thesis is on actively self-selected goals to change one's personality traits. That is, individuals actively change their reference values for how to react to environmental situations. Hudson and Roberts (2014) demonstrated that goals to change oneself do indeed exist and are even "extremely prevalent" (Hudson & Roberts, 2014, p. 80). Moreover, they are unique and non-redundant with other more generalized types of motives (e.g., the desire to *be* emotional stable in general). Furthermore, findings from clinical research indicates that active personality change is indeed possible: Two meta-analytical reviews on personality trait changes during therapeutic interventions yielded average

effect sizes ranging from around .5 to 1 standard deviation (Shapiro & Shapiro, 1982; Smith, Glass, & Miller, 1980). These effect sizes are quite impressive, especially if one considers the relatively short duration of clinical interventions ranging from six months to about two years, e.g. in cognitive-behavioral therapy. So far, these changes have been considered as "side effects" of therapeutic interventions, especially in cognitive-behavioral therapy, which primarily focuses on modifying maladaptive reference values and basic assumptions about the self, others, and the world, teaching and practicing behavioral and regulation skills, as well as strengthening individuals' self-efficacy.

Taking together the high prevalence of individuals' goals to change one's personality traits and the findings on personality trait change during therapeutic treatment, this raises the question if and how such change goals operate to drive personality trait development. The SRT proposed by Denissen and colleagues (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) identifies changes in reference values as one mechanism that plays a role in intentional personality development. Based on the theoretical framework of the SRT, Hennecke and colleagues (2014) expand this theoretical perspective by detailing in their 3-SRF the conditions under which people will change their levels of personality traits through self-directed efforts, thereby allowing for specific predictions related to self-regulated trait change (see section 2.5).

The research described in this chapter aims to make one of the first contributions to the understanding of the processes that underlie the intentional change of personality traits by explicitly measuring constructs that classify as reference values in personality development and by testing the theoretically proposed preconditions for self-regulated trait change in adulthood (Hennecke et al., 2014). Throughout the following sections, I will outline the three research questions that guided my research concerning the macro-perspective on motivational determinants of personality trait development: (1) Can personality traits change within a relatively short period of time?, (2) Can people change for the better simply if they want to? – The role of goal importance and feasibility in personality trait change, and (3) How do major life goals influence longer-term personality trait development?

2.4   Short-term personality development: Can personality traits change within a relatively short period of time?

Studies on personality trait development greatly vary in terms of the time they cover, ranging from several months (e.g., Bleidorn, 2012; Vaidya, Gray, Haig, & Watson, 2002, Study 2) through several years (e.g., Lüdtke et al., 2011; Neyer & Asendorpf, 2001; Specht at al., 2011) to a decade or more (e.g., Allemand et al., 2010; Sutin, Costa, Wethington, & Eaton, 2010). Reflecting the theoretical reasoning that personality traits change rather slowly and that changes can not thus be identified in

short time periods, many researchers interested in personality development prefer long-term study designs where personality is measured once a year or even less frequently (Luhmann et al., 2014). Accordingly, in their seminal meta-analysis Roberts and colleagues (2006) excluded longitudinal studies with retest intervals of less than one year. However, more recent work indicates that personality traits may change even within very short periods such as a few months, particularly if activated by major life transitions (e.g., high school graduation; Bleidorn, 2012) or psychological interventions in which individuals work on specific personal goals (e.g., Gi, Egger, Kaarsemaker, & Kreutzkamp, 2010; Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012). Thus, it might be possible that event-induced or intentional changes in personality have been underestimated or undetected as the retest intervals employed in previous studies were not appropriate (i.e., in most cases too broadly spaced).

One basic issue of the present dissertation was the question whether personality traits change during a relative short period of time in which individuals actively invest in their personal goals in the context of a cognitive-behavioral training. Four measurement occasions were evenly distributed to cover a period of nine months, so that changes in personality traits immediately after training participation as well as follow-up changes could be tracked. Following the general assumption of many bottom-up approaches to personality development (Caspi & Moffit, 1993; Flesson & Jolley, 2006; Roberts, 2009), development is likely to begin with behavioral changes, usually triggered by situations or in pursuit of goals. When individuals act consciously on their goals to change the levels of specific personality traits – especially within the context of a cognitive-behavioral training that focuses on how to change thoughts, feelings, and behaviors – development in those specific traits might even be accelerated. That is, during the distinct and relative short period of training participation, individuals put conscious efforts into changing their behaviors. To the degree that these behavioral changes become automatized and habitual, one might expect substantial trait changes (Hennecke et al., 2014) – even within the short time span of nine months. Taking its cue from the SRT, the present study focused on a time window in which individuals started meeting their new reference values – that is, a time at which a model element (see Figure 3) undergoes meaningful changes and at which "investigations would be especially fruitful" (Denissen, Penke, et al., 2013, p. 33). Having established the phenomenon of short-term personality trait changes, the second research question examined goals to change oneself (i.e., specific goal characteristics) as possible factors in the prediction these trait changes and will be discussed in the next section.

2.5 Goals to change oneself and personality trait development: Can people really change for the better simply if they want to?

Equipped with the knowledge from an increasing number of longitudinal studies that personality traits change across the entire lifespan (for meta-analytic summaries, see Roberts & DelVecchio, 2000; Roberts et al., 2006), the field has moved from description to explanation and addresses the two clearly emerging questions: (1) What factors drive adult personality development and (2) how do these factors induce changes in such relatively stable constructs like personality traits? As mentioned above, empirical research has identified several meaningful sources of influence, like genetic factors, life events, or relevant peers. Only recently have researchers begun to take motivation and self-regulation processes into account and suggested goals to change oneself as a further possible driving factor in adult personality trait development. An answer to the second leading research question might be found in the commitment to and investment in these goals that promote changes in personality traits.

From social role demands to personal goals: **Social investment theory**

A prominent theoretical approach to the two broad questions of current scientific interest is social investment theory (SIT; Roberts et al., 2005), which can be integrated into the broader framework of their neo-socioanalytic theory (Roberts & Wood, 2006). The SIT proposes that normative personality trait development is triggered by age-graded life transitions as they pressure individuals to commit to and invest in new social roles (e.g., starting a job, entering a romantic relationship, becoming a parent, retiring from work). These new roles come along with specific behavioral demands and social expectations that can be formulated in trait-terms (e.g., to behave in conscientious, agreeable, and emotionally stable ways) and form a reward structure for personality maturation. If individuals internalize and commit to these external role demands, social expectancies and demands may turn into *personal* goals or reference values. Facing and committing to role demands that require a large degree of behavioral changes should result in personal goals to change one's general way of behaving (as well as thinking and feeling), that is, one's personality traits. Relying on the literature on motivation, these change goals do not need to be deliberately articulated by individuals. Moreover, it seems fair to assume an unconsciously occurring comparison with age-graded social expectancies which may result in positive or negative self-evaluation and corresponding goals to change or maintain own behaviors (e.g., Mussweiler & Bodenhausen, 2002; see also section 1.6).

Goals to change oneself – Establishing a new research construct

Hudson and Roberts (2014) demonstrated in a sample of young adults that a vast majority of individuals expressed goals to grow with respect to each of the Big Five personality domains – especially in Emotional Stability and conscientiousness. In their study the authors used a modified version of the Big Five Inventory (BFI; John & Srivastava, 1999) on which participants rated their goals to change their personality traits. The 44 standard BFI-items remained the same; however, the

instruction, the wording on the items, and the response scale were adapted to allow participants to rate how much they liked to *change* each trait (e.g., I want to be talkative; scale ranging from -2 = *much less than I currently am* through 0 = *I do not want to change in this trait* to +2 = *much more than I currently am*). Principal axis factoring revealed that people's change goals almost perfectly aligned with the Big Five dimensions – a finding that is consistent with the idea that individuals' change goals are organized in terms of the Big Five personality factors: That is, people desire to improve in extraversion, not merely in ad-hoc traits related to extraversion. Furthermore, strong negative correlations between the current level of a trait (except for openness) and the desire to change with respect to that trait (average r = -.39) demonstrated that people who are low in certain personality traits most desire to improve with respect to those traits. Change goals were almost exclusively positive, i.e., people desired to grow in trait levels. Thus, individuals' desires relate to socially desirable traits which they lack.

Besides establishing the existence of goals to change oneself, there is evidence from only one longitudinal study suggesting that personal goals promote changes in behaviors which in turn promote changes in personality traits: Bleidorn (2012) addressed the question of how life transitions stimulate personality maturation in young adults and examined personality trait changes in a sample of German high school students during their transition from school to adult life. Despite the short study period of one year, there were both significant mean-level changes and inter-individual differences in the changes of personality traits. Strongest changes were found with respect to conscientiousness, especially for those students who were directly facing the transitional phase. Additionally, latent growth curve modeling revealed that inter-individual differences in personality trait changes were associated with changes in students' investments into achievement behavior. Taken all findings together, it seems reasonable to assume that the personal goal of a successful graduation formed a salient reward structure which first induced behavioral changes (i.e., increases in achievement behavior). Subsequently, these new behaviors might have become internalized and automatized and resulted in the observed increases in students' conscientiousness (Bleidorn, 2012; Roberts et al., 2005). This study provides a fine-grained and intensive-longitudinal examination of personality trait changes in a transitional period and its findings have further implications for theoretical approaches to how environmental factors influence an individual's personality by pointing to a bottom-up process of personality change. Nonetheless, like many other investigators identifying personality trait change related to transitional role experiences, Bleidorn (2012) *implicitly* argued that these effects are mediated by changes in goals. Studies employing an *explicit* measurement of goals or other sorts of reference values (such as social expectations, preferences) could provide important insights into the processes of how goals exert their influence on changes in personality traits, but up to now such studies have been very rare (Denissen, Penke, et al., 2013).

As highlighted by the SIT and supported by the findings from Bleidorn (2012), it is not the transitional experience per se that triggers personality trait change, but rather the commitment to and the psychological investments in newly entered social roles. However, commitment and investments are much more likely to occur when social expectations that are associated with a certain role have been internalized and "converted" into personal goals. Thus, psychological investments in social roles can also be described as investments in attaining personal goals to change one's personality traits in the direction that facilitates meeting the relevant role demands. But how do *psychological investments in personal goals* work?

Do goal importance and feasibility function as determinants of personality trait change?

One answer to this question is provided by the 3-SRF (Hennecke et al., 2014). As the authors take a functional perspective on personality development, their theoretical work can be embedded into the larger framework of the SRT which addresses the active self-regulative role of the individual (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013). The 3-SRF focuses on the goals individuals try to achieve through their trait-related behavior as well as on self-regulation and habit formation processes which may facilitate turning these goals into trait change. The following pre-conditions have to be met for personality trait changes to occur: First, changing trait-related behavior must be considered desirable or at least as a necessary means to reach a superordinate goal. Second, changing trait-related behavior must be considered feasible and the individual must actually be able to perform that behavior. These two conditions can be approximately captured by the terms *value* and *expectancy*, borrowed from classic models of motivation and planned action (e.g., Atkinson, 1957; Fishbein & Ajzen, 1975; Heckhausen, 1977; Vroom, 1964). Both the person's commitment to certain behaviors as well as the likelihood of success in performing those behaviors is determined by the interaction of goal value and expectancy to reach the goal. Third, self-regulated behavioral changes have to become habitual and automated through the frequent repetition of the targeted behavior – only then does the intentional process result in a persistent shift in an individual's personality traits (see also Figure 4).

To give a vivid example, imagine a shy young man who aims at becoming more extraverted. It may be the case that he deems that goal necessary to manage his new job as salesman. Likewise, he considers it feasible to change his behaviors related to extraversion (e.g., approaching unfamiliar customers) and thus he gradually behaves in a more extraverted fashion, feels more secure in situations with unfamiliar customers and thinks in a more optimistic way about such situations. To the degree to which these changes in behavior, feelings, and thoughts become automated and habitual over time (i.e., they do no longer require conscious attention and control), changes in the trait of extraversion will manifest themselves. This changed behavior may even generalize to other important domains of his life: He might act more sociably and vividly as a husband, father, or friend.
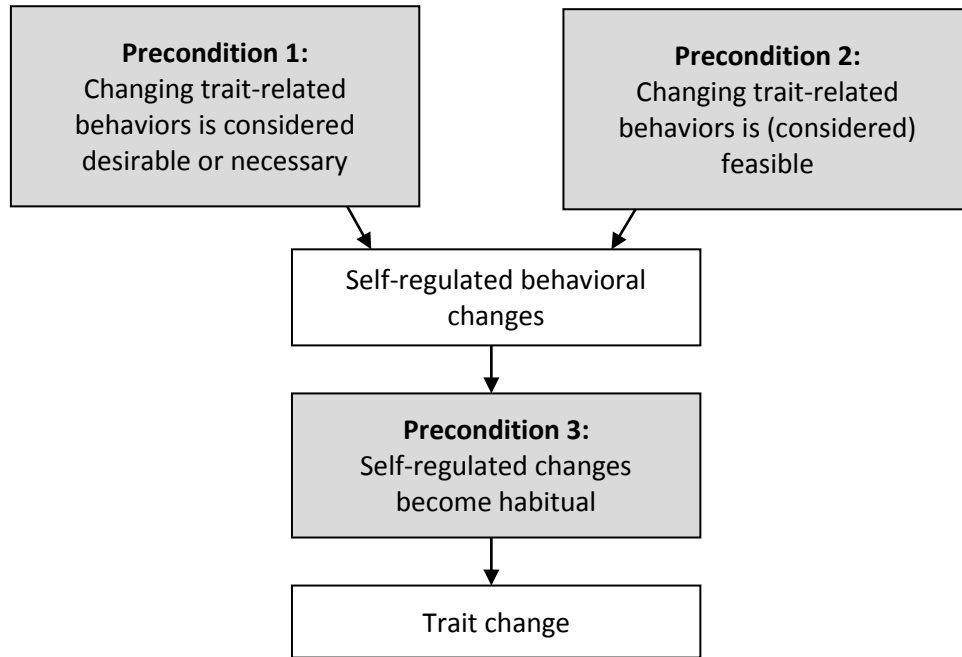
Figure 4. Three-part framework for self-regulated personality development. Adapted from Hennecke and colleagues (2014, p. 290).

In line with the bottom-up processes of intentional personality trait change within the 3-SRF, Magidson, Roberts, Collado-Rodriguez and Lejuez (2014) have proposed a set of guiding principles for the theory-driven modification of targeted personality traits. The authors hold the view that personality traits not only exist at the trait level, but also at the state level which reflects moment-to-moment fluctuations in personality functioning (see also Fleeson, 2001). Although existing evidence suggests that personality states are partially a behavioral manifestation of corresponding traits (Nezlek, 2007), there still remains state-level variation that may be explained by other sources than those related to traits (e.g., environmental contingencies; Roberts, 2009). For example, in a diary study by McCabe and Fleeson, 2012, daily fluctuations in extraversion-related goals (e.g., "trying to have fun") were related to extraverted behavior: Goals predicted almost 75% of the variance in extraverted behavior. Thus, such contingencies are seen as the starting point for targeting core behaviors that underlie personality traits with the goal of establishing new patterns of behavior that become habitual over time and manifest in personality trait changes. Furthermore, and also consistent with the 3-SRF, Magidson and colleagues (2014) argue that the direction of trait change depends on the importance and perceived feasibility of personal goals: The authors identified Eccles's expectancy-value theory (e.g., Eccles, 2009; Eccles et al., 1983) as a motivational framework for behavioral interventions targeting personality trait change (in their case, conscientiousness).

Hence, both theoretical approaches to intentional personality trait change (i.e., 3-SRF and guidelines for a theory-driven intervention) emphasize the role of personal goals and their characteristics for personality trait change.

It should be noted, however, that the self-regulation perspective of intentional personality trait change is intended to complement existing models of personality trait development and that the authors thereby accept the notion that biological and social or environmental factors are also likely causes of personality trait development (Denissen, van Aken, et al., 2013; Hennecke et al., 2014). Furthermore, the 3-SRF specifies the conditions and *processes* through which intentional personality trait change can take place and thus provides testable hypotheses about how people may intentionally develop their trait levels in the directions they desire.

The present study is aimed at shedding some further light on how personal goals can influence personality trait change by explicitly measuring individuals' goals to change oneself as well as specific goal characteristics like importance and feasibility. In doing so, data from the present study will allow to test some of the theoretically derived mechanisms of self-regulated personality change proposed by the 3-SRF (Hennecke et al., 2014) as well as by the guiding principles for theory-driven intervention for changing personality (Magidson et al, 2014). To the best of my knowledge, no existing study has examined whether individuals can change their personality traits simply because they want to do so (for a recently published exception see Hudson & Fraley, 2015).

In the next section, I will focus on my third research question that is intended to complement findings on the influence of *mid-level goal units* on personality trait change by examining the effects of *major life goals* on self-regulated trait change within the relatively short period of less than one year. So far, no previous study has investigated this issue and my third research question is to take a first step toward filling this gap in the empirical literature.

2.6   Major life goals and personality trait development

During the last 15 years, only a few studies have responded to the call by Roberts and Robins (2000) to examine empirically the structural links between life goals and personality traits (e.g., Bleidorn et al., 2010; Lüdtke et al., 2009; Roberts et al., 2004). Findings from these studies have consistently demonstrated meaningful associations of moderate magnitude between life goals and personality traits, both concurrently and across time. Beyond addressing the phenotypic pattern of correlations between goals and traits, Bleidorn and colleagues (2010) have investigated the shared etiologies of both constructs. Employing a multivariate longitudinal-biometric design, the authors disentangled genetic and environmental effects on the links between goals and traits both cross-sectionally and across time. They concluded from their analyses that major life goals and personality traits are

"related but distinct elements of the personality system" (Bleidorn et al., 2010, p. 377). Thus, individuals not only calibrate their goals in line with their personality traits, but also adapt their traits to their goals in order to react adequately to the demands and expectations of their current or anticipated social environment (see also the conceptual framework by McAdams & Pals, 2006, discussed in section 1.1). Accordingly, major life goals and personality traits should be examined as complementary units of the personality system.

To examine the relation between goals and personality traits, Roberts and Robins (2000) adopted and recommended an approach to compare units at similar levels of abstraction. Personality traits and major life goals are both relatively broadly defined and represent dispositional constructs: the former referring to who people are, the latter reflecting what people desire to become. Thus, from a conceptual point of view the comparison of life goals and personality traits seems reasonable (see also Figure 1). However, the focus of the present work is to investigate *short-term* personality change (i.e., over nine months) driven by specific goals to change one's trait levels. Analogously to the conceptualization of personality traits, major life goals are thought to be relatively stable over time and to reflect what individuals *generally* strive for in their lives (e.g., Roberts et al., 2004). It might therefore be somewhat counterintuitive to assume that major life goals exert their influence on personality traits within this time period of less than one year, especially as previous longitudinal studies have examined the interplay of life goals and personality traits within time frames of at least two years (Lüdtke et al., 2009) or longer (Bleidorn et al., 2010; Roberts et al., 2004). Roberts and colleagues (2004) have found meaningful links between changes in life goal importance and in personality traits over a period of four years. For example, changes in relationship goals have been associated with changes in extraversion, agreeableness, and conscientiousness. Valuable as these findings on correlated change and corresponsiveness of life goals and personality traits are in increasing our understanding of the developmental processes underlying personality trait development, they fail to address the causal direction of effects. Lüdtke and colleagues (2009) examined the development of life goals and personality traits at the transition from school to college or employment over a period of two years. While they found significant effects of prior personality traits on subsequent life goal importance, there were almost no effects of prior life goal importance on subsequent personality traits. The question then remains of how to explain the theoretically sound, but empirically missing effects of prior life goals on personality traits.

Within their six notions on the role of time in personality development, Luhmann and colleagues (2014) argue that the timing of measurement occasions is crucial for research addressing change phenomena. Hence, studies with large time lags between measurement points might not be able to detect any trait change at all if the change is reversed after a certain period. In the reverse case,

studies with short time lags between measurement occasions might not be able to detect personality trait change that is slow or delayed. Timing is ideally derived from theoretically based assumptions on when and why change occurs (Collins, 2006), notwithstanding the fact, as noted by Luhmann and colleagues (2014), that theories on personality trait development are mute with respect to the role of time or do not address time explicitly enough. Therefore, it might be possible that the time lags chosen by Lüdtke and colleagues (2009) were just not appropriate to the task of detecting the effects of prior life goals' importance on subsequent personality traits. But principally, it remains an important task for future theoretical and empirical research to address explicitly the temporal course of personality trait changes (e.g., gradual, abrupt).

To the best of my knowledge, there has been no study to date that investigates the effects of life goals on personality trait change within such a relatively short time period of less than one year. This is more than plausible considering the broad definitions and relatively high temporal stabilities of both concepts. However, the present work studied individuals during a period of active and deliberate investments in intentional personality trait development: Thus, one can assume that this period of intentional trait development reflects a "strong situation" for change as it includes high motivation for a new way of behaving while providing clear information and support from the training how to behave adaptively (Caspi & Moffitt, 1993). In such a "strong situation" trait change might be accelerated compared to commonly studied personality trait change during normative transitional periods in adult life (e.g., transition from school to work life). Furthermore, while social expectations and/or internalized goals might rarely be consciously represented during transitional periods, phases of intentional trait development imply that change goals are deliberately represented and continuously reflected on by the individual. Moreover, as individuals deliberately decide to invest large efforts to overcome (in their view) unwanted or dysfunctional behavioral patterns, it seems plausible to assume that in the course of this process they also think about what is generally important for them in their lives, i.e. they consciously reflect on higher-order life goals asking themselves if it is worth investing in achieving and maintaining new behavioral (including cognitive and emotional) patterns. In this way, major life goals in line with the goal to change oneself might be activated, become conductive for behavior and serve as motivational triggers for personality trait change in the very period of investment in goals to change oneself – even within the short time period of nine months.

I suggest that the context of intentional self-regulated trait change has the advantage that it identifies the time period in which individuals are especially committed to their goals and invest efforts to reach such goals. In general, people might rate certain life goals as generally important to them; however, although these importance ratings may remain relatively stable, the active

commitment to such life goals and the efforts invested to reach them might wax and wane over time (Vancouver, 1997). As suggested by the 3-SRF (Hennecke et al., 2014), high goal importance alone is not predictive of behavioral and trait changes, rather it is simultaneously perceived importance and feasibility of personal goals that trigger behavioral investments in these goals. Hence, Lüdtke and colleagues (2009) might have studied a transitional period in which life certain life goals were generally deemed important (e.g., having a family), but not feasible or appropriate at that time in life (participants were 20 years old on average and were graduating from school to work life or university). In that case, following the 3-SRF (Hennecke et al., 2014), one would not have expected effects of prior goals on subsequent personality traits. As early as in 2004, Roberts and colleagues called for studies to incorporate multiple dimensions of nomothetic life goal ratings rather than to focus solely on the importance of goals.

Drawing on the call by Roberts and colleagues (2004) as well as on the 3-SRF (Hennecke et al., 2014), the present work addresses the influences of different major life goal characteristics on personality traits within the relatively short period of nine months. Following the notion that appropriate spacing of measurement occasions is crucial to the study of change (Luhmann et al., 2014), individuals were tested every third month on four equally spaced occasions in order to detect, describe and explain short-term personality trait change with respect to mean-levels and rank-order differences. The specific context of intentional personality trait development justifies the examination of the influence of broad major life goals on personality trait changes within the relatively short time period under investigation.

2.7   The present study

The present study examines the influence of goals to change oneself and major life goals on personality trait changes with respect to mean-levels and rank-order. Three issues guided this research: First, I investigated short-term stability and change of personality traits during a nine-months period of intentional and self-regulated investments in personal change goals. I expected to find significant mean-level changes in targeted traits from baseline to each measurement occasion. (i.e., over the course of 3, 6, and 9 months, respectively). Due to the focus on intentional trait development (Denissen, van Aken, et al., 2013; Hennecke et al., 2014), processes of trait change were supposed to work deliberately and in an accelerated way compared to processes of normative change processes during major life transitions – thus resulting in significant mean-level trait changes after only several months. Moreover, Hudson and Fraley (2015) demonstrated that change processes can be facilitated by appropriate psychological interventions. As participants had volunteered to take part in a cognitive-behavioral training intervention (Hinsch & Pfingsten, 2007; further details below) that addressed behavioral changes related to neuroticism and extraversion, participants typically

aimed at reaching personal training goals related to decreases in neuroticism and increases in extraversion. Accordingly, and in line with the purpose of the training, trait changes were expected to occur with respect to decreases in neuroticism and increases in extraversion (and no changes in the other Big Five traits). Definite hypotheses about the effect-sizes of mean-level trait changes were more difficult to deduce as no empirical study had previously addressed intentional trait change employing an explicit measure of goals to change oneself. However, according to the effect-sizes of short-term personality trait change reported by Bleidorn (2012), small to medium effect sizes of mean-level changes were expected over the course of nine months. In contrast to Bleidorn (2012), the present study investigated individuals who explicitly and deliberately invested in personal goals to change their levels of specific traits: Therefore, effect sizes were anticipated to be somewhat larger than those reported in Bleidorn (2012). Moreover, studies that assessed personality trait change as a side-effect of intensive cognitive-behavioral therapy over several months, revealed even large pre-post decreases in neuroticism (Cohen's d = 1.0) and medium increases in extraversion (Cohen's d = .59; e.g., Gi et al., 2010). Finally, and in contrast to typical findings from evaluation studies focusing on symptom reduction (e.g., Beelmann, Pfingsten, & Lösel, 1994), mean-level changes in neuroticism and extraversion were hypothesized to increase with a longer time distance from baseline measurement. That is, personality trait change from pre- to post-training assessment was expected to be smallest while trait changes from baseline to follow-up measurements were expected to become larger because changed behavioral patterns may generalize to other domains of everyday life or may deepen across time (Hennecke et al., 2014).

Second, adopting a functional perspective on personality development and thus emphasizing motivational and self-regulation processes for trait changes (e.g., Denissen & Penke, 2008; Hennecke et al., 2014; McCabe & Fleeson, 2012), I expected personal goals to change oneself to serve as meaningful predictors of mean-level changes in neuroticism and extraversion. Hence, individuals were predicted to serve as active agents of their own development. As suggested by the 3-SRF (Hennecke et al., 2014), the combination of both perceived goal importance and feasibility was hypothesized to be positively associated with the amount of desired changes in neuroticism and extraversion. Accordingly, *neither* high goal importance *nor* high perceived feasibility of a goal should suffice to predict meaningful trait changes in the desired direction. Both preconditions were considered necessary for initiating consistent changes in trait-relevant behavior. Referring to the terms of the SIT (Roberts et al., 2005), during a period of active goal investment (i.e., training participation in this study), importance and feasibility determined the psychological commitment of an individual to his or her goals. Furthermore, goal characteristics were assumed to be predictive of trait changes only in the first time period where change processes might be triggered and initiated. It seems plausible to assume that maintenance und generalization of trait-relevant behavioral changes

were driven by other mechanisms than perceived importance and feasibility of change goals at the beginning of goal investment (i.e., at the first measurement occasion). Positive consequences of the changed behavior (e.g., increased well-being) or positive feedback from relevant others (e.g., as social role expectancies are better met) constitute such mechanisms for maintenance and generalization.

Third, the role of major life goals in short-term mean-level trait changes was examined. Major life goals were expected to exert influence even during this very short time period as they were assumed to be deliberately reflected by individuals who invest in trait-relevant behavioral changes. Again, drawing on the theoretical reasoning of the 3-SRF (Hennecke et al., 2014), the hypothesis was examined that the interaction of the importance and feasibility of life goals predict mean-level trait changes in neuroticism and extraversion. In contrast to change goals which were assumed to exert an influence at an early stage, major life goals were expected to act in a more continuous way, i.e. affect mean-level changes in neuroticism and extraversion over the whole study period. This reasoning built on the conceptual understanding of major life goals as broadly formulated with respect to their content and relatively enduring across time (e.g., Roberts & Robins, 2000).

The present analyses focused on two different categories of major life goals hypothesized to have an influence on individuals' desired trait changes, namely affiliation and intimacy goals. Both affiliation and intimacy goals can be scaled along the broad dimension of communion (vs. agency; Pöhlmann & Brunstein, 1997). Affiliation goals incorporate community-oriented endeavors and refer to social ambitions, such as having a lot of friends or spend much time with others. In contrast, intimacy goals refer less to a quantitative aspect of communion but rather to a qualitative one: Intimacy goals comprise social ambitions such as having deep and confident relationships or giving affection to someone. Participants in this study might have generally thought a decrease in neuroticism and an increase in extraversion as socially desirable in and of itself, but that their very change goals might serve a broader, more basic life goal, namely bonding with others and maintaining confident and satisfying relationships (i.e., intimacy and affiliation life goals). Thus, the two goal categories of affiliation and intimacy were hypothesized to positively predict mean-level changes in neuroticism and extraversion. In addition, and in contrast to other research (e.g., Lüdtke et al., 2009), major life goals were expected to be predictive of inter-individual differences in trait changes. As pointed out above, in this specific context of intentional trait change, life goals may be deliberately reflected and thus become conductive for consistent behavioral changes: Individuals who attach greater importance to affiliation and intimacy as life goals were expected to change more intensively on the relevant traits than individuals who perceive a low importance of these life goals, resulting in rank-order inconsistency. Furthermore, while variance in perceived importance of change goals was

expected to be rather low in this study (i.e., all participants took part in the same training that focused on decreases in neuroticism and increases in extraversion), variance in importance of major life goals was supposed to be larger and thus might have qualified as a predictor of rank-order inconsistencies across time.

Personality trait change in the context of an intervention: The Group Training on Social Competencies (GSK)

Intervention studies are rare in research on personality (but see Hudson & Fraley, 2015; Jackson, Hill, et al., 2012). However, they are essential to establish causal links and to identify processes that drive personality development. In the present study I examined personality trait change in the context of a cognitive-behavioral intervention, although not making use of a full control group intervention design. The intervention context, however, implicates several advantages for the purposes of my research: Previous results demonstrated that intentional personality change can be facilitated by appropriate psychological interventions – especially if they support the formulation of specific goal implementation intentions (Hudson & Fraley, 2015). Thus, for the purpose of the present study, the GSK training was chosen to provide a context for individuals that help them to implement their change goals and to define the time span in which individuals mainly invest in their change goals. The intervention context has the further advantage that individuals have homogenous change goals: Related to the GSK training, participants formulated goals to improve in extraversion and Emotional Stability. It should be noted, however, that the present study was *not* intended as an intervention study to examine the efficacy of the GSK training (or of specific training elements like increasing change motivation) in altering personality traits. Consequently, with respect to the aims of the present research it was not required to implement a control group in the overall study design (for a discussion of the benefits of an additional waitlist control group design see section 2.10.4). Moreover, and as mentioned above, the GSK context served to study individuals with uniform change goals in terms of their content and to identify the time span of behavioral investment into personality trait changes.

The Group training on social competencies (GSK)

The GSK (Hinsch & Pfingsten, 2007) is a standardized structured training program aiming at the enhancement of social competencies and based on the fundamental assumptions of cognitive-behavior therapy. In particular, it addresses shy or socially anxious people who wish to overcome problems and drawbacks of their reserved behaviors. In Germany this group training has been well established for more than 30 years and still enjoys great popularity not only in therapeutic contexts, but also in advanced education and further training contexts. It is an intensive, yet economic program with flexible building blocks that can be adapted to different requirements, target groups, and

settings. In the present study the training was implemented in its original version; that is, adult participants with the overriding goal to enhance their social competencies attended seven weekly sessions à 180 minutes.

Drawing on a process model of socially competent behavior (see Figure 5a), the authors of the GSK arranged the training of coping abilities at three different levels, namely on the levels of cognitive, emotional, and "overt" observable behavior (for comparable models see also e.g., Beck & Clark, 1997; Döpfner, 1989; Spence, 2003). As explanatory models are a relevant factor for therapy success (Pfammatter & Tschacher, 2012), a less complex version of the process model displayed in figure 5a is imparted to the participants. Therefore, participants are enabled to explain and comprehend their own problem behavior. Furthermore, the content and purpose of the training structure are made transparent. Similar to other recent interventions or training programs to modify behavior, the GSK is based on the mechanisms of self-monitoring and self-control. The primary goal of cognitive-behavioral interventions such as the GSK is thus not so much the modification of specific behavioral problems as rather the development of general abilities that might help the individual to overcome relevant social problems. Referring to training elements at the cognitive level, the GSK for example addresses the differentiation between emotions and cognitions as well as between aggressive and self-assured behavior, realizing self-verbalizations and the re-formulation of negative self-verbalizations into positive intentions. Development of emotional coping abilities is indirectly targeted as participants are taught a shortened and adapted version of progressive muscle relaxation (Jacobson, Emrich, & Wirth, 1999). Furthermore, emotions are indirectly addressed by changing self-verbalizations: that is, in line with the ABC-model of Albert Ellis (e.g., Ellis, 2008) it is assumed that emotional reactions result from antecedent thoughts and can thus be influenced through the modification of those very thoughts. Finally, the GSK training focuses on the observable behavioral (or motoric) level: Behavioral skills are practiced using role plays in conjunction with video-feedback – which constitute the most time-consuming part of the training program. Additionally, and in order to transfer new behaviors to daily life, participants are urged to implement in-vivo exercises as homework between the training sessions. The described training levels are addressed with respect to three classes of social situations that are especially focused within the program, namely asserting one's rights, social relationships, and soliciting others for sympathy. In the last two training sessions, participants are requested to exercise idiosyncratic social situations that are personally relevant to them in their daily lives.

Having outlined the process model of behavior that underlies the GSK training, it becomes obvious that this approach from the clinical research tradition is well in line with the general assumption of many bottom-up approaches to personality development: Both the GSK process model as well as bottom-up models imply that internal (e.g., goals) and external factors (e.g., feedback from relevant peers) will not affect personality traits directly, but typically act on an individual's behavior, feelings, and thoughts (Roberts, 2009). This is exactly a basic assumption of the sociogenomic model of personality (Roberts & Jackson, 2008) which will be addressed and outlined in more detail in chapter

three. Furthermore, the rationale of the GSK training explicitly focuses on the issue of rooting behavioral changes in consistent habits which in turn may lead to long-term changes in personality (Figure 5b; compare Hennecke et al., 2014): The GSK thus qualifies as a "strong context" for intended self-regulated personality trait changes since its main goal consist of building and establishing new behavioral patterns.
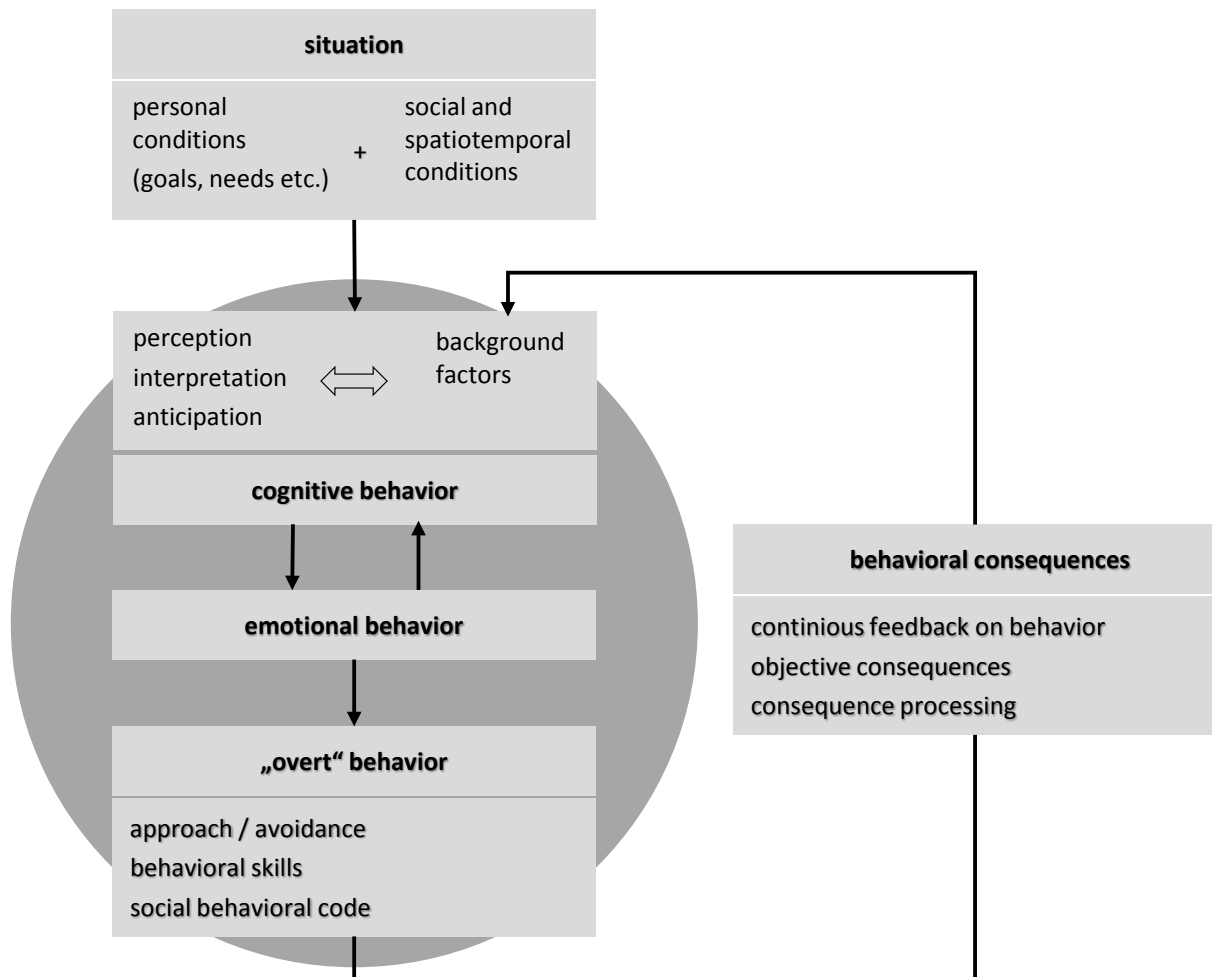
Figure 5a. Explanatory model of social skills and skill problems: A situation is perceived by a person, then processed cognitiveley and emotionally and eventually leads to a certain behavior. This behavior triggers consequences in the environment that in turn react upon the person. Adapted from Hinsch & Pfingsten (2007).

