

**Online Positive Psychology Interventions Based on Pleasure, Engagement,  
Meaning, Positive Relationships, and Accomplishment: Measurement, Val-  
idation of Interventions, and Exploration of Working Mechanisms**

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## ABSTRACT

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This thesis aims at extending the knowledge on positive psychology interventions based on Seligman's (2011) Well-Being Theory that suggested five elements of well-being (i.e., pleasure/positive emotions, engagement, meaning, positive relationships, and accomplishment).

The three main aims of the thesis were: (1) Constructing and validating a measure for the endorsement of positive relationships and accomplishment that could be used along existing measures of pleasure, engagement, and meaning; (2) testing the effectiveness of online interventions based on each of the five components of the Well-Being Theory separately, and examining for whom they work best; and (3) exploring the impact of potential working mechanisms by comparing the effects of interventions that focus on cognitive or emotional components of an intervention.

Results showed that positive relationships and accomplishment can be assessed independently, and that they explain additional variance in well-being above pleasure, engagement, and meaning. Further, all interventions lead to an increase in well-being, while the interventions work best for those in the middle range of the well-being continuum. Finally, the thesis provides initial findings on the importance of both, emotional and cognitive components in interventions.

In summary, the findings suggest that the Well-Being Theory is a useful framework for developing interventions, and provides further insights in how, and for whom, such interventions work best.

## ZUSAMMENFASSUNG

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Das Ziel dieser Dissertation ist, das Wissen über Interventionen aus der Psychologie, die auf Seligmans (2011) Well-Being Theory basieren, zu erweitern. Diese schlug vor, dass Wohlbefinden aus fünf Elementen besteht (d.h. pleasure/positive emotions, engagement, meaning, positive relationships und accomplishment).

Die drei Hauptziele dieser Dissertation waren: (1) Ein Messinstrument zu konstruieren und zu validieren, das das Ausmass des Verfolgens von positive relationships und accomplishment erfasst und gemeinsam mit existierenden Messinstrumenten zur Erfassung von pleasure, engagement und meaning verwendet werden kann; (2) die Wirksamkeit von online Interventionen zu überprüfen, die auf den fünf Komponenten der Well-Being Theory basieren und zu untersuchen, für wen diese am besten funktionieren; und (3) den Einfluss potentieller Wirkmechanismen (d.h. von emotionalen und kognitiven Komponenten) in solchen Interventionen zu untersuchen.

Die Resultate zeigten, dass positive relationships und accomplishment unabhängig voneinander erfasst werden können und zusätzliche Varianz im Wohlbefinden erklären, über den Einfluss von pleasure, engagement und meaning hinaus. Alle überprüften Interventionen führten zu einem Anstieg im Wohlbefinden, wobei diese am wirksamsten waren für diejenigen Personen im mittleren Bereich des Wohlbefindensspektrums. Schliesslich konnten erste Hinweise für den Einfluss von kognitiven und emotionalen Komponenten in Interventionen erbracht werden.

Zusammenfassend legen die Ergebnisse nahe, dass die Well-Being Theory einen nützlichen Rahmen für die Entwicklung von Interventionen bietet und bieten weitere Einblicke wie und für wen solche Interventionen am wirksamsten sind.

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**GENERAL INTRODUCTION**

**Positive Psychology**

Positive psychology is the scientific study of the “good life” (Peterson & Park, 2003). Seligman, Parks, and Steen (2004) argue that psychology used to have three goals: “the first was to cure mental illness, the second was to make relatively untroubled people happier, and the third was to study genius and high talent” (Seligman, Parks, & Steen, 2004; p. 1379), but that the latter two goals were neglected after the Second World War. The goal of positive psychology is to “complete” psychology again, by emphasizing those aspects of life that have been neglected. The main focus of this thesis is on the second of the original goals of psychology; the development and evaluation of positive psychology interventions, which consist of “treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions” (Sin & Lyubomirsky, 2009; p. 468) compared to “programs, interventions, or treatments aimed at fixing, remedying, or healing something that is pathological or deficient—as opposed to building strengths” (Sin & Lyubomirsky, 2009; p. 468). To further specify this general definition: positive psychology interventions are defined here as psychological interventions that aim to enhance positive aspects of life, that can be self-administered by individuals who are not suffering from a mental disorder, and that lead to an increase in well-being. The overarching question of this thesis could be framed as:

<p>Can accomplishment and positive relationships in term of Seligman’s (2011) Well-Being Theory be subjectively measured? Do interventions based on Seligman’s PERMA dimensions promote well-being in self-administered online settings, and for whom do they work best? What are potential working mechanisms?</p>
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In the following paragraphs an overview of philosophical and psychological well-being theories will be given, followed by an introduction into positive psychology interventions and research questions.

## Theories of Well-Being

In this chapter, selected philosophical and psychological approaches towards well-being are reviewed. This chapter aims at reviewing the suggested answers in the literature on the question of what well-being is, how it can be achieved, and how it should be measured.

### Hedonism vs. Eudemonia

Throughout history, numerous ideas have been brought forward on what constitutes a “good life” and how it can be achieved. Most of these ideas can be subsumed under two different but partially overlapping philosophical perspectives; *hedonism* and *eudemonia* (Ryan & Deci, 2001). According to Watson (1895), who summarized the development of hedonic theories, the principle of hedonism can be traced back to the Greek philosopher Aristippus (c. 435 BCE – 356 BCE), who called the attainment of agreeable feeling the end of all human action. Accordingly, the ultimate goal in life should be to maximize pleasure and minimize pain, which should be sought in the present moment and not by regretting the past or anticipating the future. This view was further elaborated by Epicurus (c. 341 BCE – 271 BCE), who emphasized that pleasure should be sought (and pain avoided) in the long-term. His idea of an ideal state was a serene and tranquil satisfaction. Furthermore, Epicurus also claimed that his idea of hedonism was consistent with a virtuous life since it promoted the long-term achievement of pleasure (e.g., courage facilitates the endurance of momentary pain that might lead to gratifications in the long run, whereas the absence of justice – on a societal level – leads to the fear of punishment). Hedonic positions were also held by Thomas Hobbes (1588–1679), who saw a selfish pursuit of pleasure as the origin of all acts; John Locke (1632–1704), who described the human will to be guided by what brings pleasure, but also warns that certain pleasures might appear desirable but not bring happiness; David Hume (1711–1776), who also saw the desire for pleasures as the sole motive for actions; and Jeremy Bentham (1748–1832) and John Stuart Mill (1806–1873), who laid the foundation of utilitarianism by promoting the idea that legislation should aim at producing a maximum of pleasure in the community

(Watson, 1895). Thus, the pursuit of hedonism has developed rather far from the early, myopic and more individualistic concepts, and does not contradict the pursuit of virtue. Watson (1895) summarizes the fundamental principle of hedonism:

That all actions are determined by the desire for pleasure; that the pleasure which to the individual at the moment seems strongest determines the will; that reason has no power to originate, to retard, or to prevent action, but is a purely formal, or theoretical activity; that there is no “innate faculty” or “moral sense” belonging to man in his natural state, but that moral judgments are resolvable into a peculiar form of pleasure; that justice is a means of obtaining security for life and property, and so of securing the greatest pleasure of society as a whole; and that a man’s motive in doing a benevolent or just act is ultimately a regard for his own pleasure; – these are the main features of a hedonism. (p. 137)

It has to be emphasized that *pleasure* in the description of hedonic theories does not refer to a distinct emotional state (such as joy), but serves as an umbrella term for positive emotional states (also including sensual pleasures, and discrete emotional states such as joy, love, or pride), whereas some other philosophers also include non-emotional gratifications (such as wealth or power) as pleasures. Of course this same concept also applies to *pain*.

In modern psychology, hedonism is present in the field of *hedonic psychology*, “the study of what makes experiences and life pleasant or unpleasant,” (Kahneman et al., 1999; p. ix) which is interested in “feelings of pleasure and pain, of interest and boredom, of joy and sorrow, and of satisfaction and dissatisfaction (Kahneman et al., 1999; p. ix.). Hedonic psychology treats well-being and hedonism equivalently (Ryan & Deci, 2001), and examines the effects of the pursuit of hedonism on the individual, as well as at a societal level (as in the utilitarian approach).

Aristotle (c. 384 BCE – 322 BCE) formulated the contrasting view of *eudemonia*, which recommended recognizing and living in accordance with the *daimon* or “true self”

(Norton, 1976). This daimon represents an ideal. Therefore eudemonia requires individuals to fulfill their potential, and strive towards perfection and excellence. These potentials include not only those potentials that are shared by all humans, but also those that are distinct for every person (Waterman, 1990). The Greek term *eudaimonia* is usually translated as “happiness”, whereas nowadays “happiness” is usually understood in a hedonic view (Waterman, 1990). However, eudemonia as conceptualized by Aristotle, does not refer to the subjectively good or pleasant life, but on “what is *worth* desiring and worth having in life” (Telfer, 1980, p. 37). Fromm (2013) distinguishes between subjective, hedonic desires whose fulfillment results in momentary pleasure, and eudemonic desires that lead to growth. Thus, since the pursuit of certain pleasures might lead to bad outcomes, well-being (in the eudemonic sense) cannot be measured in terms of subjective happiness (in the hedonic sense). Correspondingly, Aristotle considered the pursuit of hedonic pleasures to be vulgar and made men slaves to their desires (Deci & Ryan, 2001). According to Aristotle, eudemonia could be achieved by contemplating and exercising moral virtues (Telfer, 1980). Later conceptualizations broadened this idea, in the sense that all activities can be expected to nourish eudemonia that further one’s potentialities (Waterman, 1990). Similar views were held by the humanistic psychologists Carl Rogers and Abraham Maslow, who both emphasized an individual’s need for *self-actualization* (i.e., “the full use and exploitation of talents, capacities, potentialities” (Maslow, 1954; p. 150). Waterman (1990) exemplifies the main difference between hedonism and eudemonia in the reasons for pursuing an activity; while engaging in an activity an individual might experience positive outcomes such as enjoyment, as well as experiences related to eudemonia such as feelings of purpose and accomplishment. But, whereas from the hedonic point of view the goal *is* the experience of positive states (i.e., enjoyment), experiences related to eudemonia are not the goal of the efforts, and only *indicate* success in furthering talents; instead the individual is intrinsically motivated in their pursuit of the activity (Waterman, 1990). In other words:



[...] the subjective experiences of feelings of expressiveness (eudaimonia) are a byproduct of engaging in actions consistent with the development and expression of one's best potentials and the pursuit of intrinsic goals. Such subjective experiences serve as a valuable indicator for when those potentials are being furthered, but they are not being sought as a goal in itself. The motive for eudaimonic activity is the value of the activity itself, not the subjective experiences that accompany it. (Waterman et al., 2010, pp. 42-43)

Thus, eudemonia could be considered a sufficient but not necessary condition for hedonic well-being (Telfer, 1980). Or, hedonic happiness "...is the by-product of a life that is well-lived" (Ryff & Singer, 1998; p. 5), but not the goal.

Regarding the measurement of the concepts, one important issue has to be highlighted. For both approaches, there is no consensus as to what actions should lead to long-term well-being (complexity increases since inter-individual differences are assumed). For hedonic well-being, however, the goal-state is more clearly defined: the subjective experience of happiness. For eudemonic well-being it is difficult to determine what should be relevant indicators of eudemonia. Diener et al. (1998) therefore criticized the eudemonic approach for requiring experts to define well-being.

In summary, differences between the two approaches can be made along two axes: (1) the goal of a good life (achieving hedonic well-being vs. eudemonic well-being), and (2), how this good life could be achieved (pursuit of hedonic experiences vs. striving for fulfilling one's potentials). Despite all these differences, both philosophical approaches agree in one important aspect: both consider the good life to be attainable.

### **Selected Psychological Theories of Well-Being**

Psychology has been mostly occupied with questions on what constitutes a "good" or "healthy" life and how it should be measured. Important early conceptualizations were provided by Jahoda's (1958) criteria for positive mental health (e.g., growth, environmental mas-

tery, autonomy); Maslow's (1954) description of the "self-actualized person" that can "loosely [be] described as the full use and exploitation of talents, capacities, potentialities" (p. 150); Allport's (1961) criteria for a mature person (e.g., warm relations to others, self-insight, and realistic perception of skills); or Rogers (1963) concept of a "fully functioning person" that is described as "able to live fully in and with each and all of his feelings and reactions" (p. 21). This section aims at describing and discussing selected *contemporary* psychological theories of well-being that, in most cases, have their roots in the aforementioned conceptualizations of well-being. In the following paragraphs, the following approaches are shortly described and discussed: Subjective Well-Being (Diener, 1984), Ryff's conceptualization of psychological well-being (Ryff, 1989ab), Ryan and Deci's (2001) Self-Determination Theory, Keyes (2002) definition of Mental Well-Being, whereas a special emphasis is put on Seligman's Authentic Happiness Theory (2002), as well as his Well-Being Theory (2011). Further theories of well-being that have been proposed (e.g., Huta, 2013; Fowers, Molica, and Procacci, 2010; Steger, Kashdan, and Oishi, 2008; Vittersø, 2013; Waterman et al., 2010; and Diener et al., 2010) and are distinguishable from the selected theories by offering different definitions and conceptualizations of eudemonic well-being are not discussed here, as this section focuses on the most frequently used contemporary theories on well-being. For an overview on further contemporary theories, see Huta and Waterman (2014).

The most frequently used approach of describing well-being following the hedonic traditions is *subjective well-being*, which encompasses a cognitive evaluation of one's life (i.e., life satisfaction; usually measured with the Satisfaction with Life Scale; Diener, Emmons, Larson, & Griffin, 1985) and affective evaluations (i.e., the presence of positive moods and the absence of negative moods; usually measured with the Positive Affect and Negative Affect Schedule; Watson, Clark, & Tellegen, 1988). Diener, Sapyta, and Suh (1998) describe the advantage of this approach as being that it does not rely on experts to define well-being, but instead offers a more democratic approach in the sense that people may define well-being

for themselves, and weight the relevance of different aspects in their lives for well-being (such as goals, values, and strengths). In their view, those aspects that could be considered as indicators of eudemonic well-being (e.g., a sense of mastery, goal progress, positive relationships) result in subjective well-being. However, they question the universality of such indicators and whether they "... can be positive in all cultures and in all life circumstances" (Diener, Sapyta, & Suh, 1998; p. 36) and, thus, refer to the problem of defining the components of eudemonic well-being. The subjective well-being approach has been criticized for not being a sufficient condition for well-being. Nozick (2013) concluded from his thought experiment that most people would not want to live wired to a machine that produces positive feelings or happiness, but that people want to earn their pleasures (see also Jayawickreme & Pawelski, 2013). In line with this notion, Diener, Sapyta, and Suh (1998) argue "subjective well-being is a necessary ingredient of the healthy life, but not a sufficient one" (p. 35).

Other psychological approaches follow the eudemonic view. With her theory of *Psychological Well-Being*, Ryff (1989a) presented a theory that is based on the eudemonic approach. It tries to integrate different ideas on positive psychological functioning or well-being, drawing on previous works of Jung, Allport, Rogers, Maslow, Jahoda, and others. Her theory includes six dimensions that define psychological well-being: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth (measured with Ryff's scales of psychological well-being; Ryff, 1989b).

Another frequently mentioned eudemonic approach is *Self-determination theory* (Ryan & Deci, 2001). Its basic assumption is that there are three basic innate psychological needs (i.e., autonomy, competence, and relatedness; usually measured with the Basic Psychological Needs Scale; Baard, Deci, & Ryan, 2004) that, when fulfilled, foster eudemonic and hedonic (i.e., subjective) well-being. This theory has its roots in earlier need-based theories of motivation; for example, McClelland (1961) suggested a highly similar set of needs; namely, the need for power, the need for achievement, and the need of affiliation. Similar needs were also

postulated by Murray (1938); among many other needs he mentioned the needs for autonomy, achievement, and affiliation. According to Ryan and Deci (2001) these basic needs are not valued equally across different cultures, although fostering them should lead to positive psychological consequences across all contexts. In addition, in contrast to other theories, Ryan and Deci (2001) do not claim that their basic needs define or constitute well-being but that these are "...the principal factors that foster well-being" (Ryan & Deci, 2001; p. 147).

Kashdan, Diener, and King (2008) criticize the distinction between hedonic and eudemonic well-being, since these philosophical concepts are difficult to apply in psychology. A similar problem is mentioned by Waterman (2010) in his critique of psychological well-being, which could apply to most eudemonic theories in psychology: "It does not follow, however, that the particular qualities they [i.e., Ryff & Singer, 2008] describe correspond to flourishing as that concept might have been recognized by Aristotle or as it is employed by contemporary philosophers working within the eudaimonic tradition" (Waterman, 2010; p. 43). Further, Kashdan et al. (2008) argue that the idea of hedonic well-being stems from a subjectivist idea (i.e., relying on subjective feelings of pleasure), whereas the idea of eudemonic well-being is tied to an objectivist view (i.e., relying on objective social values or virtues), and that in psychology the main focus is on subjective experiences. In addition, Kashdan et al. (2008) criticize the definition and measurement of eudemonia, since it is difficult to distinguish between antecedents and consequences, or correlates, and that the criterion is actually unclear. Moreover, they state that Aristotle and other representatives of the eudemonic view (e.g., Telfer, 1980) assume that eudemonic well-being is usually accompanied by high levels of hedonic well-being. This notion of the interrelatedness of the two concepts is also corroborated by empirical findings, which usually report two strongly correlated factors, whereas some of the components of psychological well-being show secondary loadings on subjective well-being (Keyes, Shmotkin, & Ryff, 2002). Instead of differentiating two qualitative different types of well-being, Kashdan et al. (2008) argue for a "quantitative distinction

among a matrix of well-being dimensions” (Kashdan et al., 2008; p. 228).

Others have argued that the existing psychological theories lack universality. Christopher and Hickinbottom (2008) argued that ideas of the good life vary with time and among cultures, and that psychological approaches of the good life are biased by Western perceptions, as well as by an individualistic perspective of happiness and the self. Delle Fave, Brdar, Freire, Vella-Brodrick, and Wissing (2010) conclude, based on a cross-country qualitative study, that in Western societies “well-being is prominently pursued and found in meaning and feelings confined to the home environment or to a close circle of friends. Community and Social issues are less valued as targets of resource investment.” (p. 204). Delle Fave et al. (2010) also argue that other relevant aspects of happiness (such as harmony and balance, which are often mentioned when lay people are asked to define well-being,) are hitherto overlooked dimensions of happiness.

Other theories have tried combining both hedonic and eudemonic approaches in a common framework: Keyes (2002), drawing on the work of Ryff (1989), argues that mental health consists of high emotional (i.e., subjective) well-being (sensu Diener and Lucas, 1999), psychological well-being (sensu Ryff, 1989), and argues for the necessity of a third component; social well-being, consisting itself of five dimensions (i.e., social acceptance, - actualization, - contribution, - coherence, and - integration); usually measured with the Mental Health Continuum-Short Form (Keyes et al., 2008). For individuals scoring high in all these three aspects he introduces the term *flourishing*; as a description of the mentally healthy, whereas those who score lower in these aspects are referred to as *languishing*.

### **Authentic Happiness Theory and Well-Being Theory**

Seligman (2002; see also: Seligman, Parks, & Steen, 2004) introduced in his *Authentic Happiness Theory* another approach that aimed at integrating both perspectives. He argued that *authentic* happiness (Seligman uses “authentic happiness” not in the hedonic sense) can be achieved through three ways of life: a hedonic way of *pleasure* (or positive emotions), and

a eudemonic way of *meaning* (i.e., using one's strengths "to belong to and in the service of something larger than ourselves; something such as knowledge, goodness, family, community, politics, justice or a higher spiritual power"; Seligman, Parks, & Steen, 2004; p. 1380). As a third way, Seligman suggested *engagement* (i.e., being fully engaged and absorbed; experiencing flow-states; Csikszentmihalyi, 1990). Whereas others considered engagement to be an indicator of eudemonia (e.g., Delle Fave & Massimini, 2005; Vittersø, 2013), or a combination of both eudemonia and hedonism (Waterman, 1993), Peterson, Park, and Seligman (2005a) argue for it to be viewed as distinct; since emotions are absent during the experience of flow and flow activities do not have to be meaningful, as well as vice versa.

In 2011, Seligman revised his Authentic Happiness Theory. He criticized the strong reliance on life satisfaction in well-being research, since it is strongly "determined by how good we feel at the very moment" (Seligman, 2011; p. 13), and is therefore strongly dependent on emotional states. Furthermore, he argued that his previous theory did "not exhaust the elements that people choose for their own sake" (Seligman 2011; p. 14). In the revised version of his theory, called *Well-Being Theory*, he implemented some important changes: Firstly, he suggested that, in addition to pleasure, engagement, and meaning, two further components should be added; namely, *positive relationships* and *accomplishment*. Together they form the acronym *PERMA*. According to Seligman (2011) a potential element should meet three properties to qualify as an element of his theory: (1) contribute to well-being, (2) be pursued for its own sake, and (3) be defined and measured independently from the other elements.

Secondly, he argued that these five are the *elements* of well-being, "each contributing to well-being, but none defining well-being" (Seligman, 2011; p. 15). Thus, he argues for measuring well-being across these five dimensions, instead using global conceptualizations of well-being, as in measuring life satisfaction or happiness. Thirdly, he redefined the pleasure component: Seligman argued that happiness and life satisfaction should be subsumed under

the element of pleasure, instead being the goal of the theory as it is in Authentic Happiness Theory. Fourthly, he argued that, whereas pleasure or positive emotions should be assessed subjectively, the other elements have subjective and objective components, since an individual might judge these things wrongly: “Crucial [...] is the need for objective indicators to complement the subjective indicators widely in use. [...] I can believe I have a positive relationship with my dean, but objective indicators can falsify my belief. The same is true of meaning and accomplishment.” (Jayawickreme, Forgeard, & Seligman, 2012; p. 337). Fifthly, according to Seligman (2011) the goal of positive psychology should not be increasing life satisfaction but increasing flourishing, by fostering all elements of his Well-Being Theory.