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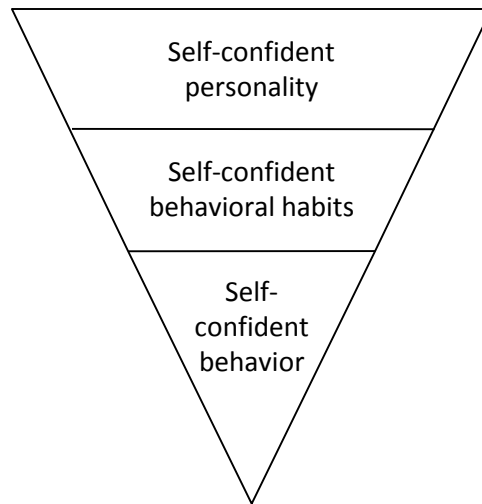
Figure 5b. Pyramid of self-confidence: If self-confident behavior is shown over a longer period, it becomes habitual and eventually results in restructuring personality traits. Adapted from Hinsch & Pfingsten (2007).

The conjunction of the inherent training goals (i.e., enhancing social competencies) with the personal goals of participants is especially emphasized in the training. Thus, the authors' definition of social competences provides a formal framework for the understanding of social competent behaviors, but it does not contentually specify what is meant by social competent behavior: Social competencies are understood as the availability and implementation of cognitive, emotional, and motoric behaviors that lead in specific social situations to a long-term beneficial ratio of positive and negative consequences for the individual (Hinsch & Pfingsten, 2007, p. 90). Accordingly, in the concrete case, the evaluation of events as positive or negative consequences depends on the personal goals that the individual associates with the implementation of specific behaviors. Imagine again the young man who strives to become more extraverted: He might desire to behave more confidently, for example when claiming his right to exchange damaged or faulty goods in a store. It might be a possible consequence that the shop assistant reacts irritated or even angry to the young man's request. However, drawing on the personal goals of the young man the positively valued consequence of behaving confidently (and not primarily agreeable) in order to assert his right might outweigh the negative consequence of prompting an upset reaction of an interaction partner. In contrast, another person who strives to become more agreeable might judge the same behavioral sequence as less social competent with rather negative consequences as the primary personal goal is to behave more agreeably in general.

2.8   Method

2.8.1   Participants

Participants were recruited in the proximity of Bielefeld using various acquisition strategies, particularly the dissemination of flyers and posters at relevant places at Bielefeld University and in the city center of Bielefeld. As the training that was offered to participants particularly addresses shy or social anxious people, respective counseling centers at the university or in the city (e.g., Student Advising and Counseling Center, Career Service, Center for Health Management) were contacted and asked to convey study information to their clients. Counseling centers also posted a PDF version of the training offer on their websites. All study advertisements comprised standardized information describing the training's general conditions and purposes as well as brief information on the associated study participation. Interested individuals were provided with contact details to register for an individual briefing session.

From N = 110 individuals who had initially indicated interest in study participation, N = 99 kept the appointment for the individual briefing session. N = 2 out of those individuals decided against study participation due to scheduling difficulties. Thus, a sample of N = 97 participants provided data at the first measurement occasion and started training participation[2]. Age of participants (68 females, 29 males) ranged between 20 and 58 years (M = 30.01, SD = 7.88). The majority of the sample comprised of university students (38%) or of individuals who had already finished their degrees (34%). Using a scale ranging from 0 = *not at all* to 4 = *very much*, participants reported that they were considerably affected by their social problems in daily work life (M = 2.46, SD = 0.97) as well as in daily private life (M = 2.34, SD = 1.05). Yet, the amount of perceived stress did not significantly differ between the contexts (i.e., work vs. private life) (t(84) = -.76, p = .45).

2.8.2   Procedure

I conducted individual briefing sessions at my office at Bielefeld University. For each participant, the briefing session took part about four weeks before the first training session and lasted about half an hour plus some additional time to complete the first data collection. Furthermore, the individual briefing session served to check the general inclusion criteria for the GSK training, such as the presence of persistent problems in coping with daily social situations related to work and/or family life. Sticking to additional specific indication criteria ensured that participants were psychologically capable and sufficiently motivated to take part in the different building blocks of the training and to accept the cognitive-behavioral exercising basic conception of the GSK training. The training concept

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[2] I only included datasets with a maximum of 20% missing data per scale (Downey & King, 1998). However, as the online questionnaires mainly based on forced choice items, only scattered missings occurred.

goes without any explicit exclusion criteria, however, contra-indication is given when problems of any sort or (psychological) diseases preclude the fulfillment of inclusion criteria or require a specific adaptation of the training implementation (e.g., inpatient setting, reduced length of training sessions etc.). Following the suggestion from the ethics commission of Bielefeld University, I additionally defined specific exclusion criteria that were checked during the briefing session, namely the presence of substance abuse, acute substance dependence, psychosis, bipolar disorder, severe concentration or attention deficits, and self-injury. However, none of the individuals who attended a briefing session had to be excluded from training participation due to the listed criteria.

In a next step, the GSK training (Hinsch & Pfingsten, 2007) was explained and illustrated in order to compare the purpose of the training with each potential participant's personal training goals. Thus, each person was thoroughly informed to decide whether to participate or not. Furthermore, participants were informed about the purpose and the course of the study. Especially, the object and procedure of the experience-sampling method was explained to them and each participant ran a first practice trial – either using one's own web-enabled smart phone or they received a web-enabled HTC Touch Diamond handheld computer for the duration of the experience-sampling periods (for an overview see Figure 2; for a detailed description of the experience-sampling study see chapter 3). If participants were still interested to participate, they registered for one of the training courses, received a written study manual and signed an informed consent (for participants' study manual and informed consent see Appendix A). Finally, participants changed rooms and completed the first occasion of data collection on a PC by themselves. This procedure ensured that all participants completed the first measurement occasion at comparable time points in the process of goal investment: That is, immediately after they decided to take part in the training and to work on their goals. In the introductory questionnaire, they provided some basic demographic information, declared their personal goals for the GSK training in an idiographic format, and answered to a set of standard personality and life goal questionnaires. Furthermore, the standard evaluation questionnaires of the GSK training were handed over to the participants as paper-pencil versions: Thus, participants had time to complete them until the start of the training.

Participation in the study was voluntary and not financially remunerated. The standardized GSK training was offered free of charge and thus an attractive incentive for many participants as adult education centers or other institutions typically charge a fee of 60€ or even more. Furthermore, participants were offered to receive individual feedback after the full completion of the four-wave longitudinal study as a further reward for their services.

Eight training courses with a maximum of N = 12 participants were offered. All courses started in the period between January and April 2013. Subsequent individual measurement occasions ($T_2 - T_4$) were individually timed for each participant, depending on the timing of the training course that was attended. Advanced psychology students from Bielefeld University had been qualified as trainers for the GSK (see section 1.8). There were teams of three trainers per course: This was necessary to enable the parallel implementation of behavioral training using video feedback in small sub-groups. The conception as well as the building blocks of the GSK training will be described in section 2.8.2.

Participants attended an individual evaluation session about two weeks after they had completed the training (see Figure 2). Again, evaluation sessions were conducted in my office and lasted about half an hour plus some additional time to complete the second occasion of data collection. The procedure of the one-to-one session and the subsequent data collection was structured analogously to the first measurement occasion. Among other things, individuals reflected their training participation and evaluated to which degree behaviors and/or general attitudes had changed or remained stable during the last three months. Furthermore, they were asked which behavioral or cognitive changes they desired to maintain or even to intensify in their everyday lives; and how they plan to realize such maintenance goals. Finally, participants handed back the standard evaluation questionnaires of the GSK training that they had completed between their last training session and their evaluation session.

Follow-up measurement occasions were equally spaced three and six months, respectively, after training participation had been completed. Participants were provided with a study link via email and were asked to complete the full set of online questionnaires within the next seven days. If they had not responded after one week, participants were reminded of their follow-up participation. While N = 69 individuals provided complete self-reports for the second measurement occasion, only N = 48 (i.e., almost 70% of the post-test sample) and N = 44 (i.e., almost 64% of the post-test sample), respectively, participated in the online follow-up measurement occasions (further details related to panel attrition are described in section "Attrition analyses"). Only participants who completed the online follow-ups within two weeks after the first email were included in the analyses. Altogether, waves of data collection took from December 2012 (briefing sessions for the first training courses) to December 2013 (final follow-up occasions for the last training courses) (see also Figure 2).

Prior to study implementation, the ethics commission of Bielefeld University proved the described research project and evaluated the study as ethical uncritical. The ethics proposal as well as the positive statement of the ethics commission are presented in the Appendix B.

2.8.3 Measures

Big Five personality dimensions. To assess the Big Five personality dimensions of neuroticism, extraversion, agreeableness, and conscientiousness, a shortened German version of the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992; Ostendorf & Angleitner, 2004) was administered at all four measurement occasions. The personality dimension of openness was not assessed in this study as the duration of the overall assessment program had to be reduced to lower the burden for participants: openness had been considered as least susceptible to change processes in the specific training context of the study and has thus been omitted from the assessment program (the original ordering of the items was maintained). The NEO-PI-R contains 240 items (i.e., 48 Items per trait dimension), grouped into 30 facet scales that are hierarchically organized under the five domain scales of the five-factor model of personality (see Appendix C, Table C-1 for a listing of the 30 facet scales). The items were rated on a 5-point Likert-type scale ranging from 0 = *strongly disagree* to 4 = *strongly agree*. Internal consistencies (Cronbach's alpha) were .92 for neuroticism, .89 for extraversion, .85 for agreeableness, and .90 for conscientiousness, respectively. Despite the relatively small sample size, internal consistencies of domain and facet scales were close to values from the representative norm sample (Ostendorf & Angleitner, 2004), with only one exception for a facet scale of agreeableness (compliance). Table C-1 (see Appendix C) shows the internal consistencies at Times 1 to 4 as well as the corresponding values from the norm sample in brackets.

Goals to change oneself and related goal characteristics. Personal goals to change oneself were assessed based on a selection of modules of the revised version of Little's Personal Project Analysis inventory (PPA; Little, 1983). The PPA assessment modules 1 and 2 (i.e., project elicitation/*What's up?* and project appraisal/*How's it going?*) were translated into German by two independent German native speaker with an advanced level of the English language and adapted to the specific context of training participation and intentional trait change project. Please note, that at the time of study planning and implementation (2012/2013), the concept and nomothetic assessment of goals to change oneself has not yet been empirically examined (i.e., Hudson & Roberts (2014) were the first who addressed this issue) and to the best of my knowledge there has been no previous study that had explicitly captured goals or intentions to change one's personality traits (see also Denissen, Penke, et al., 2013). However, the methodology of PPA was chosen and slightly adapted to capture personal change goals as it allows "personally salient and ecologically representative idiosyncratic units to be assessed along a set of dimensions that are explicitly modular and adaptable" (Little & Gee, 2007, p. 51). Thereby, PPA increases fidelity of measurement within participants without costs with regard to comparability across individuals. In particular, PPA asks participants to provide a listing of their planned or ongoing personal projects they are going to focus on, and rate each of these

projects on a set of characteristics like importance or feasibility. In the earliest version of the PPA the authors categorized the projects according to different content domains. Among others, they extracted an *intrapersonal* project category from their data comprising goals like "being more extraverted" or "raising my consciousness" which suggests that the format of the PPA is capable to capture goals to change oneself. In particular, the assessment procedure of the PPA seems to capture goals at a comparable definitional breadth as it is done by the nomothetic assessment procedure suggested by Hudson and Roberts (2014).

In the present study the idiographic assessment of personal projects aimed at those projects that participants desired to work on during the following several months with the help of the GSK training (the adapted instruction for idiographic training goal assessment is presented in Appendix D). Accordingly, participants were expected to generate projects of the intrapersonal domain, especially focusing on the decrease in neuroticism and the increase in extraversion (see above for the indication of the GSK training). Participants were instructed to formulate a maximum of eight personal training goals. Across the 97 individuals, the mean number of formulated change goals was about 5 (SD = 1.70), with a range of 2 to 8 goals.

Two independent raters evaluated the idiographically formulated training goals in terms of Big Five traits. That is, on the basis of the domain description in the manual of the NEO-PI-R (Ostendorf & Angleitner, 2004) they rated whether training goals referred to changing in neuroticism, extraversion, agreeableness, openness, conscientiousness, or in none of those dimensions, respectively. The majority of goals were formulated with respect to changing in neuroticism (40-50% of all goals; e.g., "becoming less anxious in social situations"), followed by goals related to changing in extraversion (39-42% of all goals; e.g., "becoming more communicative and talkative"). Inter-rater agreement was examined using Cohen's Kappa and yielded κ = .67 can be interpreted as an indicator of good agreement between the two independent raters (Fleiss & Cohen, 1973).

Referring to the second module of PPA (project appraisal), participants were further asked to appraise their projects with respect to a set of standardized dimensions (e.g., importance, difficulty, control, support, etc.). The project dimensions were rated on a 5-point Likert-type scale ranging from 0 = *not at all* to 4 = *absolutely*. The complete list of project characteristics as well as the German module version of project appraisal used in the present study can be found in the Appendix D (Table D-1). Of primary importance for the present work are the personal project dimensions of importance and difficulty which were both assessed with one item each. To ease interpretation in terms of the 3-SRF (Hennecke et al., 2014; see section 2.5), the project dimension of difficulty was recoded as feasibility. At the first measurement occasion, participants reported high goal importance and low perceived feasibility of their personal training goals as pointed out by M = 3.62 (SD = 0.55) and M =

0.98 (*SD* = 0.72), respectively. Across the four measurement occasions goal importance significantly decreased while perceived feasibility of personal goals significantly increased: As indicated by multivariate repeated measures analysis of variance, there was a significant effect of measurement occasions on both goal importance (*V* = 0.60, $F(3,39) = 19.33$, $p < .01$) and perceived feasibility (*V* = 0.64, $F(3,39) = 23.63$, $p < .01$). The upper part of Table D-2 (see Appendix D) shows descriptives for both goal dimensions for all measurement occasions.

Major life goals. To assess the importance of participants' affiliation and intimacy goals as well as their current success in reaching those goals, the self-report questionnaire GOALS (Pöhlmann & Brunstein, 1997) was administered at all four measurement occasions. The theoretical basis of the GOALS is in line with Bakan's (1966) distinction between communion and agency goals. Both higher order dimensions are represented by three subscales regarding the motive classifications of McAdams (1988) and McClelland (1985). Each of the six subscales (i.e., Intimacy, Affiliation, Power, Variation, Altruism, and Achievement) consists of four descriptions of life goals that have been thoroughly selected from a larger item pool employing a combined strategy of internal consistency and factor analysis (Pöhlmann & Brunstein, 1997).

To assess the importance of life goals all items start with "I want to …" followed by the particular life goal. Participants were asked to rate the importance of each of the 24 life-goal descriptions according to its relevance to their long-term or lifetime orientation on a 5-point Likert-type scale ranging from 0 = *not important* to 4 = *very important*. In a second step, participants were encouraged to evaluate their current success referring to the degree of attainment of each of the presented life goals ("How successful you are currently in the realization of this goal?"). Again, a 5-point Likert-type scale was used, ranging from 0 = *little successful* to 4 = *very successful*. The four items indicating the domain of affiliation were: "spend a lot of time with other people", "be friends with many people", "engage in a lot of activities with others", and "have a large circle of friends". Intimacy goals were marked by "receive affection and love", "give affection and love", "have a close relationship", and "have trusting relationships with other people" (according to translations by Hofer, 2003; Hofer & Chasiotis, 2003). Referring to life goal importance, Cronbach's alpha was .78 for intimacy and .86 for affiliation. With respect to current success in life goal attainment, Cronbach's alpha was .85 for intimacy and .91 for affiliation. Detailed descriptives for affiliation and intimacy goals across all measurement occasions are shown in the bottom part of Table D-2 (see Appendix D).

2.8.4 Data analysis

As noted earlier, stability and change can be captured in several distinct ways, each with different implications. The most two common ways to analyze changes are examining mean-level differences

and rank-order consistencies. To account for both conceptions of change, I estimated two different types of longitudinal structural equation models: (1) latent change models for examining (effects on) mean-level changes in personality traits as well as (2) cross-lagged panel models for analyzing (effects on) the rank-order stability across nine months. All of the models capture personality traits as latent factors to account for unreliability of employed measures and thus allow for disentangling structural relationships from random measurement error (e.g., Bollen, 1989). For the examination of change in latent models, it is crucial to ensure that changes on a latent factor-level are not are not due to changes in the relation between the latent factors and the manifest indicators (Bollen & Curran, 2006). Therefore, I first tested the personality trait measures for strong factorial invariance.

Measurement invariance models. Four measurement models were estimated separately for neuroticism, extraversion, conscientiousness, and agreeableness: These models served as a basis for all further models. Each model comprised four correlated latent factors, one for each measurement occasion. Three item parcels were used as indicators to measure each latent personality factor (Little, Cunningham, Shahar, & Widaman, 2002). The main advantage of this parceling approach is the reduction of the number of model parameters that need to be estimated. Following the suggestion from Little and colleagues (2002), *domain representative* parcels were constructed as indicators for each personality dimension: That is, it has been ensured that each parcel contains item content from each of the six facets of a personality domain. In doing so, it has further been ensured that each facet is present in each parcel to the same extent[3]. Strong factorial measurement invariance was implemented by constraining both factor loadings as well as measurement intercepts to be invariant across time (Meredith, 1993; Meredith & Horn, 2001; van de Schoot, Lugtig, & Hox, 2012). If strong factorial invariance is given, changes in a personality trait will lead to changes in the latent factors instead of changes in the measurement part of the model. Residuals of parcels were allowed to correlate across measurement occasions. In other words, correlated uniquenesses were included for the matching parcels and items collected at time points 1, 2, 3, and 4 (see recommendations by Bollen & Curran, 2006, Marsh & Hau, 1996).

Latent change models. Mean-level changes in personality traits were modeled as latent difference variables in latent baseline and latent neighbor change models, thus accounting for measurement error due to unreliability of measures (Geiser, 2012). These latent difference variables represent the differences in the true scores between two measurement occasions and thus reflect true change (McArdle, 2009). A positive value on a change variable indicates increases, while a negative value

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[3] In their comparison of internally consistent parcels with domain representative parcels, Kishton and Widaman (1994) found better stability and fit of the models employing domain representative parcels and interpreted their findings as compelling evidence for the utility of domain representative parcels. However, some researchers may consider the domain representative parcels as confounded indicators (see Little et al., 2002).

points to decreases in a variable between two measurement occasions. The more positive or negative the value, the more pronounced the increase or decrease, respectively. In baseline change models, mean-level change is modeled with the first measurement occasion as the reference point or "baseline" (Geiser, 2012; see Figure 6a). Accordingly, change within the present data was analyzed between the first and the second, the first and the third, and the first and the fourth study wave, respectively. In contrast, in neighbor change models, mean-level change is modeled between subsequent or "neighbored" measurement occasions (Geiser, 2012; see Figure 6b). For the present data, this means that change was analyzed between the first and the second, the second and the third, and the third and the fourth study wave.

Employing both types of change models allowed the investigation of mean-level changes from two different perspectives: First, baseline change models were used to identify the specific onset of change processes. Thereby, I was able to examine whether personality traits had already changed after three or six months or whether the longest time interval of nine months was needed for uncovering substantial changes. Second, neighbor change models served to illustrate the course of trait development. Within both types of change models, the latent factors were fixed to 1, and the intercept and slopes were allowed to correlate (comparable to the intercept-slope correlation of growth curves). To interpret the latent change as true change, the level and change variables must be correlated. Given that the amount of variance across time is constant, these correlations are negative. These correlations depend on the degree and the direction of change as well as on the degree of decrease and increase across time. Therefore, they should be (if at all) interpreted with caution (e.g., Kandler et al., 2015) and, thus, I avoided interpreting the correlations between level and change. The amount of change was computed as the standardized mean difference (i.e., the differences between two trait means divided by the pooled standard deviation). Following Cohen's (1992) rule of thumb, mean-level differences of $d = |0.2|$ can be interpreted as small effects, $d = |0.5|$ as medium effects, and $d \geq |0.8|$ as large effects.
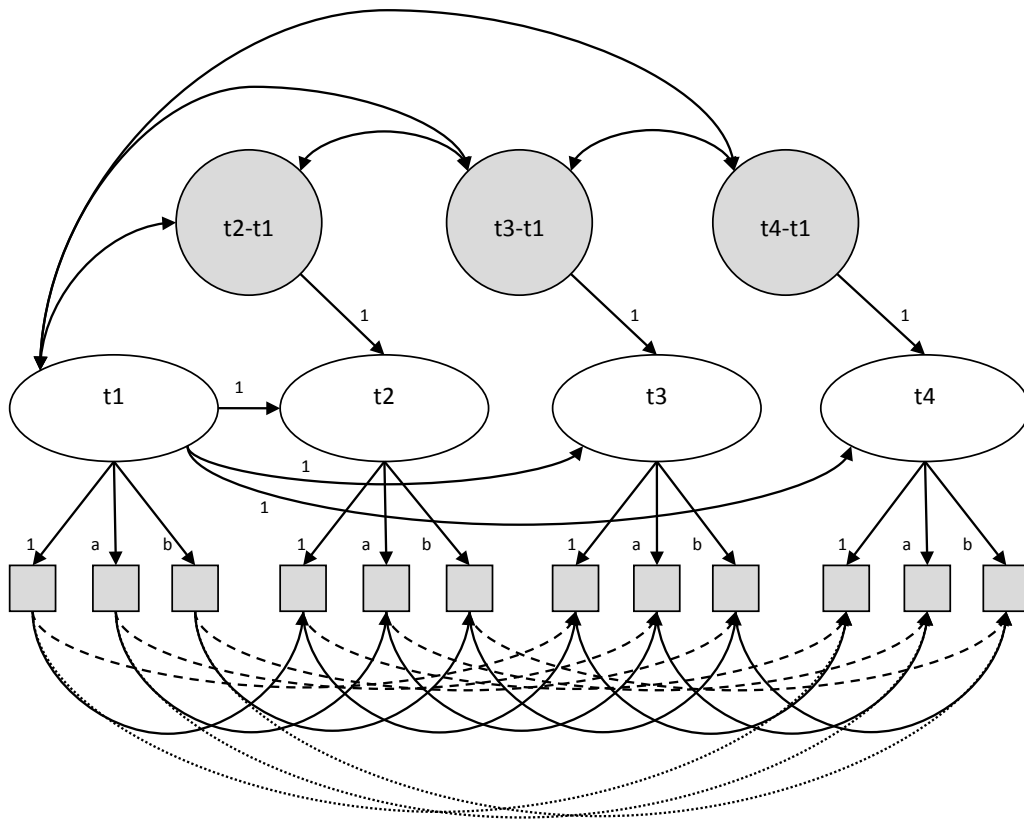
Figure 6a. Latent baseline change model with four measurement occasions. T1 to T4 represent measurement occasions.
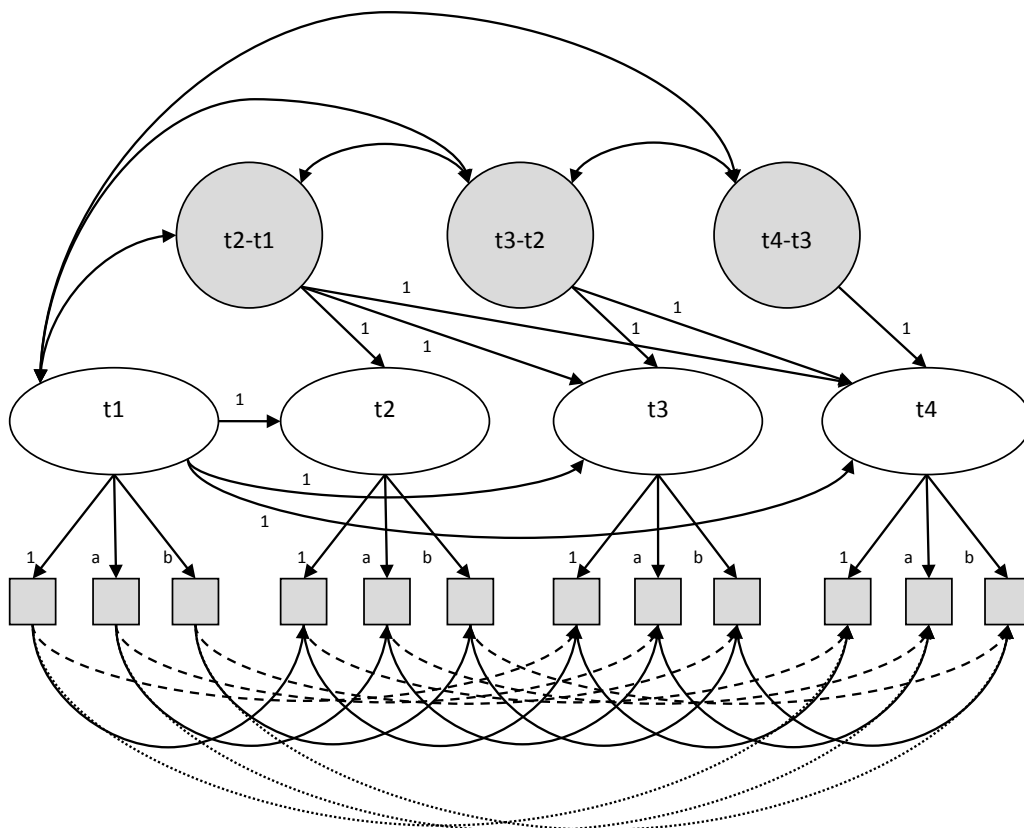
Figure 6b. Latent neighbor change model with four measurement occasions. T1 to T4 represent measurement occasions.

Substantial changes in trait neuroticism and extraversion (not conscientiousness and agreeableness) were expected for both the shorter and the longer time intervals: Thus, initial levels of goal characteristics were included in the model as predictors of trait changes from baseline to the second, third, and fourth measurement occasion, respectively. Hence, for neuroticism and extraversion, I modeled change using a baseline change model that included all four measurement occasions. Based on the 3-SRF (Hennecke et al., 2014), for the goal characteristics, I included initial levels of goal importance and feasibility (grand-mean centered) as well as their interaction effect (the product term of both grand-mean centered importance and feasibility as both are manifest variables) in the model to predict subsequent mean-level changes in traits (see Figure 7). With respect to major life goals, latent change models were specified in an analogous way: Initial levels of life goal importance and current success (grand-mean centered) as well as their interaction effect were expected to predict subsequent trait changes – especially in the long run.[4]

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[4] Due to the relatively small number of participants (N = 97), it turned out to be essential to estimate a parsimonious and robust model by minimizing the number of estimated parameters. Therefore, separate models were estimated to examine effects of possible covariates, that is, participants' age (grand-mean centered) and sex. Referring to both neuroticism and extraversion, out of 12 possible covariate effects only age had an effect on short-term change in neuroticism, in the sense that older participants decreased more in neuroticism from time point 1 to time point 2 (b = -.02, $p \leq .01$). However, the effect was not so large as to suspect that findings would be seriously biased when not simultaneously controlling for age, especially considering that age influenced the change rate at only during the first study interval (T1 – T2).
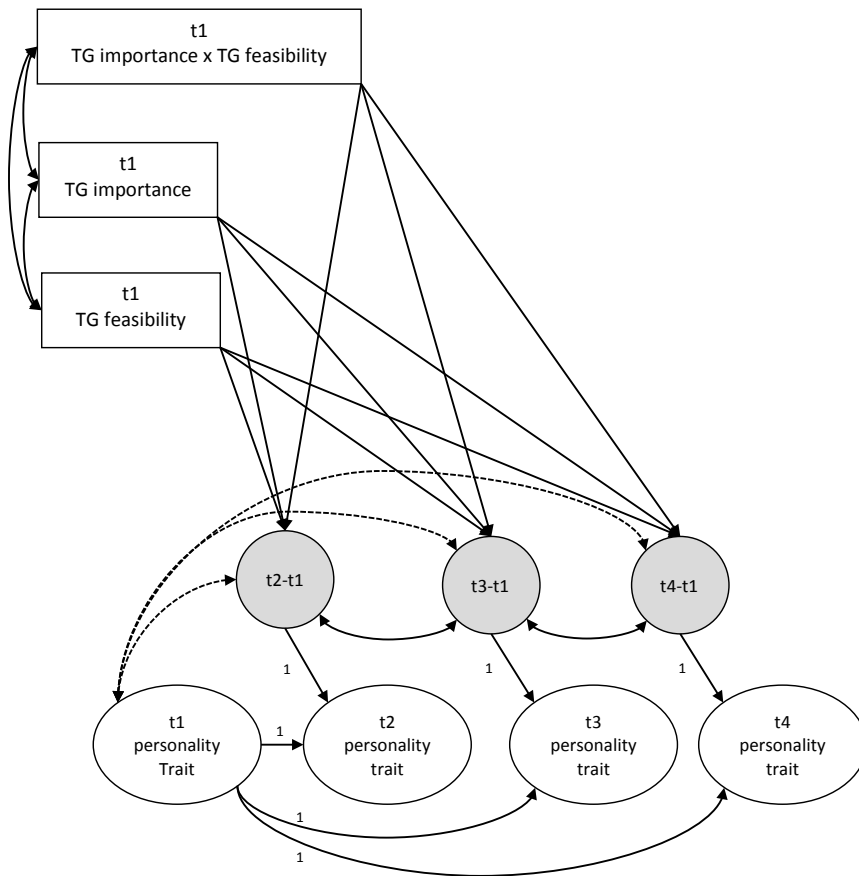
Figure 7. Latent baseline change model: Goal characteristics as predictors of mean-level changes in personality traits. TG = training goal. T1 to T4 represent measurement occasions. For reasons of clarity, measurement models were omitted.

Reliable Change Index. Complementing findings on short-term mean-level changes in personality traits, the Reliable Change Index (RCI) was used to assess individual change on each personality trait. Measurement error and its effects on variability of scores across measurement occasions are taken into account by the RCI (Christensen & Mendoza, 1986; see also Jacobson & Truax, 1991). It has been widely employed to examine the clinical significance of change in therapeutic settings (Jacobson, Roberts, Berns, & McGlinchey, 1999). During the last several years, it has been increasingly applied in longitudinal studies on personality development (e.g., Allemand et al., 2010; Lüdtke et al., 2009; Roberts et al., 2001, 2004). For calculation of the RCI, each participant's score at time point 1 is subtracted from the same participant's score at time point 2; the result is divided by the standard error of the difference between the two scores, which can be calculated using the standard error of measurement (see Jacobson & Truax, 1991, for details on formulae). The standard error of the difference score captures the spread of the distribution of change values that would be expected if no factual change had occurred. RCI values smaller than -1.96 or larger than 1.96 are unlikely to come about without any true change and are therefore regarded reliable. In essence, if trait change

was completely random, one would expect the distribution of RCI values to be normally distributed, with about 2.5% below the value of -1.96, 2.5% above the value of 1.96, and 95% of the individuals not changing on the personality trait level.

Cross-lagged panel models. Latent cross-lagged panel models (also termed as *reciprocal effect models*, Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005) were used to examine the longitudinal relationship between change in neuroticism and extraversion and major life goals over the whole study course of nine months. That is, to what extent do neuroticism and extraversion predict change in certain life goal dimensions or, vice versa, do certain life goal dimensions predict changes in neuroticism and/or in extraversion? Bearing in mind that unreliability of the measured variables might distort the parameter estimates, personality traits were also modeled as latent variables as was described with respect to the latent change models. Major life goals were modeled as manifest variables. I performed two cross-lagged panel models: one for neuroticism and one for extraversion. Figure 8 illustrates one such cross-lagged panel model.
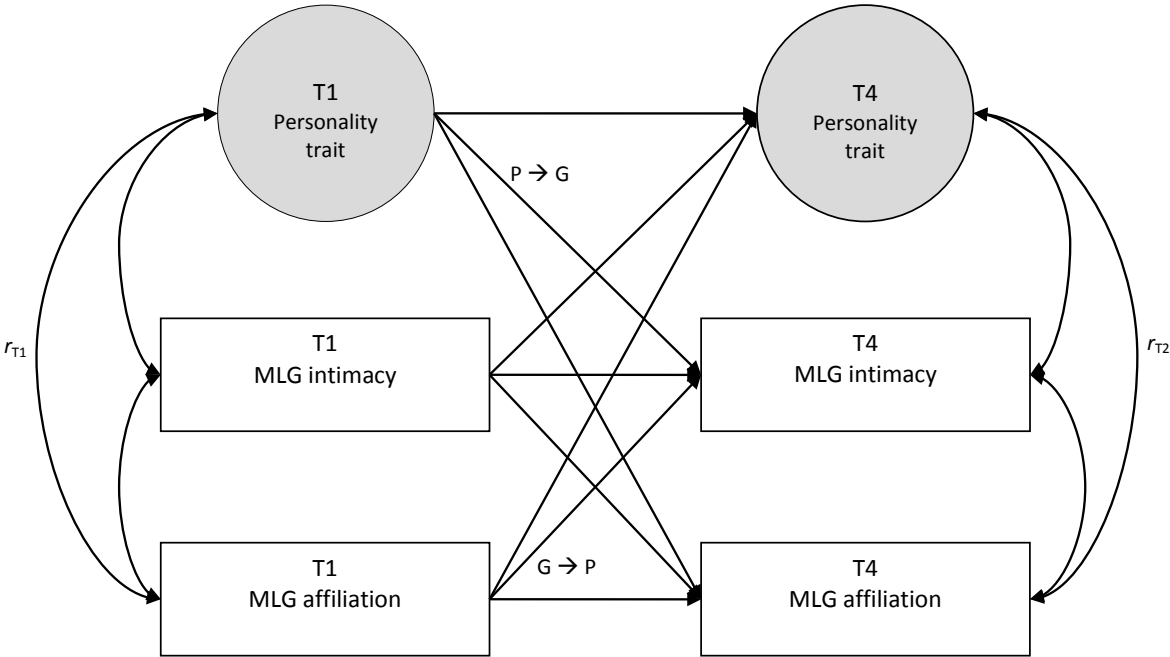
Figure 8. Generic cross-lagged panel model assessing prospective relationships among the Big Five personality traits and major life goal importance.

Note. T1 = first measurement occasion; T4 = fourth measurement occasion; MLG = major life goal; P $\rightarrow$ G = prospective effect of T1 personality trait on T4 life goal importance controlling for stability of life goal importance; G $\rightarrow$ P = prospective effect of T1 life goal importance on T4 personality trait controlling for stability of personality trait. For reasons of clarity, measurement models were omitted.

Descriptive and manifest preliminary analyses were conducted with IBM SPSS statistics 22 (IBM, 1989-2013). All latent variable models were estimated with Mplus version 7.31 (Muthén & Muthén, 1998-2015) under the application of the full information maximum likelihood (FIML) estimator[5], that allows for missing data (Enders, 2010). Evaluation of model fit was based on multiple criteria: The chi-square model test statistic has been shown to lead to higher probabilities of rejecting any model with increasing sample size (Bentler & Bonett, 1980). Consequently, alternative measures of model fit have been recommended for evaluating model fit (i.e., so-called fit indices). Generally, comparative fir indices (CFIs) above .90 and a root-mean-square error of approximation (RMSEA) below .08 represent an acceptable fit to the data. A standardized root-mean-square residual (SRMR) below .08 is an indicator of good model fit (e.g., Hu & Bentler, 1998; Marsh, Hau, & Grayson, 2005).

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[5] FIML applies all the available data for each individual and is especially recommended for longitudinal modeling with missing data, as missing information can be partially reconstructed from previous or subsequent measurement occasions. Estimates based on the FIML procedure have been demonstrated to be efficient and consistent when missing information is missing at random (MAR). Moreover, some authors argue that even deviations from MAR would not invalidate FIML estimates; they can still be considered superior to other missing data procedures (e.g., listwise or pairwise deletion methods; Schafer & Graham, 2002).

2.9   Results

First, I present findings from attrition analyses and focus on the results according to the measurement invariance model. Subsequently, I report on latent change models that estimated mean-level changes as well as rank-order stabilities across the four measurement occasions. To complement findings on short-term personality trait changes, RCI scores are presented pointing to changes at the individual level. Next, goals to change oneself and major life goals are examined as possible predictors of mean-level trait changes. Finally, findings on the longitudinal cross-lagged panel associations between personality traits and life goals are presented.

2.9.1   Attrition analyses

The overall rate of attrition across all four measurement occasions was 54.6% (53 individuals), with 28.9% (28 individuals) between the first and the second, 21.7% (21 individuals) between the second and the third, and 4.1% (4 individuals) between the third and the fourth study wave. Attrition effects were inspected by comparing personality und goal scores at time point 1 between participants with data at each measurement occasion and those who completed the survey at the first measurement occasion, but did not take part in later assessments. Table 2 presents the means and standard deviations for responders and nonresponders as well as the *d*-metric effect size indicating the standardized mean-level differences between these groups, with a positive *d* indicating that those who completed each measurement occasion were higher on a certain variable than those who did not complete all four measurement occasions.

There were no significant differences between responders' and nonresponders' sex, indicated by χ^2 (1, *N* = 94) = .55, *p* = .46). Furthermore, no significant differences with respect to personality traits and goal characteristics were detected.

Additionally, Little's (1988) missing completely at random (MCAR) tests were conducted for all variables of interest[6]. Little's MCAR test provides a statistical chi-square test of the MCAR assumption

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[6] There are different missing data mechanisms and different approaches have different assumptions about these mechanisms: Rubin (1976) defined a taxonomy of "missingness" that has become the standard for any discussion of this topic. This taxonomy depends on the different reasons why data is missing. Little's MCAR test is based on this taxonomy and distinguishes between three different processes that produce missing data related to the information they provide about the unobserved data (Little & Rubin, 1987; Rubin, 1976). Missing values can be classified as missing completely at random (MCAR), missing at random (MAR), or missing not as random (MNAR). Adopting those mechanisms to longitudinal studies in which missing data arises from panel attrition, MCAR warrants dropout to be independent of responses at every measurement occasion (i.e., there is *nothing* systematic going on that makes some data more likely to be missing than others), while MAR tolerates dropout to depend on responses at any or at all measurement occasions prior to dropout. Finally, MNAR suggests that dropout relies on the unobserved responses after the individual drops out (Schafer & Graham, 2002). MCAR and MAR are both considered "ignorable" as it is not necessary to include any information about the missing data itself when dealing with the missing data. Furthermore, MCAR or MAR, respectively, is

(i.e., H_0 = missing values of a certain variable are independent of all observed variables in the data set). A significant value indicates that the data is *not* MCAR. For the personality trait variables, three MCAR tests suggested a random dropout at $p > .05$ (neuroticism, extraversion, agreeableness; see Table 2). The MCAR test for conscientiousness can be considered nonsignificant at $p > .01$: It suggests that nonresponders are less conscientious than individuals who participated in all four measurement occasions. However, according to Cohen's classification, the effect size ($d = .10$) can be considered very small indicating that findings will not be seriously biased. For the goal variables (training goals and life goals), none of the four MCAR tests was significant (at $p > .05$) indicating that dropout can be considered completely at random.

Table 2. Attrition analyses: Mean-level differences at T1 and results of MCAR tests

Scale	Responder		Non-responder		Effect size	MCAR statistics		
	M	*SD*	*M*	*SD*	*d*	χ^2	*df*	*p*
Personality								
Neuroticism	123.02	22.32	115.90	24.64	.30	13.35	11	.27
Extraversion	87.41	21.59	92.61	21.76	-.24	10.87	11	.45
Agreeableness	116.15	18.85	115.82	17.41	.02	5.84	11	.88
Conscientiousness	113.00	23.40	110.80	20.74	.10	21.63	11	.03
Training goals								
Importance	3.67	.57	3.59	.53	.15	15.32	11	.17
Feasibility	.86	.68	1.08	.76	-.31	7.06	11	.79
Major life goals								
Affiliation	10.02	3.32	9.06	3.29	.29	14.71	11	.20
Intimacy	14.17	2.62	14.04	1.85	.04	4.90	11	.94

Note. MCAR = missing completely at random. Responder = participants who completed each of the four assessments (Personality: *n* = 41, Training Goals: *n* = 42, Major Life Goals: *n* = 42); non-responder = participants who completed the T1 assessment but did not take part at later assessments (Personality: *n*= 56, Training Goals: *n* = 56, Major Life Goals: *n* = 55). Mean-level comparisons refer to T1 measurements of personality traits, training goals and major life goals.

2.9.2 Measurement invariance model

As can be seen in Table 3, measurement models for neuroticism, extraversion, and conscientiousness fit very well (each CFI ≥ .99, RMSEA ≤ .06, and SRMR ≤ .08), suggesting that strong measurement invariance was given. The measurement model for agreeableness results in somewhat inferior fit indices (CFI = .97, RMSEA = .07), but still indicating strong measurement invariance. However, a SRMR = .13 points to only partial strong invariance. In case of partial strong invariance, it has been suggested to set the factor loading of the third parcel at the first measurement occasion free, in order to warrant interpretation of all coefficients (Byrne, Shavelson, & Muthén, 1989). In doing so, fit indices improved for the agreeableness measurement model; notwithstanding, as CFI and RMSEA suggest at least acceptable model fit and agreeableness (and conscientiousness) are not expected to change during the course of the study and thus do not serve as dependent variables in subsequent variables, I decided to report coefficients and fit indices from the strict model in which all factor loadings and parcel intercepts were set equal across time.

Table 3. Measurement models for testing strict factorial invariance across 9 months

Dimension	Model fit			
	χ^2 (df)	CFI	RMSEA	SRMR
Neuroticism	45.84 (42)	1.00	.03	.08
Extraversion	51.32 (42)	.99	.05	.07
Agreeableness	62.75 (42)	.97	.07	.13
Conscientiousness	55.12 (42)	.99	.06	.07

Note. CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual. All χ^2 values were non-significant at $p > .01$.

2.9.3 Short-term changes in personality traits across nine months

Latent means and standard deviations are presented in Table 4, with change estimates computed as standardized mean differences (Cohen's *d*), and variance components displayed in Table 5. Please note, that model fit is identical for baseline and neighbor change models as both are based on identical measurement models (Geiser, 2012). Already the inspection of these descriptive statistics prompted that there were differences across measurement occasions. Considering the *d*-coefficients, it becomes apparent that mean-level differences between measurement occasions occurred in neuroticism and extraversion, but not in agreeableness and conscientiousness.

Table 4. Descriptive statistics of latent study variables

Scale	Means					Standard deviations			
	T1	T2	T3	T4		T1	T2	T3	T4
Neuroticism	2.54	2.26	2.29	2.23		.50	.56	.57	.51
Extraversion	1.90	2.14	2.07	2.12		.39	.43	.38	.42
Agreeableness	2.49	2.48	2.38	2.40		.37	.36	.42	.37
Conscientiousness	2.33	2.45	2.39	2.37		.44	.40	.42	.42

Note. T1 to T4 represent measurement occasions.

Table 5. Standardized mean differences between study variables, and variance components (baseline and neighbour change)

Scale	Standardized mean differences														
	T1 → T2			T1 → T3			T1 → T4			T2 → T3			T3 → T4		
	d	p	σ^2	d	p	σ^2	d	p	σ^2	d	p	σ^2	d	p	σ^2
Neuroticism	-.53	.00	.14	-.47	.00	.13	-.61	.00	.20	.05	.68	.21	-.11	.27	.10
Extraversion	.58	.00	.05	.44	.00	.07	.54	.00	.04	-.17	.15	.12	.12	.10	.03
Agreeableness	-.03	.62	.06	-.28	.01	.07	-.24	.00	.02	-.26	.08	.19	.05	.52	.03
Conscientiousness	.29	.00	.09	.14	.10	.05	.09	.33	.06	-.15	.09	.01	-.05	.41	.01

Note. T1 to T4 represent measurement occasions. Arrows indicate the change interval. Model parameters were standardized relative to the first measurement occasion (i.e., the mean of the intercept was set to 0, the variance was set to 1). All variance components were significant at $p < .05$ (except from $\sigma^2_{(T1 \to T4)}$ for agreeableness: $p = .07$).

Mean-level personality trait changes: Latent change models

Neuroticism. Baseline change models revealed that participants decreased in neuroticism across three (d = -.53, p = .00; χ^2(42) = 45.84, *p* = .32, CFI = 1.00, RMSEA = .03, SRMR = .08), six (d = -.47, *p* = .00), and nine months (d = -.61, *p* = .00), respectively. Neighbor change models indicated that change occurred during the early study interval, that is, between the first and the second measurement occasion, but no substantial decreases in neuroticism were found between the second and third (d = .05, *p* = .68), and the third and fourth measurement occasion (d = -.11, *p* = .27), respectively. This change pattern points to an immediate onset of substantial decreases in neuroticism which were maintained across the whole study period of nine months. Significant variance components of change estimates suggested substantial amounts of individual differences in change.

Extraversion. Baseline change models revealed an overall increase in extraversion (d = .54, p = .00; χ^2(42) = 51.32, *p* = .15, CFI =.99, RMSEA = .05, SRMR = .07), while neighbor change models further indicated that changes occurred between the first and the second time point (d = .58, *p* = .00), but not between the second and third (d = -.17, *p* = .15) and the third and fourth time point (d =.12, *p* = .10), respectively. Hence, the temporal course of the change pattern resembles the one for neuroticism. Again, all variance components of change estimates were significant and pointed to substantial amounts of individual differences in change in extraversion.

Agreeableness. agreeableness was found to decrease over the time of six months (d = -.28, p = .01; χ^2(42) = 62.75, *p* = .17, CFI =.97, RMSEA = .07, SRMR = .13) and nine months (d = -.24, *p* = .00). The *d*-metric of the second measurement interval was not significant, but indicated a trend for a decrease in agreeableness (d = -.26, *p* = .08), which suggests a delayed onset of change compared to the change patterns found for neuroticism and extraversion. Except from the variance component of the change estimate between time point 1 and time point 4 (σ^2 = .02, *p* = .07), all variance components were significant and suggested individual differences in change in agreeableness.

Conscientiousness. Finally, baseline change models for conscientiousness yielded an early increase across three months, with no substantial mean-level changes during the other time intervals (d = .29, p = .00; χ^2(42) = 55.12, *p* = .08, CFI =.99, RMSEA = .06, SRMR = .07). However, as suggested by neighbor change models, the change estimate for the second time interval (T2 $\rightarrow$ T3) indicated a reversed trend in the sense that conscientiousness tended to decreased again (d = -.15, *p* = .09). Again, significant variance components of change estimates suggested substantial amounts of individual differences in change in conscientiousness.

Hypotheses concerning personality trait change even within relatively short periods of time were generally confirmed. As expected for the specific training context of the present study, substantive

mean-levels changes were found in neuroticism and extraversion: Considering the amount of change in both variables, trait changes in the expected directions reached partly moderate effect sizes. Furthermore, changes in neuroticism and extraversion were prolonged across all measurement occasions. For neuroticism, the largest effect size was reached for overall changes across nine months, while for extraversion the largest effect sizes was found during the three-months period of active and supported goal investment (i.e., during the pre-post-training interval). However, the effect size for overall increase in extraversion was only somewhat lower. Looking at the change trajectories across all four measurement occasions, it becomes apparent that in both traits there mean-level changes were very pronounced during the phase of active goal investment, then weakened a bit during the time when the training was finished, and finally become more pronounced again in the last temporal thirds of the study course. Although no mean-level changes were predicted for agreeableness and conscientiousness, latent change models yielded single significant effects for distinct time intervals.

Rank-order stability

As shown in the right part of Table 6, 7, and 8, respectively, the rank-order stability coefficients for the Big Five dimensions were medium to large in size, ranging from .59 for neuroticism (T1 → T4) to .92 for agreeableness (T1 → T4). The relatively low rank-order stability for neuroticism across nine months suggested substantive individual differences in personality change as rank-order stability was far less than perfect (cf. the finding for individual level change, Table 8). The average 3-months test-retest correlation was .79, for both the six- and nine-months interval the average correlation coefficient was .80 (cf. Olkin & Pratt, 1958). The correlations are, therefore, within the range of values reported in previous studies for comparable age groups and time intervals (e.g., Bleidorn, 2012).

Table 6. Change in personality traits over 3 months of goal investment (T1 to T2)

Scale	T_1 M(SD)	T_2 M (SD)	Mean change $(d)^a$	Individual-level change[b] Decreased %	Stayed the same %	Increased %	Rank-order stability (r_{12})
Neuroticism	2.54 (.50)	2.26 (.56)	-.53	23	75	2	.77
Extraversion	1.90 (.39)	2.14 (.43)	.58	2	80	18	.86
Agreeableness	2.49 (.37)	2.48 (.36)	-.03	0	100	0	.77
Conscientiousness	2.33 (.44)	2.45 (.40)	.29	0	95,5	4,5	.76

Note. T1 to T2 represent measurement occasions.

[a] d = (mean of T2 − mean of T1) / pooled standard deviation; standardized mean-level differences between T1 and T2, with positive values signifying mean-level increases and negative values indicating mean-level decreases.

[b] Percentage of individuals whose scores on each dimension decreased, stayed the same, or increased, according to the Reliable Change Index. The expected frequencies are 2.5%, 95%, and 2.5%. The observed frequencies differ from the expected frequencies for neuroticism and extraversion ($\chi^2(2)$ values ranged from 44.4 to 73.9, all ps < .01). χ^2 could not be computed for traits with none participant in one of the change categories.

Table 7. Change in personality traits over 6 months of goal investment (T1 to T3)

Scale	T_1 M(SD)	T_3 M (SD)	Mean change $(d)^a$	Individual-level change[b] Decreased %	Stayed the same %	Increased %	Rank-order stability (r_{13})
Neuroticism	2.54 (.50)	2.29 (.57)	-.47	16	81	2	.79
Extraversion	1.90 (.39)	2.07 (.38)	.44	0	76	24	.76
Agreeableness	2.49 (.37)	2.38 (.42)	-.28	0	98	2	.79
Conscientiousness	2.33 (.44)	2.39 (.42)	.14	0	95	5	.86

Note. T1 to T3 represent measurement occasions.

[a] d = (mean of T3 − mean of T1) / pooled standard deviation; standardized mean-level differences between T1 and T3, with positive values signifying mean-level increases and negative values indicating mean-level decreases.

[b] Percentage of individuals whose scores on each dimension decreased, stayed the same, or increased, according to the Reliable Change Index. The expected frequencies are 2.5%, 95%, and 2.5%. The observed frequencies differ from the expected frequencies for neuroticism ($\chi^2(2)$ = 33.5, p < .01). χ^2 could not be computed for traits with none participant in one of the change categories.

Table 8. Change in personality traits over 9 months of goal investment (T1 to T4)

Scale	T_1 M(SD)	T_4 M (SD)	Mean change $(d)^a$	Individual-level change[b] Decreased %	Stayed the same %	Increased %	Rank-order stability (r_{14})
Neuroticism	2.54 (.50)	2.23 (.51)	-.61	7	90	2	.59
Extraversion	1.90 (.39)	2.12 (.42)	.54	5	83	12	.87
Agreeableness	2.49 (.37)	2.40 (.37)	-.24	0	100	0	.92
Conscientiousness	2.33 (.44)	2.37 (.42)	.09	2	98	0	.84

Note. T1 to T4 represent measurement occasions.

[a] d = (mean of T4 − mean of T1) / pooled standard deviation; standardized mean-level differences between T1 and T4, with positive values signifying mean-level increases and negative values indicating mean-level decreases.

[b] Percentage of individuals whose scores on each dimension decreased, stayed the same, or increased, according to the Reliable Change Index. The expected frequencies are 2.5%, 95%, and 2.5%. The observed frequencies differ from the expected frequencies only for extraversion ($\chi^2(2)$ = 17.0 p < .01). χ^2 could not be computed for traits with none participant in one of the change categories.

Individual differences in personality trait change

Irrespective of the reported mean-level changes in personality traits over time, some individuals might change more or less than the average. In order to test whether a given participant exhibited reliable personality trait change over three, six, or nine months, respectively, RCIs were calculated for each trait. In a second step, individuals were classified as reliable decreasers, reliable increasers, or non-changers: Participants' scores were rated as "having stayed the same" if they were within the 95% confidence interval of the RCI, or as "having decreased" or "increased" if their RCI score was not included in the 95% confidence interval. As shown in Tables 6, 7, and 8, the vast majority of participants (75-100%) stayed the same over the three respective study periods (i.e., T1 → T2, T1 → T3, T1 → T4) on any given trait. However, reliable individual-level trait changes were expected for neuroticism and extraversion and a sizable minority indeed demonstrated these changes, whether decreases or increases. Chi-square tests indicated reliable changes on the individual level for both neuroticism and extraversion at all study intervals. There was only one exception, in the sense that individual-level changes in neuroticism occurred randomly across the whole study period of nine months, since only 9% of the sample was categorized as changers. In contrast, 19% demonstrated reliable long-term changes in extraversion across nine months. Individual-level changes were most pronounced at T1 → T2: Consistent with predictions, 23% of participants showed reliable decreases in neuroticism and 18% showed reliable increases in extraversion. Also in line with hypotheses, changes in agreeableness and conscientiousness were not present at all or occurred randomly. Additionally, I summed the number of trait dimensions on which each participant experienced reliable change to find out the modal amount of change an individual experienced across the four personality traits. With respect to the first measurement interval, almost 39% of individuals experienced reliable change (either an increase or a decrease) on one or more personality traits across three months. All participants experienced reliable change on either one (27%) or two (11%) personality dimensions. Referring to the whole study period of nine months, 22% of participants experienced reliable change on one or more personality traits; that is, 15% changed on one trait dimension, while 7% changed on two personality dimensions. On average, participants experienced reliable individual-level change on .29 trait dimensions across nine months.

Overall, these results indicate an almost perfect level of stability at the individual level for agreeableness and conscientiousness across nine months[7], congruent with results on individual change reported by prolonged studies from Lüdtke and colleagues (2009) for a two-year period, Robins and colleagues (2001) for a four-year period and Allemand and colleagues (2010) for a ten-year period. However, stability at the individual level was much lower of neuroticism and

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[7] It should be noted, that the RCI is a conservative measure that sets a high standard for significant individual change: Related to Agreeableness, a participant had to increase or decrease .30 scale points to be classified as reliable changer.

extraversion, and thus points to meaningful within-person changes – even within the short period of three months.

2.9.4 Change goals as predictors of mean-level personality trait changes

Neuroticism. The latent true change model for neuroticism showed an acceptable fit to the data, χ^2 (72) = 100.89, p = .01, CFI = .97, RMSEA = .064, SRMR = .099. The predictors of goal importance and feasibility were uncorrelated (r = .01). For the first (T1 → T2) and the third (T1 → T4) study interval, the initial level of neuroticism negatively predicted subsequent changes (see Table 9) in the sense that lower initial levels of neuroticism predicted less decrease in neuroticism. Table 9 also displays findings from the latent mean-level change model (from baseline): Analyses revealed that the interaction term of goal importance and feasibility negatively predicted changes in neuroticism across three months. That is, goals to change oneself which are perceived as both highly important and feasible predicted substantial decreases in neuroticism across the three-month period of active goal investment. Neither high goal importance, nor high feasibility alone were predictive of subsequent changes in neuroticism. Moreover, as the significant interaction coefficient denotes, both preconditions are needed to result in meaningful trait changes. However, one marginal effect of perceived feasibility of change goals on subsequent trait changes (T1 → T2) was observed. As hypothesized, goal characteristics predicted trait changes in neuroticism only across the first study period (i.e., across three months), but not across six and nine months, respectively.

Table 9. Changes in neuroticism predicted by training goals: Estimates for the latent mean-level change model

	Neuroticism T1 →T2		Neuroticism T1 →T3		Neuroticism T1 →T4	
	Estimator	p	Estimator	p	Estimator	p
Neuroticism T1	**-.30**	**.03**	-.12	.53	**-.47**	**.00**
TG importance	.01	.96	.12	.43	.01	.96
TG feasibility	*-.19*	*.09*	.08	.66	-.12	.43
TG importance x feasibility	**-.34**	**.00**	-.06	.70	-.13	.33

Note. TG = training goal. T1 to T4 represent measurement occasions. Arrows indicate the change interval. Estimators represent latent standardized regression coefficients. Values in boldface are significant at p < .05; values in italics are significant at p ≤ .10.

Table 10. Changes in extraversion predicted by training goals: Estimates for the latent mean-level change model

	Extraversion T1 →T2		Extraversion T1 →T3		Extraversion T1 →T4	
	Estimator	p	Estimator	p	Estimator	p
Extraversion T1	-.10	.50	-.13	.48	.08	.77
TG importance	-.03	.84	-.17	.30	-.04	.84
TG feasibility	-.01	.94	*-.32*	*.05*	-.26	.24
TG importance x feasibility	**.29**	**.02**	.01	.96	-.09	.64

Note. TG = training goal. T1 to T4 represent measurement occasions. Arrows indicate the change interval. Estimators represent latent standardized regression coefficients. Values in boldface are significant at $p < .05$; values in italics are significant at $p \leq .10$.

Extraversion. The latent change model for extraversion also showed an acceptable fit to the data, χ^2 (72) = 103.79, p = .01, CFI = .96, RMSEA = .067, SRMR = .070. In contrast to neuroticism, initial levels of extraversion did not predict changes later on (see Table 10). Findings from the latent mean-level change model (from baseline) are displayed in Table 10: As for neuroticism, analyses yielded a significant interaction term of goal importance and feasibility; that is, goals to change oneself which are perceived as both highly important and feasible predicted increases in extraversion across three months. Again, neither high goal importance nor high feasibility alone predicted subsequent changes in extraversion. Somewhat counterintuitively, one marginal effect of perceived feasibility of change goals on subsequent trait changes (T1 → T3) was observed in the sense that higher perceived feasibility of change goals at T1 predicted lower increases in extraversion from T1 to T3. Finally, as expected, goal characteristics predicted trait changes in extraversion only across the first study period, but not across six and nine months, respectively. Thereby, findings related to goal-related changes in extraversion were very similar to those for neuroticism. To conclude, findings from latent change models largely support hypotheses about training goals as predictors of mean-level changes in both neuroticism and extraversion.

2.9.5 Major life goals as predictors of mean-level personality trait changes and inter-individual differences in change

Analogous to the models described above, further latent change models were estimated to examine the role of affiliation and intimacy life goals in predicting personality trait changes later on. Again, the 3-SRF (Hennecke et al., 2014) served as a theoretical background and thus importance of and former success in affiliation and intimacy life goals as well as the respective interaction terms were included in the model as predictors. Additionally, latent cross-lagged panel models were employed to test

whether perceived importance of major life goals predict inter-individual differences in trait changes across the overall study duration of nine months.

Intimacy and affiliation life goals as predictors of mean-level personality trait changes

Neuroticism. The fit of the latent change model for neuroticism was acceptable, as indicated by χ^2 (103) = 173.48, *p* = .00, CFI = .92, RMSEA = .080, SRMR = .11. Contrary to expectations, none of the interaction effects of importance of and former success in life goals reached significance (see Table 11). Though, as can be seen from Table 11, life goal importance alone seems to play an important role for predicting trait changes in neuroticism: High importance of intimacy goals predicted meaningful decreases in neuroticism both across six (T1 → T3) and nine (T1 → T4) months (although the last effect was only marginally significant at *p* = .08), but not across three months (T1 → T2). Importance of affiliation goals also turned out to be a significant predictor of mean-level changes in neuroticism across nine months, but pointing the opposite direction of the association. That is, high importance of affiliation goals predicted smaller decreases in neuroticism across nine months. This – at first sight – counterintuitive finding will be outlined below in conjunction with findings on changes in extraversion.

Extraversion. For mean-level changes in extraversion, model fit was barely acceptable, χ^2 (103) = 193.51, *p* = .00, CFI = .901, RMSEA = .090, SRMR = .08. As for changes in neuroticism, none of the interaction effects was significant in predicting mean-level changes and again, intimacy goals positively predicted change in extraversion (see Table 12). That is, higher importance of intimacy life goals predicted increases in extraversion across six (T1 → T3) and nine (T1 → T4), but not across three (T1 → T2) months. Characteristics of affiliation goals were not relevant for the prediction of mean-level changes in extraversion. Thus, findings for extraversion closely resemble life goal-related change patterns found for neuroticism.

Table 11. Changes in neuroticism predicted by major life goals: Estimates for the latent mean-level change model

	Neuroticism T1 →T2		Neuroticism T1 →T3		Neuroticism T1 →T4	
	Estimator	*p*	Estimator	*p*	Estimator	*p*
Neuroticism T1	-*.28*	*.08*	-.08	.67	**-.43**	**.01**
MLG affiliation						
importance	.11	.44	.12	.48	**.42**	**.00**
success	-.25	.12	-.02	.91	-.21	.21
importance x success	.15	.32	.02	.90	.02	.90
MLG intimacy						
importance	.19	.22	**-.38**	**.02**	-*.26*	*.08*
success	-.02	.87	-.10	.50	-.13	.33
importance x success	-.10	.45	-.01	.95	-.11	.38

Note. MLG = major life goal. T1 to T4 represent measurement occasions. Arrows indicate the change interval. Estimators represent latent standardized regression coefficients. Values in boldface are significant at *p* < .05; values in italics are significant at *p* ≤ .10.

Table 12. Changes in extraversion predicted by major life goals: Estimates for the latent mean-level change model

	Extraversion T1 →T2		Extraversion T1 →T3		Extraversion T1 →T4	
	Estimator	*p*	Estimator	*p*	Estimator	*p*
Extraversion T1	.11	.61	-.20	.42	.01	.97
MLG affiliation						
importance	.13	.44	-.04	.81	-.04	.83
success	-.31	.15	-.29	.20	-.43	.11
importance x success	-.05	.79	.01	.95	.05	.81
MLG intimacy						
importance	-.05	.77	**.39**	**.01**	**.43**	**.01**
success	-.02	.91	.15	.33	.24	.19
importance x success	.23	.12	.20	.13	.21	.18

Note. MLG = major life goal. T1 to T4 represent measurement occasions. Arrows indicate the change interval. Estimators represent latent standardized regression coefficients. Values in boldface are significant at *p* < .05.

In sum, and consistent with hypotheses, affiliation and intimacy life goals were effective in predicting mean-level changes in both neuroticism and extraversion, and furthermore exerted influence only across the longer time intervals (i.e., across six and nine months, but not across three months). Yet, the interaction effect of goal characteristics – as predicted by the 3-SRF (Hennecke et al., 2014) – could not be shown, since none of the tested effects reached significance. Instead, the general importance of life goals turned out as a useful predictor of mean-level changes in both neuroticism and extraversion. Appropriately, importance of intimacy goals predicted decreases in neuroticism and increases in extraversion, while importance of affiliation goals played a minor part in the prediction of mean-level changes – and if it did, then in the opposite direction of effects of intimacy

goals. Thus, evidence suggests that high importance of affiliation goals is associated with smaller subsequent decreases in neuroticism.

Intimacy and affiliation life goals as predictors of inter-individual differences in personality trait changes

In a further step of the analysis, I investigated the longitudinal cross-lagged associations between major life goals and personality traits across nine months. Two reciprocal effect models were estimated to examine the effect of life goal importance at the first measurement occasion on personality traits at the fourth measurement occasion and vice versa (see Figure 8).

Model fit was satisfactory for both neuroticism (χ^2 (44) = 449.74, p = .00, CFI = .98, RMSEA = .056, SRMR = .075) and extraversion (χ^2 (44) = 458.35, p = .00, CFI = .97, RMSEA = .078, SRMR = .059). Table 13 presents the concurrent correlations at the first and fourth time point for each goal-trait combination as well as the cross-lagged path coefficients relating constructs from first and fourth measurement occasion. Correlations between life goals and personality traits at time point 1 were small to medium in size. The most pronounced association was found between affiliation goals and extraversion (r = .40). Correlations between intimacy life goals and neuroticism and extraversion, respectively, were small (r = .13 and r = .12) and not significant, but replicated findings from Lüdtke and colleagues (2009) who reported similar concurrent correlation coefficients for relationship life goals (cf. intimacy goals) and neuroticism and extraversion. For affiliation goal importance, concurrent correlations with personality traits at time point 4 largely resemble correlations at the first measurement occasion. However, the correlational pattern was different for intimacy life goals: While intimacy life goals were not significantly correlated with extraversion at time point 1, they were significantly positively linked to extraversion at time point 4 (r = .39) reflecting a larger fit between life goals and the relevant trait of extraversion at time point 4 than at time point 1. The same pattern of an increasing fit between goal importance and trait level from time point 1 to time point 4 was identifiable for intimacy goal importance and neuroticism: Although correlational coefficients did not reach significance, it is apparent that intimacy goals and neuroticism were positively correlated at time point 1 (r = .13), while the correlation reached the same size at the fourth measurement occasion, but the sign turned negative (r = -.13). This might be cautiously interpreted as as trend towards an increased fit between life goal importance and personality trait. Importance of intimacy and affiliation life goals was positively correlated at both time point 1 (r = .18) and time point 4 (r = .33).

Furthermore, the results showed statistically significant prospective effects of life goal importance at time point 1 on personality traits at the fourth time point. Specifically, intimacy life goal importance (T1) negatively predicted neuroticism (-.22) nine months later and positively predicted extraversion

nine months later (.17). Affiliation goal importance (T1) was positively linked to neuroticism at time point 4 (.24), but no such link was found related to extraversion. Contrary to findings from Lüdtke and colleagues (2009), no statistically significant prospective effects of personality traits (T1) on later life goal importance (T4) were found. Only one marginally significant effect could be detected for neuroticism (T1) negatively predicting intimacy goal importance (T4; r = -.24, p = .09). However, specifically with respect to relationship goals, Lüdtke and colleagues (2009) found no prospective effects of traits on later life goal importance, either. Considering my hypotheses, these results confirm the idea that prior importance of life goals in line with current change goals has an effect on subsequent personality traits. Moreover, findings from the cross-lagged models demonstrated that not every participant conformed to the average change patterns revealed in the latent change models, but rather that meaningful individual differences in personality trait change exist that can be predicted by the importance of major life goals.

Table 13. Correlations between personality traits and life goal importance at T1 and predictive effects of personality traits and life goal importance

Goal importance	Neuroticism								Extraversion							
	r_{T1}	*p*	P→G	*p*	G→P	*p*	r_{T4}	*p*	r_{T1}	*p*	P→G	*p*	G→P	*p*	r_{T4}	*p*
Intimacy	.13	.21	-.24	.09	**-.22**	**.02**	-.13	.41	.12	.25	.20	.20	**.17**	**.03**	**.39**	**.00**
Affiliation	-.01	.95	.08	.56	**.24**	**.04**	.01	.94	**.40**	**.00**	.19	.15	-.01	.95	**.57**	**.00**

Note. Correlations and standardized path coefficients statistically significant at $p < .05$ are shown in bold face. r_{T1} = concurrent correlations among T1 personality traits and T1 life goal importance; P→G = prospective effect of T1 personality traits on T4 life goal importance controlling for stability of life goal importance; G→P = prospective effect of T1 life goal importance on T4 personality traits controlling for stability of personality traits; r_{T4} = concurrent correlations among T4 personality trait residuals and T2 life goal importance residuals.

2.10 Discussion

The purpose of the current study was to examine in how far personal goals to change specific personality traits and major life goals are associated with corresponding changes in those traits across time. As specified in the 3-SRF (Hennecke et al., 2014), I proposed that both high importance and feasibility of change goals are necessary preconditions of substantial mean-level changes in the related traits. With respect to the influence of broad major life goals on personality development within only several months, this study was more explorative and examined the hypothesis that life goals in line with change goals positively affect self-regulated changes in personality traits.

Latent change analyses have confirmed goal-related decreases in neuroticism and increases in extraversion across three, six, and nine months, respectively. As predicted, only the interaction of both importance and feasibility of personal change goals predicted subsequent changes in neuroticism and extraversion across three months, while neither high importance nor high feasibility alone predicted substantial trait changes. With respect to relevant major life goals, perceived goal importance alone predicted subsequent trait changes; however, consistent with the broader definitional scope of the construct, life goals exerted their influence only across the longer study periods (i.e., across six and nine months). Furthermore, cross-lagged panel models have revealed that there were effects of prior life goal importance on subsequent personality traits, but no effects of prior personality traits on subsequent life goal importance. I will discuss the findings with regard to the three major research questions of the present work and relate the findings against the backdrop of the existing literature.

2.10.1 Can personality traits change within a relatively short period of time?

Consistent with the SRT (e.g., Denissen, van Aken, et al., 2013; Wood & Denissen, 2015) which states that trait change is likely to occur in periods characterized by both a strong intention to change and the (perceived) ability to do so, neuroticism and extraversion significantly have decreased and increased, respectively, across all study intervals of three, six, and nine months. Within each of the three time periods, trait changes reached moderate effect sizes suggesting that participants indeed made intentional and self-regulated efforts to reach their personal change goals. Given the short time period under investigation and compared to other studies, the medium effect sizes for changes in both neuroticism and extraversion are quite impressive: Bleidorn (2012), for example, examined students during the year before their final exams and found small effect sizes for change in conscientiousness across one year. Finn, Mitte and Neyer (2014) also reported small effect sizes for change in neuroticism across nine months in their study on young adults engaging in romantic partnerships. Only studies that have assessed personality trait changes as a "side-effect" of cognitive-

behavioral interventions over several months reported effects sizes of changes in neuroticism that were moderate to large in absolute terms. Effect sizes of change in extraversion are comparable between most of these studies and the present work (e.g., Clark, Vittengl, Kraft, & Jarrett, 2003; Gi et al., 2010; Krasner et al., 2009; Piedmont, 2001). Taken together, the moderate effect sizes for changes in neuroticism and extraversion – maintained across all study periods – point to the fact that the current intentional desire to change one's traits and the supporting training participation represented a "strong situation" for change (Caspi & Moffitt, 1993) as participants were likely to invest in their personal goals to change levels of specific traits. Furthermore, the finding of substantial trait changes within such a short period of time has implications for how personality trait changes should be examined: Luhmann and colleagues (2014) have recently argued that "timing and duration of longitudinal studies on personality development should be based on theoretical assumptions on how changes unfold over time" (p. 259). To conclude, as derived from the SRT (e.g., Denissen, van Aken, et al., 2013) and empirically demonstrated in the present data, substantial personality trait changes do indeed occur within relatively short periods of time; that is, in time periods when individuals actively invest in their personal goals to change themselves (e.g. as they anticipate or experience specific role demands they desire to meet). Researchers interested in processes of personality trait development should take that into account when considering the appropriate spacing of measurement occasions.

Inconsistent with my predictions, meaningful changes have also been found for agreeableness and conscientiousness, but were however confined to distinct study intervals. Due to the fine-grained spacing of measurement occasions, even these temporary changes in agreeableness and conscientiousness have been detectable: While conscientiousness significantly increased during the first three months but remained stable across six and nine months, agreeableness decreased only across the longer time intervals of six and nine months. It should be noted, however, that effect sizes of these unpredicted changes are only small in magnitude. The temporary increase in conscientiousness across the duration of training participation can well be explained by the highly structured and transparent procedure of the GSK training (Hinsch & Pfingsten, 2007): Participants were encouraged to behave in a more conscientious way, that is, for example, to introspect themselves as to their thoughts, feelings, and behaviors, or to regularly practice new behaviors and progressive muscle relaxation. The training context thus creates a salient reward structure to behave more conscientiously. If participants meet these demands, they will experience themselves behaving more conscientiously than before their training participation. This seems to be reflected in the transient changes in trait conscientiousness. However, the small decreases in agreeableness with their delayed onset might be driven by reactions from the participants' social environments to their changed behaviors (Roberts et al., 2008): Among other things, participants of the GSK training learn

to behave assertively, express their own opinion (even if it is in contrast to others), or "to say no" to others. Admittedly, in general these behaviors are positively valued by society, but it is a known phenomenon in the context of (sub)clinical interventions, that the social environment might initially react in irritated or impatient ways to someone who consistently changes his or her own behavior and thereby might even attenuate the realization of newly learnt behaviors (Dadds, Barrett, Rapee, & Ryan, 1996; Hinsch & Pfingsten, 2007). For example, imagine a shy woman who previously did favors to everybody at work (maybe she did not want to annoy the others), and is now re-drawing her personal boundaries in the sense that she looks after her own needs, which results in the denial of others' requests. It seems understandable that her colleagues might initially be upset as they lose the comfortable opportunity to delegate work. These negative reactions from relevant others might impede her consistent behavioral changes. Summing up, the time-specific small changes in agreeableness and conscientiousness not hypothesized within the perspective of self-regulational trait development can be explained by considering the background of the training rationale.

As expected, trait changes increased with longer time intervals from baseline measurement (neuroticism), or remained stable in magnitude (extraversion). This finding is consistent with the assumption from the 3-SRF (Hennecke et al., 2014) that habit formation processes help individuals to maintain and generalize desired behavioral changes across time and situations. Furthermore, the result is in line with the frameworks proposition that behavioral changes are more and more translated into relatively stable and measurable trait changes. A previous study by Rapee, Kennedy, Ingram, Edwards, and Sweeney (2010) examined the effect of a behavioral intervention specifically designed to change temperament traits in children and found similar results related to the temporal course of trait change: An increasing change trajectory in behavioral inhibition over several years suggested that initial behavioral changes became automatized and habitual over time resulting in substantial trait changes.

Participants' age and sex have been demonstrated to be unrelated to personality trait changes. However, there is a small age effect in the sense that older participants decreased more in neuroticism during their training participation. According to the SRT (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013), self-regulation capacity is higher in older individuals (e.g., Aldwin, Sutton, Chiara, & Spiro, 1996), and is proposed as one of the mechanisms that drive normative personality trait changes. Consequently, the accelerated short-term decline in neuroticism for older adults might be due to a higher level of self-regulation capacity. However, the age effect for neuroticism is only small, and did not emerge with respect to extraversion.

Referring to findings on the stability of relative trait differences between individuals, latent change models suggest that a period of active goal investment in adult life is associated with moderate to

high rank-order stability in personality traits. In line with findings from Wood and Wortman (2012), extraversion was more stable in its rank-ordering across nine months than neuroticism. To explain this finding, Wood and Wortman (2012) for one thing drew on the demonstrated variance in desirability of both traits: While extraversion varied substantially in its desirability across individuals, neuroticism varied less and was clearly undesired. For another thing, the authors demonstrated that individuals have often already attained the trait levels that they find desirable (Wortman & Wood, 2015). Thus, for traits that substantially vary in their desirability (e.g., extraversion), investments to maintain or reach a desired trait level should vary in directions for different people; for example, while some people strive to behave sociably, others desire to act in the opposite way. Such developmental investments should result in a preserved rank-ordering of trait differences between individuals, as people actively invest in the maintenance of different trait levels. In contrast, for traits that vary less in their desirability (e.g., neuroticism) all individuals aim to maintain a similar level of that trait. With respect to the specific training context, overall variability in trait desirability might be somewhat constrained in the present sample compared to the sample of Wortman and Wood (2015), but there was still meaningful variance in change goal importance pointing to individual differences in desirability of specific trait levels. Although change goal importance was not assessed separately in relation to neuroticism and extraversion, contentual inspection of the idiographically measured change goals suggests a higher variability in desired levels of extraversion than of neuroticism. Accordingly, the pattern of higher rank-order stability for traits with higher variance in their desirability (i.e., extraversion) was supported by the present results.