The relevance of the two newly added components is widely discussed in the literature. Seligman (2011) described accomplishment as “success, accomplishment, winning, achievement, and mastery for their own sake” (Seligman 2011; p. 18), since “people often acted simply to exert mastery over the environment” (Seligman 2011; p. 20). Jayawickreme et al. (2012) provide a more detailed description:

This motive is close to Nietzsche’s [2011] “will to power.” Winning only for winning’s sake can be seen in the pursuit of wealth for its own sake. Accomplishment need not be tied to winning and also includes motivation for mastery and competence. Accomplishment can be defined in terms of achievement, success, or mastery at the highest level possible within a particular domain (Ericsson, 2002). In some domains (e.g., sports, business, and education), accomplishment is measured through agreed-upon standards, such as competitions (e.g., gold medals at the Olympics), honors and awards (e.g., winning the Nobel Peace Prize), scholastic achievement tests (e.g., performance on the SAT), or reaching a particular level (e.g., president or CEO of an organization). At the individual level, accomplishment can be defined in terms of reaching a desired state and progress toward prestated goals. (p. 335)

Similar components can be found in earlier theories of motivation and personality. For example, Murray (1938) mentioned the need for achievement (characterized as “to overcome obstacles, to exercise power, to strive to do something difficult as well and as quickly as possible”; Murray, 1938; p. 80-81). Murray describes the need for achievement as “[...] an elementary Ego need, which alone may prompt any action or be fused with any other need” (Murray, 1938; p. 81). This description fits Seligman’s (2011) criteria for elements of well-being well. Furthermore, accomplishment-related components have often been related to well-being, mental health, or positive psychological functioning. Allport (1961) describes the pursuit of (appropriate) goals as a criterion for a mature person. Jahoda (1958) mentions growth, development, self-actualization, and environmental mastery as criteria for mental health – concepts that have considerable similarities with accomplishment. Maslow (1954) describes self-actualized persons as being “propelled by growth motivation” (p. 162) and being “fixed on ends rather than on means, and means are quite definitely subordinated to these ends” (p. 169). Ryan and Deci (2001) mention competence as a basic need, whereas Ryff (1989a) includes personal growth and environmental mastery as dimensions of psychological well-being. Finally, Schwartz et al. (2012) list achievement as one of ten basic values.

Seligman argues for the inclusion of positive relationships since, “other people are the best antidote to the downs of life and the single most reliable up” (Seligman, 2011; p. 20). Jayawickreme et al. (2012) argue for the inclusion of positive relationships as an element of well-being: Although “all positive relationships are accompanied either by positive emotion or meaning or accomplishment, [...] not to mean that the relationships are done for the sake of getting positive emotion or meaning or accomplishment” (p. 335). Although Seligman (2011) and his co-authors (e.g., Jayawickreme et al., 2012) do not give a specific definition of positive relationships, it can be assumed, based on the writings of Seligman (2011), that “positive relationships” in the Well-Being Theory are highly similar to other conceptualizations, such as those by Ryff (1989) who described the component of “positive relations with others”



as having “warm, trusting interpersonal relations” (p. 42). As for accomplishment, the relevance of positive relationships has been discussed widely in the literature: Murray (1938) mentions the *need for affiliation*; for Allport (1961) caring about others and maintaining warm, intimate relationships are important aspects of a mature person; while Jahoda (1958) emphasizes the ability to love and adequacy in interpersonal relations for mental health (although these aspects are subsumed under environmental mastery); and Maslow (1954) describes self-actualized people as having “deeper and more profound interpersonal relations than any other adults” (p. 166). Keyes (2002) includes social well-being on the same hierarchical level as emotional and psychological well-being in his conceptualization of mental health. Ryan and Deci (2002) suggest the basic need for *relatedness*, and Schwartz et al. (2012) mention safety, harmony, and stability of relationships (and society and self) as a basic value. Thus, with the inclusion of positive relationships and accomplishment, Seligman (2011) added two elements that are considered by the majority of definitions to be core elements of (eudemonic) well-being (Huta & Waterman, 2014).

Whereas no measurement instrument for the assessment of well-being in terms of Seligman’s (2011) Well-Being Theory has been developed so far, Peterson et al. (2005a) developed a questionnaire for measuring the endorsement, or orientation, towards each of the ways of life suggested by the Authentic Happiness Theory (OTH; Orientations to Happiness Questionnaire); assessing the life of pleasure, the life of engagement, and the life of meaning.

Peterson et al. (2005a) report that these three routes are empirically distinguishable, and are correlated but not redundant. Further, all three orientations are related to life satisfaction. Ruch, Harzer, Proyer, Park, and Peterson (2010) report extensive psychometric information for the German version of the OTH. They find support for the factorial structure, and the internal consistency and test-retest reliability (for three and six months) with coefficients  $\geq .70$  for pleasure and meaning, and  $\geq .60$  for engagement. In addition, Ruch et al. (2010) confirm the findings of Peterson et al. (2005a) that the three scales are related, but not over-

lapping, and that all scales are positively related to life satisfaction; correlation coefficients ranged from  $r = .24$  to  $r = .29$ , while they explained together a total of 13% in the variance of life satisfaction. Thus, the orientations to happiness can be considered traits, in the sense that are relatively stable across time and situations. As for other personality traits (or dimensions of personality, such as the big five), the orientations to happiness are expected to be relevant for a broad array of domains, such as behavioral tendencies, emotions, thoughts, or attitudes, what is also reflected in the OTH items that ask about behavioral tendencies (e.g., “In choosing what to do, I always take into account whether it will be pleasurable”), thoughts (“I have spent a lot of time thinking about what life means and how I fit into its picture”), or attitudes (“I agree with this statement: ‘Life is short, eat dessert first’”).

The OTH has been used in numerous studies across various countries all over the world using different indicators of well-being (e.g., Banth & Talwar, 2012; Brdar & Kashdan, 2010; Buschor, Proyer, & Ruch, 2013; Chan, 2009; Chen, Tsai, & Chen, 2010; Góngora & Castro Solano, 2014; Kumano, 2011; Park, Peterson, & Ruch, 2009; Peterson, Ruch, Beer-mann, Park, & Seligman, 2007; Ruch, Harzer, Proyer, Park, & Peterson, 2010; Vella-Brodrick, Park, & Peterson, 2009), in a variety of settings, such as educational settings (e.g., Chan, 2013; Gabriele, 2013), work settings (e.g., Johnston, Luciano, Maggiori, Ruch, & Ros-sier, 2013; Proyer, Annen, Eggimann, Schneider, & Ruch, 2012; Swart & Rothman, 2012), and clinical settings (e.g., Duckworth, Steen, & Seligman, 2005; Terrill et al., 2015), as well as with a wide array of specific samples (e.g., Croft, McKernan, Gray, Churchyard, & Georgiou-Karistianis, 2014; Samson & Antonelli, 2013). Various studies have examined the relationships of the orientations to happiness with personality (Pollock, Noser, Holden, & Zeigler-Hill, 2015) specific traits such as emotional intelligence (Bhullar, Schutte, & Malouff, 2012), attachment security (Peterson & Park, 2007), playfulness (Proyer, 2014), gelotophobia (Proyer, Ruch, & Chen, 2012), humor (Ruch, Proyer, & Weber, 2010), or grit (Von Culin, Tsukayama, & Duckworth, 2014). Finally, the orientations to happiness have been discussed

in philosophy (Haybron, 2001) and economics (Prinz & Büniger, 2012), and have been used in a wide array of methodological approaches, such as experimental studies (Giannopoulos & Vella-Brodrick, 2011; Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009) or experience sampling methods (Grimm, Kemp, & Jose, 2015).

Those individuals with high levels of well-being, or robust mental health, are usually described as “flourishing” (Keyes, 2002; Seligman, 2011), or living a “full life” (Peterson et al., 2005a), whereas those with low levels of well-being are described as “languishing” (Keyes, 2002), or living an “empty life” (Peterson et al., 2005a). Peterson, Park, and Seligman (2005a) showed that for pleasure, engagement, and meaning, individuals who have low scores on all three orientations report very low levels of life satisfaction (empty life), whereas those with high scores in all orientations reported very high scores in life satisfaction (full life). Avsec, Kavčić, and Jarden (2015) used a person-centered approach and found four individual profiles (“types”) of orientations to happiness in a study including seven countries using cluster analytic approaches: A “full life” profile, a “pleasurable life” profile (high scores in pleasure, low scores in meaning, and average scores in engagement), a “meaningful life” profile (high scores in meaning, low scores in pleasure, and average scores in engagement), and an “empty life” profile. Those living a full life reported the highest scores in life satisfaction and psychological well-being, followed by those living pleasurable or meaningful lives, whereas those living an empty life reported the lowest scores. These findings provide further support for the importance of the components of the Authentic Happiness Theory.

In addition to the OTH, Seligman et al. (2005) also developed the Authentic Happiness Inventory (AHI; also called Steen Happiness Index). The AHI, inspired by the components of the Authentic Happiness Theory, allows for an overall assessment of happiness. In comparison to the OTH the items in the AHI “reflect the three kinds of happy lives” (Seligman et al., 2005; p. 414), and thus focus more strongly on the *presence* of pleasure, engagement, and meaning, and less on the *orientation* towards them, as in the OTH. In addition to

that, the AHI includes also other aspects of positive psychological functioning, such as items on accomplishment (from *I feel like a failure* to *I feel I am extraordinarily successful*), mood (from *I am usually in a bad mood* to *I am usually in an unbelievably great mood*), goal attainment (from *I rarely get what I want* to *I always get what I want*), and aspects of relationships (from *I feel cut off from other people* to *I feel close to everyone in the world*). Thus the AHI includes many aspects of positive psychological functioning, and therefore offers an extensive overall assessment of well-being. Proyer, Gander, Wellenzohn, and Ruch (2015) report extensive information psychometric properties of the AHI, find strong support for its factorial structure, stability, convergent and divergent validity, and confirm its robust relations to the Orientations to Happiness. Proyer et al. (2015) argue that the AHI offers a strong overall estimation of well-being, but is better able to reflect changes (i.e., more sensitive to positive life events or interventions than other global assessments of well-being, such as the Satisfaction with Life Scale) and is therefore especially useful for intervention studies.

### **Summary and Conclusion**

The core characteristics of the selected theories of psychological well-being are summarized in Table 1. The theories can be differentiated with regard to what the “goal” of the theory is, i.e., what outcome it tries to define or explain; what the overarching question is that the lead to the development of the components; what components are suggested; and whether the suggested components are rather seen as defining elements of well-being or as antecedents of well-being. Table 1 shows that, despite a strong correspondence among the suggested components of the theories, there is a wide disagreement in various other aspects. For example, there is no agreement what the goal, or “outcome,” of the theories should be called, and how it should be called, respectively. Whereas the components of the Authentic Happiness Theory and the Self-Determination Theory are more seen as antecedents of well-being, the components are in the other theories outcomes, i.e., elements of well-being. Furthermore, the approaches differ in terms of the overarching question they are trying to answer, or that leads

them to the development of the components, respectively. The inclusion of the components of the Authentic Happiness Theory, the Well-Being Theory, and the Self-Determination Theory has a motivational basis and the components are derived rationally, whereas Ryff's and Keyes approaches follow more an eclectic approach and aim at providing a framework that is extensive as possible.

In general, the presented theories of well-being are mostly descriptive and do not completely fulfill the criteria of a “good” scientific theory (in the sense of “a set of related statements that explain a variety of occurrences”, Elmes, Kantowitz, Roediger, 2011; p. 41), such as being precise and having non-overlapping components, making predictions, and being falsifiable (Elmes et al., 2011). This is due to the problem of lacking or unclear criteria that would be needed for falsification. However, there seems to be considerable agreement among most researchers that well-being should be measured by both hedonic and eudemonic components. Although these components are usually correlated, it has been shown that they can be distinguished theoretically and empirically (Keyes et al., 2002; Waterman, 1993), and a broad variety of findings support the validity of both approaches. Both have been associated with better health and longevity; better work-related outcomes (such as higher productivity and income levels); and better interpersonal relationships (for an overview see Pavot & Diener, 2013, Ryff, 2014, and Ryan & Deci, 2001). The difference between the two approaches has been corroborated by a recent genomic study that reported “distinct gene regulatory programs” (Fredrickson et al., 2013) related to hedonic and eudemonic well-being, and suggested that these are also distinct entities at the level of molecular physiology.

From an intervention perspective, it can be assumed that – regardless of which theory is taken into consideration – the suggested components contribute to positive psychological functioning and to the subjective experience of well-being. Therefore it might be fruitful to develop interventions that directly aim at increasing these components.

GENERAL INTRODUCTION

Table 1

*Overview of Selected Psychological Theories of Well-Being.*

Theory/Approach	Author	Components		Goal	Question	Level of components	Measurement
		No.	Short names				
Subjective Well-Being	Diener (1984)	3	Life satisfaction, positive affect, negative affect	Subjective Well-Being	What is the “good life”?	Elements	Life satisfaction, Positive Affect, Negative Affect (several measures were used)
Self-Determination Theory	Ryan & Deci (2000)	3	Autonomy, competence, relatedness	Subjective Well-Being, self-actualization, vitality, and mental health	What fosters intrinsic motivation?	Antecedents	Basic Psychological Needs Scale (Baard, Deci, & Ryan, 2004)
Psychological Well-Being	Ryff (1989a)	6	self-acceptance, positive relations with others, personal growth, purpose in life, environmental mastery, autonomy	Positive Psychological Functioning	What are the criteria for successful ageing?	Elements	Ryff scales of Psychological Well-Being (Ryff, 1989b)
Mental Health Continuum	Keyes (2002)	14	Psychological and Subjective Well-Being, and five factors of social well-being: social acceptance, social actualization, social contribution, social coherence, social integration	Mental Well-Being / Flourishing	What is needed for positive functioning in life?	Elements	Mental-Health Continuum Short Form (Keyes et al., 2008)
Authentic Happiness Theory	Seligman (2002)	3	Pleasure/Positive Emotions, Engagement, Meaning	Happiness	What is pursued for its own sake?	Antecedents	Orientations: Orientations to Happiness (Peterson et al. 2005a); Outcome: Satisfaction with life scale (Diener et al., 1985)
Well-Being Theory	Seligman (2011)	5	Pleasure/Positive Emotions, Engagement, Meaning, Positive Relationships, Accomplishment	Flourishing	What is pursued for its own sake?	Elements	PERMA-components (no measurement has been developed so far)

Seligman's Authentic Happiness Theory, and its extension; the Well-Being Theory, have several distinguishing advantages for applied purposes (adapted from Rayman & Atanasoff, 1999): they are comparatively simple regarding their structure, their components are face valid, and they use simple vocabulary; both theories use only a few (more or less) well-defined, tangible, and separable components that also can easily be explained to lay people, in comparison to the more abstract, vague, and potentially overlapping concepts that are used in other theories (e.g., self-actualization in Maslow's theory, or environmental mastery in Ryff's conceptualization). These aspects might help for the acceptance of interventions based on these theories in participants and clients. Finally, the theories are easily translatable into practice. In the Authentic Happiness Theory, Seligman (2002) not only provides a definition of well-being but also elaborates how the different components of well-being can be attained; namely, by directly pursuing the experience of positive emotions (living a life of pleasure), engaging in activities that enable the experience of absorption and flow (living a life of engagement), and putting one's efforts into something larger than oneself (living a life of meaning), while also providing a measurement instrument for the assessment of these lives. These ideas could also be applied to the components of the Well-Being Theory -at least for pleasure, engagement, and meaning-, whereas for positive relationships and accomplishment no conceptualization and measurement of the endorsement of (or the orientation towards) these components has been developed so far. Whereas according to Seligman (2011) PERMA should be measured using subjective and objective measures, the endorsement of these components could be measured using subjective measures, as in the OTH framework. Such a measure would be highly useful from an intervention perspective; the endorsement of these components could be relevant for selecting appropriate interventions (e.g., choosing an intervention that fits the preferred or a hitherto less pursued way to well-being); it could be assessed whether interventions are capable of increasing the endorsement of these components; and it could be examined whether the intervention effectiveness depends on an individual's

expression in the endorsement of these components (i.e., considering moderation effects).

### **Positive Psychology Interventions**

Research in positive psychology interventions has steadily increased in the last decade. However, early approaches on deliberately increasing well-being through interventions can be traced back to Fordyce (1977, 1983) who was among the first psychologists to empirically test happiness-enhancing strategies (see below). Seligman et al. (2005) published a seminal study on testing self-administered online interventions that fostered further research in this area. The development of positive psychology interventions, as well as some of the most eminent studies in this field, will shortly be presented and discussed in the following paragraphs, followed by some relevant specific aspects of positive psychology interventions.

#### **Development of Positive Psychology Interventions**

Fordyce (1977, 1983) was among the first to conduct psychological studies on interventions that aim at increasing happiness in participants. His basic idea was that average and unhappy people could adopt characteristics of happy people and thereby enhance their own happiness. He proposed fourteen such characteristics (“fourteen fundamentals”) that individuals can develop (Fordyce, 1977): (1) be more active and keep busy, (2) spend more time socializing, (3) be productive at meaningful work, (4) get better-organized and plan things out, (5) stop worrying, (6) lower your expectations and aspirations, (7) develop positive, optimistic thinking, (8) get present-oriented, (9) work on a healthy personality, (10) develop an outgoing, social personality, (11) be yourself, (12) eliminate negative feelings and problems, (13) close relationships are the number one source of happiness, and (14) put happiness as your most important priority.

In a series of seven experimental studies, Fordyce (1977, 1983) varied the degree of involvement with these fourteen fundamentals (i.e., providing information on these fundamentals vs. instructing participants to conduct activities related to the fundamentals), the components and the content of trained characteristics (i.e., comparing the full program that



aims at training all fourteen fundamentals with interventions that trained a subset of the fundamentals related to Life-Style [1, 2, 3, 4, 13], Attitudes and Values [5, 6, 7, 8, 13], or Personality [9, 10, 11, 12]), or the used comparison conditions (i.e., waitlist control condition vs. conditions that received parts of the program). Fordyce concluded that “[...] the program has a noticeable and perhaps long-lasting effect on happiness for the great majority of individuals exposed to it and that this effect is due to the content of the information, not merely the artifact of sensitization or expectations about happiness to which it was compared” (Fordyce, 1983, p. 483).

Although Fordyce’s findings have to be interpreted with caution, since his studies did not fulfill strong methodical standards (i.e., student samples, no randomization, no follow-ups, intervention and control activities were delivered by the researcher, etc.), the studies provided initial invaluable insights into positive psychology interventions: happiness can be increased, and addressing happiness directly and on purpose is an effective strategy for increasing it – in contrast to the widespread notion that seeking happiness directly is detrimental for it; a view that is still often held by exponents of eudemonic approaches (e.g., Martin, 2007). Furthermore, the findings provided important information under what circumstances interventions work best: participants benefited more from the program when it was delivered in a more structured way; a program that combines multiple components or interventions does not necessarily provide larger benefits than the single components; and interventions that focus on lifestyle changes—compared to those that address more fundamental aspects of personality—showed more quickly beneficial effects on well-being. Between the seminal studies of Fordyce (see also Friedman, 2013) and the advent of positive psychology, only a few further studies have been published that could be considered positive psychology interventions (e.g., Lichter, Haye, & Kammann, 1980; Smith, Compton, & West, 1995; Cook, 1998; Fava, Rafanelli, Cazzaro, Conti, & Grandi, 1998). However, starting from 2000, the number of such studies steadily increased (cf. Sin & Lyubomirsky, 2009). Seligman et al. (2005) set a further

milestone by testing the following five different positive psychology interventions in a randomized, placebo-controlled online study:

- *Gratitude visit*: Writing and delivering a letter of gratitude to someone they have not properly thanked before.
- *Three good things*: Writing down three things that went well on every day for one week and explaining why those things went well.
- *You at your best*: Writing about a time when someone showed their best side and then reflecting on the displayed strengths.
- *Identifying signature strengths*: Participants completed a questionnaire on character strengths (VIA-IS; Peterson, Park, & Seligman, 2005b; based on the classification of character strengths by Peterson & Seligman, 2004), received a feedback on their highest five strengths (“signature strengths”), and were instructed to use them more often every day for a week.
- *Using signature strengths in a new way*: The same exercise as *identifying signature strengths*, but participants were asked to use them in a new and different way on every day for a week.

Participants were randomly assigned to these interventions, or a placebo control condition (*early memories*; writing about early memories on every night for one week). Seligman et al. (2005) assessed happiness (in the sense of Seligman’s 2002 Authentic Happiness Theory) and depressive symptoms before the intervention, after the intervention, and at four follow-ups (one week, one month, three months, and six months). The authors reported that three out of the five interventions, i.e., gratitude visit, three good things, and using signature strengths in a new way, increased happiness and decreased depressive symptoms in comparison to the placebo control condition. Except in the gratitude visit-condition where effects lasted for one month, the positive effects of the interventions were observable for up to six months after the intervention. These findings have been replicated (Mongrain & Anselmo-Matthews, 2012),

also under the condition that participants are not informed on potential beneficial effects on well-being (Gander, Proyer, Ruch, & Wyss, 2013).

The study of Seligman et al. (2005) made some important contributions to the field: Firstly, they showed that simple exercises that are conducted for the duration of one week can elicit long-term changes in well-being for up to six months. Secondly, instead of various other studies in the field (such as Fordyce, 1977, 1983), Seligman and colleagues (2005) tested the effects of separate exercises – and not of a whole program that includes multiple components. This allows for a deeper understanding of why and when interventions work, since effective components can be separated from ineffective ones. Thirdly, they showed the potential of online interventions, which have some advantages over classical face-to-face approaches (see below).

Two recent meta-analyses confirmed the effectiveness of positive psychology interventions: Sin and Lyubomirsky (2009) reported effect sizes of  $d = .61$  and  $r = .65$  for the increase of well-being and the reduction of depressive symptoms across 51 controlled interventions. Bolier et al. (2013) applied stricter criteria for the inclusion of studies (including only randomized studies, excluding studies that are not clearly positive psychology interventions, such as mindfulness-interventions). Additionally, they distinguish between subjective and psychological well-being. Bolier et al. (2013) report effect sizes of  $d = .34$  for subjective well-being,  $d = .20$  for psychological well-being, and  $d = .23$  for depression. Thus there is a general agreement on the effectiveness of positive psychology interventions. However, Bolier et al. (2013) report that study quality is a relevant moderator for the reported effectiveness (low-quality studies tend to report stronger effects) and argue for more high-quality studies, with sound methodological approaches (e.g., using randomization and intent-to-treat analyses).