Given that the present study focused on a relative short specific period, the question remains how stable the demonstrated personality trait changes actually are. Do they indicate sustainable changes in neuroticism and extraversion or only transient shifts likely to fade out after change goals pass out of mind? According to the 3-SRF (Hennecke et al., 2014), one can expect that the sustainability of the observed trait changes depends on the degree to which the once effortful pursuit of the goal of more extraverted and emotionally stable behavior becomes automatized, effortless, and unconscious. Automation of new behaviors results through frequent pairings of contexts with the new behaviors and is assumed to be a necessary precondition for long-term trait changes. In the present study, changes in neuroticism and extraversion were maintained across half a year after training participation had finished, thus suggesting that behavioral changes were generalized to other situations outside the training context which led to relatively consistent personality trait change. Nonetheless, future studies should follow adults over longer time periods after their self-regulated investments in personal change goals with the aim of examining factors that might be relevant for the maintenance of these trait changes.

2.10.2 Goals to change oneself and personality trait development: Can people really change for the better simply if they want to?

Consistent with the call from Denissen and colleagues (Denissen, Penke, et al., 2013), the present study employed explicit measurements of personal goals to change the self and of their characteristics. Therefore, it was possible to test specific assumptions that have been proposed by the 3-SRF (Hennecke et al., 2014): Substantial decreases in neuroticism and increases in extraversion across three months were predicted by the combination of both high perceived change goal importance and feasibility. Thus, supporting assumptions from the 3-SRF (Hennecke et al., 2014), neither the importance nor the feasibility of change goals alone were able to predict subsequent changes in the corresponding personality traits.

With respect to the temporal course of trait changes, it has been demonstrated that for both neuroticism and extraversion change goal characteristics predicted mean-level changes only across the first study period of three months. These consistent findings suggest that initial goal importance and feasibility tend to trigger and account for immediately following trait changes, but are not predictive of the long-term maintenance of those changes.

Somewhat counterintuitively, higher previous feasibility of change goals predicted lower increases in extraversion from the first to the third measurement occasion. However, perceived feasibility was assessed before training participation and might have been based on an unrealistic or naïve evaluation of one's abilities, or on an underestimation of the demands of changing behavioral patterns. Consequently, if such an unrealistic evaluation is not adapted during the course of the training, it might result in weakened efforts to consistently change one's behavior and thus leads to lower increases in extraversion.

It should be emphasized that the present findings of substantial intentional mean-level changes in neuroticism and extraversion were documented at the *group* level (except for individual-level findings based on the RCI). The only study that examined whether people can volitionally change their traits (Hudson & Fraley, 2015) found meaningful effects at the *individual* level – but only very small mean-level increases in each trait. Given that group-level trends are influenced by inter-individual variance in change goals and initial trait levels and also by other unknown processes or factors, the consistent mean-level findings are impressive and allow for the conclusion that individual-level processes have "added up" to create the demonstrated group-level pattern. Nonetheless, the impressive mean-level changes have to be interpreted against the background of the study's invention context that implied homogenous change goals and consistent timing of investment in change goals.

Further corroborating the group-level results, mean-level trait changes have been found at the broad domain level, even though change goals were relatively specific: that is, they typically point to changes at the narrower facet level. For instance, goals to increase in assertiveness predict subsequent increases specifically in assertiveness, but not in the global trait-domain of extraversion (Hudson & Fraley, 2015). Hence, it might be possible that changes on the facet-level have added up to trait changes at the domain-level even across this relatively short time period.

More generally speaking, my findings from latent change models support the impression that the recently proposed SRT (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) captures a relevant perspective on how personality changes take place and complements existing perspectives on personality development that have highlighted biological and environmental/social driving factors (e.g., McCrae & Costa, 2008; Roberts & Jackson, 2008; Roberts & Wood, 2006). However, as the existing theoretical perspectives are certainly not mutually exclusive but seem to complement each other (Specht et al., 2014), the self-regulation perspective concurs with the assumption that biological and environmental factors are likely to influence personality development. In line with this, Hudson and Roberts (2014) found that although the majority of young adults reported goals to change with respect to existing levels of their Big Five personality traits, we know from other studies that normative trait changes in young adulthood are rather small in size – even before the age of 30 when the strongest mean-level changes occur (Roberts et al., 2006). Thus, it seems natural that many factors other than the motivation to change one's personality contribute to the complex processes of stability and change in personality traits.

Against the background of their functional perspective of personality development, Wood and Denissen (2015) recently discussed increasing the extent to which an individual finds a specific trait desirable or valuable as "perhaps the single most important route to increasing levels of a behavioral or psychological trait" (p. 102). They reasoned that individuals' levels of personality traits are moderately to highly correlated with the extent of how desirable they perceive those traits (Wortman & Wood, 2015), which supports the self-regulation perspective on development that a person's traits demonstrate some tendency to unfold towards levels they deem desirable or useful. Nonetheless, the authors conceded that their correlational finding based on self-reports can be interpreted in various ways. However, findings from the present study revealed that the desirability (or the importance) of goals to reach a specific trait level alone is insufficient for the prediction of effective subsequent trait changes. As specified in the 3-SRF (Hennecke et al., 2014), the (perceived) feasibility of the change goals proved to be the second necessary precondition for consistent trait-related behavioral changes.

However, in many cases, individuals might be capable of performing new behaviors that are associated with the desired trait level (e.g., regularly tidy up one's work desk when striving for the goal to become more conscientious) and a majority might also perceive goal attainment feasible. In this sense, Wood and Denissen (2015) are right to consider increasing trait desirability as the most important route to changing corresponding trait levels. However, there might be other contexts where merely increasing the motivation to change oneself might be insufficient: Thus, individuals suffering from psychological problems or diseases (e.g., social phobia) might be highly motivated to decrease in neuroticism and increase in extraversion, but still often fail to realize the desired changes on their own and consequently seek professional support to attain their change goals (i.e. participate in interventions ranging from trainings focusing on minor behavioral alterations to psychotherapy). Pointing to the relevance not only of motivation but also (perceived) ability to change, results from the present study further suggest that increasing behavioral competencies are likely to account for the mean-level changes in traits (see chapter 3).

2.10.3 Major life goals and personality trait development

The life goals of intimacy and affiliation as predictors of mean-level personality trait changes
Within the relatively new branch of research on self-regulated or volitional personality change, no previous studies have explicitly tested whether major life goals that underline personal change goals exert influence on subsequent trait changes. Although previous studies on personality development during transitional periods in young adulthood found no effects of life goals at baseline assessment on subsequent trait changes (Lüdtke et al., 2009), I assumed that the context of intentional personality change catalyzes the deliberate activation of one's life goals to weigh the pros and cons of investing efforts to change aspects of one's personality traits. Data from the present study enabled me to test whether life goals influence trait changes in a similar way as do change goals, that is, whether they work in line with assumptions from the 3-SRF (Hennecke et al., 2014).

My findings demonstrated that intimacy and affiliation life goals differed in their effectiveness to predict mean-level trait changes. That is, the importance of intimacy life goals consistently predicted subsequent long-term decreases in neuroticism and increases in extraversion, while the importance of affiliation goals was in general not predictive of trait changes. However, there is one distinct effect: High importance of affiliation goals was associated with smaller subsequent decreases in neuroticism. Clearly, this finding points to the opposite direction of effects of intimacy goals. Trying to explain this unexpected finding, one might recur to the contentual definition of both categories of life goals: While intimacy goals are closely tied to the *quality* of relationships (i.e., close, trusting relations), affiliation goals predominantly point to *quantitative* aspects of relations (i.e., lots of friends and acquaintances; Pöhlmann & Brunstein, 1997). Hence, the assumption of affiliation and

intimacy goals to be in line with and underlining participants' goals to change themselves might have been appropriate for intimacy goals, but inappropriate for affiliation goals. So, it would have been be more appropriate to assume that participants had desired to enhance levels of extraversion and decrease levels of neuroticism in order to establish and maintain close trusting relationships, but both to a lesser extent in order to entertain relations *with a large number* of others. Equipped with this understanding, the line of argumentation that was outlined in the theoretical part of this chapter (i.e., only life goals that are in line with participants' change goals will be activated and become conductive for behavioral patterns) resulted in the prediction that only intimacy goals should be predictive of trait changes in neuroticism and extraversion. Moreover, the GSK training is especially addressed to shy and reserved individuals: Accordingly, participants from the present subclinical sample reported to be considerably affected by their social problems in both daily work life and social life. The parallel existence of reserved behavioral patterns on the one hand, and a strong motive to have *lots of* friends and acquaintances on the other hand, might produce high psychological pressure preventing people from declining in their levels of neuroticism. However, this post-hoc explanation of the positive effect of affiliation goal importance on change in neuroticism is only speculative and needs to be confirmed in further studies.

With respect to different life goal characteristics, only importance has proved to be a meaningful driving factor for trait changes. Neither current success nor the interaction of both characteristics effectively predicted personality development. Although none of the effects reached significance, effects of current success in life goals on trait changes were almost exclusively negative pointing to the fact that higher current success in attaining a certain life goal was linked to reduced changes in those traits that are relevant to being successful in that life goal domain. It should be noted, however, that for life goals the dimension of "current success" was assessed instead of perceived goal feasibility. Admittedly, it is possible that current success in one life goal domain may be associated with the extent to which people perceive this life goal as feasible; but from the data it seems more likely that current success in life goals attenuates the "pressure" to change in the specific trait that is relevant to reach the corresponding life goal. Consequently, at this point no final conclusions can be drawn on whether life goal characteristics exert their influence in the way predicted by the 3-SRF (Hennecke et al., 2014) and thus act in a similar fashion to personal change goals. Future studies on the role of life goals for intentional trait development should be careful to measure explicitly life goal feasibility in order to test propositions from the 3-SRF. Nonetheless, in contrast to the effects of goals to change one's traits, my evidence shows that life goal importance alone seems relevant for the long-term changes, that is, for the maintenance of realized changes.

Focusing on the temporal course of life goal effects on mean-level changes, it has been shown that life goals predicted only long-term trait changes and thereby contrast with effects of change goals that exert their influence only within the short-term period of three months. Following from this, one can conclude that initial change goal characteristics trigger or initialize changes in the corresponding traits, while the initial importance of broader underlying life goals seems to be a relevant factor for the long-term maintenance of these changes.

The life goals of intimacy and affiliation as predictors of inter-individual differences in personality trait changes

Cross-lagged panel models demonstrated effects of prior major life goals on subsequent personality traits, but no effects of prior personality traits on subsequent life goals. These effects are small but of substantive size – a finding that is in line with Bleidorn and colleagues (2010) who found genetically and environmentally mediated effects of prior life goals on subsequent personality traits across five years. In view of results from the present study and from Bleidorn and colleagues (2010), goals might be considered as proxies for anticipated contexts, leading individuals to adapt their personality traits to successfully achieve their life goals (Roberts et al., 2004). However, present findings are in contrast to a prior study of longitudinal relations between personality traits and life goals during a transitional period in young adulthood (Lüdtke et al., 2009). These researchers found prospective effects of personality on subsequent life goals across two years, but almost no effects in the reverse direction. However, even though the present study covered only a time period of nine months, it has focused on a distinct period in which people actively and deliberately invested in their personal goals to change aspects of their personality traits. As expected, my findings suggest that major life goals underlining the specific change goals are likely to be deliberately reflected during such a period and to act as motivational triggers for subsequent changes in personality traits. Thus, although broad life goals have been conceptualized to influence an individual's life over years rather than weeks (Roberts & Robins, 2000), the present study indicates that phases of intentional trait change might be "strong situations" in which latent life goals underlining personal change goals are activated and become operative.

Against the background of the present finding that intimacy and affiliation life goals partly drive personality trait changes in the context of volitional personality trait changes, evidence from Roberts and colleagues (2004) warrants further attention: They found normative decreases in all life goal domains during young adulthood except for social and relationship goals which remained stable. The authors interpreted their finding of overall decrease in life goal importance as the result of an adaptive selection process (e.g., Baltes et al., 2006; Freund & Baltes, 2000). The selection hypothesis proposes that individuals have only limited personal and social resources that have to be focused on

investments in selected goals. However, social and relationship goals (such as intimacy and affiliation) seem to have a special status in young adulthood as their importance remains stable although limited personal and social resources force individuals to focus on only selected goals. This is consistent with findings from the present study in the sense that relationship life goals may remain equally important across adulthood, but that there are distinct periods in life where these otherwise latent goals become relevant; for example, during periods of active investments in volitional trait changes where personal resources are (made) available to change some aspects of one's personality – which in turn might serve to get closer to one's broader goals in life (e.g., trusting and confident relationships).

In particular, intimacy life goals were prospectively associated with lower neuroticism and higher extraversion nine months later. This effect may be partly attributable to an increased investment in behavioral efforts to consistently change one's behaviors, thoughts, and feelings related to those traits that are relevant for success in the corresponding life goals among people high in intimacy goals. Findings from the experience-sampling data of the present study support this conclusion which will be further discussed in chapter 3. Additionally, affiliation goals turned out to be prospectively associated with higher levels of neuroticism after nine months. This effect mirrors the mean-level finding that high importance of affiliation goals was associated with smaller subsequent decreases in neuroticism. As discussed above, this – at first glance – paradoxical effect can be explained by re-defining affiliation goals as ostensibly not underlining the change goals participants reported and maybe even producing psychological stress for shy and socially anxious individuals.

2.10.4 Limitations and future directions

The present study is characterized by its fine-grained, in-depth longitudinal investigation of intentional personality trait changes in an adult sample, where all participants were motivated to achieve change on the same traits and were supported in changing their personality by the same standardized intervention. In terms of these aspects, the design comes close to a laboratory setting; nonetheless, one should keep in mind the quasi-experimental nature of the study. Thus, due to imperfect internal validity the design allows causal conclusions regarding the association between change goals and personality traits only under the common reservations. In particular, I cannot distinguish change goal effects from other possible influences on personality trait change. The majority of participants were in their late 20s and early 30s, and young adulthood represents a sensitive phase with a relatively high frequency of experiencing different life events (Headey & Wearing, 1989). This means that I cannot rule out that some participants in the sample faced such life events during the course of this study, and that these experiences might have affected change in personality traits in either direction.

There are also some further limitations that warrant attention. First, the present findings rely exclusively on self-report data, which might be associated with an overestimation of effects. On the one hand, self-report data on personality traits offer a number of compelling advantages – not least that individuals can introspect themselves and thus have better and more direct insight into their personality aspects (and also into subtle changes therein) than observers (e.g., Paulhus & Vazire, 2007). However, the advantage of self-reports through *privileged access* to internal processes cannot be examined empirically. On the other hand, self-reports of personality traits may suffer from response sets and response biases such as social desirability which can be subdivided into the facets of self-deception and impression management (Paulhus, 1991). It might be possible that participants of the present study were motivated to report increased levels of socially desired traits (e.g., extraversion; Dunlop et al., 2012) to prove to themselves that training participation was worth the effort. Thus, while self-deception might seem conceivable in the present study, impression management (i.e., the conscious distortion of self-reports to fool others) is likely to play a minor role as longitudinal assessments of personality traits were implemented using online questionnaires that participants completed on their own and after their individual training evaluation session. That is, participants did not meet their GSK trainers or the researchers again after post-assessment, which reduces the probability of effects due to impression management. However, to overcome these limitations, further studies should include measures of personality beyond self-reports to enhance validity of trait change assessment and to disentangle personality trait changes from illusionary changes (e.g., Specht et al., 2014). Combining different methods such as others' reports (Vazire, 2010), behavioral observations (Furr, 2009), or indirect tests (Back, Schmukle, & Egloff, 2009) in longitudinal designs allows compensation for the shortcomings of each individual method.

Second, the measurement of personal goals to change aspects of one's personality in itself may have an effect on these same goals. As individuals were prompted to write down their change goals for the training, they might have been primed to reflect on their change goals, as well as to structure and to organize them. That is, change goal assessment per se may act as an intervention. Whether such an effect of change goal assessment exists, could be examined by manipulating the salience of change goals. If this is the case, the examination of individuals' *naturalistic* attempts to change their personality traits becomes complicated (cf. Hudson & Fraley, 2015). On the other hand, compared to Hudson and Fraley (2015), only those individuals participated in the present study (and thus in the training) that had a natural desire to change some aspects of their personality. Furthermore, an idiographic assessment format was used to assess change goals, a procedure that is supposed to be less "invasive" than a nomothetic assessment (e.g., Change Goals Big Five Inventory, C-BFI; Hudson & Roberts, 2014) as it does not preset change goals but rather captures the intrinsic change desire of a person. Thus, with respect to the present study, it is possible that change goals that were already

activated have been intensified by the explicit assessment, but it seems unlikely in this context that change/training goals were only activated when it came to their assessment. The present design certainly comes close to individuals' naturalistic attempts to change their personality traits, but idiographic goal assessment impedes the comparability of findings across studies (e.g., Hudson & Roberts, 2014). Hudson and Fraley (2015) therefore suggest that future studies should address this limitation by combining nomothetic change goal assessment with measuring change trajectories of personality traits before and after completing the change goal measure. Discontinuity in trait changes before and after change goal assessment can be interpreted as indicating an effect of change goal measurement on individuals' desires to change their personality.

A third and related point is that the present study lacks the implementation of a control group which would have allowed conclusions about whether observed trait changes were caused or accelerated by the training participation as compared with individuals who work on change goal attainment on their own. Further studies could profit from the implementation of a waitlist control group that serves as an "untreated" comparison group during the study and receives training at a later date: Specifically, a waitlist control group that provides measures of personality traits three times before training participation (T1, T2, T3) and reports change goals twice before training participation (T2, T3), would allow conclusions about both the effects of change goal measurement (see above) as well as about how far training participation helps people to attain their desired personality changes. It should be noted, however, that first and foremost, the present study aimed to examine the role of change goal characteristics for personality trait development, rather than testing the efficacy of this specific GSK training in helping people to change aspects of their personality. In fact, behavioral changes were expected to promote personality trait changes and thus to act as a relevant *process* of trait changes (see chapter 3): In order to investigate this hypothesized association, a study *context* (rather than an *intervention*) was chosen which is likely to facilitate those behavioral changes. That is, with respect to the research questions of the present work, the GSK training could have been substituted by any other environment or intervention that supports trait-corresponding behavioral changes. Nonetheless, it is a promising next step for future research to test which (elements of) interventions lead to substantial gains in personality traits. For example, Hudson and Fraley (2015) demonstrated that an intervention that generates specific behavioral, cognitive, and affective implementation intentions (Gollwitzer & Brandstätter, 1997) was effective in supporting people to attain their desired changes, while a rather vague change plan intervention where people had to formulate change steps on their own failed to promote trait changes. Implementation intentions focus on when and where to initiate goal-directed actions and are typically formulated as "when encountering situation X, perform behavior Y". The potential of psychological interventions to

catalyze trait change processes and possible costs and benefits of such interventions will be further discussed in the general discussion at the end of this thesis.

Fourth, as discussed above, the sustainability of the observed trait changes has to be examined in future longitudinal research with more extended time frames. Although it is possible that the observed trait changes are only temporary, it was demonstrated that they were maintained (for neuroticism even intensified) beyond the discontinuation of the training participation which extends findings from previous studies that focused only on pre- and post-test assessment immediately before and after an intervention (Hudson & Fraley, 2015). However, more extended time frames in longitudinal studies allow also the examination of factors that might be relevant for the long-term maintenance of intentional personality changes. The present study suggests that global life goals act as a relevant factor for maintaining changes although other factors, such as feedback from relevant others on the consistently performed trait-related behavioral changes (e.g., Roberts et al., 2008) or an individual's *valuation traits* (i.e., how consequences of changed behaviors are typically evaluated or emotionally reacted to by an individual; Wood & Denissen, 2015) might be influential as well. Future studies should include longitudinal measurement of these maintenance factors.

Finally, the present sample was relatively small and consisted of highly educated individuals, which reduces the generalizability of effects. Although the present study did not examine the efficacy of specific intervention elements in facilitating trait changes, it seems likely that the relevant intentional processes to perform consistent behavioral changes put high cognitive, motivational, and self-regulation demands on individuals. For example, the formulation of implementation intentions requires abstract and detailed reflection on one's personal goals as well as about specific context-behavior links that are effective in initiating goal directed actions when such a situational context is encountered (Gollwitzer & Brandstätter, 1997). Thus, it is possible that less educated individuals may face more difficulties in achieving their change goals – even when supported by an intervention. To investigate the generalizability of effects, it would be desirable to compare the findings of the present study with those from future longitudinal studies with larger samples preferably drawn from populations with different educational backgrounds and lower dropout rates.

2.11   Conclusion

Can individuals intentionally change their personality traits just because they want to and get help to do so? The present research provides first evidence not only for the fact that personality – although defined by relatively high stability – is malleable within several months, but also that personal goals to change aspects of one's personality may actually drive personality development in desired ways. Extending findings from previous research that psychological interventions as implemented in this study may catalyze trait changes, the present findings suggest that these changes are maintained even after participation in an intervention. Major life goals underlining the specific change goals are likely to act as motivational factors relevant for the maintenance of executed trait changes. In sum, the present findings point to the relevance of the recently suggested perspective on personality development that highlights self-regulation and motivational factors as important driving forces of personality trait changes.

However, the findings presented still leave open several associated questions: How are these trait changes linked to investments in trait-related behaviors as suggested by bottom-up approaches to development? Focusing on changes in trait-related behavior at the within-person level, the question remains open whether intra-individual variability in trait-related behavior is contingent on variation in change goal characteristics? Moreover, are those goal-behavior links universal or do they differ between individuals, for example due to relatively stable individual differences, such as major life goals? Therefore, taking a closer look at the processes underlining personality trait changes, the second part of my research adopted a micro-perspective and aimed at shedding light on both within- and between-person associations of personal goals and personality traits as well as on the question whether consistent behavioral changes catalyze trait changes.

3. A micro-analytical perspective on intentional personality change: Linking goals to change oneself, personality states and major life goals

3.1 Introduction

In general, personality development seems to be a gradual and rather long-term process that may take place over years or at least several months (e.g., Roberts et al., 2013). However, as noted earlier, conceptualizing personality change at both the micro- *and* macro-level dimension of time offers seminal ground for research on stability and change in personality across the lifespan and across situations from both trait and state perspective (see section 1.7). Such a change concept related to different levels of time has been incorporated into two recent and seminal theoretical models of personality: Both the *density distribution approach to trait descriptions* (Fleeson, 2001, 2012; Fleeson & Gallagher, 2009) and the *sociogenomic model of personality* (Roberts, 2009; Roberts & Jackson, 2008) integrate ways of thinking and findings from two distinct lines of research on personality stability and change – one line of research, with an emphasis on *structures*, focusing on long-term development of traits (macro-perspective) and the other one, with an emphasis on *processes*, focusing on short-term fluctuation in states (micro-perspective). The question about the degree of consistency and changeability of personality has generated much controversy culminating in the so-called person-situation debate that has mattered to the field of personality psychology during the second half of the last century (e.g., Kenrick & Funder, 1988). By now, several longitudinal studies and meta-analyses have suggested that – despite its relatively stable nature – personality continues to change during adulthood and even into old age (for overviews, see Roberts & Mroczek, 2008; Roberts et al., 2008; Specht et al., 2014). Realizing that there is *both* stability *and* change, over time and across situations, most personality researchers consider personality as a relatively stable framework that still provides room for substantial changes (e.g., Fleeson & Noftle, 2009). Nowadays, since the lessons from the person-situation debate have been learnt (e.g., Donnellan, Lucas, & Fleeson, 2009; Fleeson, 2004; Hogan, 2009; Kenrick & Funder, 1988; Mischel, 2004), bringing together structure and process approaches of personality seems to be a promising way to gain new insights into the short-term processes that underlie long-term changes in personality structures (Fleeson & Noftle, 2009). In particular, although average trait levels reveal much about personality development, they do not allow the examination of short-term personality processes, such as the interpretations of situations, resource availability, or desires and strivings (Noftle & Fleeson, 2015).

There are several reasons why examining intra-individual variability in personality is considered important (e.g., Noftle & Fleeson, 2015). First, a full description of individuals' personality obviously includes that a person is not always the same but may also vary from moment to moment – at least to some small degree (e.g., Mischel & Peake, 1983). Consequently, solely focusing on trait

questionnaires which capture how individuals behave in general, excludes examination of variability in how individuals actually behave throughout their daily lives. Second, the concept of intra-individual variability expands the ways in which researchers can investigate (personality) traits (e.g., Hooker, 2002): Personality traits need not only be conceptualized as static one-time entities of individuals but also, for example, as frequency distributions of trait-related behaviors. Third, intra-individual variability itself can and has recently been considered as a relatively indicator of stable inter-individual differences (Nesselroade, 1991) that in turn might be relevant for meaningful outcomes such as survival (Eizenman, Nesselroade, Featherman, & Rowe, 1997) or general affectivity (Shifren & Hooker, 1995). Finally, "intraindividual variability allows new insight into what makes traits tick" (Noftle & Fleeson, 2015, p. 177) in that it enables the investigation of internal or external factors relevant for trait manifestation change, and in how far trait manifestation in turn influences changes in, for example, actions or emotions (Fleeson, 2012).

Thus, the present study is aimed at complementing the macro-analytical perspective on personality development outlined in the previous chapter by examining associations of personal change goals and personality states (i.e., trait-related behavior) as they unfold in individuals' daily lives. Within my thesis, goal-personality associations will be examined at both the between- and within-person level as well as at both the structure- and process-level. In particular, this chapter is aimed to provide one further step towards a comprehensive understanding of the short-term processes potentially mediating personality trait changes. Before I will outline the issues that guide this research including a concise presentation of the sociogenomic model of personality, I will briefly sketch what is meant by the concept of *personality states*.

Assessing the five factors of personality as states: The density distribution approach

In general, a personality *state* can be defined as comprising the same content of thoughts, feelings, and behaviors as the corresponding trait (Zillig, Hemenover, & Dienstbier, 2002), however, states refer to shorter timeframes than traits. That is, while traits are typically assumed to last for several months or years, states serve as proper descriptions of personality for only minutes or hours.

Until Fleeson transferred the state concept to the personality domain within his density distribution approach (Fleeson, 2001), it had only been used in research with regard to affect (Fleeson, 2012). The density distribution approach aims to integrate both concepts of stability and variability into its definition of personality traits and thereby served as one resolution to the person-situation debate: Not playing off personal factors *against* situational factors, the density distribution approach has helped to shift the scientific focus to the examination of how both types of factors can inform each other to explain an individuals' behavior in a specific moment. Personality *states* are considered as manifestations of the corresponding *trait* in short-term and concrete ways of thinking, feeling, and

acting. Thus, a trait is not simply represented by a mean, but rather by an entire behavioral distribution. Personality states and traits can be assessed in the same way, capturing the same content and the same dimensions: For instance, individuals can not only be described by their mean level of extraversion ("how extraverted they are in general"), but also by their specific behaviors on a continuum from lowly to highly extraverted ("how extraverted they behave in a given moment"). Accordingly, in statistical terms, each person's density distribution comprises an *average* level of behavior, and a *standard deviation* that captures the amount of within-person variability in behavior. A state measure offers direct information about the extent to which a person is exhibiting trait content in a given moment and personality states are characterized by both the relative stability of the corresponding trait and the natural fluctuations of behaviors.

The density distribution approach has proved to be a useful framework to describe broad personality traits such as the Big Five (e.g., Bleidorn, 2009; Fleeson, 2001, 2007) or character traits (Bleidorn & Denissen, 2015). However, it has to be mentioned that it is *not* intended to capture specific actions or movements (e.g., "talking to a friend" or "doing housework"), but rather descriptions of ways of behavior (e.g., "behaving extraverted" or "behaving conscientiously").

3.2   Personality states as a function of goals to change oneself

So far, several studies have demonstrated that within-person changes in trait-relevant behavior were not random but rather contingent on certain situational characteristics, such as task orientation (Fleeson, 2007) or social roles (e.g., Bleidorn, 2009; Heller, Watson, Komar, Min, & Perunovic, 2007). In particular, it was demonstrated that a typical person differs from himself or herself on two distinct measurement occasions more than he or she differs from another person (e.g., Bleidorn, 2009; Fleeson & Gallagher, 2009). Furthermore, it was shown that these situation-behavior contingencies are not universal but differ reliably between persons (Fleeson, 2007), which is line with the functionalist framework on personality functioning that considers any trait as a certain form of an *if-then* situation-behavior contingency (e.g., *if* situation X, *then* expect response Y; e.g., Wood & Denissen, 2015).

Up to now, research on potential predictors of intra-individual variability in personality states has focused in a large part on social roles (e.g., Bleidorn, 2009; Bleidorn & Denissen, 2015; Heller, Perunovic, Wei & Reichman, 2009). However, internal situations, such as personal goals, might be an interesting predictor candidate as well, since guiding individuals' behavior is a relevant part of many definitions of the goal construct (Austin & Vancouver, 1996). There are only few studies that have investigated the intra-individual link between personal goals and personality states. For example, McCabe and Fleeson (2012) investigated a variety of different personal goals individuals were

pursuing and found that about 75% of the variation in extraverted states could be accounted for by momentary goal content. That is, personal goals largely explained why individuals sometimes manifested extraversion and sometimes manifested introversion, and why some individuals manifested extraversion more often than did others. In their ten-day experience-sampling study, Heller and colleagues (Heller, Komar, & Lee, 2007) examined the intra-individual relationship between approach/avoidance goals and personality state reports of both neuroticism and extraversion. Approach and avoidance goals differ in their motivational direction (i.e., *towards* an outcome vs. *away from* an outcome) as well as in the valence (i.e., positive vs. negative) associated with the outcome (e.g., Elliot & Friedman, 2007). For instance, "getting a good grade" can be defined as an approach goal, while "not failing the exams" can be termed an avoidance goal. The authors' findings indicated that at the within-person level approach goals – relative to avoidance goals – were associated with higher levels of self-reported extraverted states and lower levels of self-reported neurotic states (see also Perunovic, Heller, Ross, & Komar, 2011). Based on these findings Heller and colleagues developed a conceptual bottom-up model that links social roles, short-term goals, personality states, and personality traits (Heller et al., 2009). Within their framework, they posit that social roles come along with a set of specific goals that in turn elicit relevant behaviors, thoughts, and feelings to reach that goal.

The authors' conceptual understanding of social roles driving behaviors, feelings, thoughts and potentially corresponding traits in the long run (Heller et al., 2009), perfectly intertwines with the *social investment principle* of personality development (Roberts et al., 2005; see section 1.3) assuming that changes in personality traits are triggered by lasting changes in social roles in relevant life domains like work, family, or partnership. According to both theoretical approaches, social roles are assumed to be associated with goals and expectations how to behave within a specific role (e.g., behave conscientious and ambitious when entering work life), therefore providing a reward structure for showing and omitting certain behaviors. By committing to a new role and internalizing the associated role expectations individuals adapt their behavior towards these new behavioral guidelines.

Equipped with the understanding of social roles coming along with role-associated goals, experience-sampling studies on social roles and personality states allow indirect conclusions about the within-person relations of goals and trait-related behavior. Bleidorn (2009), for example, showed that different social roles were associated with different self-reported personality states. That is, being in the student role predicted higher conscientious behavior and less emotional stable, extraverted, open, and agreeable behavior. On the other hand, being in the friend role was associated with elevated levels of emotionally stable, extraverted, open, and agreeable behavior. There was no effect

on conscientious personality states. Hence, at the intra-personal level social roles that come along with associated goals and expectations are significantly interrelated with personality states. Additionally, Bleidorn (2009) examined the role of major life goals for within-person processes and found that life goals predicted average levels of personality states, but failed to predict within-person variability in states.

Empirical evidence from these diary studies (Bleidorn, 2009; Heller, Komar, et al., 2007; McCabe & Fleeson, 2012) demonstrated that shifts in short-term goal characteristics (also irrespective of their content, i.e. approach vs. avoidance orientation) and role-associated goals are related to changes in corresponding personality states. This is in line with the theoretical notion by Heller and colleagues (2009) that short-term goals represent the "active, meaningful psychological ingredient of situations, and, consequently, should exert a significant impact on the behavior of the person" (p. 174; see also Yang, Read, & Miller, 2006). Studies that focused explicitly on personal goals to change oneself showed that change goals were generally unrelated to average levels of *concurrent* daily behavior (Hudson & Roberts, 2014), but were associated with *subsequent changes* in trait-related behaviors (Hudson & Fraley, 2015). However, both studies on change goals and daily behaviors did not focus on the intra-individual level as change goal importance was assessed only once (see also section 1.5). Thus, the question remains how the expression of personality states relates to a person's change goals in that particular moment: Are people behaving more in line with their change goals while these goals are psychologically activated? This issue is conceptually and also statistically different from the question addressed by the two previous studies that examined the relations between personality states and change goals *across* (instead of *within*) individuals. That is, while previous studies focused on between-person differences, a thorough investigation of this research question requires studying the within-person relations between change goals and personality states.

Taking up the proposition by Denissen and colleagues (Denissen, Penke, et al., 2013) to better document person-situation dynamics using experience-sampling designs, the present study employed an experience-sampling design to complement previous findings on the link between change goals and personality states with evidence from the within-person level: Why are people more extraverted in some situations but rather introverted in others? Do change goals act as meaningful psychological processes that might explain variation in personality states? To the best of my knowledge, the present study is the first one that examines personal change goals and personality states as they unfold in the stream of individuals' daily lives and investigates whether variability in trait-related behavior is contingent on variability in characteristics of personal goals to change oneself. Applying propositions of the 3-SRF (Hennecke et al., 2014) to the intra-individual level of analysis, the variation in the interaction of desirability and feasibility of change goals is

assumed to be positively associated with variation in personality states. Thus, the presumption is that people adjust their personality-related behavior to current change goal demands.

3.3   Major life goals and personality states

To what extent do the abovementioned goal-behavior contingencies reliably differ between persons? Related to this question, interactionist positions on personality functioning have proposed that how an individual will act in a particular situation is not only contingent on the person's trait level or on current situational (internal or external) factors but also on how the individual uniquely reacts to the relevant situational cues (e.g., Fleeson, 2007; Magnusson & Endler, 1977; Mischel & Shoda, 1995). It is essential to note, that the term "situation" can refer to both rather external (e.g., social roles) and more internal situations (e.g., specific change goals). Thus, following interactionist positions on personality functioning, one can assume that some people may adapt their behavior to meet salient (i.e., currently important and feasible) change goals while other people may not adjust their behavior or even exert behaviors in the opposite direction of goal attainment (e.g., behaving in an introverted way although the salient change goal reflects the desire to behave more extraverted). Such between-person differences in reactivity to situational factors were demonstrated in previous experience-sampling studies on personality states (Bleidorn, 2009; Fleeson, 2007) and virtue states which are conceptually quite similar to personality states (Bleidorn & Denissen, 2015).

Based on the presence of reliable differences in goal-behavior contingencies between individuals, the question arises which factors might be related to those inter-individual differences. In particular, interactionist approaches to personality functioning suggest a number of relatively stable dispositions, such as competencies or goals, that interact with situational cues to generate behavioral patterns (e.g., Fleeson, 2007; Magnusson & Endler, 1977; Mischel & Shoda, 1995). Goals structure and attribute meaning to individuals' daily behavior and are thus expected to act as one relevant factor guiding individuals' behavior (e.g., Austin & Vancouver, 1996; Freund, 2003; Hill et al., 2015; Maier & Brunstein, 2001; Pöhlmann & Brunstein, 1997). The present study thus aims to examine the associations between major life goals and personality states while experiencing different levels of change goal salience. That is, do life goals account for the variation in the within-person links between change goals and personality states across individuals?

The domains of intimacy (e.g., having deep and confident relationships, giving affection to someone) and affiliation (e.g., having a lot of friends or spend much time with others) life goals were chosen to investigate the links between life goals, personality states, and change goals. As described in chapter 2, those two life goal domains are supposed to be in line with and underlie participants' specific goals to change their levels of neuroticism and extraversion. Accordingly, the mental representation of

desired outcomes related to those life goals and the activities that help reach them are assumed to guide individuals' behavior while pursuing their life goals. Thus, participants are expected to adjust their trait-related behavior more or less flexibly toward the accomplishment of their relevant life goals. In particular, high importance of underlying intimacy and affiliation life goals is assumed to intensify the link between change goals and related personality states. In other words, life goals may moderate individual's behavioral goal investment in reaction to different levels of change goal salience and therefore account for between-person differences in contingencies of personality states on current change goal characteristics.

The present study is further aimed at examining whether the life goals of intimacy and affiliation are related to the stable aspects of personality states as well. That is, I expect both life goal domains to be associated with the average levels of extraverted and neurotic personality states. Previous research has provided evidence that established associations between life goals and Big Five personality traits (e.g., Lüdtke et al., 2009; Roberts & Robins, 2000; Roberts et al., 2004) can be also applied to the stable parts of personality states (Bleidorn, 2009), thereby providing further support for the density distribution approach (Fleeson, 2001).

3.4   Transactions between personality traits and investment into trait-related behavior

In recent years, research has advanced our understanding of driving factors for personality development in adulthood. Several external (e.g., graduation from school; staying abroad; entering work life) but also internal factors (e.g., change goals) have been identified as sources of influence on personality development (e.g., Bleidorn, 2012; Hudson & Fraley, 2015; Specht et al., 2011; Zimmermann & Neyer, 2013). However, most studies adopted a macro-analytical perspective (i.e., structure-oriented) and thus examined individuals across relatively long time periods. In contrast, only a few studies (e.g., Bleidorn, 2012) have focused on the micro-analytical (i.e., process-oriented) level to investigate *how* internal and experiences and demands induce changes in personality traits (Roberts & Jackson, 2008). Hence, the question remains, *how* these transitional and internal experiences and social role demands trigger personality development. In other words, which processes at the micro-analytical level might underlie changes in personality traits?

Theoretical approaches intended to explain how identified driving factors may shape a person's personality all assume to at least some degree that substantial trait changes are usually preceded by changes in trait-relevant behavior (i.e., personality states; Fleeson & Jolley, 2006; Magidson et al., 2014; Noftle & Fleeson, 2015; Roberts, 2009; Roberts & Jackson, 2008). That is, these authors generally hypothesize that (socio)environmental and internal experiences influence personality traits in a bottom-up fashion. In fact, this bottom-up process is a core element of the sociogenomic model

of personality (Roberts, 2009; Roberts & Jackson, 2008): Changes in personality states (i.e., changes in trait-related behaviors, thoughts, and feelings) are supposed to mediate changes in personality traits. Thus, each environmental or internal factor that triggers personality trait change is assumed to have exerted significant influence on the corresponding states beforehand. Sustained behavioral changes (including changes in feelings and thoughts) make up the process through which traits that are most related to these specific behaviors may be altered (see Figure 9). For instance, imagine a young professional who desires to become more extraverted. The explicit change goal comes with a strong motivation to behave more assertive, talkative and sociable than before. After a period of active (and successful) effort to match these goal demands, he might come to see himself as an outgoing self-confident employee, and maybe even as more extraverted person than he was several months before (Roberts, 2006). Further stabilization and generalization of the increased extraversion level depends on the degree to which the young man identifies with the relevant behavioral changes (e.g., Roberts et al., 2008).
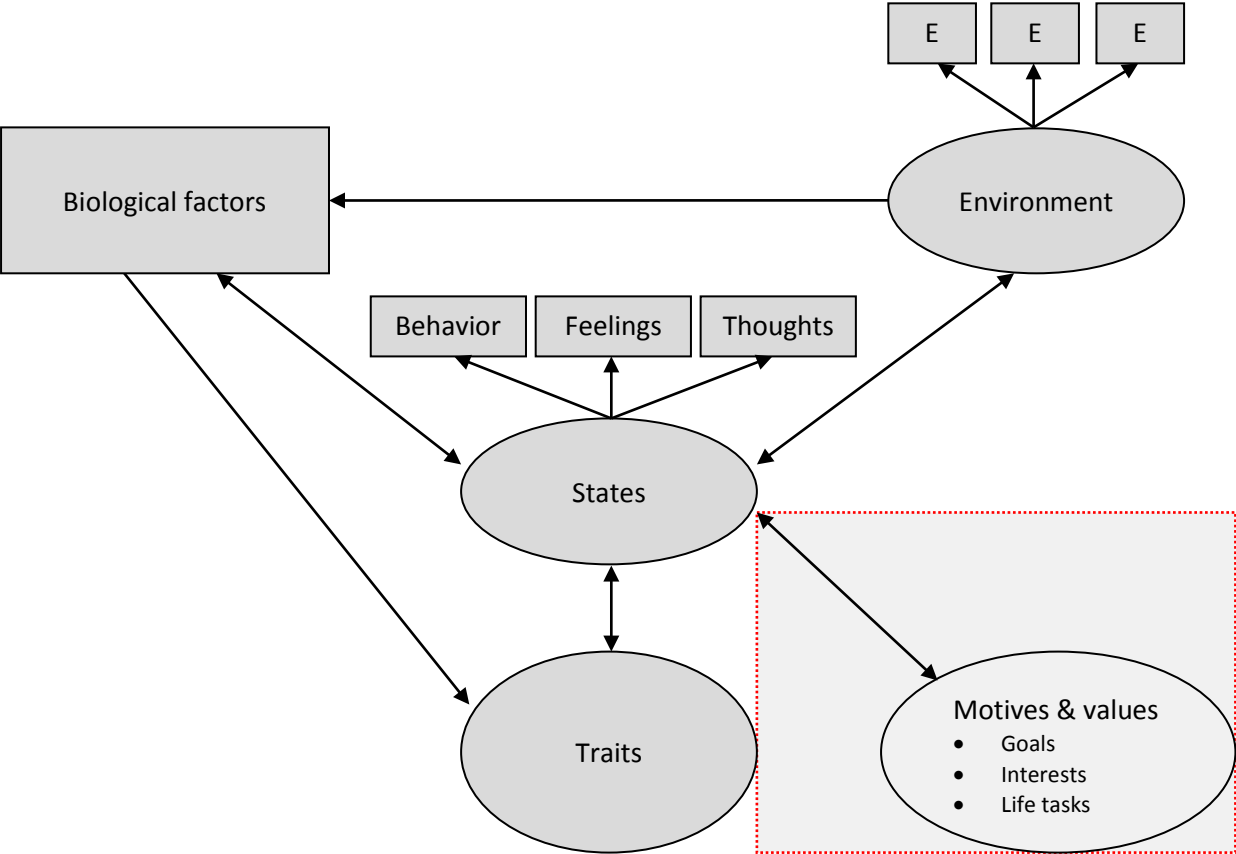

Figure 9. Sociogenomic model of personality traits. Adapted from Roberts, 2009.

The present study sets out to link the micro- and macro-analytical perspective on personality trait development and tests the proposed bottom-up process that changes in trait-related behavior predict subsequent changes in corresponding traits.

3.5 The present study

The present research aimed to provide a fine-grained investigation of the processes underlying personality trait changes during a time of intentional active goal investment in adulthood. Making use of an experience-sampling design in conjunction with MLM procedures, the within- and between person relations among personality states, current change goals, and major life goals have been examined. Furthermore, linking structures and processes of personality functioning, the relationship between personality states and short-term changes in personality traits has been investigated.

Three issues guided this research: In a first step, I examined the within-person relationship between current change goals and personality states. Since goal characteristics such as approach/avoidance orientation have already been shown to be associated with personality-related behavior (Heller, Komar, et al., 2007), differences in change goal characteristics were expected to provoke different levels of state neuroticism and extraversion. The present analyses focused on two goal characteristics that are assumed to be both necessary for goals to induce behavioral consequences (Hennecke et al., 2014): currently perceived importance and feasibility of change goals. The combination of both high change goal importance and feasibility should be associated with higher levels of extraverted behavior, but lower levels of neurotic behavior (including feelings and thoughts). The presence of either high goal importance or feasibility alone should not be sufficient to guide individuals' behavior. Being aware of the fact, that behavior in a concrete situation is influenced by a plethora of more or less objective situational cues (e.g., presence of others, social interactions, events, settings; for an overview see Rauthmann et. al., 2014) as well as by the perception of these cues, small but significant effects of goals on personality states were expected. Objective situational cues are somehow translated into a subjective psychological situation, and how these cues are processed in turn depends on aspects of the person like traits, knowledge, and goals (e.g., Mischel & Shoda, 1995; Rauthmann, 2012; see also Wrzus, in press). That is, within the whole complex process of determining behavior, feelings, and thoughts, change goals were expected to be only one – but meaningful – predictor of individual behavior.

A related issue concerns the universality of these within-person relations: Interactionist positions on personality functioning (e.g., Fleeson, 2007; Magnusson & Endler, 1977; Mischel & Shoda, 1995, 1999) suggest that there should be notable differences in persons' situation-behavior links, implying that people react differently to the same "change goal context". Previous research demonstrated

those between-person differences in individuals' role-personality contingencies (e.g., Bleidorn, 2009; Bleidorn & Denissen, 2015; Fleeson, 2007). Analogously, in the present study, participants were expected to differ substantially and reliably in their within-person links between current change goal characteristics and personality states. Such significant differences across individuals would imply that participants differ not only in how frequently they express personality states but also in the goal characteristics under which they usually express these states (e.g., Fleeson, 2007).

Second, major life goals were hypothesized to predict between-person differences in both average personality states and within-person links between change goals and personality states. The present study focused on the two life goal categories of affiliation and intimacy that were expected to underlie participants' goals to change levels of neuroticism and extraversion. In line with previous research on the links between major life goals and personality traits (Lüdtke et al., 2009; Roberts & Robins, 2000; Roberts et al., 2004), affiliation and intimacy life goals were assumed to be positively associated with extraversion and negatively with neuroticism. The present work also tried to discover cross-level interactions between relatively stable individual dispositions and within-person associations between change goals and personality states. With respect to the moderating effect of life goal content, my study was aimed to investigate the more abstract assumption that life goals moderate (in this case: intensify) the within-person link between change goals and personality states.

Finally, this study was intended to take a closer look at the interface between personality structures and processes. Specifically, using latent true change models, I examined the temporal relationship between personality states and personality trait change across three months of active change goal investment. That is, averaged levels of personality states at the beginning, in the middle and at the end of the three-month period were examined as predictors of mean-level change in personality traits. In line with bottom-up perspectives (e.g., Roberts, 2009; Roberts & Jackson, 2008), higher averaged levels of extraverted behavior should predict increases in extraversion, while lower levels of neurotic behavior should predict decreases in neuroticism.

3.6   Method

3.6.1. Participants

Out of the 97 individuals who started participation in the GSK training (for the sample description see chapter 2), 50 individuals agreed to take part in the experience-sampling study as well. One participant quit providing diary data due to the time-consuming nature of study participation. The remaining 49 participants (35 females, 14 males) completed the experience-sampling study and could be included in the analyses. Age of participants ranged between 20 and 58 years (M = 31.8, SD = 8.4). As for the longitudinal study described in chapter 2, participation in the experience-sampling study was voluntary and not financially remunerated.

3.6.2 Procedure

Introductory session

Participants first attended an information session in which the aim and procedure of the experience-sampling method was explained to them. This introductory part was integrated into the individual briefing session for the training and longitudinal study participation (see section 2.8.1). Each participant could decide whether to use his/her own web-enabled smartphone or a web-enabled HTC Touch Diamond handheld computer given to them for the duration of the experience-sampling periods. The web-enabled handheld devices were equipped with SIM cards and the required amount of financial credit. The experience-sampling study was implemented as an online questionnaire using the program Unipark of the online-survey software EFS Survey. All participants ran a first practice trial to rule out technical problems and to ensure their comprehension of all adjective-based items to capture personality states (further details below). Practice trials were subsequently deleted from the master data file.

Experience-sampling

Following the introductory session, participants started the first 4-day experience-sampling period. Overall, participants took part in three experience-sampling periods, the other periods in the middle, and after training participation, respectively (see Figure 2). During each phase, they completed up to four experience-sampling reports per day according to a regular schedule (10 and 12 am, 4 and 6 pm). In each experience-sampling report participants were asked to rate their personality states as well as momentary change goal characteristics. The experience-sampling reports on state personality were assessed in the same format as standard adjective-based personality measures with the difference that rather than describing oneself *in general*, participants were asked to rate their behavior, feelings, and thoughts *during the previous hour* (for a similar approach, see Bleidorn, 2009; Bleidorn & Denissen, 2015; Fleeson, 2001, 2007). After four days, all participants were invited to

extend the sampling period for two further days, if they had missed some scheduled measurement occasions. Thus, some participants even completed more than the regular scheduled 16 experience-sampling reports per phase. After the end of the respective measurement period, smartphones not belonging to the participants were returned to the experimenter.

Overall, the response rate was satisfying with a total number of 2,336 completed experience-sampling reports. Reports not completed at the four specified times were excluded from the analyses which was possible due to the automatically date and time stamped data. Across the 49 participants, the mean number of reports was M = 47.7 (SD = 6.0); the median was 48.

3.6.3 Measures

Experience-sampling reports

During each of the three 4-day experience-sampling phases, participants were asked to rate two kinds of momentary states, namely their personality states as well as their momentary change goal characteristics.

Personality states. In line with Fleeson's density distribution approach (2001), bipolar adjective pairs were used to measure the two broad dimensions of neuroticism and extraversion as states. In the present work, personality states are intended to represent the domains of neuroticism and extraversion as they are captured by the NEO-PI-R (Costa & McCrae, 1992; Ostendorf & Angleitner, 2004) instead of drawing on taxonomical based adjective rating lists. To define manageable but reliable sets of items for each Big Five domain and its facets that are suited for the particular demands of an experience-sampling design, a pre-study was conducted on a sample of N = 141 individuals recruited at Bielefeld University and online (Macdonald, 2013).[8] Related to state neuroticism and extraversion, a total of 66 bipolar adjectives were selected from the authorized German manual of the NEO-PI-R (Ostendorf & Angleitner, 2004) which contains a comprehensive pool of German adjectives as possible descriptors of both opponent poles of all the 30 facet scales. Macdonald (2013) initially selected five to six bipolar adjective pairs for each of the six facets of neuroticism and extraversion, respectively. Four independent criteria guided this selection process: First, the adjective pairs should be adequate to describe a person's momentary behavior, feelings, and thoughts. Second, the adjectives should represent current language usage with little room for subjective re-interpretation (e.g., Kauffeld, Jonas, Grote, Frey, & Frieling, 2004). Third, no adjective should be present twice in the item pool and finally, expressions with more than one word should be

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[8] It should be noted, that the pre-study was intended to develop experience-sampling measures for all the Big Five domains as well as its facet scales. Since solely the state assessment of the two domains of neuroticism and extraversion is relevant for the present study, findings of the pre-study are presented only with respect to these two domains.

avoided. Participants of the pre-study rated their behavior, feelings, and thoughts during the previous hour by means of the initial item pool of bipolar adjective pairs. Items were presented as a standard one-time questionnaire using the same instruction and rating scale as developed for the experience-sampling study. Based on results from item analyses, reliability coefficients, and principal component analyses, 36 items were chosen to capture neuroticism and extraversion as states. That is, each domain scale was represented by 18 items and, in turn, each facet by three items. To minimize the burden for participants, only those facets of both domains were assessed that were assumed to capture behaviors likely to be addressed by participants' change goals. For example, with respect to extraversion, it was expected that participants of the GSK training rather aim to increase levels of assertiveness and gregariousness than levels of excitement-seeking. As a result, the domain of neuroticism was measured using 15 bipolar items covering the facets of anxiety, angry hostility, depression, self-consciousness, and vulnerability, while extraversion was assessed using 9 bipolar items covering the facets of warmth, gregariousness, and assertiveness. A complete list of the adjective pairs for state neuroticism and state extraversion is shown in Table E-1 (see Appendix E).

In each experience-sampling period, participants were asked at each measurement occasion to describe their behavior during the previous 60 minutes on the basis of these 24 bipolar adjective pairs using a 5-point bipolar rating scale (e.g., "Which of the two terms is better suited to describe your behavior, feelings, and thoughts during the previous hour: withdrawn or sociable?"). Participants' reports on these items were used to compute scale scores for state neuroticism and state extraversion, respectively.

Change goal characteristics. Besides the adjective pairs for personality state assessment, participants also rated the degree to which they perceived their change goals important and feasible during the previous hour by means of a 5-point Likert scale ranging from 0 = *not at all* to 4 = *very much*. Momentary change goal importance and feasibility were assessed with one item each. Change goals had been idiographically formulated at the beginning of the study before training participation.

Trait-like variables

Major life goals. As described in section 2.8.3, major life goals were measured using the self-report questionnaire GOALS (Pöhlmann & Brunstein, 1997). The dimensions of importance and current success in affiliation and intimacy life goals were expected to be meaningfully associated with the average personality state level as well as with the within-person goal-behavior links.

Personality traits. Personality traits were measured using the German version of the NEO-PI-R (Costa & McCrae, 1992; Ostendorf & Angleitner, 2004; see section 2.8.3).

3.6.4 Data analysis

Taking account of the nested structure of experience-sampling data (i.e., measurement occasions nested in individuals as higher order levels) MLM procedures and the full maximum likelihood method with robust standard errors were employed using the software program HLM (Version 7.01; Raudenbush, Bryk, & Congdon, 2013). MLM can be well described as a series of nested regressions in which coefficients of one level of analysis become the dependent variables at the next level of analysis (e.g., Raudenbush & Bryk, 2002; Snijders & Bosker, 2012).

The multivariate MLM approach that was employed in the present study is associated with several advantages (e.g., Hox, 2002; Jackson, 2010; Raudenbush & Bryk, 2002; Snijders & Bosker, 2012) of which the following are of particular relevance for the present study: First, multivariate MLM analyses allow for the examination of structural links between latent state constructs and predictors at both the within- and between-person level simultaneously. Second, MLM takes the fact that the measurement occasions are a random selection of the population of all possible measurement occasions into account. Third, the multivariate approach capitalizes on the associations between the personality state scales and thus provides more accurate standard errors and more powerful tests of the effects at both the within- and between-person level. Moreover, and fourth, the multivariate approach avoids chance capitalization which would come up when estimating separate univariate models. Finally, this approach allows to check for the psychometric properties of the state scales at both the within- and between person level simultaneously.

To address the issues of the present research, I estimated a series of multivariate three-level models with the two personality states of neuroticism and extraversion as multiple dependent variables (e.g., Hox, 2002; Nezlek, 2007; Raudenbush & Bryk, 2002; Raudenbush, Rowan, & Kang, 1991; Snijders & Bosker, 2012). Level 1 captured variation among item scores within each measurement occasion, level 2 represented variation among measurement occasions within each person, and level 3 was related to variation among participants. Level 1 exclusively provides a measurement model, whereas levels 2 and 3 can be considered as a multivariate two-level model for the latent true scores.

In a first step, I estimated an unconditional model (model 1) in which no predictors were specified at either level 2 or level 3. This unconditional model can be well demonstrated in three distinct stages: Level 1 represents variation among item scores within each measurement occasion. In other words, item inconsistency is captured as variation around the true score at a given measurement occasion.

Level 1 : $Y_{ijk} = d_{1ijk} \pi_{1jk} + d_{2ijk} \pi_{2jk} + e_{ijk}$,[9] (1)

where Y_{ijk} is the score on personality state item i at measurement occasion j for person k; d_{pijk} is a dummy-coded indicator variable for the two personality state scales taking on the value of 1 if item Y_i belongs to scale p and 0 if not (indexed by subscripts 1 to 2); π_{pjk} is the latent true score for person k at measurement occasion j, and e_{ijk} is a measurement error which is assumed to be normally distributed with a mean of zero and a variance σ^2. The error variance in each state scale σ_e^2 is the variance of the measurement error σ^2 divided by the number of items of the respective state scale p (Raudenbush et al., 1991). Thus, the model at level 1 is comparable to a restrictive confirmatory factor analysis with loadings constrained to be equal for items pertaining to the same scale and one common error variance (Hox, 2002; Raudenbush & Bryk, 2002).

At level 2, the latent true scores of each of the two personality state scales π_p were assumed to vary across measurement occasions within individuals:

Level 2 : $\pi_{pjk} = \beta_{p0k} + r_{pjk}$, (2)

where β_{p0k} is the true score mean in state scale p of person k, and r_{pjk} is an occasion-specific effect (i.e., a random effect on scale p associated with occasion j in person k). For each measurement occasion, the two random effects were assumed to be distributed multivariate normal with means of zero and a 2 by 2 variance-covariance matrix τ_π.

At level 3, the participant mean scores on the two latent personality state scales vary around their respective grand means γ_{p00}:

Level 3 : $\beta_{p0k} = \gamma_{p00} + u_{p0k}$. (3)

For each participant, the random effects u_{p0k} were assumed to be distributed multivariate normal with means of zero and a 2 by 2 matrix τ_β. There were two equations on levels 2 and 3 a time, that is, one for the neuroticism state scale and one for the extraversion state scale.

Evident from equations (1) to (3), the fixed part of this unconditional three-level model comprises p regression coefficients for the indicator variables, which are the two grand means of the personality state scales. The random model part contains two variance-covariance matrices, τ_π and τ_β, as well as one level-1 variance σ^2. This model provided level-specific internal consistencies for the latent personality state scales[10]. Furthermore, this model identifies the error-free variance in personality

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[9] Notation according to Raudenbush & Bryk (2002).
[10] Within-person internal consistency is given by $\alpha_{\pi p} = \mathbf{T}_{\pi pp}/(\mathbf{T}_{\pi pp} + \sigma_e^2)$, where $\mathbf{T}_{\pi pp}$ denotes the 2 x 2 variance-covariance matrix at level 2 and σ_e^2 is the error variance on scale p which results from σ^2 divided by the number

state scores that is to be accounted for at the within- and between-person level in subsequent analyses and thus provides baseline estimates that can be employed to estimate effect sizes (Aguinis, Gottfredson, & Culpepper, 2013; Raudenbush & Bryk, 2002).

The R^2 statistic is a well-known effect size concept in ordinary multiple regression analysis and indicates the proportion of variance in the dependent variable that is explained by the independent variables. In MLM, an analogous index can be computed (i.e., Pseudo-R^2) that compares variance from the unconditional model with residual variance in the conditional models including predictor variables (Aguinis et al., 2013). Pseudo-R^2 thus takes into account that there is unexplained variance at different levels. Accordingly, for the present model, two Pseudo-R^2 values were estimated: The level-2 Pseudo-R^2 as a value for the within-person variability accounted for by level-2 predictors and the level-3 Pseudo-R^2 as an estimator for the between-person variance modeled by level-3 predictors.

In order to examine the structural links between personality states, change goals and life goals, the unconditional model (model 1) was gradually extended by entering predictor variables at level 2 and level 3. At level 2, each personality state was regressed on the two change goal characteristics of importance and feasibility as well as of their interaction which were all represented by coefficients referred to as level-2 slopes (model 2, conditional at level 2). Person-mean centering has been traditionally recommended to properly estimate the variation of level-2 predictors (Raudenbush & Bryk, 2002). However, person-mean centering does not account for systematic time trends in the predictor variables at level 2: While change goal importance turned out to decrease across measurement occasions, change goal feasibility increased across time. In such cases of systematic relations between the predictor variables and time, Curran and Bauer (2011) recommend a centering strategy referred to as *detrending*: Instead of centering the predictor variable with respect to the person mean, detrending requires to center the predictor variable with respect to the person-specific regression line linking the predictor variable and time. In others words, the centered predictor variable represents the residual from the regression of the predictor on time – computed separately for each participant. Thus, in detrending, a centered predictor value of zero does not simply represent the person mean in that predictor (as in person-mean centering), but rather the person mean corrected for the influence of time. In contrast, level-3 predictors were centered around their

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of items representing each scale p (Raudenbush et al., 1991). Internal consistency for measuring differences among occasions within the same person depends on the number of items in the scale and the degree of intercorrelation among them. The between-person internal consistency is given by $\alpha_{\beta p} = \mathbf{T}_{\beta pp}/(\mathbf{T}_{\beta pp} + (\mathbf{T}_{\pi pp} + \sigma^2_e)/J_k)$, where $\mathbf{T}_{\beta pp}$ is the 2 x 2 variance-covariance matrix at level 3 and J_k is number of occasions sampled within a person k. The between-person reliability mainly depends on the number of occasions sampled per person and the degree of intercorrelation among them. To a lesser extent this reliability is influenced by the number of items and the degree of intercorrelation among them (Raudenbush et al., 1991).

grand means: Thus, related to major life goals, the two intercepts at level 3 can be interpreted as adjusted means for person *k* (whereas the two intercepts at level 2 represented the unadjusted means for person *k)*.

As recommended by Bolger and Laurenceau (2013), the number of measurement occasions was also entered as a level-2 predictor to control for linear time trends in the expression of personality states. Intensive repeated measurement is at risk to provoke reactivity over time which in turn might cause biased experience-sampling reports. Further enhancing the risk of reactivity, the experience-sampling data of the present study was collected during the course of an intervention likely to promote behavioral changes. Thus, to check for time-related trends in the expression of neurotic and extraverted states, model 1 (unconditional) was gradually extended by two level-2 predictors: The number of measurement occasions (per person, counting from 0) was entered as a single predictor to check for linear change, whereas both the number of measurement occasion and the squared number of measurement occasions were entered to check for quadratic time trends (e.g., Bolger & Laurenceau, 2013; Hox, 2002). There was no systematic time trend in the states of extraversion. However, there was a small linear decrease in neurotic states throughout the whole study interval. Although this effect was rather small, number of measurement occasions was incorporated as a control variable in all further analyses.

At the third level, the intercepts and slopes estimated at the within-person level (level 2) become the dependent variables and were predicted by life goal importance (grand-mean centered; model 3). Predictors at both levels of analysis were considered in the analyses as observed variables. That is, measurement error due to unreliability of measures was controlled for on part of the outcome variables (i.e., the personality states), but not of the predictor variables.

In addition to MLM analyses, latent change models were estimated to examine transactions between personality traits and investment into trait-related behavior (Geiser, 2012; see section 2.8.4). The three means of behavioral distributions were included as predictors (cf. the experience-sampling waves before, in the middle, and after the training; see Figure 10). Mean-level changes in personality traits between the first and the second measurement occasion were chosen as criterion, since behavioral distributions were assessed between these two occasions.
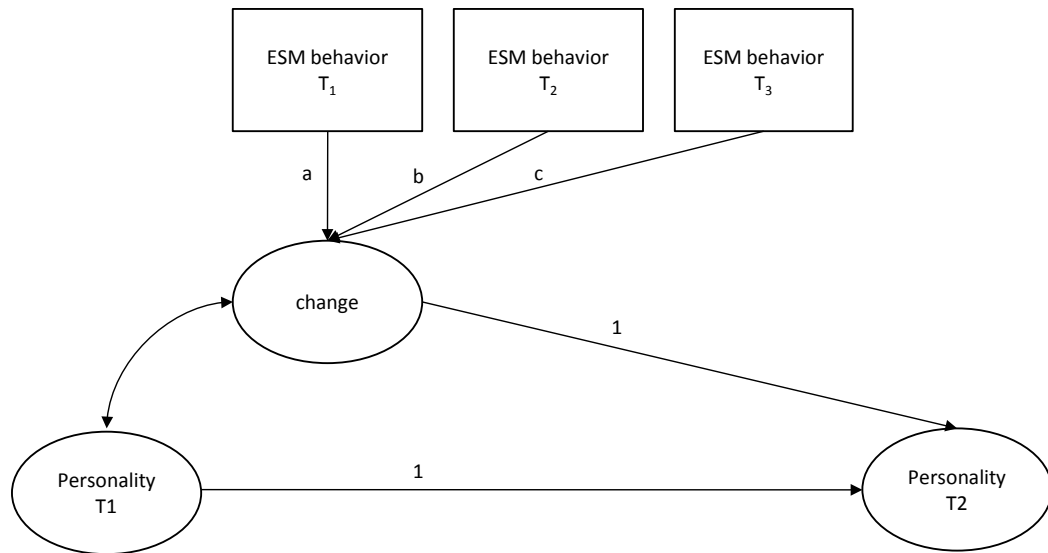
Figure 10. Mean-level change in personality traits predicted by trait-related behavior before, in the middle, and after training participation.

Note. T1 = first measurement occasion of the longitudinal study; T2 = second measurement occasion of the longitudinal study; ESM = experience-sampling method; T_1 = first measurement wave of the experience-sampling study (before training participation); T_2 = second measurement wave of the experience-sampling study (in the middle of the training participation); T_3 = third measurement wave of the experience-sampling study (after training participation). For reasons of clarity, measurement models were omitted.

3.7 Results

The results section can be divided into four parts. In a first and basic step, drawing on the unconditional model (model 1), I examined the degree to which individuals changed their personality states from one moment to the next and in how far they differed from each other in their average manifestation of personality states. Furthermore, the unconditional model served to provide the level-specific reliability of personality state scales. Second, I investigated whether intra-individual variability in personality states was associated with momentary changes in individuals' change goal characteristics. Third, I tested whether between-person variability in both average personality states and the within-person links between change goal characteristics and states can be explained by broad major life goals that underlie participants' change goals. Finally, the bottom-up approach to personality trait change was tested in the sense that behavioral changes were examined as predictors of changes in the corresponding traits.

3.7.1 Within- and between-person variability in personality states

Within- and between-person variability in each of both personality states were estimated by means of the unconditional three-level model (Hox, 2002). As can be seen from Table 14, all variance estimates were significantly different from zero. Individuals differed about the same from moment to moment as they differed from each other: 50% to 54% of the total variation on personality states occurred within persons, while 46% to 50% occurred between persons. Visual inspection of person-specific graphs displaying within-person variation in personality states across measurement occasions supports this finding (see Appendix F). The substantial variance within and between person in both neurotic and extraverted states justified subsequent analyses entering predictors at both level 2 and 3 (i.e., current change goal characteristics as well as major life goals).

Table 14. Variance components and reliability coefficients at the within- and between-person level (model 1)

Scale	Within-person (level 2)			Between-person (level 3)		
	Variance (%)		Reliability	Variance (%)		Reliability
Neuroticism	.37	(54)	.86	.32	(46)	.97
Extraversion	.22	(50)	.68	.22	(50)	.97

Note. N = 49 individuals, N = 2336 measurement occasions; percentages of within- and between-person variance in the latent personality state variables are in brackets. All variance components are significant at $p <$ .01.

Table 14 also demonstrates the internal consistencies at level 2 and 3 constituting average reliabilities across measurement occasions and individuals, respectively. At the within-person level, internal consistencies ranged between .68 for the extraversion state scale and .86 for the neuroticism state scale. These reliabilities can be considered satisfying, especially considering the fact that the extraversion state scale is based on nine items only. These findings suggest that reliabilities were still substantial when personality state scores were computed for separate measurement occasions from which the stable between-person variability had already been deducted. The internal consistencies at the between-person level amounted to .97 for both state scales suggesting that the used adjective pairs provide highly reliable measures of the two personality dimensions of neuroticism and extraversion (for the average person across measurement occasions).

3.7.2 Personality states as a function of current change goal characteristics

In order to examine why individuals express different personality states at a varying degree at different times and in different situations, I extended the unconditional model (model 1) by entering change goal characteristics as level-2 predictors – simultaneously controlling for linear time trends in both neurotic and extraverted states. The results of this conditional model (model 2) are presented in the first two columns of Table 15. In this model, both personality states were simultaneously predicted from change goal importance, feasibility and the interaction scores of both. In model 2, variance in personality states was exclusively modeled at the within-person level: In other words, this model was still unconditional at the between-person level (level 3).

The upper part of Table 15 presents the fixed effects of change goal characteristics and their interaction on the two personality state domains. Effects were estimated as unstandardized multilevel regression coefficients that can be interpreted in the same way as standard regression coefficients: That is, the slopes for change goal importance (γ_{p20}), feasibility (γ_{p30}), and their interaction (γ_{p40}) quantify the direction and magnitude of association variation in the outcome variable with variation in the predictor variable. The intercepts (γ_{p00}) represent the average levels of the outcome variables, and they suggest that participants on average experienced higher levels of extraversion than neuroticism in their everyday lives. As predicted, the interaction of change goal importance and feasibility was significantly associated with both extraversion and neuroticism states.

Table 15. Multivariate multilevel regressions of neuroticism and extraversion states on current training goals (model 2) and major life goals (model 3) with control for time trends

Model parameter	Model 2 (conditional at L2)		Model 3 (conditional at L3)	
	N	E	N	E
Fixed (MLM regression coefficients)				
Intercept, γ_{p00}	**1.82**	**2.33**	**1.82**	**2.33**
Linear change[a], γ_{p10}	**-.01**	–	**-.01**	–
TG importance, γ_{p20}	–	–	–	–
TG feasibility, γ_{p30}	*-.12*	–	*-.12*	–
TG importance x TG feasibility (I x F), γ_{p40}	**-.05**	**.05**	**-.04**	**.04**
Importance intimacy goals, γ_{p01}	–	–	–	–
Importance affiliation goals, γ_{p02}	–	–	*.06*	*-.06*
Success intimacy goals, γ_{p03}	–	–	**-.04**	*.04*
Success affiliation goals, γ_{p04}	–	–	**-.06**	**.04**
TG I x F by intimacy goals, γ_{p41}	–	–	–	**.01**
TG I x F by affiliation goals, γ_{p42}	–	–	–	–
Modeled variance[b]:				
L2-Pseudo R^2	.32	.29	.32	.29
L3-Pseudo R^2	–	–	.19	.20
Random (variance components)				
L2-Intercept, r_{pjk}	**.25**	**.15**	**.25**	**.15**
L3-Intercept, u_{p0k}	**.37**	**.25**	**.30**	**.20**
L3-Linear change, u_{p1k}	**.01**	**.01**	**.01**	**.01**
L3-TG importance, u_{p2k}	**.06**	**.04**	**.07**	**.04**
L3-TG feasibility, u_{p3k}	**.09**	**.05**	**.09**	**.05**
L3-TG importance x TG feasibility, u_{p4k}	**.01**	**.01**	**.01**	**.01**

Note. N = 49 individuals, N = 2336 measurement occasions. L2 = level 2, L3 = level 3. TG = Training goals. The chi-square statistics are based on only 2287 of 2336 (48 of 49) units that had sufficient data for computation. Fixed effects and variance components are based on all the data.

a Number of measurement occasion (per person, counting from zero).

b Proportional reductions in the variance components of personality states (N, E). At the within-person level (L2-Pseudo R^2), proportional reductions in variance were estimated in comparison to the unconditional model (without explanatory variables); at the between-person level (L3-Pseudo R^2), proportional reductions in variance were estimated in comparison to Model 2 (only conditional at level 2). Values in boldface are significant at $p < .01$; values in italics are significant at $p < .05$.

In particular, findings demonstrate negative effects of the interaction of importance and feasibility in neurotic states, but positive effects on extraverted states. Figures 11 and 12 represent so-called "spaghetti plots" (Bolger & Laurenceau, 2013) displaying the within-person links for the average person (black regression line in boldface) as well as for each participant (red regression lines). Furthermore, perceiving one's change goals as feasible was negatively related to neurotic states. For example, there was a decrease of .12 scale points in neurotic states for every one-point-increase in change goal feasibility scores (while holding the other predictors constant).

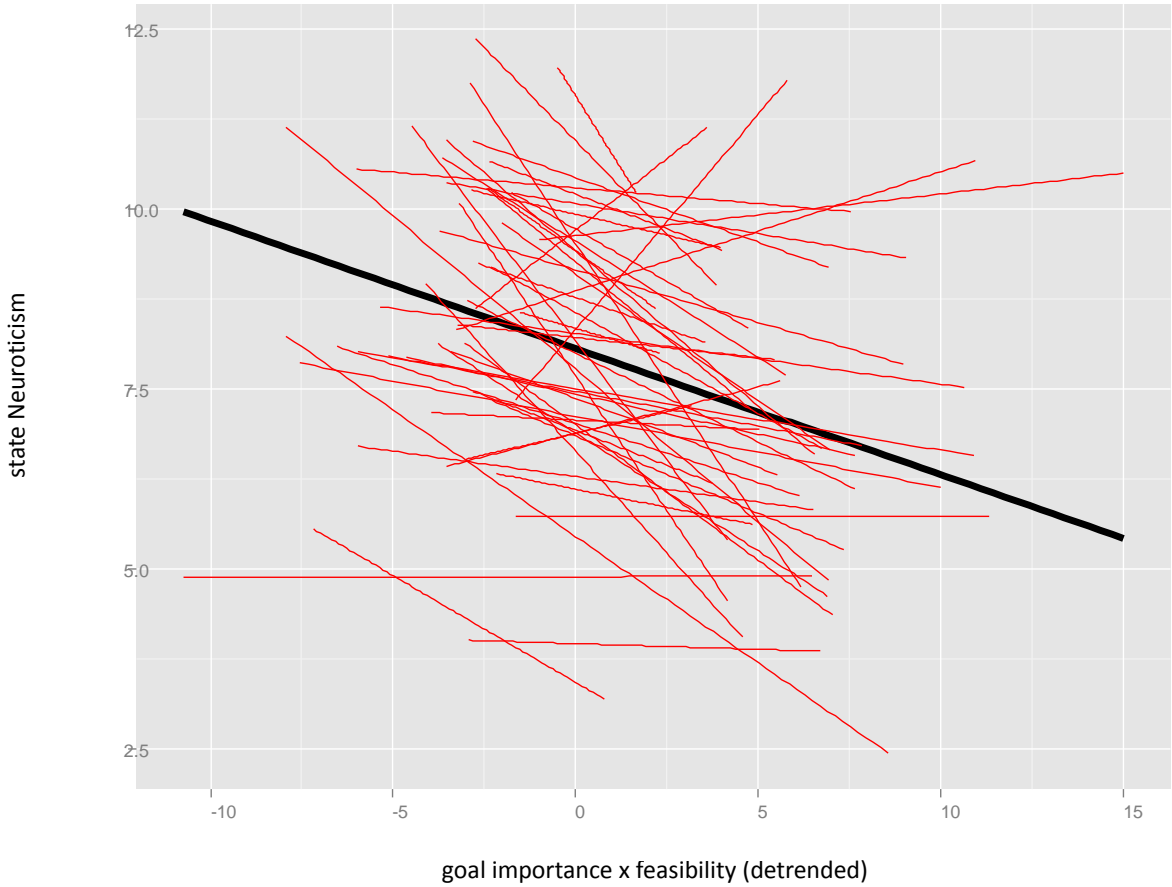**Figure 11.** Predicted scores of state neuroticism for each individual. The black thick line represents the within-person association between the interaction of change goal importance and feasibility and state neuroticism for the average person.
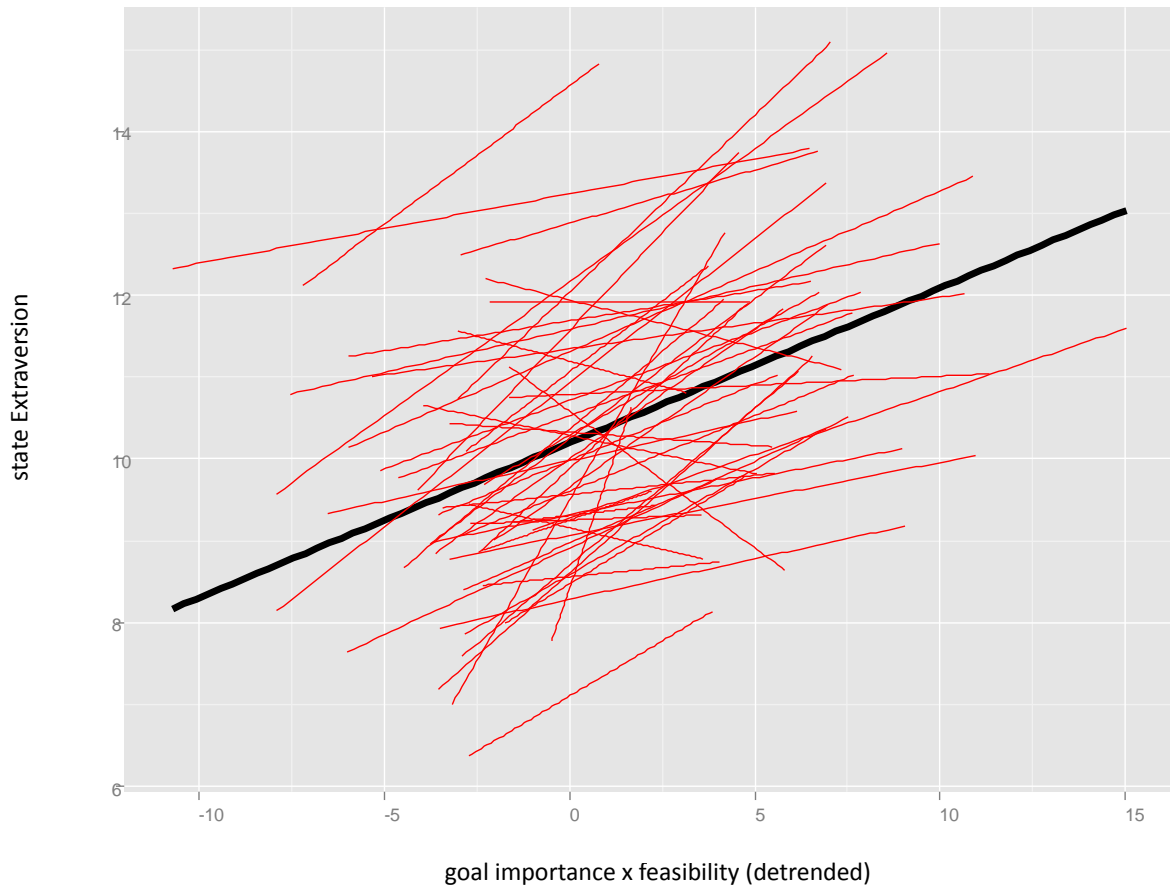
Figure 12. Predicted scores of state extraversion for each individual. The black thick line represents the within-person association between the interaction of change goal importance and feasibility and state extraversion for the average person.