### **Online Positive Psychology Interventions**

Conducting high-quality studies is facilitated in various regards (e.g., with regard to randomization of participants, and standardization of delivery) when using online-delivered

interventions. In 2014, 91% of Swiss and 81% of European households had Internet access, while the rate continues to increase in recent years (Swiss Federal Statistical Office, 2014). With the increased distribution of Internet access, online intervention studies are conducted more often, since they offer several advantages for the participant and for the researcher (Mitchell, Vella-Brodrick, & Klein, 2010): For the participants, the interventions are easily accessible, since participation is not tied to a particular place or time; there is a low-threshold for participating (anonymity is possible); the interventions can be delivered at low costs (although this has been questioned recently; Bolier et al., 2014); and interventions can easily be tailored to the participant (e.g., providing individualized feedback). Additionally, the researcher benefits from increased standardization of intervention delivery, since information is provided identically to participants, and the possible confounding interaction between researcher and participant can be eliminated. It is also easier to generate large samples of participants, which allows for testing smaller effects. Of course, there are also some disadvantages; the major disadvantages – from a research perspective – are the high dropout rates that might complicate the interpretation, and the generalizability of the findings. In a short review of five online intervention studies, Mitchell et al. (2010) report dropout rates ranging from 29% to 83% for follow-up periods of up to six months. Furthermore, two meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009) reported the lowest effect sizes for self-administered interventions compared to group or individually administered interventions, – as is usually the case for online interventions. Nonetheless, the online delivery of interventions remains a very useful method for intervention studies that focus on research and use experimental approaches. Thus, when comparing the effectiveness of interventions based on different components of a well-being theory—or studying possible mediators in an intervention—the online delivery of interventions may be an especially useful approach due to the ease of standardizing the delivery, and the recruitment of large samples.

### **Theory-Based Interventions**

However, methodological sound studies are difficult to interpret when they are not based on a theoretical framework. In the meta-analysis by Sin and Lyubomirsky (2009), about half of the studies aimed at increasing one specific aspect or trait (e.g., gratitude, optimism, goal-setting, kindness, mindfulness, strengths, or forgiveness), about a third of the studies validated existing programs (e.g., Well-Being Therapy, Positive Psychotherapy, or Fordyce's 14 fundamentals), while the rest of the studies examined the effectiveness of specific paradigms (e.g., positive writing). However, none of the interventions in the meta-analysis *directly* related to a theoretical framework of well-being, or directly aimed at addressing components of a well-being theory. Instead, most interventions (and programs) followed an eclectic approach, and combined elements that have been shown -or are expected to- positively influence well-being, and do not bother with theoretical reasoning. This is surprising, since testing interventions that are directly derived from a theory of well-being would yield several advantages. Firstly, such studies would provide strong empirical evidence for a theory, since it could be shown that suggested components of well-being have a direct influence on well-being<sup>1</sup>. Secondly, findings of theory-derived intervention studies could be interpreted within the theoretical framework. Thirdly, it would be possible to compare different components of a well-being theory with regard to how easily they can be addressed in an intervention; this would be especially relevant from an applied perspective. Fourthly, whereas various interventions aim at increasing well-being indirectly by increasing characteristics that are themselves strongly related to well-being (e.g., gratitude, character strengths, or optimism, to name but a few), training components of well-being theories seems to be a more direct approach, and may also be more efficient.

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<sup>1</sup> However, for most theories of well-being that define well-being as a multidimensional construct that is defined by its dimensions (such as in theories by Ryff, Keyes, or in Seligman's Well-Being Theory), it is not trivial to find a suitable criterion in order to avoid circular reasoning.

Only a few intervention studies have been published so far that were directly related to a theoretical framework of well-being. Exceptions have been the studies by Proyer, Gander, Wellenzohn, and Ruch (2015) and Giannopoulos and Vella-Brodrick (2011), which both tested interventions based on Seligman's (2002, 2011) Authentic Happiness Theory. Proyer et al. (2015) tested the effectiveness of a multi-component program with different components – based on pleasure, engagement, meaning, and overall happiness—and reported increases in all these components in comparison to a waitlist control condition. Giannopoulos and Vella-Brodrick (2011) tested variants of the three good things exercise that aimed at increasing pleasure, engagement, meaning, or all of these aspects simultaneously. They report that all of the interventions are effective in increasing mental health (*sensu* Keyes) in comparison to a placebo control condition, or a waitlist control condition. Thus, whereas there is evidence for the contribution of pleasure, engagement, and meaning to well-being, no study has experimentally examined the contributions of the two components that were added in Seligman's (2011) Well-Being Theory, positive relationships and accomplishment.

### **The Three-Good-Things Intervention**

When comparing the effectiveness of interventions based on different components of a particular well-being theory, it is important to use a paradigm that is known to be effective and can be easily adapted to different contents. One of the most frequently used interventions in research is the three good things intervention. Several studies have confirmed its effectiveness for time periods of up to six months (Gander et al., 2013; Mongrain & Anselmo-Matthews, 2012; Proyer, Gander, Wellenzohn, & Ruch, 2014; Schueller & Parks, 2012; Seligman et al., 2005). In addition, the exercise is easy and is well received by participants, which results in a tendency towards lower dropout rates for this exercise than for others (Gander et al., 2013; Proyer, Gander, Wellenzohn, & Ruch, 2014). Further, this intervention can easily be adapted to different contents. Gander et al. (2013) tested a variant of this intervention using the paradigm of writing and reflecting on three things on a daily basis with a

humor-based intervention: Instead of writing down “good” things, participants were instructed to write down “funny” things. Gander et al. (2013) report that the humor-based variant showed comparable effects in increasing well-being, whereas it was superior to the three good things intervention in reducing depressive symptoms. Other studies used the three good things paradigm for training the components of Seligman’s (2002, 2011) Authentic Happiness Theory (Giannopoulos & Vella-Brodrick, 2011). Whereas it has previously been argued that all positive interventions are effective due to the common factor of “involving the activation of positive, self-relevant information” (Mongrain & Anselmo-Matthews, 2012; p. 21), Wellenzohn, Proyer, Gander, Hentz, and Ruch (2014) have shown that the three good things intervention and the three funny things intervention elicit different sets of emotions and are, therefore, also distinguishable in their effects.

Thus, the three good things paradigm is an easy, well-received, and highly efficient approach that can be employed for training participants using a variety of contents. It is particularly useful for experimental studies since the paradigm can easily be applied to manipulate the content of an intervention for contrasting purposes. However, it is still unclear exactly *how* this intervention works. It can be assumed that the exercise has multiple relevant components, such as an affective component (i.e., the savoring and re-experiencing of good things), and a cognitive component (i.e., elaborating on why these good things have happened). Whereas Wellenzohn et al. (2014) also found support for the mediating role of positive emotions in this intervention, no study so far has examined whether the cognitive component also contributes to the positive effects of this intervention.

### **How do positive psychology interventions work?**

Whereas there is a large body of evidence corroborating the notion *that* positive psychology interventions are effective in increasing well-being (Bolier et al., 2013; Sin & Lyubomirsky, 2009), it is still widely unknown *how* they work and what working mechanisms are involved. A number of mediators have been proposed to explain the success of positive psy-

chology interventions. For interventions based on a specific characteristic, the changes in well-being are usually explained by increases in this specific characteristic, such as increases in state- and trait-gratitude in gratitude- and kindness-based interventions (Froh, Sefick, & Emmons, 2008; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006). A working mechanism that has been proposed to explain the effects on well-being across a variety of interventions (e.g., Gander et al., 2013; Martínez-Martí, Avia, Hernández-Lloreda, 2010; Otake et al., 2006) is the elicitation of positive emotions. Based on Fredrickson's (2004) broaden-and-build theory of positive emotions, this explanation assumes that the interventions elicit positive emotions that broaden the thought-action repertoire and build up physical, social, intellectual, and psychological resources that elicit further positive emotions and thus create an upward spiral. Other working mechanisms that have been suggested to explain the effects across interventions are mindfulness (e.g., Gander et al., 2013; Fava, Rafanelli, Cazzaro, Conti, & Grandi, 1998), self-regulation (e.g., Gander et al., 2013; Huta & Ryan, 2010; King, 2001), and the activation of positive, self-relevant information (Mongrain & Anselmo-Matthews, 2012). Although the effects of positive psychology interventions have been attributed to a variety of different variables, many intervention studies do not explicitly test for possible mediators or even elaborate on the possible working mechanisms of these effects. Thus, there is as yet no generally accepted framework that aims at explaining the working mechanisms, and few empirical studies have rigorously tested such effects. This is especially interesting since the widely used definition of positive psychology interventions as "treatment methods or intentional activities cultivating positive feelings, positive behaviors, or positive cognitions" (Sin & Lyubomirsky, 2009; p. 468) refers more to working mechanisms than to outcomes (e.g., increasing well-being).

However, knowledge of working mechanisms is crucial for a number of reasons. Firstly, it allows researchers to shift away from testing the effectiveness of specific exercises to a considering these interventions at a more abstract level by reflecting on what characteristics



are shared by “different” exercises. This may aid in identifying relevant working mechanisms and allow for the design of experimental studies aimed directly at testing the underlying working mechanisms. Secondly, interventions could be refined in a way that strengthens the elicitation of a particular working mechanism. Thirdly, it is possible to compare the effectiveness of different working mechanisms and test for inter-individual differences in susceptibility to change. This might make it possible to create more individually tailored exercises and further increase the person  $\times$  intervention fit, thereby increasing the acceptance and effectiveness of a particular intervention (see Proyer, Wellenzohn, Gander, & Ruch, 2014; Schueller, 2010, 2011, 2012). Fourthly, knowledge of relevant working mechanisms might help to detect which working mechanisms are not covered in an intervention and thus foster the development of new interventions. Fifthly, the knowledge of working mechanisms might allow for an earlier assessment of whether a specific intervention might work for a particular individual whereas changes in well-being might be follow later on (see also Proyer, Wellenzohn, et al., 2014).

Quoidbach, Mikolajczak, and Gross (2015) have recently proposed a framework on working mechanisms from an emotional regulation perspective. They argue that “positive emotion-inducing strategies are a core component of positive interventions” (Quoidbach et al., 2015; p. 656), and use a process model of emotion regulation strategies for classifying positive interventions (Gross, 1998). This model suggests five different families of emotion regulation strategies: (1) situation selection (i.e., entering or avoiding situations based on their expected emotional output); (2) situation modification (i.e., modifying a situation to increase its (positive) emotional output); (3) attentional deployment (i.e., focusing on positive aspects of a situation, such as savoring the moment); (4) cognitive change (i.e., altering appraisals of a situation); and (5) response modulation (i.e., influencing the physiological, experiential or behavioral response to the situation, for example, by laughing or sharing positive emotions with others). Further, Quoidbach et al. (2015) suggest that positive interventions can be dis-

tinguished with regard to whether these emotion regulation strategies are applied before, during, or after a situation. In the “gratitude visit” exercise, for example, the suggested working mechanisms are the emotion regulation strategies of cognitive change and response modulation after an emotional event, whereas in the “three blessings” exercise (a similar exercise to the “three good things” exercise) cognitive change following an emotional event is the suggested working mechanism.

Whereas the framework of Quoidbach et al. (2015) is a very helpful and long-needed contribution to furthering the theory of positive psychology interventions, it cannot be considered a comprehensive framework; it aims at distinguishing and explaining the positive emotion-inducing aspect, whereas positive psychology interventions also include other strategies that do not directly aim at eliciting emotions (see the definition of positive psychology interventions above). Further, the suggested model follows more a descriptive approach to classifying interventions, and cannot be considered a model of working mechanisms that aims to explain the pathways through which an intervention affects well-being.

Lyubomirsky and Layous (2013) suggested another model of the working mechanisms involved in positive psychology interventions. They suggest that interventions increase happiness by stimulating “increases in positive emotions, positive thoughts, positive behaviors, and need satisfaction” (Lyubomirsky & Layous, 2013; p. 60). Whereas this model is more comprehensive than the one suggested by Quoidbach et al. (2015), since it only accounts for changes in positive emotions, it probably does not fully account for all the relevant processes that might be involved in positive psychology interventions. Further, Lyubomirsky and Layous (2013) do not provide clear definitions of positive emotions, thoughts, or behaviors. Whereas there seems to be a general agreement on what “positive emotions” are, it is unknown what positive thoughts and behaviors should be, and how they differ from each other and from positive emotions.

However, such models may aid in distinguishing different mechanisms and in design-

ing empirical tests to discover whether they are actually involved in increasing well-being. For example, Wellenzohn et al. (2014), tested whether positive emotions are increased in the “three good things” and the “three funny things” interventions, and whether the increase in positive emotions accounts for the increase in well-being. They confirmed the role of positive emotions in the exercise, but these only accounted for a small number of the changes in well-being, thus suggesting that other mechanisms might be involved. The “three good things” exercise might first elicit positive emotions through remembering and savoring the good things. The instruction to elaborate on why these things happened might also lead to cognitive changes, such as gaining new insights (e.g., the insight that one’s life is actually filled with positive experiences), new appraisals of a situation, or a deepened understanding of what situations actually represent good things for oneself. In the aftermath, the exercise might create an attentional stance towards “good things”, and it might have behavioral consequences, such as that more “good things” are sought. For increasing the effectiveness of the exercise and deepening the understanding of their working mechanisms, it would be useful to separate and test these hypothesized strategies empirically.

### **Working Model**

For describing the hypothesized relations among possible working mechanisms and changes in well-being, a working model is suggested, based on those presented by Lyubomirsky and Layous (2013), and Quidbach et al. (2015). The previous models are extended by including a “time frame” and distinguishing between more proximal and more distal changes, and by a first attempt to further define the cognitive component described as “positive thoughts” by Lyubomirsky and Layous (2013). Further, the working model does not include “need satisfaction” as a mediator, since it is assumed that need satisfaction can be subsumed under other types of mediators (i.e., positive emotions). The working model is shown in Figure 1.

It is expected that the performance of a positive psychology intervention will yield

psychological changes that could be regarded as more proximal or more distal. With more proximal changes, a more or less immediate increase in the frequency and intensity of affective aspects—including more cognitive aspects, such as the development of positive appraisals and new insight related-thoughts, or better understanding of what activities are beneficial for oneself—are expected. Further, it is expected that an intervention might also have behavioral consequences in the sense that it might trigger the performance of new or additional beneficial activities. In addition, following a positive psychology intervention, participants might also pay more attention to positive aspects of their lives. When a positive psychology intervention is conducted repeatedly (or is highly effective in an individual), more distal changes might be observed, such as changes in attitudes and values (e.g., an increased endorsement of a life of pleasure or engagement), or habits and skills might be strengthened (e.g., the ability to perceive positive things). In the end, trait-like aspects, such as character strengths, might also be positively affected. All of these changes can result in increased well-being (i.e., subjective well-being and/or other indicators of positive psychological functioning); however, it is assumed that changes in the more “distal” aspects lead to more sustainable effects on well-being.

# GENERAL INTRODUCTION

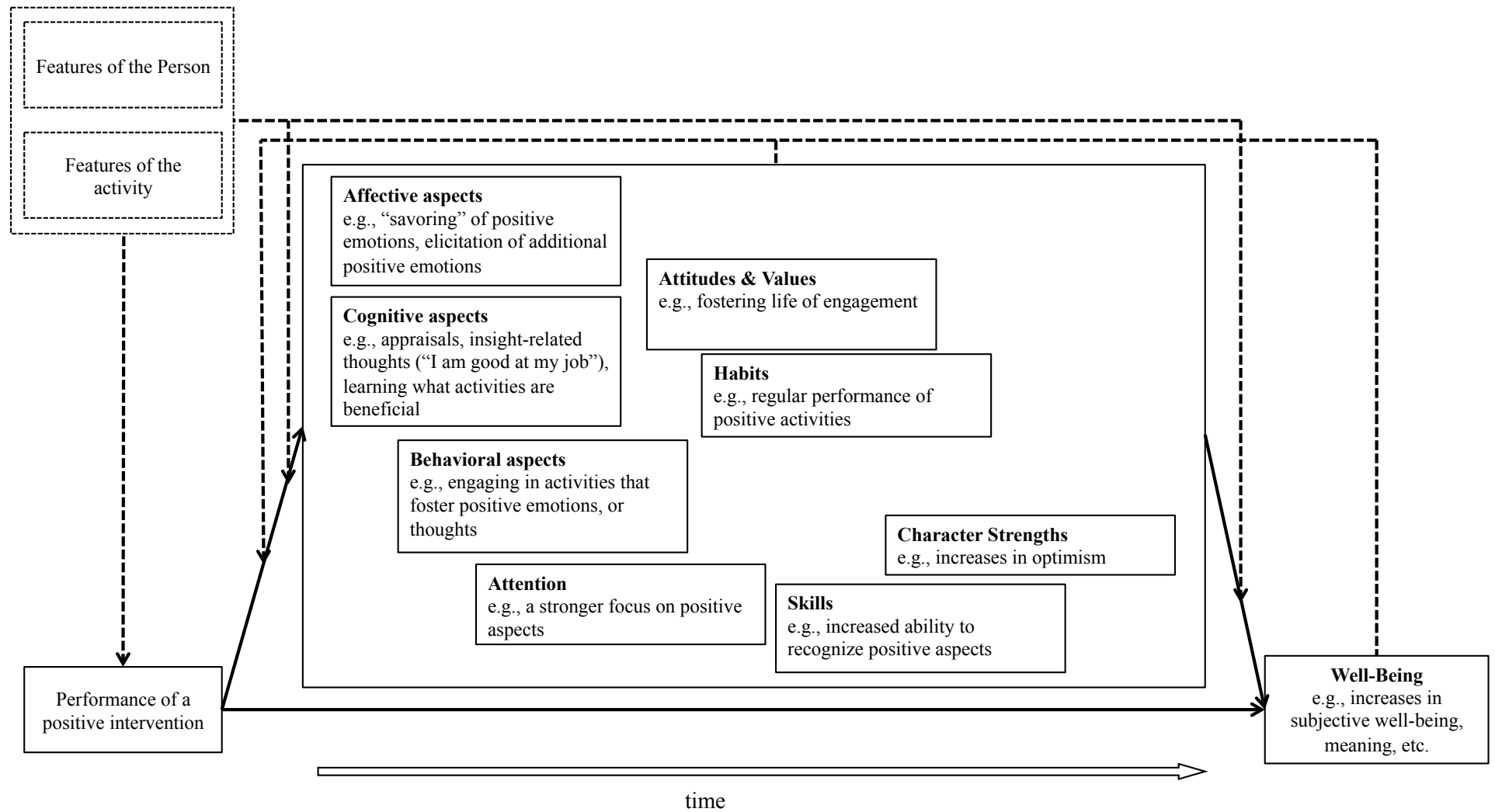


Figure 1. Working model of working mechanisms in positive psychology interventions (moderating effects in dashed lines)

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Further, it can be assumed that all the aspects that might be changed due to a positive intervention foster each other. However, the pre-intervention levels of these aspects, and also the pre-intervention level of overall well-being, might moderate the effectiveness of an intervention (dashed lines): An individual with high scores in the endorsement of pleasure might benefit less from a pleasure-based intervention than low scorers, whereas highly satisfied individuals might not benefit from an intervention. Finally, features of the person (e.g., demographics, personality, and motivation) and of the activity (e.g., content and dosage,) and their interaction (person  $\times$  activity fit) might moderate the intervention effectiveness.

It should be noted that this model is not meant to be comprehensive since there could be further relevant mediators. Further, it only serves the purpose of illustrating expected relationships between interventions, possible mediators, and outcomes, and cannot be seen as an empirical model that could be tested as a whole.

### **Summary and Conclusions**

Whereas there is strong support for the notion that positive psychology interventions are effective strategies for increasing well-being, most of the research undertaken so far has focused mainly on a pragmatic and widely atheoretical approach. This seems to be a valuable approach for preliminary research in a new research field. When new and impressive findings emerge (e.g., the seminal study of Seligman et al., 2005), it makes sense to first replicate and test variants of the initial findings and thus establish their reliability before attempting to formulate a theory. However, for progressing a field, theories and empirical studies concerning how and why interventions work are needed.

### **Research Questions**

The thesis aims to extend the knowledge of positive psychology interventions by developing measures of the endorsement of positive relationships and accomplishment, validating interventions based on Seligman's (2011) Well-Being Theory, and examining how, and under

which conditions these interventions work best. The first goal is to examine whether the endorsement of positive relationships and accomplishment can be measured independently with respect to pleasure, engagement, and meaning and whether this endorsement is positively related to well-being using cross-sectional data, thus, examining the potential for these components to be used in an intervention. The second goal is to examine the effectiveness of positive psychology interventions based on positive relationships and accomplishment in a randomized placebo-controlled online intervention study and to explore for whom they work best. The third goal is to learn more about how these interventions work by comparing different possible working mechanisms.

### **Part I**

The goal of the first part of this thesis is the development of short scales for the assessment of the endorsement of positive relationships and accomplishment using Peterson, Park, and Seligman's orientations to happiness framework (2005) with the goal of using these scales, together with the OTH, in studying specific interventions. Possible applications are testing moderating effects of baseline scores in these orientations (e.g., it could be assumed that pleasure-based interventions work better for participants with an elevated expression of the endorsement of pleasure), and testing whether interventions based on the components of Seligman's (2011) Well-Being Theory also influence the endorsement of these components (e.g., does a pleasure-based intervention change the endorsement of pleasure?).

For this purpose, the construction and validation of two short scales for the assessment of positive relationships and accomplishment is described in three studies. In the first study, data on factorial, convergent, and discriminant validity of the two new scales in three samples is presented. Additionally the ability of the new scales to predict additional variance over and above pleasure, engagement, and meaning in relevant criteria is examined, such as well-being or flourishing. The second study examines the test-retest stability of the short scales for time

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periods of one, three, and six months. The third study examines whether the two components are malleable in a placebo-controlled intervention study that addresses all components of Seligman's (2011) Well-Being Theory simultaneously. The main research questions in this part are as follows:

- Can the endorsement of positive relationships and accomplishment be assessed independently from orientations to happiness?
- Do they add to the prediction of well-being, over and above the influence of the orientations to happiness?
- Are the endorsements of positive relationships and accomplishment stable over time?
- Can they be increased in an intervention and does this go along with increases in subjective well-being?