The random part of the model (i.e., the variance components) is presented in the lower part of Table 15. Including the level-2 predictors consistently reduced the within-person variance in both personality states scales (r_{pjk}) as can be seen when comparing the level-2 variance components with those estimated in the unconditional model (first column of Table 14). The comparison of within-person variances estimated from both model 1 and model 2 were used to estimate the Level 2-Pseudo R^2 index (Raudenbush & Bryk, 2002). The largest amount of variance was explained in neurotic personality states: About 32% of the within-person variance was accounted for by variability in the degree the person perceived his or her change goals as important, feasible, or as an interaction of both. To a similar extent, change goal characteristics explained 29% of the latent within-person variance in extraversion. Thus, results indicate that both neurotic and extraverted personality states effectively vary as function of how one's current change goals are perceived.

Between-person differences in mean-levels of personality states were captured in the variance estimates of the level-3 intercepts (u_{p0k}). Compared with the unconditional model, these estimates were supposed to remain unchanged as no level-3 predictors were entered in model 2. However, in

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MLM the estimation and interpretation of explained variance is more complicated than in ordinary regression analysis as there is unexplained variance at different levels to account for (e.g., Hox, 2002; Snijders & Bosker, 2012). In fact, between-person variances in both neurotic and extraverted states slightly increased when level-2 predictors were included in the model (see Table 14 and 15). As recommended by Hox (2002), the conditional between-person variance components (u_{p0k}) of model 2 were used as baseline estimates to evaluate the effects of predictors at the between-person level (major life goals) in subsequent analyses.

Level-3 variances in change goal slopes (u_{p2k}, u_{p3k}, u_{p4k}) represent the amount of variability in these within-person associations across individuals. Effects of all change goal characteristics differed significantly between individuals. For instance, while some participants acted increasingly extraverted when perceiving change goals as important and feasible, others only slightly changed their levels of state extraversion in this internal situation. Very few participants even decreased in their extraverted states when perceiving change goals important and feasible (see Figure 12).

3.7.3 Major life goals and personality states

In a further step of analyses I wanted to set up an explanatory model that accounts for the between-person variance in both average personality states as well as in the within-person links between change goal characteristics and states. To that end, model 2 was extended towards a full three-level model (Raudenbush & Bryk, 2002). In this model, variables at the within-person level were considered as outcome variables to examine in how far they vary as a function of variables at the between-person level, that is, importance and success in intimacy and affiliation goals (model 3, see the third and fourth column of Table 15).

The intercepts and fixed effects of the level-2 predictors derived from model 3 were identical to those obtained from model 2 (with only one difference due to rounding for the interaction effect of change goal importance and feasibility; see Table 15). The fixed effects of major life goals (γ_{p01}, γ_{p02}, γ_{p03}, γ_{p04}) indicate the expected difference in mean-level states between two participants who differ by one unit in their importance/success ratings of these goals. As can be seen from Table 15, current success in intimacy and affiliation goals was significantly related to both state neuroticism and state extraversion suggesting that individuals with high success in intimacy and in affiliation goals acted on average in a more extraverted and less neurotic way. With respect to life goal importance, there was only one significant effect of affiliation goals: Individuals striving stronger for affiliation acted on average in a more neurotic and less extraverted way compared to those scoring lower on these goals. This somewhat counterintuitive finding mirrors the results obtained from the long-term latent change analyses described in chapter 2 (see section 2.9.5).

Cross-level interactions effects (γ_{p41}, γ_{p42}) regarding the change goal predictors at level 2 and life goal importance at level 3 are also presented in Table 15. However, only one out of the four hypothesized effects was significant. That is, only importance of intimacy life goals accounted for a substantial amount of the between-person variance in the within-person associations between change goals and personality states. In particular, participants strongly striving for intimacy life goals acted on average more extraverted when perceiving change goals as important and feasible compared to participants striving for intimacy life goals to a lesser extent (see Figure 13).
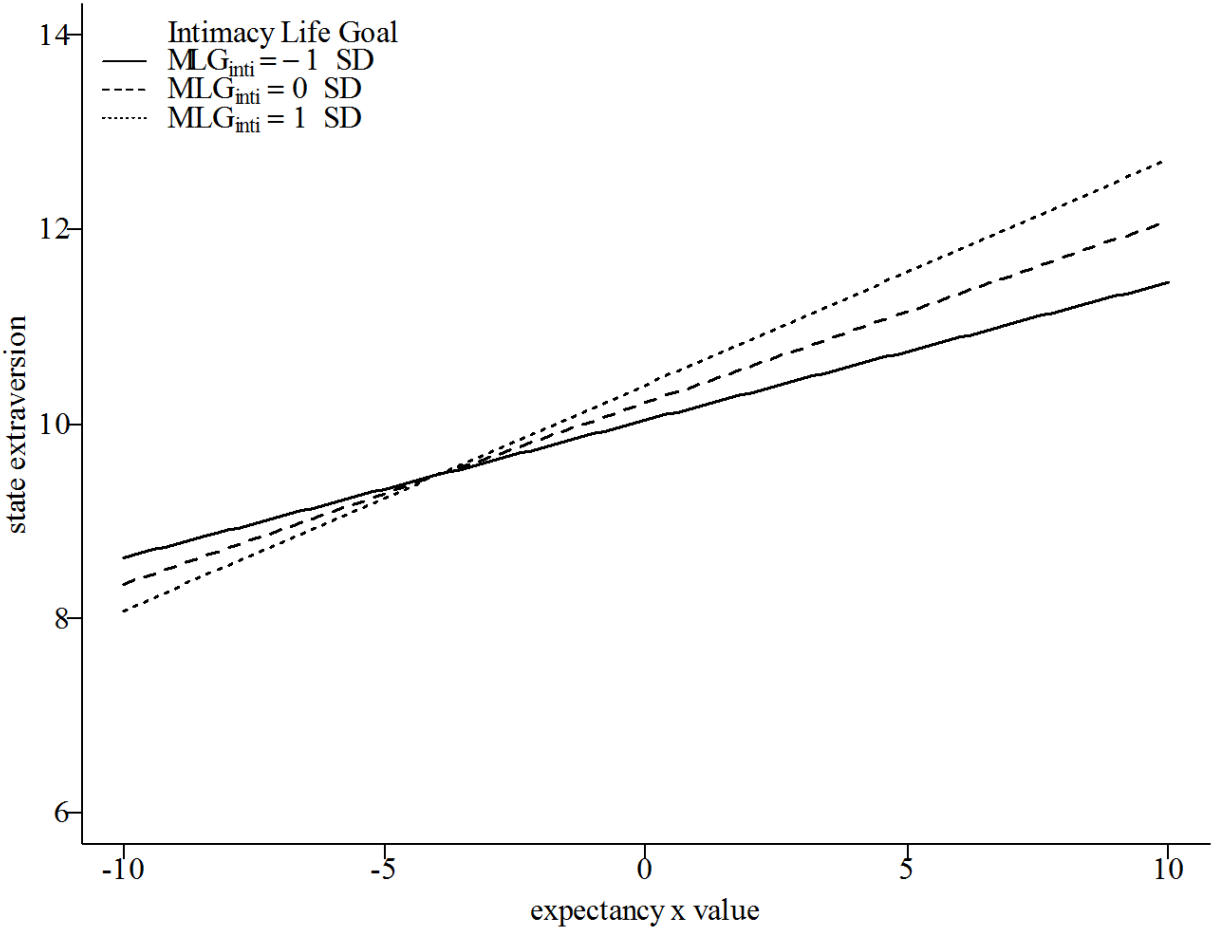
Figure 13. Predicted scores of state extraversion for individuals who were one standard deviation above and one standard deviation below the fixed between-person effect of intimacy goal importance on state extraversion.

The lower part of Table 15 also demonstrates the variance components (i.e., the random effects) of the final three-level model (model 3). Additional variance could only be explained at the between-person level, as this model was solely expanded by including level-3 predictors. Accordingly, only the variance components of the level-3 intercepts (u_{p0k}) had changed compared to model 2. Here, the between-person variances were compared across models 2 and 3 to estimate the Level 3-Pseudo R^2 index (Raudenbush & Bryk, 2002). As can be seen from Table 15, there is a considerable reduction in between-person variance in both personality state scales. In particular, individuals' importance and

success in long-term intimacy and affiliation goals explained 19% and 20% of the between-person variance in the mean-level of state neuroticism and extraversion, respectively.

As there was only one significant cross-level interaction, which was quite small in size, including level-3 predictors did not considerably reduce slope variances (u_{p2k}, u_{p3k}, u_{p4k}). Although intimacy and affiliation goals turned out to be meaningful predictors of average personality states, they hardly helped to explain between-person differences in within-person links between change goals and personality states.

3.7.4 Transactions between personality traits and investment into trait-related behavior

In order to examine the predictive effects of trait-related behavior on short-term mean-level changes in the corresponding traits, latent mean-level change models were estimated for both neuroticism and extraversion (Geiser, 2012). For each of the three experience-sampling waves, the mean value of the behavioral distribution was determined and entered as a manifest predictor in the model.[11] Thus, trait change between the first and second measurement occasion was predicted by those three behavioral means while controlling for the initial trait level.

Measurement models for neuroticism and extraversion fit well and were presented in section 2.9.2. The latent true change models for neuroticism and extraversion showed an excellent fit to the data, χ^2 (21) = 19.20, p = .57, CFI = 1.00, RMSEA = .000, SRMR = .057 and χ^2 (21) = 16.82, p = .72, CFI = 1.00, RMSEA = .000, SRMR = .032, respectively. Regarding mean-level change in neuroticism, both the trait-related behavior before training participation and the behavior after training participation served as effective predictors (Table 16). However, the effects point to different directions: While acting highly neurotic before training participation predicted larger decreases in trait neuroticism across three months, acting highly neurotic after training participation was associated with an increase in trait neuroticism across the same timeframe. With regard to extraversion, similar results were found: The initial trait level negatively predicted subsequent personality trait change suggesting that highly extraverted participants increased in extraversion to a lesser extent than individuals scoring low on extraversion. However, as mentioned in section 2.8.4 and in line with statistical recommendation (e.g., Kandler et al., 2015), I avoided the interpretation of correlations between level and change. Furthermore, acting highly extraverted after training participation was linked with an increase in trait extraversion from time point 1 to time point 2 (Table 16). Taken together, findings

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[11] Predictors in both models were inter-correlated at about r = .60. In order to test for effects of multicollinearity, different variations of the models were also examined (e.g., predicting mean-level change from only one or two behavior means. With respect to neuroticism, results remained stable across the different model variations, while model results for extraversion changed slightly, i.e., the regression weight of the behavior mean of the third experience-sampling wave decreased and failed to reach significance.

correspond with the notion that trait-related behavior is predictive of changes in the corresponding traits across time – while controlling for previous behavior and initial trait levels.

Table 16. Mean-level changes in personality traits predicted by trait-related behavior before, in the middle, and after training participation

	Neuroticism T1 →T2		Extraversion T1 →T2	
	Estimator	p	Estimator	p
Personality trait T1	.02	.89	**-.38**	**.02**
ESM behavior T_1	**-.61**	**.00**	-.19	.30
ESM behavior T_2	-.09	.70	-.28	.17
ESM behavior T_3	**.58**	**.03**	**.75**	**.00**

Note. T1 to T2 represent measurement occasions of the longitudinal study; ESM = experience-sampling method; T_1 to T_3 represent waves of the experience-sampling study. Estimators represent latent standardized regression coefficients. Values in boldface are significant at $p < .05$.

3.8   Discussion

The aim of the present study was to deepen our understanding of the stable and dynamic parts of personality by examining the interplay between neurotic and extraverted personality states, current change goal characteristics, and major life goals in individual's daily lives: Knowledge about both the stable structures as well as the dynamic processes of personality serves as the basis for a comprehensive understanding of personality functioning. In order to bridge the gap between processes and structures of personality, the present study further examined the effectiveness of trait-related behavior in predicting mean-level changes in the corresponding traits.

3.8.1   Personality states as a function of current change goal characteristics

Change goal characteristics turned out to be meaningful predictors of state neuroticism and state extraversion providing support for the assumption that short-term goals represent a relevant aspect of the internal situation for contextualizing personality (e.g., Denissen, Penke, et al., 2013; Heller, Komar, et al., 2007). Providing further support for the 3-SRF (Hennecke et al., 2014), the interaction of high change goal feasibility and importance was related to higher levels of extraverted behavior and lower levels of neurotic behavior: Findings suggest that individuals adapt their trait-related behavior to salient short-term goals, as goal characteristics explained a substantial amount of within-person variability in both extraverted and neurotic personality states. Moreover, these findings complement results from studies on change goals and personality-related behavior: Although change goals turned out to be generally unrelated to average levels of concurrent daily behavior at the between-person level (Hudson & Roberts, 2014), they are – as hypothesized – substantially related to personality states at the within-person level.

However, inconsistent with predictions and different from the findings on goal-related longitudinal trait changes at the between-person level (see chapter 2), high change goal feasibility alone was also associated with lower levels of state neuroticism. Given the present results, it might be reasonable to assume that goal feasibility by itself represents a situational factor for which changes in state neuroticism arise at the within-person level – but not in the long run at the between-person level (cf. findings presented in chapter 2). However, given the correlational nature of the present data, the reverse association is possible as well: Low levels of state neuroticism might enhance the likelihood that individuals perceive their change goals as feasible. For example, it might be possible that individuals who are generally high on neuroticism are also more motivated to pursue the goal to enhance their Emotional Stability (e.g., Baumeister, 1994; Kiecolt, 1994), while thinking about this change goal might in turn influence the trait-related behavior shown in this internal situation. These reciprocal processes are interpretable in line with the corresponsive principle (Roberts & Wood,

2006; see section 1.3) which states that individuals select and create environments that are associated with their personality (for empirical support see e.g., Wrzus, Wagner, & Riediger, in press), while the subsequent environmental experiences in turn influence especially those personality characteristics that had led individuals to those experiences in the first place. In the present study, the current change goal characteristics represent a part of the internal "environment" (i.e., of the internal situation comprising an individual's feelings, thoughts, motivation etc.). Thus, as proposed by the corresponsive principle, characteristics of the environment do not affect individuals randomly, but people rather seem to build up and adapt their internal and external experiences in line with their personality (Mischel & Shoda, 1995).

The degree of universality of the described within-person relations between change goals and personality states was a further concern of the present study. As hypothesized and providing further support for interactionist approaches to personality functioning (Fleeson, 2007; Magnusson & Endler, 1977; Mischel & Shoda, 1995, 1999), within-person links turned out to be not universal, but differed significantly between participants. Clearly recognizable from the "spaghetti plots" that demonstrate the within-person links for each person separately (Figure 11 and 12), there were participants who increase in state extraversion but also some participants who decrease in state extraversion when perceiving change goals as important and feasible. In contrast to social role contexts, short-term change goals represent a more specific and psychological situational feature (Heller, Komar, et al., 2007). Nonetheless, there is still substantial variance in the within-person links between change goals and personality states pointing to possible differences in how people interpret and evaluate internal goal representations and also in how they react to perceived goal characteristics. As proposed by the interactionist approaches (e.g., Fleeson, 2007), the present results highlight that an individual's behavior – even in a given internal situation – is a function of both the individual itself and the way the individual reacts to this internal situation.

3.8.2 Major life goals and personality states

Having established meaningful differences in the within-person links between change goals and personality states, the question remains *why* individuals differ in these contingencies. That is, why do some people flexibly adjust their personality states according to their perceived goal characteristics while others remain more or less stable? In the present analyses, major life goals were incorporated to examine whether they serve as relevant determinants of the within-person links between change goals and personality states and of average personality states. Mental representations of life goal-associated outcomes were assumed to guide individuals' behavior while pursuing life goals. Thus, participants were expected to adjust their trait-related behavior more or less flexibly toward the accomplishment of their relevant life goals. Furthermore, relations between life goals and personality

states were hypothesized to largely mirror the associations shown by previous research (e.g., Lüdtke et al., 2009; Roberts & Robins, 2000; Roberts et al., 2004). In fact, individuals' success in intimacy and affiliation goals proved as meaningful predictors of between-differences in mean-levels of both neurotic and extraverted personality states and associations actually mirrored goal-personality relations that had been previously demonstrated (e.g., Lüdtke et al., 2009; Roberts et al., 2004).

Consistent with predictions, individuals with high success in reaching their intimacy and affiliation life goals acted in an increased extraverted and decreased neurotic way. Reflecting findings from the longitudinal relationship between life goals and personality trait change as examined in chapter 2, importance of affiliation goals turned out to be a positive predictor of average neurotic states and a negative predictor of average extraverted states. At first glance, this result seems counterintuitive as affiliation goals were assumed to underlie the personal change goals and exert influence in the same way as intimacy life goals. However, as this finding pertains to the between-person level of analyses, the same post-hoc explanation as for the longitudinal between-person link between affiliation goals and personality can be applied here (see section 2.10.3): The parallel existence of reserved behavioral patterns on the one hand (i.e., the social anxious sample), and a strong motive to have *lots of* friends and acquaintances on the other hand (i.e., the affiliation motive), might produce high psychological pressure which in turn triggers high levels of state neuroticism and low levels of extraversion. Altogether, long-term strivings to shape one's life seem to convey a person's average trait-related behavior across different levels of change goal salience. This finding is compatible with the understanding of individuals as active agents of their own development who do not merely react to internal or external stimuli but rather shape their lives proactively (e.g., Brandtstädter, 2006; Mischel & Shoda, 1995).

While both intimacy and achievement goals turned out to be substantial predictors of average personality states, only importance of intimacy goals effectively helped to explain between-person differences in the within-person association between change goals and personality states. Although this effect was rather small, it demonstrated that the positive link between change goal importance and feasibility was intensified for those individuals with high strivings for intimacy (e.g., having deep and confident relationships, giving affection to someone). This finding supports the assumption that life goals underlying specific change goals might have an intensifying effect on the within-person link in the sense that individuals highly striving for underlying life goals are prepared to invest even more behavioral efforts to reach their change goals. Furthermore, the present result is in line with previous research suggesting that goal attainment may be facilitated in case of congruence between personal goals and broad motives as goal-motive congruence seems to be associated with "motivational relining" of goal-related behavior (e.g., Brunstein & Maier, 2005; Brunstein, Schultheiss, &

Grässmann, 1998). However, only one of the four hypothesized moderating effects of major life goals was found in the present study. To explain the missing cross-level effects of major life goals in her experience-sampling study, Bleidorn (2009) pointed out that life goals are possibly defined at a contentual level that is too broad and abstract to account for between-person differences in within-person contingencies effectively: More specific and contextualized goals might be more effective predictors of varying within-person links. Thus, future studies might focus on more specific and contextually embedded goals or reference values as possible moderators of within-person relations.

3.8.3 Transactions between personality traits and investment into trait-related behavior

As expected, individuals who changed their trait-related behavior during the course of active investment in change goals and acted more in line with their goals at the end of this phase showed substantial corresponding trait changes across the three months. In particular, controlling for previous behavior, individuals who acted less neurotic at the end of the three-month period decreased in trait neuroticism, whereas individuals who acted more extraverted at the end of this period increased in trait extraversion. Thus, it seems justifiable to conclude that consistently shown self-regulated behavioral changes go hand in hand with personality trait changes. This finding is in line with the sociogenomic model of personality (Roberts & Jackson, 2008) and other bottom-up approaches (e.g., Caspi & Moffitt, 1993) proposing that personality development is likely to start with changes in behavior. Typically, these behavioral changes are initialized by situations (e.g. major transitions in life such as graduation from school) or personal goals in which individuals start to invest. The present findings have implications for theoretical approaches dealing with the question how internal and external driving factors of personality development exert their influence. As expected, personal change goals involving clear behavioral demands proved to have the potential to initialize self-regulated changes in trait-related behavior. If consistently shown across time and situation (i.e., if generalized across time and contexts), the behavioral changes will result in personality trait changes (see also 3-SRF, Hennecke et al., 2014). The results further imply that change goals do not affect personality traits directly but rather exert influence on an individual's behavior, feelings, and thoughts (Roberts, 2009). Previous work suggests that this change process usually occurs in a slow, incremental fashion (e.g., Hennecke et al., 2014; Roberts et al., 2008). However, in the present study the change process might have been accelerated due to the fact that a distinct period of active and deliberate goal investment was examined and that the GSK training made behavior change strategies available to the participants.

3.8.4   Limitations and future directions

The current study employed an innovative and ecologically valid experience-sampling design in conjunction with state-of-the-art statistical techniques to examine both within- and between-person relations among personality states, current change goals, and major life goals. However, although the study has a number of strengths, the findings must still be interpreted against the background of some important limitations. First, as already noted above, the multilevel analyses identified concurrent relations only and are not able to inform causal conclusions about change goal characteristics, personality states and major life goals. Although there might be theoretical reasons to assume that goals influence behaviors, future studies are needed to establish causal relations between momentary change goal characteristics and personality states. To this end, Fleeson (2007) suggested to combine experimental designs with experience-sampling studies (e.g. McNiel & Fleeson, 2006; McNiel, Lowman, & Fleeson, 2010). For instance, state levels of change goal characteristics could be manipulated to examine whether manifestations of these goal characteristics cause increases in goal-related behavior.

Second, despite the intended focus of the present research was on change goal characteristics as proposed by the 3-SRF and major life goals, it is evident that personality states are caused by a plethora of varying sources beyond personal goals, such as social roles a person is occupying at the moment or internal physiological processes (e.g., Fleeson, 2007). Undoubtedly, there are also stable aspects of personality other than life goals which might modify the way how individuals react to internal or external environmental contexts. My study might encourage further research on other variables determining fluctuation in personality states to add to the overall picture in what drives within-person variation in personality-related behavior.

Other points are related to the sample and measurement. As already discussed above with respect to the longitudinal study, the present sample was relatively small and consisted of highly educated individuals reducing the generalizability of effects. To bolster the robustness of the present findings, future studies are needed with more representative samples.

Furthermore, employing only self-reports of change goals and personality states produces possible limitations to the present results: Ratings might have been affected by social desirability. However, both within- and between-person variability was large on all measures, suggesting that participants were usually willing to concede being unconfident, irritable, or withdrawn, for example. A low degree of within-person variability would have been an indicator of socially desirable answering and was in contrast to one of the basic hypotheses of the present research. Nonetheless, it would be valuable to make usage of other methods in experience-sampling studies such as other reports (e.g., Bleidorn &

Peters, 2011) or observational methods as they can lead to divergent conclusions. Although goals to change oneself must necessarily be self-reported, future studies should correlate change goal characteristics with observer-reports of personality-related behavior over time. For example, research using cameras to provide objective information on individuals' location and context has just started and holds promise for the field's understanding of personality processes in everyday life (for an overview of methods and technologies for behavioral observation of personality processes see Wrzus & Mehl, 2015).

3.9 Conclusion

The present research employed a flexible way to examine relations between goals and personality traits at both the within- and between-person level of personality simultaneously: Personality structures and processes were integrated into one research design and were studied "as two interrelated sides of the same behavior-producing system" (Bleidorn, 2009, p. 527). Within-person changes in personality-related behavior were partly contingent on a person's change goals pointing to the relevance of personal change goals as active and meaningful psychological ingredients of situations. At the same time, the average levels of personality states were accounted for by major life goals. Preliminary evidence was found for life goals moderating the within-person links between change goals and personality states. Furthermore, results provided support for the hypothesis that "personality states serve as a bridge to understanding how traits change over time" (Heller et al., 2009, p. 175). Pointing to a bottom-up process of personality change, short-term personality trait changes were closely related to changes in personality-related behavior. That is, self-regulated personality trait change is likely to start with behavioral changes in response to change goal demands. The current study might encourage future research on the interplay between personality structures and processes providing further insights into the complex mechanisms underlying personality functioning and development.

4. General discussion and future directions

The overall aim of this dissertation was to provide a comprehensive perspective on personality and change goal dynamics during a period of active investment into self-regulated personality trait change. This purpose was accomplished with two studies that each pursued complementary aspects of the overall aim of this research. Addressing different types of personality trait change from different temporal perspectives and capitalizing on different analytical strategies, the present dissertation merges long- and short-term perspectives on personality stability and change, thereby permitting the analyses of "macro-micro linkages" (Mroczek et al., 2006, p. 173) and providing insight into how micro-level change (i.e., short-term variation in states) and macro-level change (long-term change in traits) are related; and how structures influence processes and how processes in turn influence structures.

Findings from the present research suggest that motivational processes constitute a relevant driving force in explaining stability and change in personality traits. While confirming that biological and social and environmental factors are likely causes of personality change, the present findings also point to the active role of individuals with respect to their development and delivers explanations for how they proactively shape their own personalities. This micro- and macro-level investigation of intentional personality trait change raises some theoretical and practical implications that will be discussed in the following two sections.

4.1 Explaining normative changes in personality traits

The present work explicitly focused on individuals' deliberate goals to change aspects of their personality, which Hudson and Roberts (2014) conceptualized as "goals to change oneself". To this end, I examined adult individuals who participated in a standardized training program intended to help people change their behaviors and habits related to social competencies. Drawing on propositions from the SRT (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013), my study focused on a *specific* kind of reference values (i.e., goals to change oneself) within a *specific* context facilitating and supporting trait change (i.e., an intervention designed to promote sustaining behavioral changes). Although findings from this thesis might suggest that – with respect to lifespan personality development – individuals may be able to intentionally change their personality traits, what has still to be tested in future studies is whether the normative increases in Emotional Stability, agreeableness, and conscientiousness across the life course (e.g., Lucas & Donnellan, 2011; Roberts et al., 2006) are partially driven by individuals' goals to improve in those traits and by their active investments into the attainment of these change goals. Understanding motivational and self-regulatory driving factors of normative personality trait development ideally requires research

tracking both personality traits and change goals longitudinally over long time periods. However, cross-sectional designs can also be fruitfully used to test this idea: Previous research has shown, for instance, that openness to Experiences follows an inverse U-shaped function; that is, increasing in emerging adulthood and decreasing in older adulthood (e.g., Lucas & Donnellan, 2011; Specht et al., 2011). If personality trait development actually follows change goals, one might assume that young adults report goals to enhance their levels of openness to Experiences; and, furthermore, that these goals become less important in the years before the normative decline in openness (Hudson & Fraley, 2015).

It should be pointed out that change goals are only one kind of possible reference values that have been proposed to guide developmental trends: Motives, needs, preferences, values, or norms are also expected to serve as reference values (Denissen, Penke, et al., 2013). It seems fair to assume that different kinds of reference values exert their influence at different stages in life. For instance, *social norms* might be more relevant as developmental guidelines for traits in young adulthood than in older age when the personal network and the friendship network decrease (Wrzus, Hänel, Wagner, & Neyer, 2013), and individuals set less value on "jumping through hoops" for others, whereas *deliberate goals to change oneself* might not be tied to a specific age but rather to periods of the perceived dissatisfaction of individuals with certain aspects of their lives (e.g., Hudson & Roberts, 2014; Kiecolt, 1994). Thus, future longitudinal studies on self-regulated personality development should employ explicit measurement of different kinds of reference values and examine different periods across the lifespan.

Recent studies have shown that goals to change oneself are highly prevalent (e.g., Hudson & Fraley, 2015; Hudson & Roberts, 2014) – however, despite these pervasive desires to change, on average personality remains relatively stable. Concluding from these findings, I argue that the existence of change goals per se does not initiate personality trait changes. Rather, change goals are assumed to exert their behavior-guiding influence when they are "activated" (i.e., they are considered important and feasible). Hudson and Roberts (2014) assessed change goals in a nomothetic way in which participants rated how much they desire to decrease, increase or remain stable in extraversion, for example. Social desirability might distort such self-reports in that people might think that it is always a good thing in contemporary society to improve and optimize oneself. The majority of people might thus endorse personal change goals when they are asked about those goals, but it seems reasonable to assume that they are only activated (i.e., become personally important) in times of dissatisfaction – and when people ascribe this dissatisfaction to their existing levels of personality traits. It seems therefore unlikely that activated change goals trigger *normative* trends in personality development: In contrast to major life transitions which most individuals face within certain timeframes throughout

their lifespan, the timeframes where change goals are actually activated are highly specific to individuals resulting in large inter-individual differences in points of time when change goals turn into active elements that drive trait changes. However, one could also ask the question of where dissatisfaction with certain domains of life originates. Following this train of thought, it seems justifiable to deduce that dissatisfaction – especially at transitional periods across the lifespan – results from normative social role expectations and demands that have been adopted by an individual (i.e., transformed into a personal goal), but which the individual fails to meet. As a result of this normative-actual discrepancy, the person might develop the goal to change herself/himself in order to better meet the new role demands (e.g., become more conscientious when entering work life; see also Denissen, Penke, et al., 2013). In this sense, the commitment to change goals might be systematically connected to transitional periods associated with normative social expectations. Change goals possibly serve as a process that mediates the effects of role demands on normative personality trait change. Even so, future studies have to test the mediation of role change goals through the longitudinal tracking of role expectations, personal change goals, and personality traits – ideally before, during and after transitional periods.

However, regardless of whether change goals actually serve as factors driving normative trait development, the odds are that other sorts of reference values may trigger normative developmental trends. Social and cultural expectations, for example, have already been proven as reference values that exert influence on normative personality development through the social roles that the majority of people occupy throughout their lives (e.g., entering work life, engaging in the first romantic relationship; e.g., Neyer & Lehnart, 2007; Roberts, Caspi & Moffitt, 2003). Comparing change goals and social role expectations, one might argue that role expectations are somewhat less explicit and conscious than personal change goals. However, unconscious reference values such as implicit motives (e.g., McClelland et al., 1989) may also have an effect on personality trait changes. Previous longitudinal research has demonstrated that implicit motives and personality traits interact across the life course to predict behavior and life outcomes (e.g., Winter, John, Stewart, Klohnen, & Duncan, 1998), which in turn might affect the development of personality traits. Furthermore, not only unconscious reference values should be taken into account in future studies: Self-regulation can also be driven by both deliberate and conscious as well as unconscious and automatic processes (e.g., Koole & Rothermund, 2011; Mauss et al., 2007). Future research on self-regulated personality development would gain from considering different sorts of reference values and different sorts of self-regulation processes (cf. research on emotion regulation; Mauss et al., 2007).

To sum up, future research examining normative personality trait change would benefit from longitudinal studies tracking personality traits as well as explicit and implicit measures of different

kinds of reference values and self-regulation mechanisms across several years. Examination will be particularly rewarding during periods at which these constructs undergo meaningful changes. Beyond longitudinal studies, cross-cultural studies represent a promising way to address the question to what degree normative personality trait change involves intentional components: Cultures differ in how desirable they deem certain traits (or the expression of these traits) and in how far they consider personality change feasible. Intentional self-regulated personality change is assumed to depict a trajectory that is generally considered desirable within a culture (see Bleidorn, Klimstra, Denissen, Rentfrow, Potter & Gosling, 2013). Findings from the studies described above will help to respond to the call formulated by Specht and colleagues (2014): Integrating biological and social/environmental perspectives with ideas put forward by perspectives focusing on specific aspects of personality development (e.g., time, role scripts, and also the active involvement of individuals in their own development) into a comprehensive theory is a seminal way to explain why personality develops the way it does. Thus, one of the central challenges of the field is to explicate an integrative theory that is "as specific as possible in terms of for whom, when and in which situations different proposed developmental processes are expected" (Specht et al., 2014, p. 227).

Drawing on previous research and findings from the present study, Figure 14 illustrates an attempt to integrate the proposed driving factors and mechanisms into one model of personality trait development.
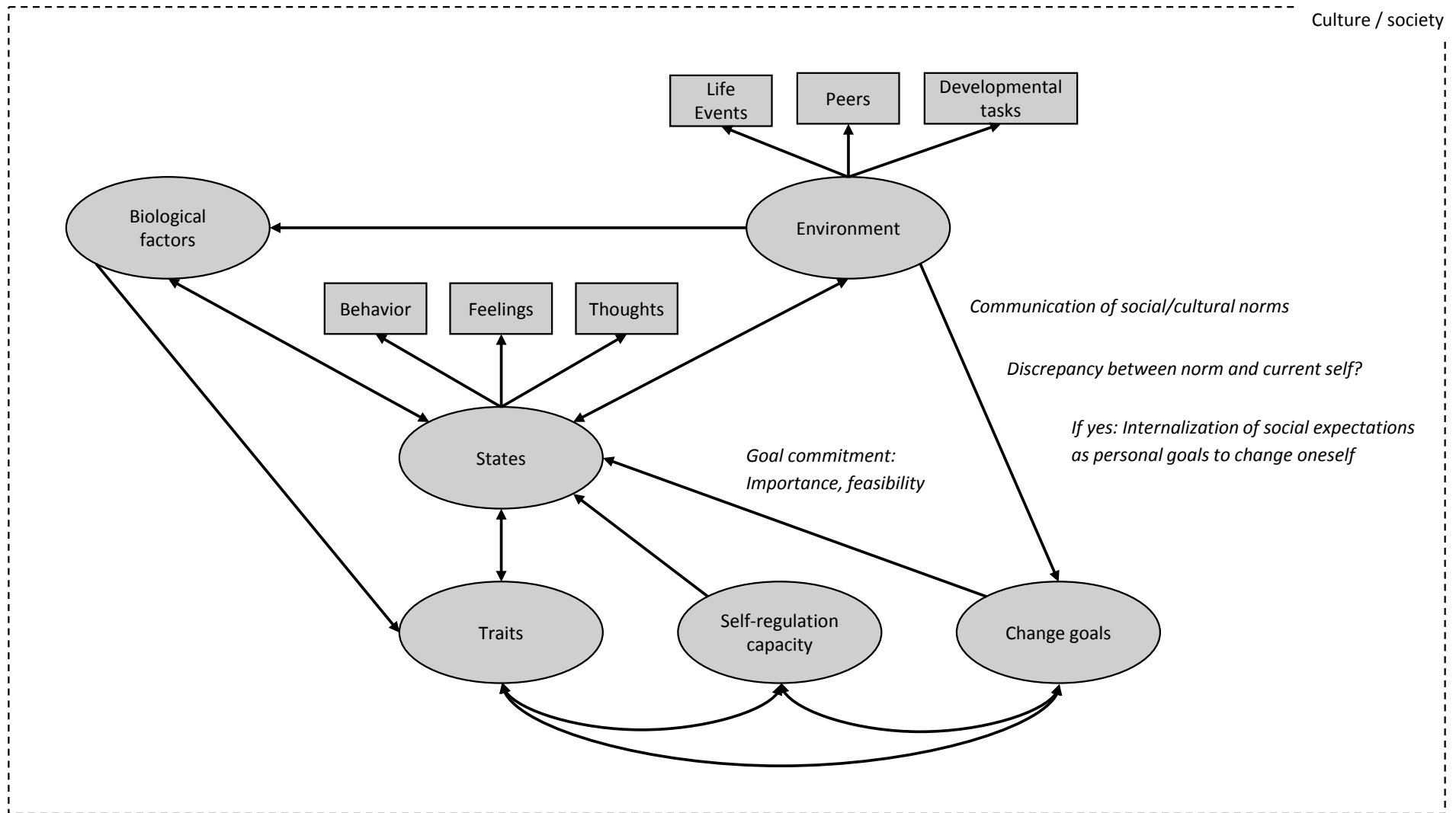
Figure 14. Factors and mechanisms driving personality trait development. The left part of the model integrates the sociogenomic model of personality, adapted from Roberts, 2009.

Note. Mechanisms are printed in italics.

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4.2   Can interventions help individuals change their personality traits?

The present research was not intended to examine the effectiveness of the GSK training intervention in altering levels of personality traits – nonetheless, the question arises whether the intervention employed helped participants change their personality traits, and if so, more specifically which parts of the intervention were effective. Although theoretical arguments speak for the fact that the GSK training helps to promote trait changes, the present findings do not allow conclusions regarding this question due to the lack of a control group condition.