It is expected that the short scales for positive relationships and accomplishment proposed in this research are positively related to orientations of happiness but not redundant, and that they add to the explanation of well-being. Further, it is assumed that the endorsement of positive relationships and accomplishment is more or less stable across a several month interval and that the test-retest correlations are comparable to those of the OTH, but that they can be altered in an intervention.

### **Part II**

The main goal of Part II is to extend the findings of Part I by examining the effectiveness of interventions based on all components of the Well-Being Theory separately, and therefore also replicating the findings of Giannopoulos and Vella-Brodrick (2011) on pleasure-, engagement-, and meaning-based interventions in a randomized, placebo-controlled online intervention study.

For this purpose, the "three good things" intervention has been adapted in the follow-



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ing way: Participants are randomly assigned to interventions focusing on (1) pleasure, (2) engagement, (3) meaning, (4) positive relationships, (5) accomplishment, (6) all of the above simultaneously (as in study 3 of Part I), or (7) a placebo control condition. Well-being (i.e., happiness and degree of depressive symptoms) is assessed before the intervention and at four intervals following the intervention (i.e., directly after the intervention, and after 1-, 3-, and 6-months). Additionally, the moderating effects of the baseline scores in the orientations to happiness, positive relationships, and accomplishment, happiness, and depressive symptoms are considered. The main research questions in this part are as follows:

- Can previous findings of the effectiveness of interventions based on pleasure, engagement, and meaning regarding the increase of well-being be replicated, and is the effectiveness of these interventions moderated by the baseline scores in the orientations to happiness?
- Do interventions based on positive relationships and accomplishment result in an increase in happiness and a decrease of depressive symptoms in comparison to a placebo control condition?
- Does the effectiveness of these interventions depend on the baseline scores in pleasure, engagement, meaning, positive relationships, accomplishment, happiness, and depressive symptoms?

It is assumed that all interventions increase happiness and decrease depressive symptoms in comparison to the placebo control condition, and that the baseline levels of the endorsement of pleasure, engagement, meaning, positive relationships, and accomplishment have moderating effects on intervention effectiveness (although previous findings regarding this topic were mixed; see Giannopoulos & Vella-Brodick, 2011; Proyer et al., 2015). Further, it is assumed—in accordance with the core idea behind positive psychology interventions that they help “relatively untroubled people” increase their well-being—that the inter-

ventions are most effective for those participants in the middle range of the well-being continuum.

### **Part III**

The main goal of the third part is to examine possible working mechanisms of a positive psychology intervention. For this purpose, three variants of the pleasure-based “three good things”-intervention (“three pleasurable things”) were created that emphasize the emotional, and the cognitive component of the intervention to varying degrees while minimizing the other aspect.

The first variant (1) focuses on the cognitive component of the intervention (why did these situations happen and what conclusions could be drawn?) while excluding the emotional component. The second variant (2) focuses on the emotional aspects. Participants in this condition are instructed to spend time with an “an activity that you would not have conducted otherwise that elicits pleasure, joy, and fun”. This condition should also yield the fewest cognitive changes. The third variant (3) had both an emotional and a cognitive focus. It asked participants to re-experiencing and savoring previously experienced positive emotions (re-experience your emotional state in these situations in as lively and intense a manner as possible”). Whereas no cognitive aspects are explicitly mentioned in the instruction, it is expected that savoring and re-experiencing positive emotions (as in the first variant) might still go along with changes on a more cognitive level (e.g., “this was a good day”). These three variants are compared with a placebo control condition in which participants are instructed to write down early childhood memories (cf. Seligman et al., 2005) in a randomized, placebo control online intervention study. Happiness and depressive symptoms are assessed before the intervention, directly after the intervention, and at a follow-up after two weeks. The main research questions in this part are as follows:

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- Do pleasure-based interventions that emphasize cognitive, emotional, or both components increase happiness and decrease depressive symptoms in comparison to a placebo control condition and to each other?
- Do these interventions increase positive emotions (emotional aspect) and create new insights (cognitive aspect) in comparison to a placebo control condition and to each other?
- Do the increases in these potential mediating variables account for the changes in happiness and depressive symptoms?

In addition to assessing happiness and depression, participants complete measures on potential mediator variables; participants are asked whether the intervention elicits positive emotions or new. It is assumed that all intervention conditions report higher scores in these mediating variables, compared to the placebo control condition, while positive emotions are expected to be higher in conditions 2 and 3, and the highest level of cognitive change is expected in condition 1. Finally, it is expected that positive emotions and insights would mediate the effects of the intervention on well-being.

**PART I:**  
**THE SUBJECTIVE ASSESSMENT OF ACCOMPLISHMENT AND POSITIVE RELATIONSHIPS:**  
**INITIAL VALIDATION AND CORRELATIVE AND EXPERIMENTAL EVIDENCE FOR THEIR**  
**ASSOCIATION WITH WELL-BEING**

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The final publication is available at Springer via <http://link.springer.com/article/10.1007%2Fs10902-016-9751-z>.

**Abstract**

In his *Authentic Happiness Theory*, Seligman (2002) describes three orientations that lead to happiness: The life of pleasure, the life of engagement, and the life of meaning. The *Orientations to Happiness Questionnaire* (OTH; Peterson, Park, & Seligman, 2005) has been developed as a subjective measure for these three orientations. In 2011, Seligman revised his theory and added two new components; i.e., positive relationships and accomplishment. These five are the basic tenets of his well-being theory. The present set of studies describes the construction and initial validation of two short scales for the subjective assessment of the endorsement of positive relationships and accomplishment. Their relation with the OTH-scales is also tested. Study 1 describes the scale construction and provides evidence for the factorial, convergent and divergent validity in three samples ( $n = 233$ ,  $n = 336$ , and  $n = 125$ ). Study 2 showed that the new scales have high test-retest reliabilities over a period of 1, 3, and 6 months ( $r = .68 - .78$ ), respectively. Study 3 examines the malleability of positive relationships and accomplishment in an intervention study that shows that the scores of both new scales increase in the intervention condition. Overall, the three studies show that the new scales have satisfactory psychometric properties – also when used together with the OTH-scales – and possible applications are discussed.

*Keywords:* accomplishment, authentic happiness theory, orientations to happiness, PERMA, positive psychology, positive relationships, test development, well-being theory.

## Introduction

Positive Psychology is the scientific study of what makes life worth living (Seligman & Csikszentmihalyi, 2000). One of its goals is identifying actions or ways of life that lead to well-being. There are numerous approaches on how a “good life” can be achieved (e.g., Keyes, Shmotkin, & Ryff, 2002; Ryan & Deci, 2001). In 2002, Martin Seligman proposed in his *Authentic Happiness Theory* three different ways of life that should contribute to happiness: A hedonic orientation based on the pursuit of positive emotions (*life of pleasure*), a eudemonic orientation based on the pursuit of meaning (*life of meaning*), and an orientation that focuses on the pursuit of engagement (*life of engagement*) that is characterized by the search for flow experiences. Seligman argues that these three orientations can be pursued simultaneously and are, therefore, not mutually exclusive.

Peterson, Park, and Seligman (2005) developed the *Orientations to Happiness* (OTH) questionnaire for the assessment of the endorsement of these orientations. Peterson et al. (2005) reported positive relations between the endorsement of pleasure, engagement, and meaning, without them being neither exclusive nor redundant. Additionally, Peterson and colleagues found that the endorsement of each of these orientations is positively related to satisfaction with life. Numerous studies have replicated the relations between these orientations and different indicators of subjective well-being, also across different countries (e.g., Buschor, Proyer, & Ruch, 2013; Chan, 2009; Chen, Tsai, & Chen, 2010; Peterson, Ruch, Beermann, Park, & Seligman, 2007; Proyer, Ruch, & Buschor, 2013; Ruch, Harzer, Proyer, Park, & Peterson, 2010; Vella-Brodrick, Park, & Peterson, 2009).

In 2011, Seligman proposed a revision of his Authentic Happiness Theory. He argues that well-being (or *flourishing*) should be assessed as a multidimensional construct and not as a unidimensional one, as in the assessment of life satisfaction or happiness. Based upon theoretical reasoning, he was interested in expanding the theory to cover well-being more broadly.

Therefore, Seligman defined criteria that an element of well-being should meet: It should contribute to well-being, should be pursued for its own sake (not for the pursuit of another element), and the definition and measurement should be independent of the other elements (Seligman, 2011). Following these criteria, he suggested the inclusion of two further elements as an extension of the Authentic Happiness Theory: Positive relationships and accomplishment.

The importance of positive relationships can also be traced back to early theories of personality. For example, Murray (1938) suggested a *need for affiliation* as a basic human need. Contemporary theories of well-being also include similar components. For example, Ryff (2014) lists *positive relationship with others* as a dimension in her model of psychological well-being, whereas Deci and Ryan (2000) describe *relatedness* as a basic human need in their Self-Determination-theory. Numerous studies have demonstrated the positive impact of social relationships in various contexts. Myers (2000) gives an overview on positive effects of close relationships (i.e., friendships and marriage), showing that they are generally linked to higher levels of well-being.

There are many predecessors for the pursuit of accomplishment as an important contributor to positive functioning. Again, Murray (1938) argued for a *need for achievement* as a basic human need. Similar components can also be found in the *Self-Determination-theory* (*competence* as a basic human need; Deci & Ryan, 2000), or in the theory of *basic values* (e.g., *achievement*; Schwartz et al., 2012). There is also empirical support for the notion that accomplishment (or related components) are positively associated with well-being. For example, Lyubomirsky, King, and Diener (2005) present an overview of studies that reported positive relationships between subjective well-being and different indicators of success at work (i.e., income, supervisor ratings, etc.). Sagiv and Schwartz (2000) reported positive correlations between considering achievement an important value and mental health and positive

affect (although no relationships with life satisfaction were found).

Finally, Seligman (2011) also redefined the pleasure component to *positive emotions*, which now also encompasses happiness and life satisfaction. He argues that each of these five components of *positive emotions / pleasure (PLE)*, *engagement (ENG)*, *positive relationships (REL)*, *meaning (MEA)*, and *accomplishment (ACC)* are pursued for their own sake and, therefore, constitute the elements of well-being (forming the acronym *PERMA*). Since one of Seligman's criterion for adding an element to his Well-Being Theory is that "it contributes to well-being" (Seligman, 2011; p. 16), the endorsement of these five components could also be considered orientations or paths to well-being. This approach is especially relevant from an intervention perspective, since promoting these orientations could be used for fostering well-being.

### **The present study**

The main purpose of this set of studies was the development and validation of two short scales for the subjective assessment of the endorsement of REL and ACC. We are not aiming for the development of a PERMA-measure (that would have to focus on whether these components are *present*), but want to provide two scales using the same methodology as the OTH (i.e., assessing the *endorsement* towards these components) that could be used along and compared with the OTH. However, despite that these two scales could be used together with the OTH-scales, they are independent from them. Study 1 describes the development of the two short scales and presents information on their reliability and factorial, convergent, discriminant, and criterion validity. Study 2 examines the test-retest-reliability of the two scales after 1, 3, and 6 months. Study 3 examines the malleability of the endorsement of positive relationships and accomplishment in a placebo-controlled intervention study.

### **Study 1**

Study 1 describes the development and initial validation of the two short scales for the



assessment of the inclination to *positive relationships* (REL) and *accomplishment* (ACC) in a development and a replication sample. Additionally, their overlap with the three components of the Authentic Happiness theory will be tested. It was expected that they will show a comparable overlap as has been reported for the OTH in samples from German-speaking countries (Ruch et al., 2010; i.e., correlations around .30). Furthermore, the predictive power of the new scales as indicators of subjective, and psychological well-being (i.e., life satisfaction and flourishing) above and beyond the dimensions of the Authentic Happiness theory will be tested in the development sample, the replication sample, and a validation sample. We expect that both scales will have incremental validity in the prediction of well-being. Finally, we examined whether individual differences in REL and ACC also reflect differences in an individuals' self-reported choice of activities. For this purpose, we asked university students how much time they spend, or would like to spend, with activities related to these dimensions in different situations: On a typical day at the university, a leisure day, and an ideal day. We expect that their scores in REL and ACC will be associated with the amount of time spent with related activities.

## **Method**

### **Participants**

Three different samples were used for scale development ( $N = 233$ ), replication ( $N = 336$ ), and validation ( $N = 125$ ). The sample characteristics are given in Table 1.

### **Instruments**

For the development of the *Positive Relationships*- and the *Accomplishment*- scales, four independently working psychologists drafted 36 new, face-valid items (18 per scale) based on the descriptions given by Forgeard, Seligman, Jayawickreme, Kern, and Seligman (2011), and Seligman (2011). As a result, the accomplishment items encompassed having ambitions, experiencing mastery in own actions, and being achievement-oriented. The rela-

tionship items included valuing the presence of others, preferring to do things with other people, and considering “being on good terms” with others as important. Item examples are given as an online supplementary. All items are positively keyed and use a 5-point Likert-style scale (from 1 = *very much unlike me* to 5 = *very much like me*).

The *Orientations to Happiness* questionnaire (OTH; Peterson, Park, & Seligman, 2005; in the German adaption by Ruch, Harzer, Proyer, Park, & Peterson, 2010) consists of 18 items for the subjective assessment of the three orientations pleasure, engagement, and meaning. All items in the OTH are positively keyed and use a 5-point Likert-style scale (from 1 = *very much unlike me* to 5 = *very much like me*). A sample item is “My life serves a higher purpose.” Peterson et al. (2005) and Ruch et al. (2010) reported satisfactory internal consistencies and stabilities and provided information on the factorial validity. The OTH is frequently used in research (e.g., Berthold & Ruch, 2014; Pollock, Noser, Holder, Zeigler-Hill, 2014; Ruch, Martínez-Martí, Heintz, & Brouwers, 2014; Von Culin, Tsukayama, & Duckworth, 2014) and is the standard measure for the pleasurable, engaged, and meaningful life in Seligman’s (2002) Authentic Happiness-theory (see Table 6 for information on reliability).

The *Satisfaction with Life Scale* (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; in the German version used by Ruch et al., 2010) is a 5-item measure for the global, evaluative assessment of subjective well-being (i.e., one’s satisfaction with his own life). The SWLS uses a 7-point Likert-style scale (from 7 = *strongly agree* to 1 = *strongly disagree*). A sample item is “In most ways, my life is close to my ideal.” The SWLS is widely used in research and shows good psychometric properties (for an overview, see Pavot & Diener, 2008). Internal consistencies in the present samples were high ( $\alpha = .80 - .90$ ).

The *Flourishing Scale* (in the German version provided by Diener et al., 2010) is a one-dimensional 8-item measure for the subjective assessment of psychological well-being. It encompasses different aspects of human functioning such as self-esteem, purpose, and opti-

mism. It uses a 7-point Likert-style scale (from 7 = *strongly agree* to 1 = *strongly disagree*). Diener et al. (2010) reported good psychometric properties; in the present sample internal consistencies were satisfactory ( $\alpha = .75 - .87$ ).

The *Flourishing Schedule* was utilized for this study to assess the amount of time participants spent with activities related to aspects of pleasure, engagement, meaning, positive relationships, and accomplishment in three different situations; on a day at the university, on a leisure day, or on an ideal day. A sample item (for a day at the university) is “What percentage of an average day at the university are you spending with the following activities?” (for pleasurable, engaging, meaningful activities, and activities related to relationships, and accomplishment). Participants were asked to indicate the percentage of the time (0-100) they spent with activities related to each of the five dimensions.

### **Procedure**

The development sample and the replication sample were recruited over the Internet (e.g., advertisement in forums and mailing lists,) or by means of leaflets in late 2011. Both samples were recruited in similar ways, but at different time periods. As an incentive, we offered individualized feedback on the results at the end of the study and course credit for students. The participants completed German versions of the *Positive Relationships* and *Accomplishment* scales, the OTH, the SWLS, and the Flourishing scale (only in the validation sample), on a web site affiliated with an institute of higher education.

Participants in the validation sample were psychology students who completed a paper-pencil version of the positive relationships- and accomplishment-scales, the OTH, the SWLS, the Flourishing scale, and the Flourishing Schedule, during an introductory psychology class. The students volunteered to participate and did not receive any sort of reimbursement for their participation. Descriptive statistics of all samples are given in Table 1.

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Table 1

*Descriptive Statistics of all Samples Covered in the three Studies*

	Study 1			Study 2	Study 3
	Sample 1	Sample 2	Sample 3		
<i>N</i>	233	336	125	394	51
Women %	74.2%	81.5%	84.8%	74.6%	62.7%
<i>Age</i>					
<i>Mean</i>	30.30	38.09	22.87	47.00	27.98
<i>Standard deviation</i>	14.64	13.52	4.15	12.10	11.58
Range	18–85	16–80	19-47	18–77	18–69
<i>Education</i>					
University	36.0%	45.0%	100.0%	63.6%	23.6%
Diploma	60.4%	19.9%	-	19.7%	60.8%
Vocational training	3.7%	25.9%	-	13.5%	15.7%
Elementary school	-	8.4%	-	3.2%	-
Did not complete school	-	0.9%	-	-	-
<i>Relationship status</i>					
In a relationship	53.0%	–	–	–	51.1%
Single	44.2%	–	–	–	46.9%
Divorced / in separation	2.8%	–	–	–	2.0%

*Note.* An em dash (–) indicates that data were not collected. University = University or university of applied sciences; Diploma = Holding a diploma allowing to attend a university or a university of applied sciences; Sample 1 = Development sample; Sample 2 = Replication Sample; Sample 3 = Validation Sample.

## Data Analysis

All exploratory and confirmatory factor analyses were conducted with Mplus (Version 6.11; Muthén & Muthén, 2007) using a robust weighted least squares estimator (WLSMV). The main goal of the exploratory factor analyses was to have the most parsimonious solution (i.e., using as few factors as possible) that still reflects the data well (i.e., shows an acceptable fit). For this purpose, we compared the fit of models with 1 to 3 factors (when analyzing the positive relationships and the accomplishment items), and 1 to 7 factors (when analyzing the new items together with the OTH-items). The factorial structure was assessed in the development and the replication samples, but not in the validation sample, since it consisted only of students. Three criteria were taken into account to evaluate model fit: Values  $\geq .90$  in the comparative fit index (CFI; Hu & Bentler, 1999), values  $\leq .08$  in the root mean square error of approximation (RMSEA; Brown & Cudeck, 1993), and values  $\leq .08$  in the standardized root mean square residual (SRMR; Hu & Bentler, 1999).

The selection of the items for the final version was based on the factor loadings (highest loading on the intended factor  $\geq .40$ , and exceed cross-loadings by  $\geq .20$ ), their corrected item-total correlation ( $\geq .40$ ), the consistency of the final scale ( $\geq .70$ ), and their content.

## Results

### Preliminary Analyses

A first inspection of the OTH-items revealed that some formulations already seemed to address REL and/or ACC. Also, earlier analyses (Peterson et al., 2005; Ruch et al., 2010) showed secondary factor loadings for some of the items in the OTH. Therefore, one item for each of the OTH-scales was excluded from further analyses in order to reduce the conceptual overlap with the new scales<sup>2</sup>. For REL and ACC, we aimed at developing scales of compara-

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<sup>2</sup> One item of the OTH was excluded since it also has an other-directed component, and a strong cross-loadings on engagement in the German OTH (see Ruch et al., 2010): (a) „In choosing what to do, I always take into account whether it will benefit other people“ (meaning); one item was excluded due to its strong secondary loading on pleasure (Ruch et al., 2010): (b) “In choosing what to do, I always take into account whether I can lose my-

ble length as in the OTH.

In a first step, we conducted an exploratory factor analysis in the development sample for the 36 items for REL and ACC<sup>3</sup>. The first five Eigenvalues were 7.97, 5.32, 2.23, 1.60, and 1.46, respectively. When comparing the model-fit of a 1 to 3-factorial solution (i.e., when one of the scales would split into separate factors), the  $\chi^2$  improved significantly with the extraction of every additional factor. However, for the fit indices, the 2-factorial solution already mostly met the criteria, although the CFI-value was slightly below the threshold. Further, the extraction of additional factors would not have led to a strong improvement in the fit indices (see Table 2).

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self in it” (engagement); (c) Finally, we decided to leave the item (c) “For me, the good life is the pleasurable life” (pleasure) out of further analyses. While the decision on the exclusion of items was relatively clear for the other two scales, all items of the life of pleasure scale seemed appropriate and have low overlap with REL and ACC regarding the content. We decided on this item since it seemed to have the comparatively strongest overlap among the other items of the pleasure scale.

<sup>3</sup> When conducting separate factor analyses for REL and ACC, for both scales one strong first factor emerged (Eigenvalues were 7.25/5.65, 1.51/1.83, 1.23/1.32 for REL, and ACC, respectively), thus, suggesting one-dimensionality of the scales.

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Table 2

*Exploratory and Confirmatory Factor Analysis for Positive Relationships and Accomplishment-Items*

		$\chi^2$	<i>df</i>	$\chi^2 / df$	<i>p</i>	CFI	RMSEA	SRMR
EFA (36-items version)								
	1-factor	2307.45	594	3.88	< .001	.52	.12 [.11 - .12]	.15
	2-factor	1071.58	559	1.92	< .001	.86	.07 [.06 - .07]	.08
	3-factor	936.12	525	1.78	< .001	.88	.06 [.05 - .07]	.07
EFA (10-item version)								
Sample 1	1-factor	481.58	35	13.76	< .001	.42	.23 [.22 - .26]	.18
	2-factor	68.45	26	2.63	< .001	.95	.08 [.06 - .11]	.05
	3-factor	39.29	18	2.18	= .003	.97	.07 [.04 - .10]	.04
Sample 2	1-factor	483.02	35	13.80	< .001	.68	.20 [.18 - .21]	.14
	2-factor	76.02	26	2.92	< .001	.96	.08 [.06 - .10]	.04
	3-factor <sup>a</sup>	36.18	18	2.01	= .007	.99	.06 [.03 - .08]	.03
CFA (10-item version)								
Sample 1	2-factor	82.12	34	2.42	< .001	.94	.08 [.06 - .10]	.07
Sample 2	2-factor	73.60	34	2.16	< .001	.97	.06 [.04 - .08]	.05

*Note.*  $N_{Development} = 233$ ,  $N_{Validation} = 336$ . RMSEA = root mean square error of approximation. SRMR = standard root mean square residual. EFA = Exploratory Factor Analysis, CFA = Confirmatory Factor Analysis.

<sup>a</sup> could not be computed due to a negative residual variances

Thus, two factors were extracted and rotated to the OBLIMIN criterion ( $\delta = 0$ )<sup>4</sup>.

Based on the criteria for the factor loadings, the corrected item-total correlations, the alpha of the total scale, and the content, the five best-fitting items per scale (out of the 18 initial items

<sup>4</sup> Peterson et al. (2005) used an orthogonal rotation when developing the OTH scale (as did Ruch et al. [2010] for the German version). However, we favored an oblique rotation due to theoretical considerations (overlap among the components). When comparing our findings with an orthogonally (VARIMAX) rotated solution, the findings were highly comparable though.

per scale) were selected. The German version of the items and a tentative English translation are given in the Appendix A.

**Construct Validity: Analysis of the Final Version**

In a next step, the items of the final version of the REL- and ACC-scales were subjected to a factor analysis in the development and the replication samples. In both samples, only two Eigenvalues exceeded unity: The Eigenvalues for the development/replication sample were 2.93/3.43, 2.48/2.05, 0.87/0.90, 0.84/0.76, 0.75/0.70, 0.55/0.58, 0.48/0.47, 0.44/0.42, 0.36/0.36, and 0.32/0.32. When comparing the model-fit of a 1 to 3-factorial solution, again, the  $\chi^2$  improved significantly with the extraction of every additional factor. However, the 2-factorial solution already met the criteria in both samples, whereas the extraction of an additional factor would not have yielded strong improvements in the fit indices. Therefore, two factors were extracted in both samples and rotated to the OBLIMIN-criterion ( $\delta = 0$ ). Factor loadings of the exploratory factor analysis are shown in Table 3.



Table 3

*OBLIMIN Rotated Factor Loadings (EFA) of Positive Relationships and Accomplishment in the Two Samples.*

Items	REL		ACC	
	S1	S2	S1	S2
Positive Relationship				
4	<b>.69</b>	<b>.71</b>	-.11	.00
9	<b>.78</b>	<b>.78</b>	.01	.06
14	<b>.57</b>	<b>.53</b>	-.10	-.09
19	<b>.56</b>	<b>.70</b>	.20	-.08
24	<b>.73</b>	<b>.77</b>	.04	.04
Accomplishment				
5	.00	-.02	<b>.71</b>	<b>.65</b>
10	-.08	.10	<b>.54</b>	<b>.46</b>
15	-.02	-.07	<b>.80</b>	<b>.70</b>
20	.09	.07	<b>.54</b>	<b>.66</b>
25	.03	.02	<b>.61</b>	<b>.64</b>

*Note.* The expected loadings are printed in boldface.  $N_{\text{Development}} = 233$ ,  $N_{\text{Validation}} = 336$ . REL = Positive Relationships, ACC = Accomplishment, S1 = Development sample, S2 = Replication sample.

Table 3 shows that the expected pattern was obtained: All items had their highest loadings on the intended factor (all  $\geq .40$ ) and no noteworthy cross-loadings were found (all  $\leq .20$ ). Tucker's Phi-coefficients indicated that the loading matrices were highly similar across the two samples; REL:  $\phi = .99$  and A:  $\phi = .97$ ). Finally, the factorial solution received further supported in a confirmatory factor analysis. A two-factor model assuming correlated factors with no secondary loadings and uncorrelated error variances fitted well in both samples (see Table 1).

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**Construct Validity: Convergent and Divergent Validity**

In a third step, we examined the overlap (or distinctiveness) of the new scales with the OTH. The 15 items of the reduced OTH and the items of the new scales were subjected to a joint factor analysis. The first seven Eigenvalues for the development/replication sample were 4.90/6.54, 2.83/2.81, 2.30/1.75, 1.78/1.50, 1.62/1.34, 1.07/1.14, and 1.04/1.00. The goodness of fit was compared for the extraction of 1 (one general factor) to 7 factors (e.g., when REL and ACC would split into two factors each), as shown in Table 4.

Table 4

*Model Fit of Exploratory and Confirmatory Factor Analyses for the Items for Positive Relationships and Accomplishment Together with the OTH-Items*

	$\chi^2$	<i>df</i>	$\chi^2 / df$	CFI	RMSEA [90% CI]	SRMR
EFA						
Development sample						
1-factor	1153.37	275	4.19	.50	.12 [.11 - .12]	.13
2-factor	841.54	251	3.35	.66	.10 [.09 - .11]	.10
3-factor	577.58	228	2.53	.80	.08 [.07 - .09]	.07
4-factor	457.20	206	2.22	.86	.07 [.06 - .08]	.06
5-factor	310.59	185	1.68	.93	.05 [.04 - .06]	.05
6-factor	268.15	165	1.63	.94	.05 [.04 - .06]	.04
7-factor	225.49	146	1.54	.95	.05 [.04 - .06]	.04

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Table 4 (continued)

	$\chi^2$	<i>df</i>	$\chi^2 / df$	CFI	RMSEA [90% CI]	SRMR
EFA						
Replication sample						
1-factor	1585.67	275	5.77	.65	.12 [.11 - .16]	.11
2-factor	870.67	251	3.47	.84	.09 [.08 - .09]	.08
3-factor	666.24	228	2.92	.88	.08 [.07 - .08]	.06
4-factor	521.34	206	2.53	.92	.07 [.06 - .08]	.05
5-factor	406.16	185	2.20	.94	.06 [.05 - .07]	.04
6-factor	330.54	165	2.00	.96	.06 [.05 - .06]	.04
7-factor	268.44	146	1.84	.97	.05 [.04 - .06]	.03
CFA						
Development sample	511.13	265	1.93	.86	.06 [.06 - .07]	.08
Replication sample	621.00	265	2.34	.91	.06 [.06 - .07]	.07

*Note.*  $N_{\text{Development}} = 233$ ,  $N_{\text{Validation}} = 336$ . EFA = Exploratory Factor Analysis, CFA = Confirmatory Factor Analysis. RMSEA = root mean square error of approximation. SRMR = standard root mean square residual.

Table 4 shows that in the development sample, only the models assuming five or more factors met the criteria. In the replication sample, also a 4-factorial solution would have been acceptable. In both samples, the fit indices of the models with 6 or 7 factors were highly comparable to those of the 5-factor model, and comparatively smaller increases in goodness of fit were observed in models including more than five factors, although, as for the previous models, the  $\chi^2$  improved significantly with the extraction of every additional factor. We decided in favor for the most parsimonious model that could theoretically be explained best, extracted five factors, and rotated them to the OBLIMIN-criterion. The five factors were moderately

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intercorrelated, with somewhat higher correlation coefficients in the replication sample (development sample: .00 [PLE and MEA] to .30 [ACC and ENG], median = .14; replication sample: .14 [ENG and REL] to .47 [accomplishment and meaning], median = .30). The factor loadings of the exploratory factor analysis are shown in Table 5.

Table 5

*OBLIMIN Rotated Factor Loadings (EFA) for Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning in the Two Samples.*

Items	REL		ACC		PLE		ENG		MEA	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Positive Relationships										
16	<b>.65</b>	<b>.67</b>	-.15	-.01	.11	.10	-.04	-.02	.09	.04
17	<b>.76</b>	<b>.77</b>	-.06	.04	.02	.00	.03	-.07	.18	.13
18	<b>.57</b>	<b>.49</b>	-.12	-.21	.01	.01	.09	.21	-.13	.07
19	<b>.59</b>	<b>.72</b>	.24	.02	-.02	-.06	-.07	.07	-.06	-.17
20	<b>.75</b>	<b>.75</b>	.07	.04	.00	.09	.03	-.01	-.13	.01
Accomplishment										
21	-.02	.03	<b>.68</b>	<b>.63</b>	.16	.10	-.11	-.18	.11	.11
22	-.13	.09	<b>.48</b>	<b>.31</b>	.22	.18	.05	.11	.05	-.04
23	-.02	.01	<b>.74</b>	<b>.74</b>	.04	-.05	.13	.10	.02	-.02
24	.05	.07	<b>.40</b>	<b>.41</b>	-.03	.15	.33	.21	.07	.14
25	.04	.07	<b>.63</b>	<b>.51</b>	-.08	.07	.15	.16	-.13	.00

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Table 5 (continued)

Items	REL		ACC		PLE		ENG		MEA	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Pleasure										
3	.27	.03	-.14	-.05	<b>.50</b>	<b>.65</b>	.05	.00	-.01	.10
8	-.02	-.01	.09	.16	<b>.50</b>	<b>.62</b>	.14	-.03	.17	.13
13	.09	.07	.18	.03	<b>.57</b>	<b>.59</b>	-.09	.13	-.05	-.21
15	.00	.10	.08	-.04	<b>.62</b>	<b>.59</b>	.02	-.06	-.08	-.06
16	-.13	-.07	.07	-.05	<b>.29</b>	<b>.24</b>	.16	.15	.17	.33
Engagement										
1	-.02	.08	-.20	-.12	.09	-.08	<b>.50</b>	<b>.34</b>	.21	.24
4	.06	-.04	.29	.52	.00	.05	<b>.50</b>	<b>.11</b>	.08	.20
6	.03	.07	.09	-.07	.08	.02	<b>.54</b>	<b>.67</b>	-.04	.06
7	.02	-.01	.02	.21	-.02	.00	<b>.75</b>	<b>.71</b>	.01	.04
10	-.13	-.21	.04	.06	-.13	.21	<b>.26</b>	<b>.42</b>	.01	.06
Meaning										
2	-.03	-.07	-.10	-.03	.00	.03	.08	.03	<b>.90</b>	<b>.77</b>
11	.16	.10	.24	.04	-.14	-.08	-.05	-.06	<b>.54</b>	<b>.71</b>
12	.05	.02	.08	.07	.07	.04	.07	.14	<b>.73</b>	<b>.71</b>
14	.11	.12	.36	.13	-.21	.04	.02	.04	<b>.51</b>	<b>.64</b>
17	-.04	-.15	-.03	-.05	.07	.05	-.20	-.05	<b>.55</b>	<b>.43</b>

*Note.* The expected loadings are printed in boldface.  $N_{\text{Development}} = 233$ ,  $N_{\text{Validation}} = 336$ . REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning. S1 = Development sample, S2 = Replication sample. Table 5 (continued)

Table 5 shows that all items for the assessment of REL and ACC had their highest loadings on the intended factor. However, item no. 22 in the development sample and item

no. 24 in the replication sample did not fully meet the other criteria. Also, most of the items for the assessment of PLE, ENG, and MEA fulfilled the criteria. One item (no. 16, pleasure) had smaller loadings on the intended factor than expected in both samples, whereas other items did not fulfill all criteria in one of the samples (i.e., items no. 3 [PLE], 10 [ENG], and 14 [MEA] in the development sample, and items no. 1 and 4 [both ENG] in the replication sample). Overall, the factor solution was considered acceptable. Tucker's Phi coefficients indicated that the factor matrices were similar across the two samples (all  $\phi \geq .90$ ), except for engagement ( $\phi = .88$ ). Thus, the factor matrices showed at least a *fair* similarity between the samples (Lorenzo-Seva & ten Berge, 2006).

A confirmatory factor analysis, assuming a five-factor model with correlated factors, no secondary loadings and uncorrelated error variances suggested a good fit in the replication sample, whereas in the development sample the CFI value was slightly below the cut off (CFI = .86; see Table 4). Since the other fit indices met the criteria, the solution was considered acceptable.

### **Descriptive Statistics**

We computed total scores for the REL- and ACC-scales along with the OTH-scales by averaging the assigned items. Coefficients for skewness and kurtosis showed that all scales were normally distributed (skewness ranged from -0.15 to -0.80 in the development sample, and from -0.06 to -0.58 in the validation sample. Kurtosis ranged from -0.46 to 1.04 in the development sample, and from -0.59 to 0.53 in the replication sample). Descriptive statistics and scale intercorrelations for both samples are given in Table 6.

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Table 6

*Descriptive Statistics and Intercorrelations of Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning in the Two Samples*

	REL		ACC		PLE		ENG		MEA	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
<i>M</i>	3.58	3.48	3.72	3.63	3.37	3.25	3.23	3.20	3.14	3.17
<i>SD</i>	0.71	0.80	0.63	0.66	0.58	0.66	0.58	0.65	0.79	0.83
CITC <sub>min</sub>	.44	.44	.42	.40	.23	.25	.17	.28	.37	.28
CITC <sub>max</sub>	.60	.65	.60	.51	.44	.54	.53	.59	.64	.63
CITC <sub>median</sub>	.53	.58	.46	.48	.40	.42	.38	.39	.53	.60
$\alpha$	.75	.79	.73	.71	.62	.67	.61	.67	.76	.76
Intercorrelations										
ACC	.11	.24***								
PLE	.20**	.33***	.23***	.43***						
ENG	.09	.16**	.37***	.53***	.15*	.35***				
MEA	.16*	.15**	.29***	.45***	.07	.33***	.28***	.46***		

(continued)

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Table 6 (continued)

	REL		ACC		PLE		ENG		MEA	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
age	-.17**	-.14*	-.39***	-.20***	-.29***	-.09	-.01	-.21***	-.09	.09
sex	.09	.04	-.03	.02	.13	-.01	-.03	-.07	.05	.00
education	-.04	-.04	-.01	.19***	-.10	-.03	.17*	.07	.06	.08
partnership	.20**		.07		.11		.11		.03	

*Note.*  $N_{\text{Development}} = 233$ ,  $N_{\text{Validation}} = 336$ . REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning. S1 = Development sample, S2 = Replication sample. Education (1 = not finished compulsory school to 5 = university degree), partnership = partnership status (0 = single; 1 = in a partnership).

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



Table 6 shows that the REL and ACC-scales had acceptable internal consistencies ( $\alpha > .70$ ), and all items had good corrected item-total correlations (all  $> .40$ ). The means and standard deviations were comparable between the samples. REL and ACC existed independently from participants' sex but were associated with younger age. Also, there were some small, but expectable correlations to other demographics: Those with higher scores in REL were more frequently in a relationship at the time when completing the survey than those with low scores, and the educational level was positively related to ACC (only in the replication sample, though). Results for the OTH-scales were comparable to earlier findings (Ruch et al., 2010) in terms of means, standard deviations, internal consistencies, and associations with demographics. The means and standard deviations of REL and ACC were comparable to those of the OTH-scales, although the new scales had numerically higher mean scores. Overall, the scales were moderately intercorrelated; numerically larger coefficients were observed in the replication sample.

#### **Time spent with activities related to relationships and accomplishment**

For assessing how REL and ACC relate to everyday behavior, the participants in the replication sample completed the REL and ACC-scales, the OTH, and the Flourishing-Schedule. The correlations of REL, ACC, and the OTH-scales with the amount of time spent in activities related to these dimensions are given in Table 7.

Table 7

*Correlations Between the Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning With the Time Spent With Activities Related to the Respective Components*

	Flourishing-Schedule				
	REL-time	ACC-time	PLE-time	ENG-time	MEA-time
Day at the University	.22*	.19*	.09	.32***	.23***
Leisure Day	.35***	.18*	.20*	.28**	.32***
Ideal Day	.44***	.22*	.04	.11	.20**

*Note.*  $N = 125$ . REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 7 shows that there was a good convergence between individual expressions in REL, ACC, and the OTH-scales with the amount of time people spent or would like to spend with activities related to these dimensions. For example, those students with greater inclination to REL also indicated dedicating more time to fostering relationships on a typical day at the university, on a day dedicated to leisure time activities, and that this is also what they would like to do on an ideal day. Of course, there were also exceptions. ENG was not related to the time spent with engaged activities on an ideal day, and PLE was neither related to the amount of time spent with pleasurable activities on a day at the university, nor on an ideal day; this might be explained by the fact that days at the university are not prototypical situations to engage in pleasurable activities, whereas the relation to the time spent with pleasurable activities on an ideal day might be reduced by ceiling effects (48% of the participants indicated the highest possible amount of time).

### **Relationship to life satisfaction and flourishing**

We examined the associations of REL and ACC with life satisfaction and flourishing in a cross-sectional design computing their associations while controlling for age and sex.

Furthermore, we tested whether REL and ACC add to the prediction of life satisfaction and flourishing (as criteria) above and beyond the impact of PLE, ENG, and MEA using multiple stepwise regression analyses; see Table 8.

Table 8 shows that both new scales and the OTH-scales were positively associated with life satisfaction and flourishing (with the exception of MEA in the development sample). ACC was the strongest predictor of flourishing, and, together with ENG, the strongest predictor of life satisfaction across all samples. Hierarchical regression analyses (criterion = life satisfaction / flourishing; step 1 = sex, age; step 2 = PLE, ENG, MEA; step 3 = REL, ACC; method = enter) revealed that the new scales explained additional variance in the prediction of life satisfaction ( $\Delta R^2 = .04$  to  $.08$ ) and flourishing ( $\Delta R^2 = .02$  to  $.12$ ) in all samples above the OTH scales. Again, ACC was one of the strongest predictors and contributed to the prediction in all samples. The results for REL, ENG, and PLE were rather mixed with contributions in selected samples only. Finally, MEA contributed to the prediction of flourishing only, but not life satisfaction. When changing the rank order of steps 2 and 3 and testing for effects of the OTH-scales above the influences of REL and ACC, similar increases in explained variance were obtained (life satisfaction:  $\Delta R^2 = .02$  to  $.09$ ; flourishing:  $\Delta R^2 = .09$ , in both samples).

PART I

Table 8

*Partial Correlations (corrected for sex and age) and Hierarchical Regression Analysis Summary for Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning Predicting Life Satisfaction and Flourishing*

	Life Satisfaction			Flourishing	
	S 1	S 2	S 3	S 2	S 3
Partial Correlations (Corrected for Sex and Age)					
PLE	.16*	.31***	.29**	.38***	.27**
ENG	.30***	.29***	.41***	.48***	.36***
MEA	.11	.21***	.29**	.48***	.34***
REL	.25***	.17**	.21*	.24**	.35***
ACC	.30***	.40***	.40***	.52***	.50***
Regression					
Step 1 ( $\Delta R^2$ )	.00	.00	.01	.02	.01
Sex ( $\beta$ )	-.02	-.03	.02	.03	-.08
Age ( $\beta$ )	.13*	.12*	.08	.11	.14
Step 2 ( $\Delta R^2$ )	.11***	.13***	.23***	.32***	.27***
PLE ( $\beta$ )	.07	.15*	.11	.12	.02
ENG ( $\beta$ )	.20**	.05	.25**	.21*	.21*
MEA ( $\beta$ )	-.04	-.02	.11	.20**	.19*
Step 3 ( $\Delta R^2$ )	.08***	.05***	.04*	.02*	.12***
REL ( $\beta$ )	.22***	.05	.11	.08	.23**
ACC ( $\beta$ )	.23**	.31***	.20*	.16*	.31**

*Note.* Coefficients of the final model (step 3) are given.  $N_{\text{Development}} = 217$ ,  $N_{\text{Validation}} = 336$ ,  $N_{\text{Sample3}} = 126$ . REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## **Discussion**

Study 1 describes the development and initial assessment of two short scales for the assessment of positive relationships (REL) and accomplishment (ACC). Both scales were reliable (internally consistent) and demonstrated factorial validity in exploratory and confirmatory factor analyses in two different samples. Data on convergent, discriminant, and criterion validity of the scales are also encouraging. It was shown that individual scores in REL and ACC went along with the amount of the time participants spent with activities related to positive relationships and accomplishment. REL and ACC are moderately correlated with each other and the OTH-scales; there was an overlap, but far from indicating redundancy. Both new scales correlated positively with different indicators of well-being (i.e., life satisfaction and flourishing) and explained additional variance in the prediction of well-being, above the contribution of basic demographics and the OTH-scales. Finally, REL and ACC showed the expected relations to demographics; e.g., high scores in ACC went along with a higher education level (in one of two samples, which might be due to the fact that the replication sample was more diverse in terms of educational levels), and individuals who are currently in a romantic relationship demonstrated greater expressions of REL.

Study 1 provides initial support for the reliability and validity of the scales for the assessment of REL and ACC, and showed that they can be used together with the OTH-scales. Overall, the factor loadings of the items assessing PLE, ENG, and MEA were comparable to earlier findings (Ruch et al., 2010). Most items loaded on the intended factors and only had negligible secondary loadings. However, some items that already showed high secondary loadings in previous studies (see Ruch et al., 2010) also did so in the current study: Items 4 (ENG) and 16 (PLE) loaded higher on the MEA- and ACC-factors than on the intended factor in one of the samples tested. This warrants further consideration in future studies.

For increasing precision in the constructs and reducing overlap among them, we have

reduced the OTH-scales by one item each. Although this might limit the comparability with previous findings to a certain degree, we believe that the concepts are still adequately described with the reduced scales (which, in fact, are empirically highly comparable to the original scales; all  $r > .95$ ), but that the distinction among pleasure, engagement, and meaning, and positive relationships and accomplishment is sharpened.

Finally, the present study replicated previous findings on the negative relationship of PLE and ENG to participants' age (Peterson et al., 2005; Ruch et al., 2010), findings for REL and ACC were in the same direction. Although these associations are generally small, the current data do not allow for a conclusion whether REL, ACC, PLE, ENG, and MEA do generally decline with age, or whether other orientations to happiness or well-being, which are currently not included in this framework, might grow in importance with age. However, more research on possible age-effects is needed, and future studies should also focus on examining these orientations in elderly people (cf. Ruch, Proyer, & Weber, 2009).