However, the idea that personality traits may be changed trough interventions has attracted increasing theoretical and empirical interest (e.g., Hudson & Fraley, 2015; Jackson, Hill, et al., 2012; Magidson et al., 2014). The possibility of deliberately changing specific personality traits seems to provide benefits for individuals and society alike. On the individual level, consistently changing one's personality traits might reduce psychological stress and dissatisfaction in certain domains of life (Hudson & Roberts, 2014; Kiecolt, 1994). For example, individuals who are dissatisfied with their social lives might think that increased levels of extraversion would alleviate their social worries. Accordingly, they might formulate goals to become more extraverted (Hudson & Roberts, 2014). On the level of society, this perspective offers, for example, promising public health implications: Personality traits closely related to health behaviors (e.g., conscientiousness) may be modified with interventions promoting changes in related behaviors that become automated over time (e.g., Denford et al., 2015; Magidson et al., 2014).

To date, there have been relatively few empirical efforts to examine how much personality traits can be altered through active efforts and interventions and how interventions should be ideally designed to catalyze consistent trait changes. However, some empirical studies investigated how interventions can affect the development of individuals' personality traits – independently of their desires to change themselves – and demonstrated that personality traits can be effectively modified using interventions (e.g., Clark et al., 2003; De Fruyt, van Leeuwen, Bagby, Rolland, & Rouillon, 2006; Gi et al., 2010; Jackson, Hill, et al., 2012; Krasner et al., 2009; Tang et al., 2009). For example, during a 20-week cognitive behavior therapy intervention intended to treat depression participants experienced substantial changes in neuroticism and extraversion (Clark et al., 2003). Another study found that a cognitive training intervention for older people (including tasks on inductive reasoning, crosswords and Sudokus) helped to increase participants' levels of openness to Experience compared with a control group (Jackson, Hill, et al., 2012). Most recent findings from Hudson and Fraley (2015) suggest that the efficacy of interventions aimed at changing personality traits could be enhanced by working to align participants' change goals with the intended goals of the intervention program. With respect to the present study, post-hoc content ratings of participants' idiographically assessed

change goals showed that training goals and change goals of participants were fairly well aligned, which might have augmented the efficacy of the GSK training in altering neuroticism and extraversion. However, this explanation is only speculative and future studies should explore whether participants' change goals mediate or moderate the efficacy of interventions such as the GSK training program.

As discussed above, accumulated evidence suggests that interventions are indeed helpful in promoting personality trait changes. However, what are the decisive elements and processes of these interventions that initiate trait changes and how do they work? Magidson and colleagues (2014) have proposed a theoretical bottom-up framework for altering personality traits suggesting that personality can be modified by targeting behaviors that characterize specific personality traits. Although these targeted behavioral changes are at first effortful and resource demanding, they may become automatized over time. If the newly learnt behaviors are consistently shown and generalize across time and situations, they will ultimately manifest in trait-level changes. A similar rationale for promoting sustainable behavioral changes underlies the "science of individual behavior change" (Denford et al., 2015, p. 151). This research area aims at designing, evaluating, and implementing behavior-change interventions to prevent illness and sustain health. It seems fruitful to transfer empirical findings and testable ideas from this scientific area to the personality-change domain in order to develop testable interventions to alter personality traits in a bottom-up fashion. In doing so, the information, motivation, and behavioral skill (IBM) model (Fisher & Fisher, 1992) proposes that changes in behavior are most likely when individuals are well informed about how the target behavior is performed, are highly motivated to change their behavior, and have the skills that are required to perform the new behavior.

Reflecting the three elements of this model, it becomes obvious that they closely resemble the preconditions for trait change as formulated in the 3-SRF (Hennecke et al., 2014): *Motivation* is incorporated as change goal importance within the 3-SRF, while both *information* and *skills* are subsumed under the (perceived) *feasibility* of the new behavior. The IBM model points out that it is not always necessary to target information, motivation, and skills within one intervention – especially so, if a behavior is easy to perform (i.e., the individual has the skills to perform this behavior; Denford et al., 2015) as it might be common in personality-related behaviors. Furthermore, research on individual behavior change demonstrated that information about the target behavior is a core element of behavior-change practice, but may not be sufficient to prompt behavioral changes (Abraham & Kools, 2012) – an empirical finding that is consistent with predictions from the 3-SRF.

As a general strategy to develop behavior-change interventions, it has been recommended to identify the determinants or regulatory processes that are important for the target behavior within

the contexts in which the behavior is usually performed (Abraham, 2014; Denford et al., 2015). Mapping out these processes may require the specification of many different processes or mechanisms described by different psychosocial theories and models. In this, *if-then*-planning, for example, has been identified as an effective change technique that increases weight loss in motivated people (Luszczynska, Sobczyk, & Abraham, 2007). Supporting the idea of drawing on findings from research in individual behavior change, the first study in the personality domain that tested two interventions to help participants attain their desired trait changes identified *if-then* implementation intentions (e.g., "If I feel upset by something my friends say, I will tell them how I feel"; Gollwitzer & Brandstätter, 1997) as an effective change technique that maximizes the amount of trait change in the desired direction (Hudson & Fraley, 2015).

From their functional perspective on personality, Wood and Denissen (2015) suggest that "perhaps the single most important route to increasing levels of a behavioral or psychological trait is increasing the extent to which the individual finds the behavioral tendency desirable or valuable" (p. 102; see also DiClemente & Prochaska, 1998). To further specify this rather general change strategy, the model developed by Fishbein and colleagues (2001) might be a useful framework as it identifies five modifiable determinants of change motivation that can be built up and strengthened by a wide range of intervention techniques. It is proposed that change motivation is likely to be stronger when (1) individuals think that advantages of changing behavior outweigh the disadvantages, (2) they anticipate feeling good or satisfied about having acted in a changed way, (3) they feel social pressure to change their behavior, (4) the changed behavior is in line with their self-image, and (5) when individuals perceive high self-efficacy (i.e., they feel capable of changing their behavior). Thus, the development of interventions to enhance the desirability of trait-related behavioral tendencies (cf. Wood & Denissen, 2015) might benefit from addressing these factors and from examining the effectiveness of the related change techniques concerning the personality trait domain.

However, as already mentioned, it seems unlikely that consistent changes in trait-related behaviors only require setting new goals and being motivated to change behavioral patterns (Hennecke et al., 2014). Breaking old habits and forming new ones is expected to be crucial to consistent behavior-changes (e.g., Denford et al., 2015). Breaking habits implies consciously recognizing contexts in which undesired behaviors are likely to occur and either avoiding these contexts or practicing new behavioral responses in these situations. That is, to break their habits, people have to prepare and practice new cognitive, emotional, and behavioral responses that counteract or weaken the established habits. This, in turn, requires effective self-monitoring, identification of impulses, conscious behavior planning, and rehearsal of new thought patterns and behavioral routines. Thus, reacting differently to everyday situations and prompts likely involves regulatory processes that go

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far beyond the simple setting of goals to change oneself. Therefore, effective interventions that help people change their traits should enhance people's self-regulatory capacity. As suggested by the 3-SRF (Hennecke et al., 2014), new behavioral patterns are more likely to be sustained (i.e. form a new habit) if they become automatically triggered by environmental cues in everyday life and can thus be performed without effortful conscious control (e.g., Verplanken, 2006). Yet, it should be pointed out that not all individuals can reach the same level of self-regulational capacity – if they "only practice enough". For example, research on the development of self-regulation capacity in childhood demonstrated meaningful genetic influences on self-regulation through robust gene-environment interactions between genetic risk and the quality of early relationships (Kochanska, Philibert, & Barry, 2009).

In summary, several studies support the assumption that personality traits may be altered through targeted interventions. However, little empirical knowledge exists about *how* these interventions induce and promote consistent trait changes. In personality psychology, first evidence recently suggested that the efficacy of trait interventions can be enhanced by explicitly drawing on individuals' change goals and by building up or enhancing their motivation to change. To systematically explore the preconditions and processes that guide personality trait changes through interventions, it seems worthwhile for personality psychology to team up with research on individual behavior change and also clinical and psychotherapy research. Given the promise of therapeutically addressing temperamental vulnerabilities such as neuroticism, for example, there has been scientific effort to design a cognitive behavioral intervention to address core trait-related processes in emotional disorders (Barlow et al., 2011). With respect to the personality domain, intervention studies that manipulate both the desirability and the perceived feasibility of trait change in combination with a control-group design would provide a strong way to examine processes of self-regulated trait change. A waiting control group could be offered the same intervention with some temporal delay to separate the effects of time from actual intervention effects. Knowledge about change techniques and how to effectively manipulate motivation and/or perceived feasibility can be transferred from clinical and individual behavior change research.

Future research on personality trait change would profit from capitalizing on intervention studies employing well-designed intervention elements that allow for the distinction of the separate effects of different intentional change processes (e.g., if-then-implementations, building up self-efficacy, practicing regulation skills, modifying maladaptive change goals). Studies to examine the efficacy of specific interventions to change personality traits are rare by now. However, as discussed above, interventions studies provide a valuable and likewise efficient tool for researchers interested in personality change *processes* – for the reason alone that change processes occur in an accelerated

way within a pre-defined time span. The present study demonstrated the short-term changeability of personality traits and suggests that interventions may help facilitating those changes. I argue that further intervention studies are needed to test the efficacy of non-clinical psychological interventions for intentional personality change over relatively short periods of time. Given that those novel interventions prove effective, they could be implemented in various non-clinical settings and could reach large numbers of people due to their low-threshold character (e.g., compared to psychotherapy) and their web-based availability.

5.   Conclusion

To conclude, although facing the limitations described above, the present research provides a substantial contribution to our understanding of intentional personality trait development. The first study adopted a macro-perspective on personality trait change and presented evidence from a fine-grained multiple-month longitudinal design suggesting that broad personality traits can and do change across relatively short time periods. Furthermore, change goals and major life goals were identified as differently acting driving factors for those personality trait changes. The second study adopted a micro-perspective and investigated short-term within-person relations between goals and personality in individuals' everyday lives. Change goals turned out to be psychological relevant situational features that guide personality-related behaviors. Furthermore, results suggested that major life goals may even intensify these goal-behavior links. Finally, linking the macro- and micro-perspective on personality trait change, it was demonstrated that personality trait development occurs in a bottom-up fashion and is likely to start with behavioral changes, here in pursuit of goals. An overview of the main findings of the present dissertation is presented in Table 17.

Abstracting from the concrete results and adopting a broader perspective, the overall contribution of the present work may be best summarized by the following two issues. First, although extensive research has already focused on patterns of personality development, especially during transitional periods in life or in the aftermaths of major life events (e.g., Lucas & Donnellan, 2011; Roberts et al. 2006; Specht et al., 2011; Zimmermann & Neyer, 2013), much more research is needed with respect to both theoretical foundations as well as empirical investigations of the processes that might account for personality trait trajectories (e.g., Roberts et al., 2008; Specht et al., 2014). Recently, SRT has been proposed by Denissen and colleagues (Denissen, Penke, et al., 2013; Denissen, van Aken, et al., 2013) and provides a perspective on *how* personality trait changes take place. This perspective suggests that trait changes occur as a consequence of changing reference values. To the best of my knowledge, the present dissertation is one of the first studies (besides Hudson & Fraley, 2015) that explicitly measured personal change goals and examined their influence on personality trait development. This work established intentional and self-regulation components as relevant driving factors for personality trait development that are worth to be considered in future research on mechanisms mediating personality trait changes.

Second, the present dissertation took a first step to merge long- and short-term perspectives on personality stability and change within the same research design, thereby permitting the analyses of macro-micro linkages. That is, within the present design it was possible to address the questions if and how micro-level change (short-term variation in states) and macro-level change (long-term change in traits) were related. An integrative study of both long- and short-term processes in

developmental studies has been called for by Nesselroade and Boker as early as in 1994. In essence, they have suggested the implementation of multiple short-term experience-sampling periods into longitudinal studies across multiple years. Those "measurement burst designs" are capable of capturing short-term within-person variability, long-term developmental patterns as well as inter-individual differences in the patterns of short-term and long-term changes. Hence, my dissertation implemented central aspects of a measurement burst design by combining phases of intensive longitudinal assessment with multiple-months longitudinal trait assessments, and provided support for the assumption that personality trait changes occur in a bottom-up fashion. As far as I know, no previous study in the field of personality trait development has combined state and trait perspectives within the same research design allowing for the examination of dynamic transactions between state and trait functioning of personality.

Taken as a whole, I hope the present dissertation may have contributed to answering two of the broad key questions within personality psychology: What drives adult personality development and how do these driving factors exert their influence?

Table 17. Summary of the main results of the dissertation

Research question	Aim	Finding	Conclusion
Macro-perspective on personality trait development			
Is self-regulated personality trait change possible? (Chapter 2)	To examine whether personality traits do change during a relative short period of goal investment, and …	Personality traits demonstrated substantial mean-level changes across 9 months.	Even broad personality traits are changeable within short time periods.
Are personal goals to change oneself and/or major life goals driving factors for personality trait development? (Chapter 2)	… to test whether personal goals to change oneself and major life goals predict mean-level changes as well as inter-individual differences in trait change.	Personal change goals predicted short-term mean-level changes in neuroticism and extraversion, while major life goals predicted long-term changes in neuroticism. Life goals had an effect on later levels of both neuroticism and extraversion, while traits showed no effect on later levels of life goals.	Personal goals serve as driving factors for personality trait development. The time frame, in which goals influence traits, depends on the hierarchical level on which the goal construct is defined.
Micro-perspective on personality trait development			
Are personal goals to change oneself related to individuals' trait-behavior in daily life and do higher-order goal constructs moderate this association? (Chapter 3)	To investigate whether change goals and individuals' trait-related behavior (i.e., personality states) are associated at an intra-individual level. Furthermore, it was tested whether major life goals produced cross-level effects on the intra-individual association between change goals and behavior.	Change goals that are seen simultaneously as important *and* feasible were positively associated with corresponding trait-related behavior. Moreover, life goals demonstrated small and somewhat inconsistent moderating effects on the within-person relationship between change goals and daily behavior.	Goals to change oneself capture psychologically relevant features of situational settings and thus provide behavioral guidance in situations in which they are "activated". Broader life goals that are line with narrower change goals may even intensify the goal-behavior-link (i.e., change goals may even be more strongly related to corresponding behavior).
Bridging the gap from behavior to traits: Do personality traits change in a bottom-up fashion? (Chapter 3)	To examine whether trait-relevant behavior (i.e. personality states) predict mean-level changes in corresponding personality traits	Averaged trait-relevant behavior at the end of the period of active goal investment predicted mean-level changes in the associated trait (statistically controlled for previous behavior).	In line with bottom-up approaches to personality development, the findings support the general assumption that much of development is likely to start with behavioral changes, e.g., in pursuit of goals.

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7. Appendices

Appendix A: Informed consent and participants' study manual

AE 04 – Arbeitseinheit für Differentielle Psychologie,
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Universität Bielefeld

EINVERSTÄNDNISERKLÄRUNG

Hiermit erkläre ich, Frau/Herr_____, mich bereit, an der Studie „*Prozesse der Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter – Die Rolle persönlicher Ziele*" mittels webbasierter Fragebogenerhebungen während und nach meiner Teilnahme am Gruppentraining sozialer Kompetenzen (GSK) teilzunehmen. Ich bin umfassend über Zweck, Inhalt und Umfang der Studie informiert worden. Die Teilnahme an der Studie ist freiwillig und jederzeit widerrufbar.

Die Studienleiterin (Frau Dipl.-Psych. Anna-Lena Peters) verpflichtet sich, die erhobenen Daten anonym und streng vertraulich zu behandeln und unterliegt diesbezüglich der Schweigepflicht. Selbiges gilt für die im Rahmen der Studie tätigen GSK-TrainerInnen.

Ich bin darüber informiert, dass das GSK durch PsychologInnen mit abgeschlossenem B.Sc. (Bachelor)-Studium durchgeführt wird, die sich aktuell im M.Sc. (Master)-Studiengang Psychologie befinden und sich zuvor unter Anleitung (durch die Studienleiterin Anna-Lena Peters, Dipl.-Psych., Psychologische Psychotherapeutin in Ausbildung) ausführlich mit den Inhalten und der praktischen Durchführung des GSK auseinandergesetzt haben.

Die Teilnahme am Training ist kostenlos. Mit meiner Unterschrift verpflichte ich mich regelmäßig am Gruppentraining teilzunehmen. Sollte ich einen Termin nicht wahrnehmen können, melde ich mich frühestmöglich (spätestens einen Tag vorher) per Mail (gsk@uni-bielefeld.de) oder telefonisch (0521-106-4528) ab.

Ich erkläre mich bereit, dass die Ergebnisse in anonymisierter Form für wissenschaftliche Zwecke verwendet werden.

...., den ....
Ort   Datum   Unterschrift (Studienteilnehmer/in)

Um einen reibungslosen terminlichen Ablauf der Trainings- bzw. Studienteilnahme gewährleisten zu können, hinterlassen Sie uns bitte Ihre Kontaktdaten. Auch diese werden wir natürlich streng vertraulich behandeln und nicht an Dritte weitergeben.

Kontaktdaten (E-Mailadresse und Handynummer)

_____

_____

Universität Bielefeld

Information für Teilnehmer/innen zur Studie

„Prozesse der Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter –

Die Rolle persönlicher Ziele"

Liebe/r Teilnehmer/in,

vielen Dank für Ihr Interesse an der oben genannten Studie der Universität Bielefeld (Arbeitseinheit für Differentielle Psychologie, Persönlichkeitspsychologie und Psychologische Diagnostik) teilzunehmen. Anhand dieses Informationsblattes möchten wir Ihnen das Ziel und den Ablauf der Studie näher erläutern.

Teilnahme:

Die Teilnahme an der Studie ist freiwillig. Sie können jederzeit und ohne Angabe von Gründen Ihre Einwilligung widerrufen, ohne dass dies mit Nachteilen für Sie verbunden wäre. Sollten Sie sich während Ihrer Teilnahme am „Gruppentraining sozialer Kompetenzen" (GSK) für einen Abbruch der Studienteilnahme entscheiden, ist es Ihnen weiterhin möglich, davon unabhängig am Training teilzunehmen.

Alle Daten im Rahmen der Studienteilnahme werden über das webbasierte Softwareprogramm *EFS Survey* erhoben. Die Bestimmungen des Datenschutzes werden eingehalten (s. u. „Datenschutz").

Ziel der Studie:

Persönlichkeitseigenschaften sind nicht so unveränderlich wie die Forschung im Bereich der Persönlichkeitsentwicklung lange Zeit angenommen hat. Bis ins hohe Erwachsenenalter sind Veränderungen der Persönlichkeit möglich und durch Studien nachgewiesen worden. Wenige Erkenntnisse liegen jedoch zu den Prozessen, also der Art und Weise der Persönlichkeitsänderung vor: Wann, wie und warum ändern sich Menschen in ihren Eigenschaften? Welche Faktoren und Bedingungen spielen dabei eine Rolle?

Die genannte Studie verfolgt das Ziel, durch eine längsschnittliche Erhebung kombiniert mit relativ engmaschigen Erhebungsphasen, ebensolche Prozesse der Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter sichtbar zu machen. Damit soll zu einem besseren Verständnis der Mechanismen von Persönlichkeitsänderung beigetragen werden. Im Fokus steht dabei das dynamische Zusammenspiel der Investitionen in individuelle Ziele und der Änderung von Persönlichkeitseigenschaften.

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Ablauf der Studie:

- **Einführungs- und Informationsgespräch**

  Im Anschluss an dieses Gespräch möchten wir Sie bitten, Ihre persönlichen Ziele, die Sie mit Unterstützung des GSK erreichen möchten sowie bestimmte Eigenschaften dieser Ziele (z.B. die Schwierigkeit) zu notieren. Ebenso bitten wir Sie, weiteres Fragebogenmaterial auszufüllen, das Ihre übergeordneten Lebensziele und Ihren Persönlichkeitseigenschaften erfassen soll.

- **„Tagebuchstudien"**

  Vor Trainingsbeginn, in der Mitte Ihrer Trainingsteilnahme sowie nach Abschluss des Trainings erfolgt jeweils eine „tagebuchartige" Befragung über 4 Tage: Während dieser 4 Tage werden Sie 4x täglich zu festen Zeitpunkten (jeweils um 10 Uhr, 12 Uhr, 16 Uhr und 18 Uhr) über ein Smartphone/PDA daran erinnert, Einschätzungen zu Ihren Gedanken, Ihren Gefühlen und Ihrem Verhalten während der letzten Stunde vorzunehmen. Dazu bitten wir Sie, sich diese Termine als Erinnerungen in Ihrem Smartphone-Kalender (falls vorhanden) zu notieren. Sollten Sie kein Smartphone besitzen, werden wir Ihnen für den Studienzeitraum ein PDA bereit stellen. In diesem Falle sind die Termine bereits eingespeichert, sodass Sie mit einem Signalton an die Erhebung erinnert werden. Auf den Beginn der 4-tägigen Erhebungszeiträume werden Sie einen Tag vorher per SMS aufmerksam gemacht.

  Während der Tagebuchphase: Bitte beginnen Sie mit den Einschätzungen unmittelbar nach der Aufforderung; Sie haben nach der Aufforderung maximal eine Stunde Zeit, um mit den Einschätzungen zu beginnen. Wenn Sie eine Befragung verpassen (d.h. seit der Aufforderung zur Tagebuchstudie ist mehr als eine Stunde vergangen), fahren Sie zum nächsten Zeitpunkt wie gewohnt mit der Befragung fort. Um dennoch auf die erforderliche Anzahl an Messzeitpunkten zu kommen (mind. 16) verlängern Sie bitte Ihren Teilnahmezeitraum entsprechend (z.B. die Befragung am 5. Tag einfach fortführen). Die Einschätzungen können Sie direkt online über Ihr Smartphone (alternativ auch am PC) über folgenden Link vornehmen:

  <div align="center">

  http://ww3.unipark.de/uc/gsk1

  </div>

Zur Einschätzung Ihres Verhaltens stehen Ihnen Adjektiv-Skalen zur Verfügung:

Ein Beispiel:					
Wenn Sie Ihr Verhalten während der letzten Stunde als sehr höflich einschätzen, sollten Sie die -2 wählen					
höflich (-) oder unhöflich (+)	☒	-1	0	+1	+2
Wenn Sie Ihr Verhalten während der letzten Stunde als eher unhöflich einschätzen, sollten Sie die +1 wählen					
höflich (-) oder unhöflich (+)	-2	-1	0	☒	+2
Wenn Ihr Verhalten weder höflich noch unhöflich war, wählen Sie die 0					
höflich (-) oder unhöflich (+)	-2	-1	☒	+1	+2

Universität Bielefeld

- **Abschlussgespräch:**

  Nach Beendigung des Trainings erfolgt ein Abschlussgespräch als Einzelsitzung, in dem Sie die Möglichkeit haben, Ihren Trainingserfolg auszuwerten. Hier bitten wir Sie, die Fragebögen zu Ihren Lebenszielen und Persönlichkeitseigenschaften, die Sie bereits aus dem Einführungsgespräch kennen, ein zweites Mal auszufüllen.

- **„Follow-up"-Erhebungen**

  Nach Ihrem Abschlussgespräch möchten wir Sie bitten, für zwei weitere „Follow-up"-Erhebungen (3 Monate und 6 Monate nach Trainingsabschluss) an der Studie teilzunehmen. Zu beiden Messzeitpunkten gilt es ein weiteres Mal Einschätzungen zu Ihren Lebenszielen und Persönlichkeitseigenschaften vorzunehmen. Das Fragebogenmaterial dazu können Sie bequem online ausfüllen: Einen entsprechenden Link zur Studie mit der Erinnerung zur Teilnahme lassen wir Ihnen per Mail zukommen.

Zur besseren Übersicht folgt auf der letzten Seite eine zeitliche Übersicht des Studienverlaufs.

Information zum „Gruppentraining sozialer Kompetenzen" (Hinsch & Pfingsten, 2007)

Das GSK ist ein kognitiv-verhaltenstherapeutisches Gruppen-Programm, das in den letzten Jahren aufgrund seiner effektiven Wirksamkeit zunehmende Verbreitung gefunden hat. Das GSK richtet sich an selbstunsichere und sozial ängstliche Personen, bei denen andauernde Schwierigkeiten beim Bewältigen sozialer Alltagsaufgaben vorliegen, die das Berufs- und/oder das Privatleben der Personen beeinträchtigen. Es vermittelt unter Rückgriff auf Kleingruppenarbeit mit Rollenspieltechniken und Videofeedback sozial kompetentes Verhalten vornehmlich in den Bereichen

- formale Rechte und Interessen durchsetzen
- eigene Bedürfnisse, Gefühle und Interessen in enge persönliche Beziehungen einbringen (v.a. Lebenspartner, Familie, Freunde)
- Kontakte zu unbekannten Personen aufnehmen („Schüchternheit", Kontaktprobleme).

Es beinhaltet Trainingselemente auf kognitiver, emotionaler und motorischer Ebene und folgt mit 7 Sitzungen à 2 ½ Stunden einem klar strukturierten und transparenten Aufbau.

Die Wirksamkeit des Trainings ist in mehreren Studien nachgewiesen worden. Bei den im Manual berichteten Effektivitätsstudien gab es keine Trainingsgruppen, bei denen kein Effekt oder eine Verschlechterung festgestellt werden konnte.

Datenschutz:

Die Bestimmungen des Datenschutzes werden eingehalten. Alle Studienergebnisse werden streng vertraulich behandelt und in anonymisierter Form aufbewahrt. Die Schweigepflicht der Studienleiterin (Anna-Lena Peters) sowie der GSK-Trainer/innen bleibt gewahrt. Wissenschaftliche Ergebnisse der Studie werden möglicherweise in psychologischen Fachzeitschriften veröffentlicht. Dabei wird eine Identifikation Ihrer Person nicht möglich sein, da die Daten in ausschließlich anonymisierter Form veröffentlicht werden.

Für weitere Fragen stehe ich Ihnen gerne zur Verfügung.

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Universität Bielefeld

Ihre Übersicht zum Studienverlauf: Bitte tragen Sie hier Ihre Termine ein.

	Datum:	Uhrzeit:
Einführungsgespräch		
„Tagebuch"-Phase* (über 4 Tage, 4x/Tag)	von: bis:	
1. GSK-Sitzung	(PRÄ-Fragebögen mitbringen)	
2. GSK-Sitzung		
3. GSK-Sitzung		
4. GSK-Sitzung		
„Tagebuch"-Phase* (über 4 Tage, 4x/Tag)	von: bis:	
5. GSK-Sitzung		
6. GSK-Sitzung		
7. GSK-Sitzung		
„Tagebuch"-Phase* (über 4 Tage, 4x/Tag)	von: bis:	
Abschlussgespräch	(POST-Fragebögen mitbringen)	
1. Follow-Up**	(3 Monate nach GSK-Abschluss)	
2. Follow-Up**	(6 Monate nach GSK-Abschluss)	

Während der „Tagebuch"-Phase: - Tragen Sie Ihr Handy immer bei sich!
- Schalten Sie Ton und/oder Vibrationsalarm ein!
- Lassen Sie den Akku nicht leer werden!
- Bei dringenden Notfällen am Wochenende: 0151-19 14 40 32

* Online-Link: http://ww3.unipark.de/uc/gsk1   (jeweils um 10 Uhr, 12 Uhr, 16 Uhr, 18 Uhr)

**Sie werden per E-Mail an das anstehende Follow-Up erinnert. Zu den Follow-Up-Zeitpunkten senden wir Ihnen einen Link zu, unter dem Sie bequem online die Abschlussbefragung durchführen können.

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Appendix B: Ethics proposal and commitment

Ethik-Antrag „Umsetzung individueller Ziele und Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter" / Anna-Lena Peters

Antrag auf Begutachtung eines Forschungsvorhabens durch die Ethikkommission der Abteilung für Psychologie der Universität Bielefeld

Titel der geplanten Studie:

„Umsetzung individueller Ziele und Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter"

Antragsteller:

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Entsprechend des von der Ethikkommission der Abteilung für Psychologie vorgegebenen ausführlichen Fragebogens wird das geplante Forschungsvorhaben im Folgenden geschildert. Zusätzlich befinden sich das Informationsschreiben sowie die Einverständniserklärung für StudienteilnehmerInnen im Anhang. Ebenso sind relevante Untersuchungsmaterialien angehängt.

Ausführlicher Fragebogen

1. Angaben zu Rahmenbedingungen und Zielen des Vorhabens: Nehmen Sie bitte zunächst Bezug auf die Punkte 1, 2 und 3 des Basisfragebogens. Haben Sie einen der drei Punkte im Basisfragebogen mit „ja" beantwortet, nehmen Sie bitte insbesondere Stellung zu diesem Punkt. Ansonsten bearbeiten Sie bitte die folgenden Leitfragen.

a) Charakterisieren Sie die Stichprobe.

Es sollen insgesamt 60 weibliche Probandinnen im Alter zwischen 18 und 40 Jahren zu insgesamt 15 Messzeitpunkten untersucht werden. Die Messzeitpunkte erstrecken sich über acht Monate und verteilen sich in wöchentlichem und später monatlichem Abstand auf den Zeitraum vor, während und nach der Teilnahme der Probandinnen am „Gruppentraining sozialer Kompetenzen (GSK; nach Hinsch & Pfingsten, 2007)".[1] Das GSK in seiner Standard-Version richtet sich an selbstunsichere und sozial ängstliche Personen, bei denen andauernde Schwierigkeiten beim Bewältigen sozialer

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[1] Zum besseren Verständnis sei bereits an dieser Stelle erwähnt, dass das GSK im Rahmen der geplanten Studie nicht als Intervention zur Beeinflussung bestimmter Variablen eingesetzt wird, sondern vielmehr eine Rahmenbedingung des Studiendesigns darstellt, das es ermöglicht einen zeitlichen Beobachtungszeitraum zu definieren, in dem Personen aktiv an persönlichen Zielen arbeiten und in die Erreichung ebendieser investieren (s.a. Punkt 1f).

Alltagsaufgaben vorliegen, die das Berufs- und/oder das Privatleben der Personen beeinträchtigen. In einem Einführungs- und Informationsgespräch im Einzelsetting, das durch die Studienleiterin (Dipl.-Psych. Anna-Lena Peters) mit jeder Interessentin für das GSK geführt werden soll, wird eruiert, ob mind. eins der folgenden allgemeinen Indikationskriterien erfüllt wird (nach Hinsch & Pfingsten, 2007):

(A) Es liegen andauernde Schwierigkeiten beim Bewältigen sozialer Alltagssituationen vor, die das Berufs- und/oder Privatleben beeinträchtigen

(B) Soziale Kompetenzprobleme erweisen sich als eine (Mit-)Ursache für andere psychische Beeinträchtigungen oder Störungen (z.B. Depression, partnerschaftliche Probleme, Substanzmissbrauch, ...).

(C) Eine Förderung der im GSK behandelten sozialen Kompetenzen ist für die soziale Wiedereingliederung oder die Bewältigung bestehender psychischer oder somatischer Erkrankungen förderlich oder unerlässlich.

(D) Eine Förderung der im GSK behandelten sozialen Kompetenzen hilft die Entstehung psychischer Störungen oder somatischer Erkrankungen zu verhindern oder erweitert die Bewältigungsressourcen der Person im Falle eines Auftretens.

Falls mindestens eins der genannten allgemeinen Indikationskriterien zutrifft, wird im Einzelgespräch ebenfalls geprüft, ob alle der speziellen Indikationskriterien durch die Interessentin erfüllt werden:

(A) Es bestehen Schwierigkeiten in mind. einem der folgenden Bereiche: formale Rechte und Interessen durchsetzen; eigene Bedürfnisse, Gefühle und Interessen in enge persönliche Beziehungen einbringen (v.a. Lebenspartner, Familie, Freunde); Kontakte zu unbekannten Personen aufnehmen („Schüchternheit", Kontaktprobleme)

(B) Die sozialen Kompetenzprobleme sind nicht primär auf objektive Lebensbedingungen zurückzuführen. Ist dies jedoch der Fall, sollte das GSK durch andere therapeutische Maßnahmen ergänzt werden.

(C) Die Interessentin ist in der Lage, die spezifische Arbeitsbeziehung des GSK zu akzeptieren (z.B. Gruppenarbeit, Verteilung des Trainerinteresses auf mehrere Teilnehmer).

(D) Die Interessentin ist ausreichend motiviert und sieht die Notwendigkeit (d.h. hat es zum persönlichen Ziel), sich mit konkreten Interaktionsproblemen auseinanderzusetzen und daran zu arbeiten.

(E) Die Interessentin ist nicht so sehr mit sich beschäftigt, dass sie die Erfahrungen anderer teilen und davon profitieren kann.

(F) Die sozialen Schwierigkeiten der Interessentin sind nicht so spezifisch und idiosynkratisch, dass sie im weitgehend standardisierten Gruppensetting nicht bearbeitbar bzw. nicht zur Diskriminierung führen.

(G) Die Interessentin akzeptiert die verhaltenstherapeutische übende Grundkonzeption des GSK und erwartet keine völlig andersartige therapeutische Situation (z.B. Selbsterfahrungsgruppe, reine Gesprächsgruppe ohne Handlungskomponente).

Von einer Teilnahme am GSK sind besonders förderliche Veränderungen zu erwarten, wenn eine Person sowohl die allgemeinen als auch die speziellen Indikationskriterien erfüllt. Sollte sich im Einführungsgespräch herausstellen, dass eine Interessentin keines der allgemeinen Indikationskriterien erfüllt oder einzelne spezielle Indikationskriterien nicht gegeben sind, wird mit

der Interessentin gemeinsam besprochen, warum eine Teilnahme am GSK ineffektiv oder gar kontraproduktiv sein könnte und Alternativen zur GSK-Teilnahme aufgezeigt.

b) Wie werden die VersuchsteilnehmerInnen rekrutiert?

Die Probandinnen für die geplante Studie sollen über Aushänge in der Universität Bielefeld sowie über gezielte Empfehlung durch die Service-Einrichtungen der Universität Bielefeld (z.B. Zentrale Studienberatung, Beratungsstelle für Studium, Lehre & Karriere, Personalentwicklung) rekrutiert werden. Es ist vorgesehen, insgesamt sechs für die Teilnehmerinnen kostenfreie Trainingskurse à 10 Personen anzubieten (empfohlene Gruppengröße nach Hinsch & Pfingsten, 2007). Die Studienteilnahme erfolgt hauptsächlich während der mehrwöchigen Trainingsphase und kann gut in den Trainingsverlauf integriert werden. Darüber hinaus werden im Rahmen der Verlaufskontrolle bis sechs Monate nach Trainingsende einmal monatlich die individuellen Zieleigenschaften und Verhaltensweisen der Probandinnen erfasst.

Vor Beginn des Trainings findet für alle Interessentinnen ein Einführungs- und Informationsgespräch im Einzelsetting statt: Hier werden Inhalte und Wirksamkeit des Trainings sowie der Studienablauf vorgestellt. Raum für Fragen der Interessentinnen ist explizit vorgesehen. Diese sollen so in die Lage versetzt werden sich im Sinne einer Selbstindikation auf fundierter Basis für oder gegen eine Teilnahme am GSK und der damit verbundenen Studie zu entscheiden. Die Anmeldung zur Teilnahme am Training erfolgt über die Einwilligungserklärung zur Studienteilnahme (s. Einverständniserklärung). Eine Anmeldung zum GSK ohne eine Teilnahme an der Studie ist nicht möglich; sollte sich eine Teilnehmerin jedoch während des Trainings entscheiden die Studie abzubrechen, so ist die Fortführung und Beendigung des Trainings ohne Nachteile für die Teilnehmerin möglich.

c) Ist die Freiwilligkeit der Teilnahme gesichert? Wird über die jederzeitige und folgenlose Rücktrittsmöglichkeit von der Teilnahmebereitschaft aufgeklärt?

Ja. Es werden nur volljährige und geschäftsfähige Personen untersucht. Alle Teilnehmerinnen werden schriftlich und mündlich über Ziel und Inhalt der Studie aufgeklärt. Ebenso werden sie schriftlich und mündlich darüber informiert, dass sie jederzeit und ohne die Angabe von Gründen die Teilnahme an der Studie abbrechen können (s. Informationsschreiben und Einverständniserklärung).

d) Werden TeilnehmerInnen über die Teilnahme an der Studie und ihre Inhalte informiert? Wird detailliert über Ziele und Verfahren der Untersuchung über die Dauer der Untersuchung, über Belastungen und Risiken durch spezifische Untersuchungsverfahren sowie über Vergütungen und andere Zusagen an die Probanden aufgeklärt?

Ja, die Probandinnen werden über Inhalt, Teilnahmebedingungen und Ablauf der Studie schriftlich und mündlich informiert (s. Einverständniserklärung). Ebenso werden die Probandinnen schriftlich und mündlich darüber aufgeklärt, dass das GSK durch fortgeschrittene Psychologie-Studierende (d.h. Master-Studierende mit abgeschlossenem Bachelor-Studium in Psychologie) durchgeführt wird, die sich zuvor im Rahmen eines Projektseminars unter Anleitung (durch die Studienleiterin Anna-Lena Peters, Dipl.-Psych., Psychologische Psychotherapeutin i. A.) ausführlich mit den Inhalten und der praktischen Durchführung des GSK auseinandergesetzt haben (s. Einverständniserklärung). Für die GSK-TrainerInnen ist eine regelmäßige Supervision durch die Studienleiterin sowie kollegiale Supervision der TrainerInnen untereinander vorgesehen.

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e) In welcher Form erklären TeilnehmerInnen Ihre Bereitschaft zur Teilnahme? Reichen Sie bitte den Wortlaut der Erklärung ein, mit der die Untersuchten (oder deren gesetzliche VertreterInnen) die Bereitschaft zur Teilnahme an der Untersuchung bekunden. Nimmt die Bereitschafts-Erklärung eindeutig Bezug auf die Teilnehmer-Information? Führt sie vorgesehene Maßnahmen zum Datenschutz auf? Bestätigt sie die Freiwilligkeit der Teilnahme an der Untersuchung und das Recht, die Bereitschaftserklärung zu widerrufen?

Nach der schriftlichen und mündlichen Aufklärung (s. Informationsschreiben; Einführungs- und Informationsgespräch), die detaillierte Informationen über die Ziele der Studie, den Studienablauf, die Studiendauer und den Datenschutz enthält, geben die Probandinnen schriftlich ihr Einverständnis für die Studienteilnahme. Es wird darauf hingewiesen, dass die Teilnahme freiwillig ist und jederzeit ohne Angabe von Gründen abgebrochen werden kann (s. Einverständniserklärung). Sollte sich eine Teilnehmerin während des Trainings entscheiden die Studie abzubrechen, so ist die Fortführung und Beendigung des Trainings ohne Nachteile für die Teilnehmerin möglich.

f) Geben Sie bitte kurz die Ziele und Verfahren des Vorhabens an.

Breite Persönlichkeitseigenschaften unterliegen auch im Erwachsenenalter noch bedeutsamen Veränderungen (Roberts & Mroczek, 2008; Roberts, Wood, & Caspi, 2008). Diese Erkenntnis im Bereich der Persönlichkeitsentwicklung führte zu einer verstärkten Erforschung des Themas auf makro-analytischer (d.h. *struktur*-orientierter) Ebene. Eine Reihe von Studien deutet mittlerweile darauf hin, dass nicht nur genetische, sondern auch umweltbedingte Faktoren an der Stabilität und Veränderung von Persönlichkeitseigenschaften beteiligt sind (z. B. Caspi et al., 2003; Neyer & Lehnart, 2007; Roberts, Walton, Bogg & Caspi, 2006). So konnten beispielsweise Annahmen der *Social Investment Theory (SIT)* von Roberts, Wood und Smith (2005) bestätigt werden, dass insbesondere die psychologische Bindung an neue Rollen in sozial bedeutsamen Lebensbereichen mit einer durchschnittlichen Zunahme in sozial erwünschten Persönlichkeitseigenschaften einhergeht (Roberts & Wood, 2006).

Die Untersuchung von *Prozessen* der Persönlichkeitsveränderung auf mikro-analytischer Ebene steht hingegen erst am Anfang: Es ist bislang wenig darüber bekannt *wie*, d.h. auf welche Art und Weise umweltbedingte Faktoren Persönlichkeitseigenschaften beeinflussen. Ein vielversprechender Ansatz zur Erforschung von Veränderungsprozessen der Persönlichkeit ist das *socio-genomic model of personality traits* (Roberts & Jackson, 2008). Es wird angenommen, dass die nachhaltige Veränderung von Persönlichkeit im Sinne eines „Bottom-up"-Prozesses über bedeutsame und anhaltende Veränderungen im persönlichkeitsrelevanten Verhalten (*personality states*; Fleeson, 2001) vermittelt wird.

Was veranlasst Personen in eine anhaltende und häufig Anstrengung erfordernde Veränderung ihres Verhaltens zu investieren? Nach Annahmen der SIT sind bedeutsame Verhaltensänderungen vor allem in solchen Lebensphasen zu erwarten, in denen Personen sich an neue soziale Rollen binden und in diese investieren (z.B. Beginn einer Partnerschaft, Einstieg ins Berufsleben, Elternwerden). Entscheidend für den Zeitpunkt, die Richtung und das Ausmaß der Änderung von Persönlichkeitseigenschaften ist jedoch nicht, ob eine Person generell diesen Rollenwechsel erlebt (z.B. ins Berufsleben startet), sondern *wie* neu auftretende Anforderungen und Aufgaben in Zusammenhang mit der neuen Rolle bewältigt werden (Roberts et al., 2005). Ausgehend von der Einordnung sozialer Rollen als Konstrukt höherer Ordnung, das sich bezüglich seiner Eigenschaften (z.B. Ziele, die jemand im Rahmen einer Rolle verfolgt) zwischen Personen unterscheiden kann

(Heller, Perunovic & Reichman, 2009), ist zu vermuten, dass die individuellen Ziele einer Person eine wichtige Rolle dabei spielen, in welche der aufgetretenen Rollenanforderungen und -aufgaben in welchem Ausmaß investiert wird.

Ziel der geplanten Studie ist es, durch eine relativ engmaschige längsschnittliche Erhebung (Dauer: acht Monate) Prozesse der Persönlichkeitsentwicklung im jungen Erwachsenenalter sichtbar zu machen und so zu einem besseren Verständnis der Mechanismen von Persönlichkeitsänderung beizutragen. Insbesondere soll das dynamische Zusammenspiel der Investitionen in individuelle Ziele und der Änderung von Persönlichkeitseigenschaften untersucht werden. Zu diesem Zweck werden zu Beginn der Studie die **persönlichen Ziele** erfragt, die die Probandinnen mit Unterstützung des GSK erreichen möchten. Es sei an dieser Stelle explizit darauf hingewiesen, dass die Durchführung des GSK in der geplanten Studie nicht als Intervention zur Beeinflussung individueller Ziele dient, sondern als „Setting" um den zeitlichen Beobachtungsrahmen festzusetzen, in dem Personen aktiv an ihren Zielen arbeiten und in die Erreichung ebendieser investieren. Zudem sollen die Probandinnen einmalig zu Studienbeginn den **Ursprung des jeweiligen Ziels** (*perceived locus of control*; Erfassung nach Lüdtke, 2006) und den sozialen **Rollenbereich** angeben, **auf den sich ihr jeweiliges Ziel bezieht (beruflich vs. privat)**. Die persönlichen Ziele werden offen idiographisch erfasst und sind bezüglich weiterer Zieleigenschaften (Ausmaß an Investition in das Ziel; Schwierigkeit; Reaktionen des Umfeldes) wöchentlich zu den Trainingssitzungen einzuschätzen (s. Studienmaterial). Ebenso schätzen die Probandinnen während der Trainingsteilnahme wöchentlich ihr **persönlichkeitsrelevantes Verhalten (personality states)** bezogen auf den Zeitraum der letzten Woche auf einer Liste mit bipolaren Adjektivpaaren ein. Die verhaltensbeschreibenden Adjektive sind dem Manual zum NEO-PI-R (Ostendorf & Angleitner, 2004) entnommen und dienen zur Beschreibung der einzelnen Facetten der breiten Persönlichkeitsdimensionen Neurotizismus, Extraversion, Verträglichkeit, Offenheit und Gewissenhaftigkeit. Nach Beendigung des Trainings erfolgt die oben beschriebene Erfassung von Zieleigenschaften und persönlichkeitsrelevantem Verhalten in monatlichem Rhythmus über einen Zeitraum von weiteren sechs Monaten. Vor Trainingsbeginn und nach Trainingsabschluss sowie zum „Follow-up" (d.h. 6 Monate nach Trainingsabschluss) werden **Lebensziele** der Probandinnen über den GOALS-Fragebogen (Pöhlmann & Brunstein, 1997) und **Persönlichkeitseigenschaften** mittels des NEO-PI-R (Ostendorf & Angleitner, 2004) erhoben. Nach Abschluss des Trainings sowie sechs Monate danach geben die Probandinnen für jedes ihrer genannten Ziele den subjektiv eingeschätzten Zielfortschritt an (Skala von *-4 = starke Veränderung in entgegengesetzte Richtung des Ziels* über *0 = keine Veränderung* bis *+4 = starke Veränderung in Richtung des Ziels*).

Im Rahmen der Durchführung des GSK und losgelöst von Fragestellungen der geplanten Studie werden gemäß Manual folgende standardisierte Instrumente zur Evaluation (prä-post-follow up) eingesetzt:

- Unischerheitsfragebogen (Ullrich & de Muynck, 1998)zur Erfassung sozialer Kompetenz
- IE-SV-F (Dorrmann & Hinsch, 1981) zur Erfassung des kognitiven Verarbeitungsstils bei Erfolgs- und Misserfolgssituationen
- Problemfragebogen (in Anlehnung an Sander & Lück, 1974; leicht gekürzte und modifizierte Version für das GSK) zur Erfassung allgemeiner psychischer und somatischer Beschwerden

g) Wie lange werden die Daten aufbewahrt?

In Anlehnung an die in der Regel vorgeschriebene Datenaufbewahrungszeit für psychotherapeutische Dokumentationen werden die in der Studie erfassten Daten zehn Jahre aufgehoben.

h) Erhalten die TeilnehmerInnen im Anschluss an die Studie eine lückenlose Aufklärung?

Die Probandinnen sind bereits <u>vor</u> Untersuchungsbeginn lückenlos über die Ziele und Hintergründe der Studie informiert.

i) Bis zu welchem Zeitpunkt können TeilnhemerInnen eine Datenlöschung verlangen?

Die im Rahmen der geplanten Studie für wissenschaftliche Zwecke erhobenen Daten können jederzeit innerhalb der zehn Jahre auf Wunsch der Probandin gelöscht werden.

2. Angaben zu Zielen und Verfahren des Vorhabens: Nehmen Sie hier bitte Bezug auf die Punkte 4,5,6,7,8,9, und 10 des Basisfragebogens. Haben Sie einen dieser Punkte im Basisfragebogen mit „ja" beantwortet, nehmen Sie bitte insbesondere Stellung zu diesem Punkt. Ansonsten bearbeiten Sie bitte folgende Leitfragen:

a) Geben die Untersuchten persönliche Erfahrungen oder Einstellungen preis, die für die Befragten von intimer Natur sind oder deren Beantwortung als stigmatisierend wahrgenommen werden kann (z.B. zu illegalem oder deviantem Verhalten oder zu sexuellen Präferenzen)?

Die Probandinnen werden im Einführungsgespräch durch die Studienleiterin gefragt, ob Sie in der Vergangenheit und/oder zum gegenwärtigen Zeitpunkt über Therapieerfahrungen verfügen. Diese Information dient zum einen der Indikationsprüfung, zum anderen der Beschreibung der Stichprobe der GSK-Teilnehmer.

b) Werden die Untersuchten absichtlich unvollständig oder falsch über Untersuchungsziele oder verfahren instruiert?

Nein.

c) Werden die Untersuchten durch die Studie mental besonders beansprucht (z.B. durch Tätigkeitsdauer, aversive Reize, negative Erfahrungen, psychischen Stress, Furcht, Erschöpfung, Schmerzen) oder werden andere negative Effekte hervorgerufen, die über das im Alltag zu erwartende Maß hinausgehen?

Das Gruppentraining sozialer Kompetenzen ist ein wirksames Verfahren zur Reduktion von sozialen Ängsten und Kompetenzproblemen bei Erwachsenen. In Evaluationsstudien zur Wirksamkeit des GSK gab es keine Gruppe, bei der kein Effekt oder eine Verschlechterung festgestellt werden konnte (Hinsch & Pfingsten, 2007; Hinsch, Bauer, Pfingsten & Weigelt, 1983). Dennoch ist zu berücksichtigen, dass einzelne Trainingselemente wie Rollenspiele mit Videofeedback und „Hausaufgaben" zwischen den Sitzungen Erwartungsangst bei einigen TeilnehmerInnen erzeugen und Anstrengung und Überwindung erfordern können. Auf diese eventuell auftretenden Nebeneffekte werden die Probandinnen im Einführungsgespräch hingewiesen bei gleichzeitiger Betonung der Freiwilligkeit an der Trainingsteilnahme. Zudem soll im Rahmen des Trainings bei Bedarf das Thema Erwartungsangst aufgegriffen und ein funktionaler Umgang damit erlernt werden.

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d) Werden die Untersuchten körperlich beansprucht (z.B. durch Entnahme von Körperflüssigkeiten durch Verabreichung von Substanzen oder durch invasive oder nicht-invasive Messungen oder Prozeduren)?

Nein.

e) Angaben zum Datenschutz: Welche personenbezogenen Daten werden erhoben? Sind Video- oder Tonaufnahmen oder andere Verhaltensregistrierungen vorgesehen? Wird die Anonymisierung der Daten gesichert?

Von den Probandinnen werden folgende personenbezogenen Daten erfragt:

- Name
- Alter
- Schul- und Berufsausbildung sowie aktuelle Berufsgruppe
- Kontaktmöglichkeit während Trainings-/ Studienverlauf (nicht zur Verwendung im Rahmen der Studie; Zugang hat ausschließlich Studienleiterin zwecks kurzfristiger Terminänderung o.Ä.): Mailadresse und/oder Handynummer

Alle Daten im Rahmen der Studie werden am PC über das webbasierte Softwareprogramm *EFS Survey* erhoben und mit einer neunstelligen Kennziffer bestehend aus Buchstaben und Zahlen versehen, bevor sie vorübergehend archiviert werden. Aus der Studie geplante wissenschaftliche Publikationen enthalten selbstverständlich nur anonymisierte Daten. Die Datenverwendung für wissenschaftliche Zwecke setzt das Einverständnis der Probandin voraus. Alle GSK-TrainerInnen und die Studienleiterin unterliegen selbstverständlich der Schweigepflicht in Bezug auf jegliche Daten der Probandinnen aus dem Training und der Studie. Vor Studienbeginn wird den Probandinnen der anonymisierte Umgang mit ihren Daten schriftlich versichert (s. Einverständniserklärung).

Ausschließlich im Rahmen des GSK (und ohne Verwendung im Rahmen der geplanten Studie) werden in einzelnen Trainingssitzungen Videoaufnahmen der Probandinnen während kurzer Rollenspielsequenzen erstellt. Die Videoaufnahmen werden nach jeder Sitzung im Beisein der Probandinnen sofort wieder durch den Trainer/die Trainerin gelöscht.

3. Angaben zur Vergütung der TeilnehmerInnen: Nehmen Sie hier bitte Bezug auf die Punkte 11 und 12 des Basisfragebogens. Haben Sie einen dieser Punkte im Basisfragebogen mit „ja" beantwortet, nehmen Sie bitte insbesondere Stellung zu diesem Punkt. Ansonsten bearbeiten Sie bitte die folgenden Leitfragen:

a) Wird die Teilnahme vergütet? Werden TeilnehmerInnen Vorteile zugesagt?

Die Probandinnen erhalten keine finanzielle Vergütung für die Studienteilnahme. Es ergeben sich keine Vorteile durch die Teilnahme an der Studie bzw. keine Nachteile durch die Nicht-Teilnahme. Sollte sich eine Probandin während des Trainings entscheiden Ihre Teilnahme an der Studie abzubrechen, so ist die Fortführung und Beendigung des Trainings ohne Nachteile für die Teilnehmerin möglich (s. 1c)).

7

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Bielefeld, 26.11.2012

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Stellungnahme der Ethikkommission der Fakultät für Psychologie und Sportwissenschaft, Abteilung für Psychologie, der Universität Bielefeld zu dem Antrag Nr. 2012-105R

Kurzbezeichnung der Studie: Umsetzung individueller Ziele und Veränderung von Persönlichkeitseigenschaften im jungen Erwachsenenalter
Hauptansprechpartner/in: Anna-Lena Peters
Ggf. Betreuer/in: Reiner Riemann

Beurteilungsgrundlage war der Antrag an die Ethikkommission bestehend aus
- Basisfragebogen   X
- ausführlichem Antrag   X
- Untersuchungsmaterialien X

Die Ethikkommission der Abteilung für Psychologie hält die Durchführung der Studie in der beschriebenen Form für ethisch unbedenklich

Für die Ethikkommission

Vorsitzender   Gutachter/in 1   Gutachter/in 2
Prof. Gerd Bohner   Prof. Frank Neuner   Dipl.-Psych. Charlotte Diehl

Appendix C: Internal consistencies of NEO-PI-R domain and facet scales

Table C-1. Internal consistencies of NEO-PI-R domain and facet scales

NEO-PI-R scale	Cronbach´s alpha (standardized)			
	T1	T2	T3	T4
N: neuroticism	**.92 (0.92)**	**.94 (0.92)**	**.94 (0.92)**	**.92 (0.92)**
N1: Anxiety	.80 (.82)	.87 (.82)	.86 (.82)	.83 (.82)
N2: Angry Hostility	.68 (.73)	.77 (.73)	.78 (.73)	.82 (.73)
N3: Depression	.85 (.85)	.88 (.85)	.85 (.85)	.80 (.85)
N4: Self-Consciousness	.76 (.72)	.80 (.72)	.78 (.72)	.70 (.72)
N5: Impulsiveness	.61 (.64)	.67 (.64)	.55 (.64)	.55 (.64)
N6: Vulnerability	.81 (.79)	.83 (.79)	.89 (.79)	.81 (.79)
E: extraversion	**.89 (0.89)**	**.92 (0.89)**	**.90 (0.89)**	**.90 (0.89)**
E1: Warmth	.70 (.71)	.72 (.71)	.76 (.71)	.74 (.71)
E2: Gregariousness	.80 (.80)	.83 (.80)	.83 (.80)	.78 (.80)
E3: Assertiveness	.81 (.80)	.83 (.80)	.73 (.80)	.76 (.80)
E4: Activity	.63 (.70)	.62 (.70)	.58 (.70)	.72 (.70)
E5: Excitement-Seeking	.67 (.60)	.71 (.60)	.68 (.60)	.70 (.60)
E6: Positive Emotions	.85 (.80)	.90 (.80)	.86 (.80)	.86 (.80)
A: agreeableness	**.85 (0.86)**	**.83 (0.86)**	**.88 (0.86)**	**.84 (0.86)**
A1: Trust	.77 (.76)	.83 (.76)	.79 (.76)	.81 (.76)
A2: Straightforwardness	.52 (.64)	.56 (.64)	.65 (.64)	.60 (.64)
A3: Altruism	.75 (.70)	.62 (.70)	.69 (.70)	.74 (.70)
A4: Compliance	.63 (.64)	.56 (.64)	.57 (.64)	.26 (.64)
A5: Modesty	.74(.74)	.75(.74)	.86(.74)	.80(.74)
A6: Tender-Mindedness	.58 (.60)	.48 (.60)	.73 (.60)	.75 (.60)
C: conscientiousness	**.90 (0.90)**	**.91 (0.90)**	**.92 (0.90)**	**.91 (0.90)**
C1: Competence	.67 (.65)	.80 (.65)	.75 (.65)	.69 (.65)
C2: Order	.67 (.70)	.70 (.70)	.78 (.70)	.75 (.70)
C3: Dutifulness	.67 (.67)	.65 (.67)	.70 (.67)	.68 (.67)
C4: Achievement Striving	.62 (.70)	.64 (.70)	.60 (.70)	.66 (.70)
C5: Self-Discipline	.85 (.81)	.87 (.81)	.88 (.81)	.83 (.81)
C6: Deliberation	.72 (.71)	.77 (.71)	.70 (.71)	.80 (.71)

Note. T1: N = 97; T2: N = 69; T3: N = 48; T4: N = 44. Values from the representative norm sample (Ostendorf & Angleitner, 2004) are in brackets.

Appendix D: Idiographic training goal assessment

Ihre persönlichen Ziele für das „Gruppentraining sozialer Kompetenzen" (GSK)

Wir alle haben zu jeder Zeit eine ganze Reihe von persönlichen Projekten und Zielen über die wir nachdenken, die wir planen, die wir durchführen und die wir (wenn auch nicht immer) abschließen. Wir möchten erfahren welche persönlichen Ziele Sie mit Hilfe des GSK erreichen und an denen Sie in den kommenden Wochen und Monaten arbeiten möchten.

Einige Ziele mögen dabei auf ein Ergebnis („meine mündliche Prüfung absolvieren") fokussiert sein, andere auf einen Prozess („einen schönen Abend mit Freunden verbringen"); es mögen Dinge sein, die wir frei wählen oder aber Dinge, die wir tun müssen; es können Dinge sein, auf die wir zuarbeiten oder aber Dinge, die wir versuchen zu vermeiden. Ihre Ziele können mit unterschiedlichen Bereichen aus dem alltäglichen Leben verbunden sein, unter anderem mit, Arbeit, Studium, Freunden, Familie, Freizeit oder Gemeinschaft. Ebenso können sich Ihre Ziele auf angestrebte Eigenschaften (Durchsetzungsfähigkeit, Geselligkeit, Freimütigkeit, usw.) oder Gefühlszustände (entspannt, gelassen, selbstsicher, weniger ängstlich in sozialen Interaktionen, usw.) beziehen. ... und sie können unterschiedlich abstrakt (z.B. ein selbstsicherer Mensch werden) versus konkret (z.B. lernen, Gespräche zu beginnen, Kritik zu äußern, fremde Personen anzusprechen, um einen Gefallen zu bitten, usw.) formuliert sein. Bitte stellen Sie sich Ihre persönlichen Ziele für das GSK in dieser breit gefächerten Art und Weise vor.

- - -

Nehmen Sie sich nun einige Minuten Zeit, um alle persönlichen Ziele zu notieren, die Sie mit Hilfe des GSK in den nächsten Woche und Monaten erreichen möchten. Es ist offen, wie viele Ziele Sie insgesamt formulieren.

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

Im Folgenden bezeichnen wir die genannten Ziele als Ihre „GSK-Ziele".

- - -

[für 1-11: 5-stufige Lickert-Skala „gar nicht-wenig-mittelmäßig-überwiegend-völlig"]

1. Wie wichtig sind Ihre GSK-Ziele für Sie?

2. Wie schwierig finden Sie es, Ihre GSK-Ziele zu erreichen?

3. Wie sehr haben Sie das Gefühl die Erreichung Ihrer GSK-Ziele kontrollieren zu können?

4. Wie erfolgreich werden Sie in der Erreichung Ihrer GSK-Ziele Ihrer Einschätzung nach sein?

5. Wie wichtig ist die Erreichung Ihrer GSK-Ziele aus der Sicht anderer Menschen, die Ihnen nahe stehen?

6. Wie erfolgreich waren Sie bei der Erreichung der genannten Ziele bisher?

7. Wie herausfordernd nehmen Sie die Erreichung Ihrer GSK-Ziele wahr?

8. Inwieweit denken Sie, wird die Erreichung Ihrer GSK-Ziele durch andere Menschen unterstützt?

Dabei kann Unterstützung verschiedene Formen annehmen, z.B. emotionale (Ermutigung, Billigung), finanzielle (Geld, materielle Besitztümer) oder praktische Unterstützung (aktive Mithilfe)

9. Inwieweit fühlen Sie sich fähig Ihre GSK-Ziele zu realisieren?

10. Inwieweit glauben Sie Ihre Ziele im GSK eigenständig zu verfolgen, so dass Sie sich aus freiem Willen für die Zielerreichung engagieren und nicht weil jemand anderes es von Ihnen erwartet?

11. In welchem Ausmaß verspüren Sie die jeweilige Emotion, wenn Sie mit der Erreichung der genannten Ziele beschäftigt sind oder über diese nachdenken?

- Traurig
- Ängstlich
- Wütend
- Fröhlich/freudig
- Hoffnungsvoll
- Angestrengt
- Unsicher
- deprimiert

12. Ziele durchlaufen bis zur Erreichung oft mehrere Stadien, die man z. B. mit Hilfe einer Zeitleiste veranschaulichen kann: 0........1........2........3........4........5........6........7........8........9........10

Nutzen Sie bitte diese Skala um das Stadium zu bewerten, in dem sich die von Ihnen zuvor genannten Ziele befinden:

0 – 1	Bewusstsein	Die Idee die zuvor genannten Ziele zu erreichen ist gerade erst bei Ihnen aufgekommen.
2	Übergang	Sie haben entschieden mit der Erreichung Ihrer genannten Ziele fortfahren zu wollen.
3 – 4	Planung	Sie planen die Erreichung der genannten Ziele und kümmern sich um die personelle oder materielle Unterstützung, die es erfordert.
5	Übergang	Sie haben die Erreichung Ihrer Ziele geplant und beginnen (oder versuchen) nun aktiv mit der Zielerreichung zu beginnen.
6 - 7	Aktion	Sie arbeiten aktiv an der Zielerreichung und versuchen es mit Ihren anderen Projekten, Ressourcen und ihren zeitlichen Verpflichtungen in Balance zu bringen.
8	Übergang	Sie bewerten die Zielerreichung und ihre Motivation damit fortzufahren, es abzuschließen oder aber es zu verwerfen.
9 – 10	Abschluss	Die Zielerreichung geht dem Ende zu oder wurde bereits erledigt bzw. abgeschlossen.

Table D-1. Description of goal dimensions

Cognitive Project Dimension	Dimension Description
Importance	How important s this project to you? Use 5 if you consider it to be very important, and 1 if it is not at all important
Difficulty	How difficult do you find it to carry out this project? Use 5 for a project that is extremely difficult to carry out. And 1 for one that is not difficult at all.
Visibility	How visible is this project to others that are close to you? Use 5 for a project that is very visible to those around you, and 1 for a project, which is not at all visible to those around you.
Control	How much do you feel you are in control of this project? Use 5 if you feel completely in control of the project, and 1 if you feel you have absolutely no control over the project
Outcome/ Likelihood of Success	How successful do you believe this project will be? Use 5 if you except the project to be entirely succesful, an 1 if you think the project will turn out to be a total failure.
Others´ View	How important is this project seen to be by those people who are close to you? Use 5 if others see a project as very important, and 1 if it seen as not important at all.
Progress	How successful have you been in this project so far? Use 5 to indicate that you have been very successful and 1 to indicate that you have had no success at all.
Challenge	How challenging do you find this project? Use 5 if it is very challenging, perhaps more than you can handle, and 1 if it is not at all challenging, indeed you find it almost boring.
Support	To what extent do you feel other people support each projevct? Support may come in different forms, e.g., emotional (encouragement, approval), financial (money, material possessions) or practical (active assistance). Use 5 if you feel other people support the project a lot, and 1 if there is no support at all.
Competence	To what extent do you feel competent to carry out this project? Use 5 if you feel completely competent to carry out the project, and 1 if you do not feel competent to carry out it.
Autonomy	How much is this project one which you feel you are pursuing autonomously? (That is, you are engaged of your own free will in the project, not because anyone else wants you to do it). Use 5 if you are engaged in this project entirely of your own free will, and 1 if this project is one that you feel totally obliged to complete because of or for someone else.
Stage	Projects often go through several stages, which can be visualized along a time-line. Think of each project as moving through stages on such a time-line. Using the scale on this page, rate each project´s stage: 1-1 Awareness: The idea for the project has just come to you. 2 Transition: You have decided to proceed with the project. 3-5 Planning: You are planning it and obtaining whatever personal and material support it may require. 5 Transition: You have the project planned out and you are beginning to (or trying to) actively start the project. 6-7 Action: You are actively working on the project and trying to balance it with your other projects, resources and time commitments. 8 Transition: You are evaluating the project and your motivation to continue with it, or bring it to completion/disengage from it. 9-5 Completion: The project is coming to a close or has actually been completed or terminated.
Feelings	How do you feel about what you are doing? (Sad, Fearful/ Scared, Full of Love, Angry, Happy/ With Enjoyment, Hopeful, Stressed, Uncertain, Depressed: 5-point Lickert-type scale from 1 = *not at all* to 5 = *absolutely*)

Table D-2. Descriptives for affiliation and intimacy goals across all measurement occasions

	T1			T2			T3			T4		
	M (SD)	σ^2	α	M (SD)	σ^2	α	M (SD)	σ^2	α	M (SD)	σ^2	α
training goals												
importance	3.62 (0.55)	0.30	-	3.07 (0.85)	0.66	-	2.62 (0.85)	0.73	-	2.49 (0.84)	0.71	-
feasibility	0.98 (0.72)	0.52	-	1.81 (0.85)	0.71	-	1.82 (0.83)	0.68	-	1.96 (1.00)	1.00	-
MLG intimacy												
importance	14.12 (2.20)	4.86	.78	14.67 (1.77)	3.14	.78	14.64 (1.74)	3.05	.74	14.13 (2.32)	5.39	.86
success	9.06 (4.39)	19.31	.85	9.91 (4.26)	18.14	.85	9.66 (4.70)	22.11	.90	9.96 (4.70)	22.13	.93
MLG affiliation												
importance	9.48 (3.32)	11.04	.86	10.17 (3.07)	9.41	.86	10.16 (3.21)	10.30	.87	9.29 (3.85)	14.80	.91
success	6.45 (4.11)	16.90	.91	7.51 (3.69)	13.61	.91	7.74 (3.91)	15.30	.93	7.71 (4.09)	16.71	.95

Note. T1 to T4 represent measurement occasions.

Appendix E: FFM state measure of neuroticism and extraversion

Table E-1. German items of the FFM state measure of neuroticism and extraversion

Scale		Item	
N: Neurotizismus			
N1: Ängstlichkeit	*Gelassen*	*vs.*	*Nervös*
	Furchtlos	*vs.*	*Furchtsam*
	Ruhig	*vs.*	*Unruhig*
N2: Reizbarkeit	*Ausgeglichen*	*vs.*	*Gereizt*
	Gut gelaunt	*vs.*	*Übellaunig*
	Heiter	*vs.*	*Verbittert*
N3: Depression	*Sorglos*	*vs.*	*Sorgenvoll*
	Unbekümmert	*vs.*	*Bekümmert*
	Fröhlich	*vs.*	*Traurig*
N4: Soziale Befangenheit	*Unbefangen*	*vs.*	*Befangen*
	Selbstsicher	*vs.*	*Selbstunsicher*
	Ungezwungen	*vs.*	*Gehemmt*
N5: Impulsivität	Kontrolliert	vs.	Unkontrolliert
	Beherrscht	vs.	Unbeherrscht
	Gezügelt	vs.	Impulsiv
N6: Verletzlichkeit	*Dickhäutig*	*vs.*	*Verletzlich*
	Stabil	*vs.*	*Instabil*
	Robust	*vs.*	*Stressanfällig*
E: Extraversion			
E1: Herzlichkeit	*Abweisend*	*vs.*	*Freundschaftlich*
	Kühl	*vs.*	*Herzlich*
	Ungastlich	*vs.*	*Leutselig*
E2: Geselligkeit	*Kontaktscheu*	*vs.*	*Kontaktfreudig*
	Ungesellig	*vs.*	*Gesellig*
	Distanziert	*vs.*	*Gesprächig*
E3: Durchsetzungsfähigkeit	*Entscheidungsschwach*	*vs.*	*Entscheidungsfreudig*
	Unentschlossen	*vs.*	*Entschlossen*
	Nicht durchsetzungsfähig	*vs.*	*Durchsetzungsfähig*
E4: Aktivität	Gemächlich	vs.	Energievoll
	Geruhsam	vs.	Lebhaft
	Passiv	vs.	Aktiv
E5: Erlebnissuche	Bedachtsam	vs.	Abenteuerlustig
	Bedächtig	vs.	Erlebnishungrig
	Träge	vs.	Unternehmungslustig
E6: Positive Emotionen	Unenthusiastisch	vs.	Enthusiastisch
	Gezügelt	vs.	Ausgelassen
	Unbeeindruckt	vs.	Begeisterungsfähig

Appendix F: Variation in personality state scores across measurement occasions
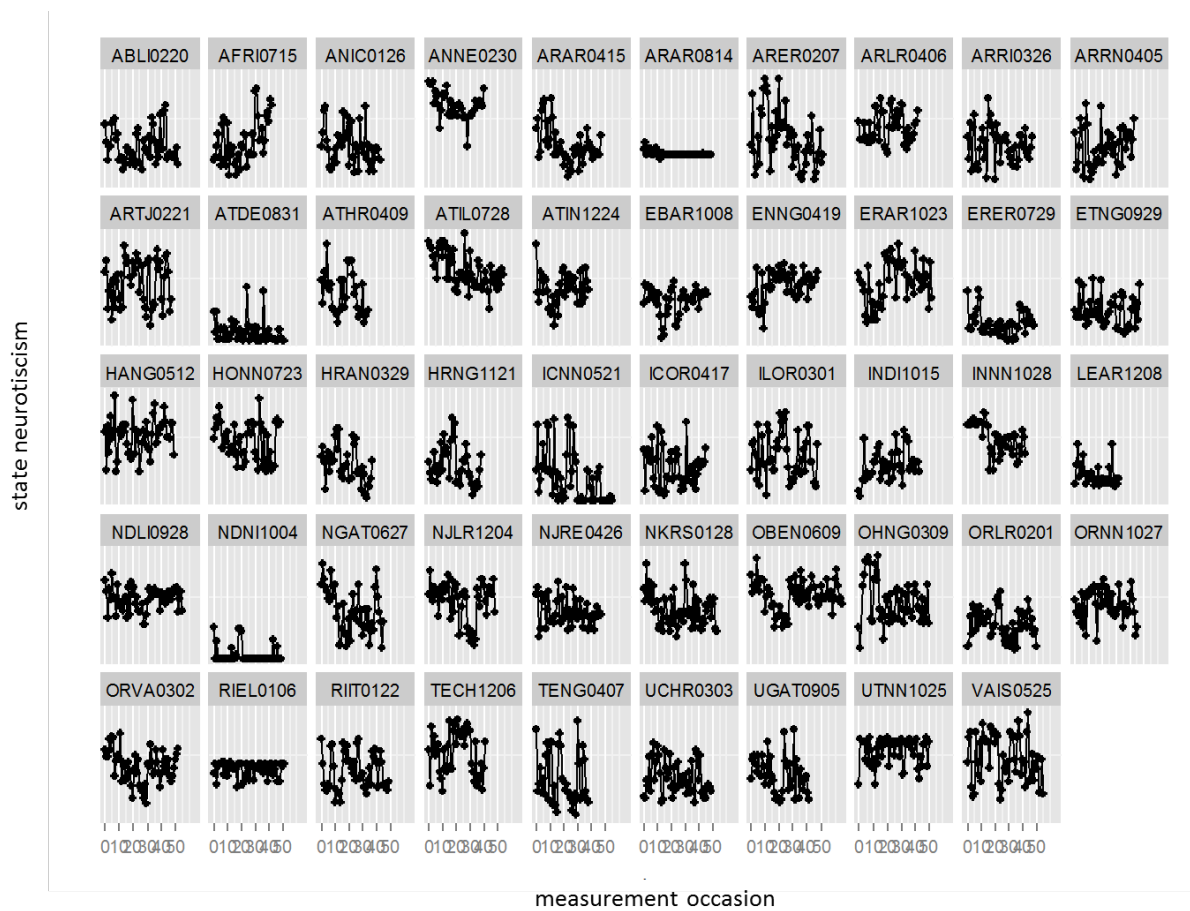

Figure F-1. Variation in state neuroticism scores across measurement occasions.

Note. Each graph represents one participant (coded by a chiffre). Masurement occasions are counted from zero.
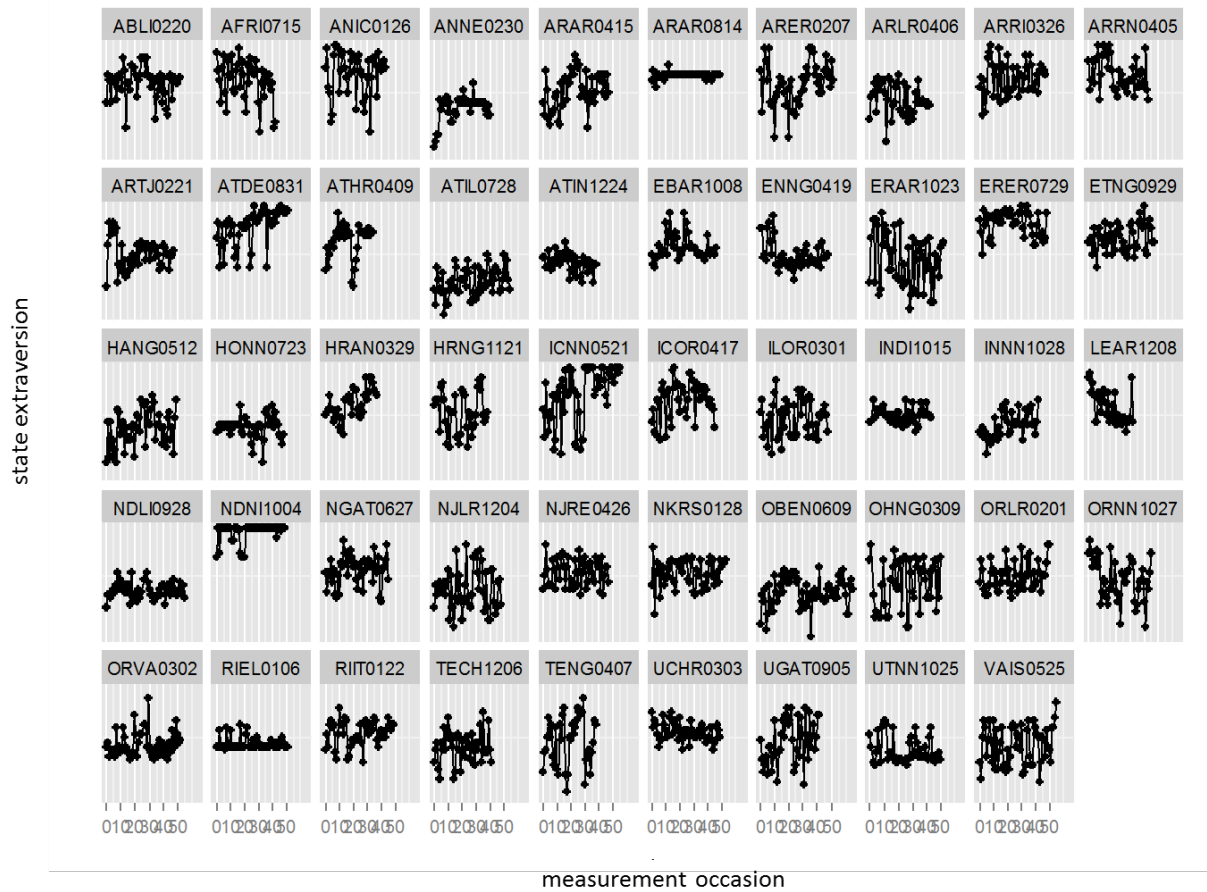
Figure F-2. Variation in state extraversion scores across measurement occasions.

Note. Each graph represents one participant (coded by a chiffre). Masurement occasions are counted from zero.