**Study 2**

Study 2 aimed at extending the findings on the reliability of the positive relationships (REL) and accomplishment (ACC) scales by examining their test-retest correlations. Earlier studies found that the OTH-scales pleasure (PLE), engagement (ENG), and meaning (MEA) were stable across time: Ruch and colleagues (2010) reported test-retest-reliabilities  $\geq .70$  for PLE and MEA, and values  $\geq .60$  for ENG in three and six months intervals, respectively. For examining whether this also holds true for the new scales and replicating earlier findings, we assessed the test-retest reliabilities of REL and ACC, and also included the OTH-scales. We expected that similar coefficients would be obtained for REL and ACC (around .70).

**Method****Participants**

A total of  $N = 394$  participants took part in study 2. Sample characteristics are given in Table 1.

**Instruments**

As in study 1, the OTH questionnaire (reduced by one item for each scale), and the newly developed scales for the assessment of positive relationships and accomplishment, were used. Internal consistencies were comparable to those reported in study 1 and ranged from  $\alpha = .64$  (ENG) to  $\alpha = .74$  (REL).

**Procedure**

All participants attended an online training program for character strengths (starting in spring 2012) and completed online versions of the REL-, ACC-, and the OTH-scales on four different time periods: Before an online-intervention, and one-, three-, and six months after the intervention. Participants were instructed to complete a placebo control exercise (i.e., writing on early childhood memories, Seligman, Steen, Park, & Peterson, 2005) on every day for one week. No effects of this exercise on well-being, depression, REL, ACC, or the Authentic

Happiness Theory-components were expected (e.g., Seligman et al., 2005; Gander et al., 2013).

## Results

The test-retest correlations for the OTH-scales and the REL and ACC scales are shown in Table 9.

Table 9

*Test-Retest-Reliabilities for Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning.*

	1 month	3 months	6 months
<i>N</i>	349	308	253
REL	.75	.73	.78
ACC	.68	.69	.69
PLE	.73	.69	.74
ENG	.71	.68	.70
MEA	.73	.73	.73

*Note.* REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning.  
All *p*-values < .001.

All test-retest correlations were above or close to .70 for up to six months, and comparable to those of the OTH-scales, which were also in line with earlier findings (Ruch et al., 2010).

## Discussion

The scales for the assessment of REL and ACC demonstrated acceptable test-retest correlations for up to six months and can be considered to be stable across the tested time period. However, since all participants underwent a placebo control intervention from which



no effects are expected, it cannot be ruled out that this might have influenced the results nonetheless. Therefore, the reported test-retest correlations have to be regarded as lower-bound estimates of the stability.

**Study 3**

The main aims of Study 3 were testing the malleability of the endorsement of positive relationships (REL) and accomplishment (ACC), and examining whether addressing them with an intervention leads to an increase in subjective well-being (i.e., an increase in life satisfaction and positive affect, and a decline in negative affect). Amongst others, Peterson and colleagues (2005, 2007) and later Buschor, Proyer, and Ruch (2013) provided empirical evidence for the expected important role of the endorsement of pleasure (PLE), engagement (ENG), and meaning (MEA) for life satisfaction. They found that the three orientations to happiness explained additional variance in life satisfaction—above and beyond self- and peer-rated character strengths. Therefore, Buschor et al. (2013) concluded, “[...] it might be fruitful to consider the three orientations as potential means for experimentally enhancing life satisfaction and well-being” (p. 124). Giannopoulos and Vella-Brodrick (2011) conducted such a study, in which 218 participants were randomly assigned to one of six conditions (four intervention conditions, two control conditions). The participants in the intervention conditions were instructed to write down three things related to PLE, ENG, or MEA (conditions 1-3), or one thing related to each of the orientations (condition 4) on a daily basis for a week. Participants in the control conditions wrote on three daily events (condition 5; placebo control) or did not receive any task (condition 6). Participants completed at a time point before the intervention started, as well as one week, and two weeks after the intervention a well-being measure (the *Mental Health Continuum – Short Form* [MHC-SF; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011], a composite measure of emotional, social, and psychological well-being). The authors reported that all intervention conditions showed larger increases in well-being than the control groups, and therefore gave first empirical evidence for the causal influence of PLE, ENG, and MEA on well-being, and showed that addressing the endorsement of these components might indeed be a potent mean to change well-being for the better.

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To the best of the authors' knowledge, there is no intervention study based on positive relationships and accomplishment. In study 3, we instructed the participants in an intervention condition to write down their daily experiences of REL, ACC, PLE, ENG, and MEA for a week and assessed participants' scores in subjective well-being (life satisfaction, positive and negative affect), the REL-, ACC-, and OTH-scales before the intervention, after the intervention, and two- and four weeks after the intervention. We used this kind of intervention (i.e., variants of the "three good things"-exercise; see Seligman et al., 2005), since they can easily be incorporated in an individual's everyday life what is believed to increase the effectiveness of an intervention (Sin & Lyubomirsky, 2009). We hypothesized that the participants in the intervention condition report stronger increases in subjective well-being, and in all REL-, ACC-, and OTH-scales, than in a placebo control condition.

## Method

### Participants

A total of 112 participants were randomly assigned to the intervention or the placebo control condition and 67 participants completed the assigned exercise and all four assessments. We excluded 16 participants because they conducted the exercises during their holidays, what might have counteracted the incorporation of the exercises in everyday life, and was expected to influence ratings of positive and negative affect<sup>5</sup>. Descriptive statistics for the final sample ( $N = 51$ ) are given in Table 1.

The intervention condition consisted of  $n = 29$  (20 women) participants and the placebo control condition consisted of  $n = 22$  (12 women) participants. The conditions did not differ regarding their sex ratio ( $\chi^2 [1, N = 51] = 1.11, p = .28$ ), age ( $t[49] = 0.72, p = .48$ ), marital status ( $\chi^2 [2, N = 51] = 2.36, p = .31$ ), education ( $\chi^2 [2, N = 51] = 2.11, p = .38$ ), or dropout rate ( $\chi^2 [1, N = 112] = 1.76, p = .18$ ).

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<sup>5</sup> Including these participants in the analyses would not yield large changes in the results. However, smaller effects and a less clear pattern would be obtained.

### **Instruments**

As in study 1, the *Satisfaction with Life Scale* (SWLS), the *Orientations to Happiness*-questionnaire (OTH), and the scales for the assessment of REL and ACC were used.

Additionally, the *Positive and Negative Affect Schedule* (PANAS, Watson, Clark, & Tellegen, 1988; in the German adaption by Krohne, Egloff, Kohlmann, & Tausch, 1996) was used. The PANAS assesses the intensity of positive and negative affect with 10 items each. Watson et al. (1988) reported good psychometric properties. In the present study, the PANAS asked participants about their feelings during the past week.

### **Procedure**

Participants were recruited in the same way as in Study 1 (development and replication samples) in late 2011. The only inclusion criterion was a minimum age of 18. All participants received individualized feedback via email at the end of the study. After participants answered basic demographic questions online, we randomly assigned them to the intervention or to the placebo control condition, and they received a paper-pencil version of the pre- and posttest questionnaires (the SWLS, the PANAS, the OTH, and the REL- and ACC-scales), and the instructions for the exercises via mail. The exercise had to be completed every day for one week. On the last day of the week, participants completed the posttest assessments of all scales, and sent all material back via mail (in a post-paid envelope). Two and four weeks after the completion of the exercise, the participants were reminded via e-mail to complete the follow-up assessments online. Participants received written instructions and a form for completion of their assignment. The instructions for the exercises were as follows:

*Intervention exercise* (abbreviated): “Every night for one week, set aside 15 minutes before you go to bed. Think back of the present day and write down all your memories related to the five areas of pleasure, engagement, meaning, positive relationships, and accomplishment” (followed by a short description of all components).

*Placebo control exercise* (abbreviated): “Every night for one week, set aside 15 minutes before you go to bed. Think of one route you have covered on that day (e.g., the route to work, or the route to the supermarket) and describe this route as detailed as possible in written form. Think of the places you have passed, and describe what you have noticed and whether there was something unusual.”

### **Data Analysis**

In the first step, we computed a planned contrast comparing the pretest scores with the scores of the later measurement periods for all dependent variables *within* each condition; one condition  $\times$  two time periods (pretest vs. posttest, 2 weeks, and 4 weeks after the intervention), for the REL-, ACC-, and OTH-scales. In the second step, we conducted the same planned contrasts comparing the pretest scores with the scores of the later measurement periods *between the* conditions; two conditions  $\times$  two time periods (pretest vs. posttest, 2 weeks, and 4 weeks after the intervention).

### **Results**

An inspection of the mean scores (means and standard deviations are given as an online supplementary; Appendix B) of participants in the intervention condition showed that most scales increased immediately after the intervention, and remained more or less stable afterwards or increased further, but did not return to baseline levels. Only the positive affectivity scores peaked at posttest and returned to baseline level four weeks after the intervention. In contrast, the changes in the placebo control condition were smaller in size and did not show a clear pattern. Results for planned contrasts are given in Table 10.

PART I

Table 10

*Planned Comparisons of the Two Conditions at the Four Different Time Periods for Satisfaction with Life, Positive and Negative Affectivity, Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning.*

Intervention	Within condition				Between conditions	
	IC		PCG		IC vs PCG	
	<i>F</i> [1, 28]	$\eta^2$	<i>F</i> [1, 22]	$\eta^2$	<i>F</i> [1, 50]	$\eta^2$
REL	5.12*	.16	3.03*	.13	0.40	-
ACC	2.57*	.08	1.25	-	3.36*	.06
PLE	3.94*	.12	0.96	-	0.26	-
ENG	3.44*	.11	0.00	-	1.93†	.04
MEA	8.11**	.23	1.16	-	2.03†	.03
SWLS	17.05***	.38	0.87	-	5.21*	.08
PA	2.84†	.09	1.22	-	3.74*	.07
NA	12.84***	.31	0.26	-	3.51*	.07

*Note.*  $N_{\text{Intervention}} = 29$ ,  $N_{\text{Control}} = 22$ . within condition = Comparison of the pretest vs. all later measurement periods for the intervention and the control condition separately. between conditions = Comparison of the pretest vs. all later measurement periods between intervention and control condition. IC = intervention condition, PCG = placebo control condition. REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning.  $\eta^2$  = eta squared.

†  $p < .10$ , \*  $p < .05$ . (one-tailed)

An analysis of the changes *within* the conditions revealed that, as expected, the scores in REL, ACC, and the OTH-scales increased in the intervention group over time. Also, increases in life satisfaction and decreases in negative affectivity were reported for the intervention condition, whereas a marginally significant increase for positive affectivity was found. In the placebo condition, there were no changes in the variables of interest, except for REL,

where also an increase was reported.

When comparing the changes *between* conditions, we found that ACC increased in the intervention condition compared to the placebo control condition, whereas the results for ENG and MEA approached significance. These changes went along with significant increases in subjective well-being: In the intervention condition, larger changes in life satisfaction, positive-, and negative affectivity were reported than in the placebo control condition.

### **Discussion**

Study 3 showed that the scales for REL and ACC, and the OTH-scales are sensitive to detect changes, elicited by an intervention targeting these characteristics: In the intervention condition, all scales increased in the intended direction. For ACC, the increases in the intervention condition exceeded those in the placebo control condition, whereas for ENG and MEA only marginally significant results were obtained.

The second main finding of Study 3 was that it provided initial evidence for a causal relationship of REL, ACC, and the Authentic Happiness Theory-dimensions with subjective well-being: Addressing these characteristics jointly in an intervention exercise led to increases in subjective well-being compared to a placebo control condition. Thus, basing an intervention on these components might be a fruitful approach for the development of intervention studies. This has received support from a study by Giannopoulos and Vella-Brodrick (2011) and recently also by Proyer, Gander, Wellenzohn, and Ruch (2016). The increases in subjective well-being were accompanied by relative increases in ACC, and a (marginally significant) trend towards an increase in ENG and MEA, but no changes in REL and PLE. This absence of changes might both be due to (small) changes in the same direction in the placebo control condition, but it is unclear whether this change occurred due to the placebo control exercise, some external factors, or is just coincidental. Since the current study cannot answer these questions, further research on this topic is needed.

Also, some limitations of study 3 have to be acknowledged: First, it can be assumed that some participants were aware of the parallels between the used measures and the instructions for the exercise. Second, the instruction to focus on REL, ACC, and the Authentic Happiness Theory-dimensions simultaneously does not allow for an examination of the influences of each of these dimensions on well-being. Therefore, we are planning to conduct an intervention study that contrasts all these dimensions in order to achieve a deeper understanding of their associations with well-being and to address questions of causality. Finally, it needs mentioning that the instruction and intervention was pretested in smaller samples before application, but still could be further improved.

### **General Discussion**

The three studies showed encouraging results for the psychometric properties of the short scales for the assessment of the endorsement of positive relationships (REL) and accomplishment (ACC), and provided evidence for their factorial validity (when used independently and also in combination with the OTH-scales), their convergent and divergent validity, their internal consistency and stability, and also for their sensitivity to change.

Although the REL- and the ACC-scales shared some variance with the OTH-scales, they existed independently and the intercorrelations did not indicate redundancy. Although from a theoretical perspective it can be expected that the scales correlate with each other empirically, a further refinement of the scales would be desirable when used together with the OTH. This could be accomplished by reformulating certain items to further decrease conceptual overlap with the new scales and each other, particularly for ENG and ACC. Nonetheless, the findings of the presented studies suggest that the REL- and ACC-scales offer a valuable addition to the OTH-scales, which might be especially relevant in intervention settings: First, the results of the intervention study provide some initial evidence that an intervention based on strengthening the focus on REL and ACC might also be effective. These findings warrant



further consideration in future studies. Secondly, the new scales might offer a valuable extension of research that has been based on Seligman's (2002) Authentic Happiness theory. Even if the two scales cannot be seen as a measure for Seligman's (2011) PERMA-dimensions, because of certain changes he proposed (e.g., positive emotion vs. the pleasurable life), it may be useful to complement standard assessments with the OTH (Peterson et al., 2005) with these two scales. One might argue that this would provide a broader perspective on a person's well-being and advance the literature on the contribution of additional factors in the understanding of outcome variables such as subjective well-being or flourishing.

### **Implications for Research and Practice**

The new scales might be especially useful from an intervention perspective. Assuming that the pursuit of positive relationships and accomplishment reflects two hitherto neglected pathways to well-being, the knowledge of additional, distinguishable ways to well-being might allow targeting well-being from different angles. Also, the REL- and ACC-scales might be helpful for increasing the person  $\times$  intervention-fit: Knowing one's profile in the OTH-, REL-, and ACC-scales might indicate in what domains someone has more "room for change" and should therefore be targeted by an intervention. There is one study (Giannopoulos & Vella-Brodick, 2011) where moderating effects of PLE, ENG, and MEA on interventions based on these components were found. It can be hypothesized that the baseline scores in REL and ACC might have similar effects. Alternatively, following the idea of "signature strengths" (Peterson & Seligman, 2004), fostering one's preferred way to well-being might also be another effective approach for increasing well-being. However, this has to be addressed in future studies. It should be examined whether interventions based on each of the five components lead to an increase in well-being, and whether there are moderating effects of the baseline scores on intervention effectiveness.

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## PART I

### Online Supplementary Material

#### Appendix A

#### *Items for the Positive Relationships and Accomplishment-Scale*

No.	Original German version	Proposed English translation
Positive Relationships		
16	Bei der Auswahl von Aktivitäten ist es mir wichtig, dass ich sie mit anderen gemeinsam machen kann.	When choosing what to do, I always take into account if I can do it together with others.
17	Ein gutes Leben bedeutet für mich, dass ich es mit anderen teilen kann.	A good life means to me that I can share it with others.
18	Worauf es im Leben wirklich ankommt ist, mit anderen Menschen gut auszukommen.	What really matters in life is to be on good terms with other people.
19	Wirkliches Glück (lachen bis einem der Bauch weh tut, Erfolge feiern, Freude empfinden usw.) kann man nur mit anderen Menschen gemeinsam empfinden.	Real happiness (roaring with laughter, celebrating success, feeling joy, etc.) can only be experienced with other people.
20	Andere Menschen sind die beste und verlässlichste Medizin gegen die Widrigkeiten des Lebens.	Other people are the best and the most reliable remedy against the adversities in life.
Accomplishment		
21	Es gibt Dinge in meinem Leben, die ich unbedingt erreichen möchte.	There are things in my life that I absolutely want to achieve.
22	Es gibt nichts Schöneres als das, was man erreichen wollte, auch erreicht zu haben.	There is nothing better than having achieved a goal I was aspiring to.
23	Ich habe Ambitionen.	I have ambitions.
24	Die meisten Dinge die ich tue, geben mir das Gefühl, etwas erreicht zu haben.	Most things I do give me a feeling of accomplishment.
25	Ich bin fähig, die meisten Dinge die ich tue, erfolgreich zu absolvieren.	I am able to complete most things I do successfully.

*Note.* The German version of all items was used. The translation shown in the table has not been validated.

PART I

Appendix B

*Means and Standard Deviations of the Two Conditions at the Four Different Time Periods for Satisfaction with Life, Positive and Negative Affectivity, Positive Relationships, Accomplishment, Pleasure, Engagement, and Meaning.*

	Pre		Post		2 weeks		4 weeks	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Intervention</b>								
REL	3.60	0.94	3.89	0.95	3.72	1.09	3.83	1.00
ACC	3.70	0.57	3.76	0.52	3.89	0.42	3.90	0.40
PLE	3.41	0.52	3.65	0.65	3.55	0.62	3.48	0.66
ENG	3.07	0.48	3.23	0.59	3.21	0.62	3.24	0.52
MEA	2.91	1.09	3.02	1.02	3.22	0.97	3.20	1.05
SWLS	4.79	1.17	5.09	1.20	5.37	1.11	5.32	0.97
PA	3.29	0.51	3.51	0.49	3.46	0.75	3.36	0.67
NA	1.98	0.65	1.59	0.50	1.67	0.61	1.71	0.49
<b>Control</b>								
REL	3.57	0.61	3.69	0.80	3.70	0.69	3.73	0.73
ACC	3.90	0.59	3.75	0.81	3.86	0.48	3.85	0.51
PLE	3.25	0.70	3.35	0.69	3.42	0.50	3.26	0.63
ENG	3.34	0.68	3.31	0.68	3.40	0.60	3.30	0.57
MEA	2.91	0.94	2.87	1.02	3.08	0.82	3.00	0.81
SWLS	4.93	1.34	5.13	1.31	5.07	1.42	4.88	1.35
PA	3.47	0.73	3.44	0.60	3.36	0.60	3.30	0.65
NA	1.82	0.48	1.71	0.62	1.72	0.58	1.85	0.59

*Note.*  $N_{\text{Intervention}} = 29$ ,  $N_{\text{Control}} = 22$ . REL = Positive Relationships, ACC = Accomplishment, PLE = Pleasure, ENG = Engagement, MEA = Meaning.



**PART II:**

**POSITIVE PSYCHOLOGY INTERVENTIONS ADDRESSING PLEASURE, ENGAGEMENT, MEANING,  
POSITIVE RELATIONSHIPS, AND ACCOMPLISHMENT INCREASE WELL-BEING AND  
AMELIORATE DEPRESSIVE SYMPTOMS: A RANDOMIZED, PLACEBO-CONTROLLED ONLINE  
STUDY.**

Fabian Gander, René T. Proyer, & Willibald Ruch

Gander, F., Proyer, R. T., & Ruch, W. (2016). Positive Psychology Interventions Addressing Pleasure, Engagement, Meaning, Positive Relationships, and Accomplishment Increase Well-Being and Ameliorate Depressive Symptoms: A Randomized, Placebo-Controlled Online Study. *Frontiers in Psychology*, 7:686. <http://doi.org/10.3389/fpsyg.2016.00686> (Open Access final publication available at: <http://journal.frontiersin.org/article/10.3389/fpsyg.2016.00686/full>)

**Abstract**

Seligman (2002) suggested three paths to well-being, the pursuit of pleasure, the pursuit of meaning, and the pursuit of *engagement*, later adding two more, *positive relationships* and *accomplishment*, in his 2011 version. The contribution of these new components to well-being has yet to be addressed. In an online positive psychology intervention study, we randomly assigned 1,624 adults aged 18 to 78 ( $M = 46.13$ ; 79.2% women) to seven conditions. Participants wrote down three things they related to either one of the five components of Seligman's Well-Being theory (Conditions 1-5), all of the five components (Condition 6) or early childhood memories (placebo control condition). We assessed happiness (AHI) and depression (CES-D) before and after the intervention, and 1-, 3-, and 6 months afterwards. Additionally, we considered moderation effects of well-being levels at baseline. Results confirmed that all interventions were effective in increasing happiness and most ameliorated depressive symptoms. The interventions worked best for those in the middle-range of the well-being continuum. We conclude that interventions based on pleasure, engagement, meaning, positive relationships, and accomplishment are effective strategies for increasing well-being and ameliorating depressive symptoms and that positive psychology interventions are most effective for those people in the middle range of the well-being continuum.

*Keywords:* online intervention, orientations to happiness, positive interventions, positive psychology, PERMA, well-being theory

## **Introduction**

Although current psychology mainly focuses on pathologies and attempts to relieve or cure mental illnesses or other malfunctions (see e.g., Myers, 2000; Ruch & Proyer, 2011), it has historically had at least two other objectives: Studying and nurturing talent, and examining ways to make “relatively untroubled” people happier (Seligman, Parks, & Steen, 2004; p. 1379). One of the core ideas of Positive Psychology is to strengthen these objectives. Positive psychology interventions (PPIs), are interventions that have been developed within Positive Psychology that aim at creating positive outcomes. They have been defined as “[...] treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions” (Sin & Lyubomirsky, 2009; p. 468). As such, they are strategies for people who desire to increase their well-being. While most of the research on PPIs has been conducted with non-clinical samples, there are also examples of applications with patients (e.g., Casellas-Grau, Font, & Vives, 2014; Huffmann et al., 2014; Seligman, Rashid, & Parks, 2006). In recent years, research and interest in practical applications of such interventions have steadily increased. Two independent meta-analyses (Bolier, Haverman, Westerhof, Riper, Smit, & Bohlmeijer, 2013; Sin & Lyubomirsky, 2009) covering a total of 69 randomized controlled studies provide support for the effectiveness of PPIs (increases in subjective and psychological well-being, and amelioration of depression).

The interventions that have been developed and evaluated thus far focus on a broad variety of psychological constructs (e.g., gratitude, hope, goal-attainment, compassion, humor, etc.) and use diverse techniques. Also, most of them do not refer explicitly to a theoretical framework or aim at directly targeting different components of a well-being theory. Interventions that are developed based on a theory of well-being have the advantage that hypotheses can directly be derived from theory and findings can be interpreted within the theory (Lewin, 1951; Michie, Rothman, & Sheeran, 2007). Furthermore, they allow for a comparison

of the efficacy of different well-being components when used in an intervention (i.e., some well-being components may be more susceptible to change than others). From a more practical perspective, addressing different aspects of well-being based on an individual's well-being profile and their preferences may increase the "fit" between the person and the activity and therefore the effectiveness of an intervention (e.g., Proyer, Gander, Wellenzohn, & Ruch, 2014, 2015ab; Schueller, 2012; Senf & Liao, 2013).

In psychology and adjacent disciplines, several conceptualizations of well-being have been proposed (e.g., Keyes, Shmotkin, & Ryff, 2002; Ryan & Deci, 2001; Seligman, 2002, 2011—to name but a few). Whereas there is no agreement on the number and type of factors that well-being consists of, most theories cover several components of subjective well-being (i.e., cognitive or affective appraisals, such as life satisfaction, positive emotions, or happiness) and psychological well-being (i.e., indicators of optimal functioning, such as having a sense of meaning, or mastery). Seligman (2002) described three basic orientations that lead to well-being in his Authentic Happiness Theory: The life of pleasure (P), a hedonic orientation that focuses on the experience of positive emotions (a subjective well-being component); the life of meaning (M), a eudaimonic orientation that emphasizes serving a greater purpose; and the life of engagement (E), which focuses on the pursuit of highly engaging and absorbing activities and the thereby elicited experience of flow (both could be classified as psychological well-being components). Peterson, Park, and Seligman (2005) developed the Orientations to Happiness (OTH) questionnaire to assess the endorsement of these three orientations. Research on the Authentic Happiness model using the OTH revealed that, as expected, all three orientations are positively correlated but not fully overlapping and show robust relations with different indicators of well-being across different cultures (e.g., Buschor, Proyer, & Ruch, 2013; Chen, Tsai, & Chen, 2010; Peterson et al., 2005; Ruch, Harzer, Proyer, Park, & Peterson, 2010; Vella-Brodrick, Park, & Peterson, 2009).

Although the Authentic Happiness Theory has been widely quoted in the literature and the OTH is frequently used in research (e.g., Berthold & Ruch, 2014; Pollock, Noser, Holder, Zeigler-Hill, 2014; Ruch, Martínez-Martí, Heintz, & Brouwers, 2014; Von Culin, Tsukayama, & Duckworth, 2014), Seligman (2011) proposed a revision, the Well-Being Theory, which comprises five elements of well-being. To P, E, and M, Seligman added: Positive relationships (R) and accomplishment (A). Gander, Proyer, and Ruch (2016) developed short scales for the assessment of R and A using the same framework as the OTH. They report that R and A have minor correlations with each other, P, E, and M, and that they explain additional variance in life satisfaction and flourishing above and beyond the OTH-scales.

It has been argued that few positive psychology studies are tied to a specific model. One example is Giannopoulos and Vella-Brodrick (2011), who used Seligman's (2002) Authentic Happiness Theory as a theoretical framework. They compared interventions on the three components of the model regarding their effectiveness in enhancing well-being. Giannopoulos and Vella-Brodrick randomly assigned 218 participants to one of six conditions, instructing them to write down three things related to either: pleasure (1), engagement (2), meaning (3), each of the three orientations (4), three events of the day just passed (5– placebo control condition), or a waitlist control condition (6). All exercises (1-5) were conducted on a daily basis for one week. Participants completed a well-being measure (the Mental Health Continuum – Short Form, MHC-SF; a composite measure of emotional, social, and psychological well-being; Lamers, Westerhof, Bohlmeijer, Klooster, & Keyes, 2011) before the intervention, after the intervention, and two weeks after the intervention. The authors report that well-being increased in all intervention conditions in comparison to the control conditions.

Additionally, Giannopoulos and Vella-Brodrick (2011) examined whether a “fit” between the intervention condition and the participants' baseline scores in the OTH (each scale split into three groups of equal size) would moderate intervention effectiveness. They found

some moderation effects that did not yield a consistent pattern: Participants with high baseline scores in pleasure and engagement benefited more when they were assigned to non-matching exercises; namely, when assigned to the engagement or meaning conditions (for pleasure), or the pleasure or meaning conditions (for engagement). The authors did not find any moderating effects for meaning. Thus, this study showed that these orientations can be directly addressed in an intervention and provided first empirical evidence for a potential causal relation of pleasure, engagement, and meaning with well-being.

Gander, Proyer, and Ruch (2016) conducted the first pilot intervention study based on the five components of Seligman's (2011) Well-Being Theory. They randomly assigned 51 participants to either an intervention condition (IC) or a placebo control condition (describing a route participants had to take this day; e.g., from home to work). Participants in the IC were instructed to write down their experiences on that day that were related to pleasure, engagement, meaning, positive relationships, and accomplishment. Both interventions were conducted daily for one week. Before the intervention, after the intervention, two weeks and four weeks after the intervention, participants completed the OTH, two short scales for the assessment of positive relationships and accomplishment (Gander et al., 2016), and measures of life satisfaction (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), and affectivity (PANAS; Watson, Clark, & Tellegen, 1988). The authors reported an increase in subjective well-being (i.e., increases in life satisfaction and positive affect, and a decrease in negative affect) in the intervention condition in comparison with the placebo control condition for up to four weeks. Additionally, they found an increase in all five well-being components in the intervention condition, while the control condition only showed an increase in R. This preliminary study provided first evidence that the five well-being components can jointly be addressed in an intervention, and that this may be associated with an increase in these components, and in life satisfaction. However, no study has as yet directly compared the potential of interventions

based on the individual components of Seligman's (2011) Well-Being Theory or addressed the positive associations of accomplishment and positive relationships with well-being in an experimental design. We aim at narrowing this gap by comparing the effects of interventions based on P, E, M, R, and A on well-being in a placebo-controlled study.

The present study has two main aims: (1) Replicating the findings of Giannopoulos and Vella-Brodrick (2011) on the effectiveness of interventions based on pleasure, engagement, and meaning and (2) extending these findings using interventions based on positive relationships and accomplishment. For this purpose, we conducted a randomized, placebo-controlled online-intervention study. In accordance with Giannopoulos and Vella-Brodrick (2011), we adapted the "three good things"-exercise (i.e., writing down three things that went well on that day and reflecting why these things happened; Seligman et al., 2005) by changing the focus of the exercise to experiences related to pleasure, engagement, and meaning. Additionally, we included conditions that address positive relationships and accomplishment. The goal of these interventions was to strengthen the focus on these components in daily life. Table 1 gives an overview on the conditions and the instructions.

## PART II

Table 1

*Descriptions of the Six Intervention Conditions and the Placebo Control Condition.*

Label	Condition	Instruction
		Please take 10 minutes on every evening for a week before going to bed ...
IC1	Pleasure	Remember three things you have experienced today that were related to fun, amusement, joy, or pleasure. Write these three things down and describe how you felt.
IC2	Engagement	Remember three things you have experienced today where your attention was particularly focused and you were not aware of your surroundings. Write these three things down and describe how you felt.
IC3	Positive Relationships	Remember three things you have experienced today that were positive experiences with other people. Write these three things down and describe how you felt.
IC4	Meaning	Remember three things you have experienced today that were personally significant and meaningful. Write these three things down and describe how you felt.
IC5	Accomplishment	Remember three things you have experienced today where you were successful or where you had the impression that you did something really well. Write these three things down and describe how you felt.
IC6	PERMA	<p>Remember one thing from each of the following topics:</p> <ul style="list-style-type: none"> <li>• Pleasure: Something you have experienced on that day that was related to fun, amusement, joy, or pleasure.</li> <li>• Engagement: Something you have experienced on that day where your attention was particularly focused and you were not aware of your surroundings</li> <li>• Meaning: Something you have experienced on that day that was personally significant and meaningful.</li> <li>• Positive Relationships: Something you have experienced on that day that was a positive experience with other people.</li> <li>• Accomplishment: Something you have experienced on that day where you were successful or where you had the impression that you did something really well.</li> </ul> <p>Write these five things down and describe how you felt.</p>
PCC	Early memories	Remember one early childhood memory and write down this memory as detailed as possible.

*Note.* IC = Intervention condition. PCC = Placebo control condition.

In comparison with the study of Giannopoulos and Vella-Brodrick (2011), we changed the design in some respects: Due to the addition of positive relationships and accomplishment, participants in the combination condition were instructed to write down one experience for each of the five components. Furthermore, we used a different placebo control condition,



namely the “early memories”-exercise (Seligman et al., 2005). We decided for this condition since the exercise has been proved suitable in numerous intervention studies (i.e., small or no changes in well-being; see Gander et al., 2013; Proyer et al., 2015, 2016; Seligman et al., 2005). Additionally, we considered changes in depressive symptoms, and we asked the participants whether they liked the interventions and whether they perceived a personal benefit from conducting them. This was done to assess indicators of a person  $\times$  intervention-fit, which was found to be important for long-term effects of such interventions (Proyer et al., 2015b). In line with Giannopoulos and Vella-Brodrick (2011), we also examined possible moderation effects of pleasure, engagement, and meaning (using the OTH; Peterson et al., 2005) and extended their findings by also considering effects of positive relationships and accomplishment (using the measures developed by Gander et al., 2016). Finally, no study has thus far examined the efficacy of positive psychology interventions according to the participant’s place on the well-being continuum (Seligman, Park, & Steen, 2004). Therefore, we also tested for moderating effects of baseline levels in happiness and depressive symptoms.

We expected an increase in happiness and a decrease in depressive symptoms in all intervention conditions, in comparison to the placebo control condition. We further expected that participants in the intervention conditions would report higher levels of subjective benefit than those in the placebo control condition. Additionally, we expected differences among the interventions regarding whether participants liked them. We assumed that the interventions targeting P and R would be better liked than the other interventions since they might be closer to the daily experiences of most participants and therefore easier to recall and describe on a daily basis. Since this study is the first to examine interventions based on, as well as moderation effects of, positive relationships and accomplishment, and because Giannopoulos and Vella-Brodrick (2011) did not find a clear pattern of moderation effects, we considered these analyses to be of a more exploratory nature and refrained from stating hypotheses on these

analyses. Finally, we expected that the interventions would be more effective for people in the middle range of the well-being spectrum than for those in the lower and upper ranges. This hypothesis was based on the assumption that self-administered interventions would be less appropriate for people with very low scores in well-being, whereas for those with very high scores, there might be ceiling effects in the sense of only little “room for improvement.”

## **Method**

### **Participants**

We estimated that sample sizes of  $\geq 100$  participants per condition would be needed to detect small effects with a power of  $\geq .80$ . However, since large dropout rates were to be expected for the follow-up after six months (see Bolier et al., 2013), we aimed at having sample sizes  $\geq 200$  for each of the interventions tested. Participants were recruited through a university press release on a recently published study in various newspapers and magazines in the German speaking countries (unrelated to the content of this study) that included a call for participation in a training program, advertised as a positive psychology program. The study was advertised as a training program for strengths (“strengthen your strengths”) and other positively valued traits. Of the 2,430 participants who registered online, 1,624 met the inclusion criteria completed the baseline assessments, and were assigned to the intervention condition or the placebo control condition. Inclusion criteria were: Being at least 18 years of age, currently not undergoing psychotherapeutic or psychopharmacologic treatment, no consumption of illegal drugs, not being interested in participating for professional reasons (for preventing biased results), and giving informed consent. The final sample consisted of  $N = 1,359$  participants (i.e., 83.7% of those who met the inclusion criteria) who completed the assigned intervention. The flow of participants through each stage of the study is shown in Figure 1.

PART II

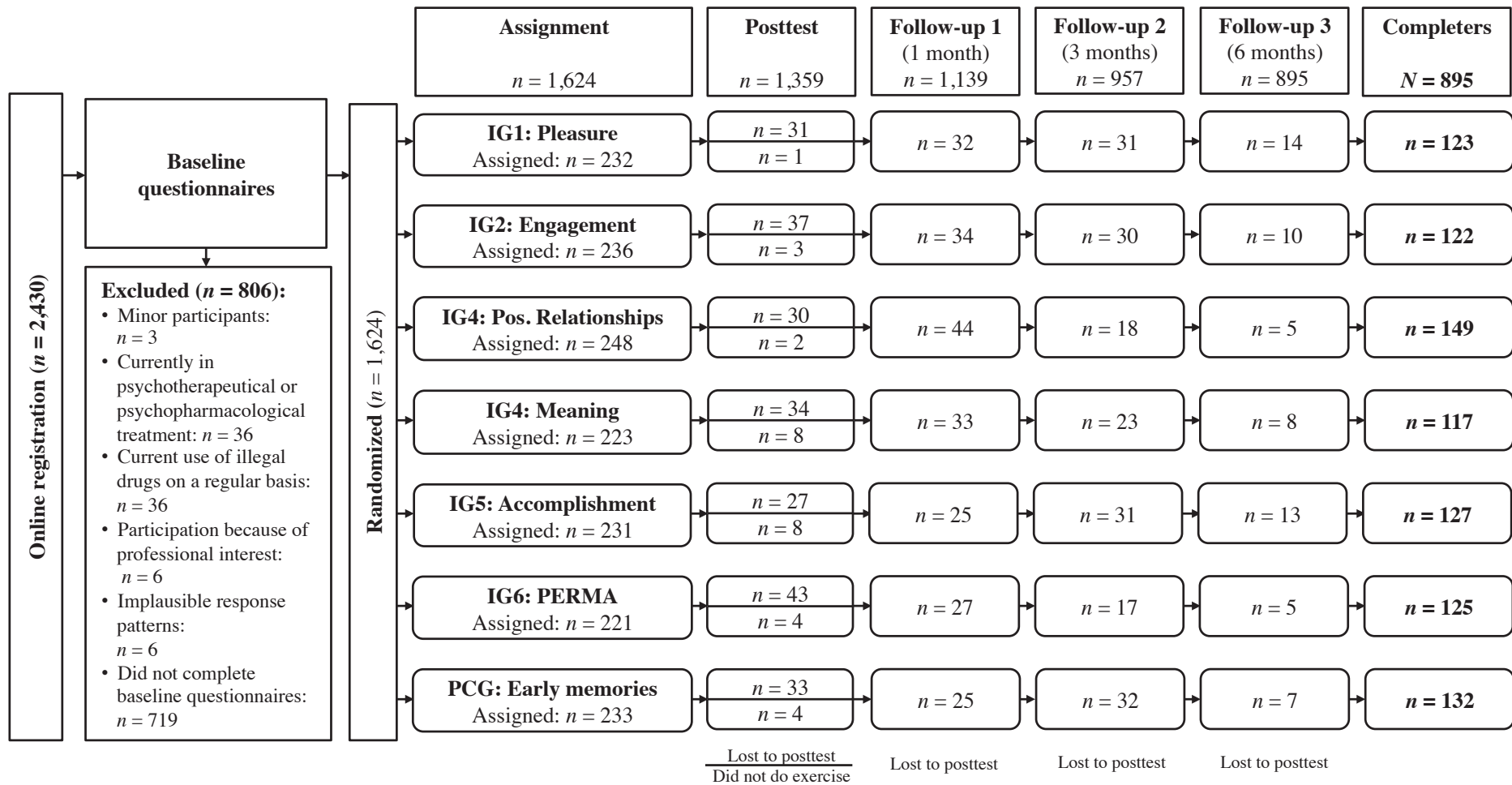


Figure 1. Flow of participants through each stage of the study

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Most participants were female (79.2%) and were of German (75.0%), Swiss (11.4%), or Austrian (10.3%) nationality. Ages ranged from 18 to 78 ( $M = 46.13$ ,  $SD = 11.74$ ). About half of the sample was married or living in a registered partnership (47.1%); about one fifth of the sample was in a relationship (20.8%, not married or in a registered partnership); about one fifth of the sample (19.1%) was single, 11.0%, divorced or living in separation; and 2.0% were widowed. More than one third of the sample (38.3%) had children. The sample was well-educated: 60.9% had a degree from a university or a university of applied sciences, 18.4% had a diploma allowing them to attend a university or university of applied sciences, and 20.7% had completed vocational training or secondary school as their highest education. Most of the participants (74.2%) were currently working; 4.3% were currently unemployed; 7.7% were retired; and the remaining 13.8% were students, interns, apprentices, on holiday, on leave, or neglected to answer the question.

We examined whether those who conducted the assigned exercise differed from those who did not in order to gain information on the generalizability of the findings. Results showed that participants in the latter group were on average 3.1 years younger,  $t(1622) = 3.70$ ,  $p < .001$  ( $d = .26$ ), and tended to be more often men (17.1%) than women (13.3%),  $\chi^2(1, N = 1622) = 3.41$ ,  $p = .07$ . Whereas there was no difference regarding happiness,  $t(1622) = 1.52$ ,  $p = .13$ , those participants who dropped out of the study tended to report more depressive symptoms,  $t(1622) = 1.89$ ,  $p = .06$ .

In a second step, we analyzed whether randomization was successful by testing for differences among the conditions in demographics and baseline levels of happiness and depressive symptoms: There were no differences among the conditions regarding age,  $F(6, 1352) = 0.75$ ,  $p = .61$ , relationship status,  $\chi^2(24, N = 1359) = 26.96$ ,  $p = .31$ , education,  $\chi^2(12, N = 1359) = 15.98$ ,  $p = .19$ , or gender ratio among the conditions,  $\chi^2(6, N = 1359) = 9.06$ ,  $p = .17$ ). However, the conditions differed regarding the participants' working status,  $\chi^2(18, N =$

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1359) = 39.38,  $p = .003$ : In the accomplishment condition, more participants were retired (12.8%) than on average (7.7%), in the pleasure condition more participants were unemployed (9.5%), and in the PERMA-condition fewer participants were unemployed (0.6%) than on average (4.3%). However, since the intervention conditions did not—generally—differ from the placebo control condition, we decided not to control for these differences in subsequent analyses. Finally, the conditions did not differ in their baseline scores for happiness,  $F(6, 1352) = 1.65, p = .13$ , or for depressive symptoms,  $F(6, 1352) = 1.24, p = .28$ .

### **Instruments**

The *Authentic Happiness Inventory* (AHI, Seligman et al., 2005; used in a German version as used by Proyer et al., 2016) is a self-report measurement for the assessment of global happiness and comprises aspects of subjective and psychological well-being that was especially designed for use in intervention studies. The AHI consists of 24 sets of five statements from which the participant has to choose the statement that describes his feelings during the past week best. A sample set of statements ranges from 1 = “*I have sorrow in my life*” to 5 = “*My life is filled with joy*”. Proyer et al. (2016) report good psychometric properties for the AHI and showed that it is sensitive to changes in well-being and also covers the top-end of the well-being continuum. The AHI has been often used in research (e.g., Ruch et al., 2010; Schiffrin & Nelson, 2010; Schueller & Seligman 2010; Shapira & Mongrain, 2010). The internal consistency in the present study at pretest was high at all measurement time points, ranging from  $\alpha = .94$  to  $\alpha = .95$ .

The *Center for Epidemiologic Studies Depression Scale* (ADS, Radloff, 1977; in the German adaptation by Hautzinger & Bailer, 1993) is a 20-item self-report measurement for the assessment of the frequency and intensity of depressive symptoms in the past week. All items use a 4-point Likert-style scale ranging from 0 (“*rarely or none of the time (less than 1 day)*”) to 3 (“*most or all of the time (5-7 days)*”), and four of the 20 items are negatively

keyed. A sample item is “I thought my life had been a failure”. The CES-D is one of the most frequently used depression measures and was evaluated as a very balanced and representative measure in a meta-analysis that compared different widely used depression measures (Shafer, 2006). The internal consistency in the present study at pretest was high at all measurement time points, ranging from  $\alpha = .90$  to  $\alpha = .92$ .

The *Orientations to Happiness Questionnaire* (OTH; Peterson, Park, & Seligman, 2005; in the German adaption by Ruch, Harzer, Proyer, Park, & Peterson, 2010) is an 18-item self-report measurement for the assessment of the three orientations *pleasure*, *engagement*, and *meaning*, as proposed by Seligman’s (2002) Authentic Happiness Theory. All items are positively keyed and are rated on a 5-point Likert-style from 1 (“*very much unlike me*”) to 5 (“*very much like me*”). A sample item is “Life is too short to postpone the pleasures it can provide” (pleasure). Various studies have used the OTH and provided information on its reliability and validity (e.g., Ruch et al., 2010; Vella-Brodrick, Park, & Peterson, 2009; Park, Peterson, & Ruch, 2009). As recommended by Gander et al. (2016) when using the OTH together with the scales for positive relationships and accomplishment, we shortened each scale by one item to reduce the overlap with positive relationships. In the present study, internal consistencies at pretest were acceptable and comparable to earlier findings (pleasure:  $\alpha = .70$ , engagement:  $\alpha = .66$ , meaning:  $\alpha = .76$ ).

The *Positive Relationships*- and the *Accomplishment*-scale (Gander, Proyer, & Ruch, 2016) are self-report scales for the assessment of positive relationships and accomplishment consisting of five items each. Together with pleasure, engagement, and meaning, they allow for an assessment of the endorsement towards all components of Seligman’s (2011) Well-Being Theory. All items are positively keyed and are rated on the same 5-point Likert-style scale as the OTH. A sample item is “Most things I do give me a feeling of accomplishment”. Gander et al. (2016) reported good factorial validity for the scales when used individually or

together with the OTH. They also showed that the scales are able to predict additional variance in life satisfaction and flourishing over and above the influence of the OTH and have high test-retest reliabilities over time periods of one, three, and six months ( $r = .68 - .71$ ). In the present study, internal consistencies at pretest were satisfactory (positive relationships:  $\alpha = .75$ , accomplishment:  $\alpha = .71$ ).

Additionally, upon completing the exercise participants reported their liking of the exercise (from 1 = “*not at all*” to 7 = “*very much*”), whether they saw a personal benefit from the exercise, and how high they perceived this benefit to be (from 1 = “not at all” to 7 = “very high”).

### **Procedure**

The federal ethics committee of the canton of Zurich, Switzerland provided approval. The whole study was conducted via an online platform (<http://www.staerkentraining.ch>), which was especially designed for the administration of online intervention studies and was created in accordance with the standards for Internet-delivered testing (Coyne & Bartram, 2006). Participants could register online after completing a form confirming that they fulfilled the inclusion criteria and giving informed consent. After registration they received an individual password which granted them access to the online platform where they were asked to complete basic demographic questionnaires and were again asked whether they fulfill the inclusion criteria. Those participants who failed to do so were excluded from all further analyses; see Figure 1 for details.

Upon completion of the questionnaires, participants could begin the program as soon as they indicated that they would have time to complete the exercise over the following week time. Before participants received their exercise, they had to complete the pretest measures of the AHI, the CES-D, the OTH-scales, and the scales on positive relationships and accomplishment. Those who did not complete the pretest measures or showed an implausible an-

swering pattern (i.e., checking the same answer for every question) were excluded from the analyses. Afterwards, the remaining participants were randomly assigned to one of the six intervention conditions or the placebo control condition via an automated algorithm (based on a Mersenne-Twister) and received their assigned exercise, which had to be conducted every day for one week. After the intervention week and one, three, and six months later, participants received an e-mail reminder to return to the online platform to complete the posttest and follow-up assessments. At posttest, the participants were asked a “manipulation check” question (i.e., “Did you conduct the assigned exercise?”); only those participants who indicated that they did so entered the following analyses. Finally, participants received automated, individualized feedback on their questionnaires (i.e., on the AHI, CES-D, OTH, and the Positive Relationships- and Accomplishment-scales) after they had completed the last follow-up, but no other incentive for participation was offered. The participants could contact the researchers via e-mail for technical support but no information or help with the exercises was provided.

### **Data Analysis**

All available data was analyzed for participants who completed the assigned exercise. For the evaluation of intervention effectiveness, we applied multi-level modeling using restricted maximum likelihood estimation (REML). This approach offers the advantage that not only those participants who completed all follow-ups enter the analysis (as in a classical repeated measurement ANOVA approach) but also the available data from participants who have missing data at some time points (cf. Singer & Willett, 2003). To estimate the overall intervention effectiveness, we analyzed the effect of “condition” (each intervention condition separately vs. the placebo control condition) on all measurement time points for happiness and depressive symptoms after the intervention week, while controlling for the pretest scores of happiness and depressive symptoms, respectively. The model was as follows:



$$Y_{ij} = \gamma_{00} + \gamma_{01}Baseline_i + \gamma_{02}Condition_i + (\varepsilon_{ij} + \zeta_{0i})$$

where

$$\varepsilon_{ij} \sim N(0, \sigma_\varepsilon^2) \text{ and } \zeta_{0i} \sim N(0, \sigma_0^2)$$

For the estimation of the overall effectiveness  $Y_{ij}$  refers to the scores of happiness or depression at all measurement time points after the intervention, *Baseline* refers to the pre-test scores in happiness or depression, and *Condition* refers to the intervention condition of interest (coded as 1) vs. the placebo control condition (coded as 0).

Subsequently, we analyzed the effect of “condition” on each assessment of happiness and depressive symptoms after the intervention separately, again controlling for the pretest scores. For these analyses,  $Y_{ij}$  refers to the scores of happiness or depression at the time point of interest. Unless otherwise indicated, always the fixed effect of “condition” is given.

For the analysis of moderating effects we computed tertile splits for the pleasure-, engagement-, meaning-, positive relationships-, and accomplishment-scales (low, medium, and high scorers), in accordance with Giannopoulos and Vella-Brodrick (2011). Using the moderator variable and its interaction with the condition as additional predictors, we conducted the same analyses of overall effects as described above. When these analyses revealed a significant interaction between a moderator and the condition, we computed simple main effects. These were done to compare the increases in happiness and depressive symptoms between each intervention condition and the placebo control condition separately for low-, medium-, and high-scorers in each orientation. For the analysis of moderating effects of baseline happiness and depressive symptoms, we conducted the same analyses of overall effects but also included the interaction of the baseline scores with the condition, the squared baseline scores, and their interaction with the condition to test whether the baseline scores might have non-linear effects on the outcomes (e.g., stronger effects for those in the medium range of the happiness scale).

We based our analyses and interpretation of the findings on those participants who conducted the assigned exercise because this allows for determining whether the interventions are effective in increasing happiness in those who conducted the interventions. However, one might argue that dropping out is systematically related to an individual difference variable (such as age; see below), possibly indicating that the interventions might not have been effective for these participants. From a more applied perspective, it is also of interest whether those the interventions would still be effective if the participants who dropped out (regardless of whether they conducted the interventions or not) would also be considered. For this purpose, we repeated the above-mentioned analyses in an intention-to-treat (ITT)-approach, using all participants that were assigned to the conditions and estimating all missing data points. These estimations were obtained using the Multivariate Imputation by Chained Equations (MICE) method in which “[...] a series of regression models are run whereby each variable with missing data is modeled conditional upon the other variables in the data” (Azur, Stuart, Frangakis, & Leaf, 2012; p. 2). This procedure is repeated to generate multiple imputed dataset (we used 20 imputed datasets). These datasets are then analyzed separately and the results are pooled to obtain an overall estimation. We used the R-package “mice” (Van Buuren & Groothuis-Oudshoorn, 2011) for this procedure. The raw data are provided as an online supplementary material (Data Sheet 1).

## **Results**

### **Intervention effectiveness**

The means and standard deviations can be found in Table 2, whereas the results of the multilevel analyses for intervention effectiveness are given in Table 3 (fixed effects for the condition are given in the prediction of happiness or depressive symptoms after the intervention while controlling for the baseline levels in happiness and depressive symptoms).

PART II

Table 2

*Means and Standard Deviations of the Ten Groups at the Five Time Periods for Happiness and Depressive Symptoms.*

	Pre			Post			1 M			3 M			6 M		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
<i>Happiness</i>															
P	200	2.94	0.60	200	3.02	0.57	169	3.09	0.59	142	3.12	0.56	144	3.21	0.53
E	196	2.95	0.59	196	3.04	0.58	164	3.09	0.59	142	3.12	0.57	150	3.14	0.61
R	216	2.95	0.57	216	3.02	0.61	174	3.05	0.61	163	3.11	0.62	167	3.15	0.60
M	181	3.03	0.50	181	3.10	0.53	150	3.18	0.54	130	3.16	0.56	138	3.20	0.57
A	196	2.87	0.60	196	2.95	0.60	172	2.99	0.61	147	3.03	0.59	150	3.10	0.62
PERMA	174	3.02	0.54	174	3.08	0.50	148	3.13	0.55	133	3.11	0.56	143	3.17	0.52
PCG	196	2.99	0.56	196	3.00	0.56	171	3.05	0.62	150	3.02	0.57	149	3.12	0.58
<i>Depressive Symptoms</i>															
P	200	0.69	0.45	200	0.60	0.43	168	0.61	0.48	141	0.58	0.45	143	0.56	0.42
E	196	0.71	0.47	196	0.60	0.41	162	0.60	0.44	141	0.62	0.44	150	0.62	0.49
R	216	0.71	0.45	216	0.62	0.44	172	0.58	0.43	163	0.58	0.46	166	0.57	0.45
M	181	0.66	0.41	181	0.60	0.43	148	0.55	0.40	129	0.58	0.42	138	0.58	0.44
A	196	0.75	0.49	196	0.64	0.44	171	0.68	0.50	145	0.66	0.46	148	0.62	0.47
PERMA	174	0.64	0.42	174	0.57	0.40	147	0.55	0.44	133	0.63	0.51	141	0.56	0.42
PCG	196	0.71	0.46	196	0.67	0.44	171	0.67	0.46	148	0.68	0.45	149	0.64	0.49

*Note.* Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale, PCG = Early memories; 1 M = one month after the intervention, 3 M = three months after the intervention, 6 M = six months after the intervention.

PART II

Table 3

*Fixed Effects of the Experimental Condition for Happiness and Depressive Symptoms*

	Overall			Post			1 M			3 M			6 M		
	<i>df</i>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>df</i>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>df</i>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>df</i>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>df</i>	<i>F</i>	<i>f</i> <sup>2</sup>
<i>Happiness</i>															
P	1,393	5.91**	.013	1,393	4.74*	.009	1,337	2.42†	.004	1,289	5.91*	.017	1,290	3.46*	.008
E	1,389	5.54**	.018	1,389	6.48**	.014	1,332	2.86*	.006	1,289	5.37*	.015	1,296	1.06	.000
R	1,409	4.88*	.016	1,409	3.47*	.006	1,342	2.40†	.004	1,310	7.43**	.020	1,313	1.77†	.002
M	1,374	5.52**	.017	1,374	5.13*	.011	1,318	5.98*	.015	1,277	4.04*	.011	1,284	0.54	.000
A	1,389	2.98*	.008	1,389	3.62*	.007	1,340	0.54	.000	1,294	4.49*	.012	1,296	2.90*	.006
PERMA	1,367	3.59*	.010	1,367	3.25*	.006	1,316	2.40†	.004	1,280	3.69*	.009	1,289	0.49	.000
<i>Depressive Symptoms</i>															
P	1,393	3.19*	.014	1,393	3.38*	.006	1,336	0.68	.000	1,286	2.94*	.007	1,289	1.46	.001
E	1,389	3.14*	.011	1,389	5.16*	.011	1,330	1.53	.000	1,286	1.06	.000	1,296	0.26	.000
R	1,409	8.22**	.036	1,409	3.14*	.005	1,340	7.08**	.018	1,308	5.15*	.013	1,312	3.63*	.008
M	1,374	2.79*	.010	1,374	1.14	.000	1,316	3.75*	.009	1,274	1.80†	.003	1,284	0.35	.000
A	1,389	1.41	.001	1,389	2.95*	.005	1,339	0.14	.002	1,290	0.81	.000	1,294	2.78*	.006
PERMA	1,368	3.66*	.014	1,367	2.67†	.005	1,315	4.00*	.009	1,278	0.35	.003	1,287	1.09	.000

*Note.* Sample sizes are given in Table 2. Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale; 1 M = one month after the intervention, 3 M = three months after the intervention, 6 M = six months after the intervention, *f*<sup>2</sup> = Cohen's *f*<sup>2</sup>.

†*p* < .10; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (one-tailed).

Table 3 shows that, overall, participants in all intervention conditions reported higher scores in happiness after the intervention than the placebo control condition when controlling for the pretest scores. An inspection of the individual time points revealed that this effect was observable in all conditions at the immediate posttest and at the three-month follow-up. At the one-month follow-up, two conditions (i.e., engagement and meaning) scored significantly higher than the placebo control condition and there was a (non-significant) trend in the same direction in two other conditions (i.e., pleasure, and positive relationships). In two conditions (i.e., pleasure, and accomplishment) the positive effects on happiness were observable up to six months after the intervention, whereas in the positive relationships condition the effects failed to reach significance.

All interventions led to an amelioration of depressive symptoms across all time points compared to the placebo control condition, except for the accomplishment-condition. Depending on the condition, this reduction in depressive symptoms could be observed up to the immediate post-test (engagement), one month (meaning and PERMA), three months (pleasure), and six months (positive relationships and accomplishment).

### **Intention-to-treat analyses**

Results for the intention-to-treat analyses using multiply imputed datasets were highly parallel as for the analyses on those participants who did not drop out of the study (fixed effects of condition are given in Table 4).

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Table 4

*Fixed Effects of the Experimental Condition for Happiness and Depressive Symptoms Using Multiple Imputed Dataset (ITT)*

	<i>N</i>	<i>df</i>	Overall		Post		1 M		3 M		6 M	
			<i>F</i>	<i>f</i> <sup>2</sup>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>F</i>	<i>f</i> <sup>2</sup>	<i>F</i>	<i>f</i> <sup>2</sup>
<i>Happiness</i>												
P	232	1,462	5.91**	.013	4.13*	.008	1.36	.002	7.62**	.018	2.08†	.005
E	236	1,467	4.12*	.009	5.37*	.011	1.56	.000	4.91*	.013	0.57	.000
R	248	1,478	4.38*	.008	3.35*	.006	0.97	.000	7.08**	.015	1.10	.000
M	223	1,454	5.30*	.011	5.79**	.011	4.13*	.009	4.30*	.011	0.79	.000
A	231	1,461	2.94*	.006	3.74*	.007	0.57	.000	3.03*	.006	1.63	.000
PERMA	221	1,451	3.05*	.007	3.19*	.006	1.66†	.003	3.23*	.008	0.61	.000
<i>Depressive Symptoms</i>												
P	232	1,462	3.49*	.008	3.28*	.006	0.75	.000	3.49*	.008	0.92	.000
E	236	1,467	2.50†	.006	4.79*	.011	1.34	.000	0.99	.000	0.25	.000
R	248	1,478	7.80**	.018	4.17*	.008	4.79*	.010	3.72*	.010	2.51†	.005
M	223	1,454	3.67*	.009	2.10†	.003	3.39*	.008	1.86†	.005	0.52	.000
A	231	1,461	2.28†	.004	3.75*	.007	0.27	.000	0.55	.000	1.82†	.003
PERMA	221	1,451	3.13*	.007	2.66†	.005	2.98*	.006	0.54	.000	1.05	.001

*Note.*  $n_{\text{placebo}} = 233$ . Only the effects for *condition* (each intervention condition vs. placebo control condition) are displayed. Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale; 1 M = one month after the intervention, 3 M = three months after the intervention, 6 M = six months after the intervention,  $f^2$  = Cohen's  $f^2$ .

† $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$  (one-tailed).

Despite of the effect sizes being smaller in size in general. The interventions led to higher happiness scores in comparison with the placebo control condition when analyzing all time points after the intervention jointly and controlling for the pretest scores. This effect was observable for up to three months in all conditions. Overall, most conditions also led to a reduction in depressive symptoms; the exceptions were the engagement and the accomplishment conditions that yielded marginally significant results. For the individual time points, the same results were obtained as for the analyses without the dropouts, the only difference was that those conditions that reduced depressive symptoms after six months (i.e., positive relationships and accomplishment) only yielded marginally significant results.

### **Moderation effects**

As a next step, we examined the influence of specific characteristics of the participants on the outcomes (i.e., we explored whether the changes in happiness and depressive symptoms were stronger when the assigned intervention matched the participants' scores on the pleasure-, engagement-, meaning-, the positive relationships-, and the accomplishment-scales). Results showed that the effectiveness of the engagement condition was moderated by pleasure; happiness:  $F(2, 385) = 3.45, p = .03, f^2 = .018$ , and depressive symptoms:  $F(2, 385) = 3.88, p = .02, f^2 = .022$ . Happiness increased in those with low,  $F(1, 385) = 6.69, p = .01$ , or medium levels of pleasure,  $F(1, 385) = 4.86, p = .03$ , but not for those with high levels of pleasure,  $F(1, 385) = 0.67, p = .41$ . Depressive symptoms decreased mainly in those with medium levels of pleasure,  $F(1, 385) = 6.64, p = .01$ , but not in those with low,  $F(1, 385) = 3.02, p = .08$ , or high levels,  $F(1, 385) = 1.09, p = .30$ . Furthermore, the effectiveness of the meaning condition was moderated by the baseline scores in meaning,  $F(2, 389) = 3.28, p = .04, f^2 = .017$ : Happiness increased,  $F(1, 389) = 11.53, p = .001$ , and depressive symptoms decreased,  $F(1, 389) = 7.95, p = .01$ , for those with high levels of meaning, but not for those with low levels,  $F(1, 389) = 0.34, p = .56$ ,  $F(1, 389) = 0.81, p = .37$ , or medium levels,  $F(1, 389) =$

0.04,  $p = .84$ ,  $F(1, 389) = 0.72$ ,  $p = .40$ .

Further, we analyzed whether the baseline scores in happiness and depressive symptoms moderated the findings. In order to test for linear and quadratic effects, we included the baseline scores, squared baseline scores, and their interaction with condition as additional predictors. Firstly, we compared the all intervention conditions combined with the placebo control condition to test for a general trend in the data. Secondly, we computed the same analyses separately for the intervention conditions (comparing each with the placebo control condition). Table 5 gives the interaction terms between the condition and the squared baseline scores (quadratic effects).

Table 5

*Moderation Effects of the Baseline AHI and CES-D on Happiness and Depressive Symptoms*

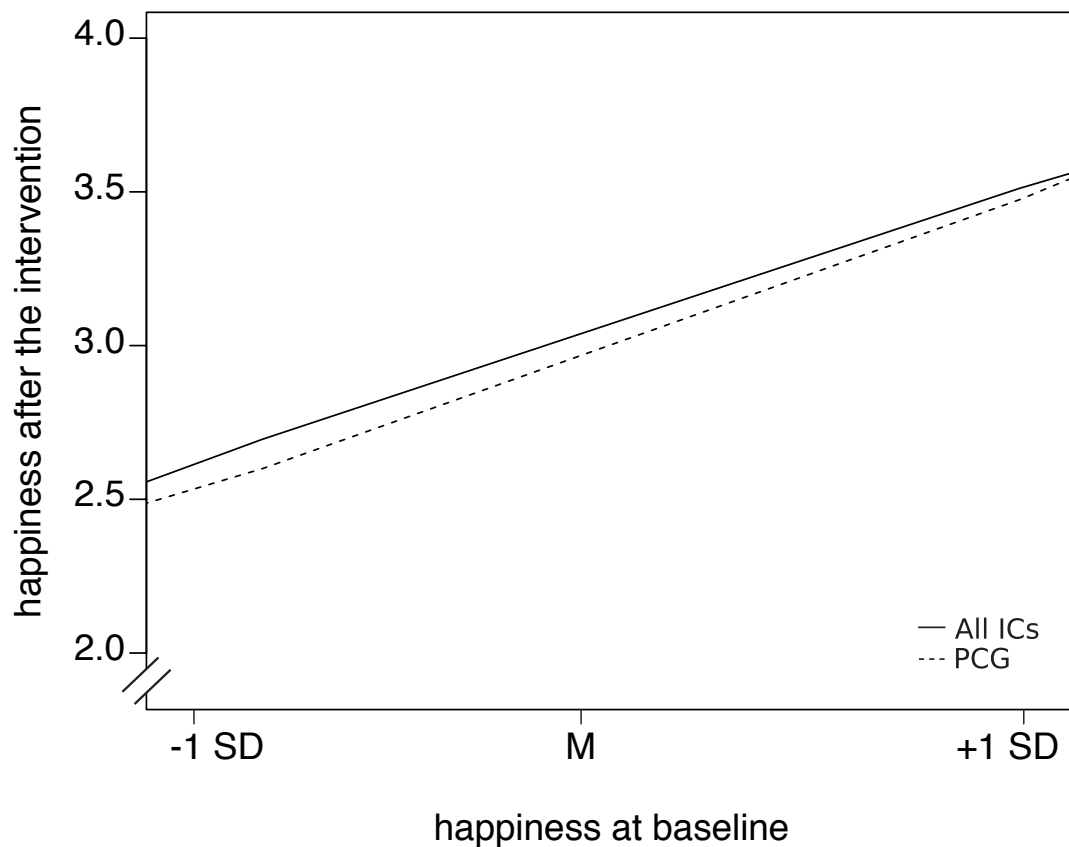
Conditions	$N$	$df$	Happiness		Depression	
			$F$	$f^2$	$F$	$f^2$
All vs. PCG	1359	1, 1353	3.51*	.004	3.23*	.002
P	200	1, 390	2.12†	.004	5.57**	.023
E	196	1, 386	2.41†	.007	0.00	.000
R	216	1, 406	1.19	.001	2.47†	.003
M	181	1, 371	1.98†	.006	1.92†	.004
A	196	1, 386	1.62	.002	4.65*	.012
PERMA	174	1, 364	3.45*	.009	3.28*	.002

*Notes.*  $n_{\text{placebo}} = 196$ . Only the interactions between squared happiness/depressive symptoms and the condition (all fixed effects) are given. Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale,  $f^2$  = Cohen's  $f^2$ .

† $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$  (one-tailed).



Table 5 shows that for both happiness and depressive symptoms an interaction was found between the conditions and (the square of the) baseline happiness (or depressive symptoms, respectively)—when comparing all intervention conditions with the placebo control condition. When analyzing the intervention conditions separately, quadratic effects (or trends) of the baseline scores for both outcomes, happiness and depression, were found for most intervention conditions.



*Figure 2.* The relationship between baseline scores in happiness and the happiness scores after the intervention (all measurement time points combined) for all intervention conditions combined (all ICs) vs. the placebo control condition (PCG).

A visual inspection of the findings revealed that, as expected, the interventions were most effective for those participants whose baseline scores in happiness and depressive symptoms were average (i.e., approximately  $\pm 1$  SD), or slightly below average for happiness and slightly above average for depressive symptoms. For those participants who had low or high

scores at baseline, the intervention was less effective. Figure 2 shows the relationship for this interaction between the baseline scores in happiness and the intervention condition on happiness after the intervention.

### Liking and benefit

We tested whether the conditions differed in terms of how much the participants liked the interventions and whether they perceived a personal benefit from the intervention.

ANOVA results indicated that the conditions differed in both aspects, liking:  $F(6, 1352) = 4.92, p < .001$ , and benefit:  $F(6, 1352) = 4.19, p < .001$ . Means, Standard Deviations, and results of Post-Hoc tests (LSD) are given in Table 6.

Table 6

*Means and Standard Deviations for Liking the Interventions and Benefiting from them.*

	<i>N</i>	Liking		Benefit	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
P	200	5.71 <sub>a</sub>	1.02	3.31 <sub>a</sub>	0.77
E	196	5.24 <sub>b</sub>	1.12	3.08 <sub>bc</sub>	0.69
R	216	5.52 <sub>ac</sub>	1.08	3.30 <sub>a</sub>	0.83
M	181	5.33 <sub>bc</sub>	1.23	3.23 <sub>ac</sub>	0.80
A	196	5.28 <sub>b</sub>	1.19	3.16 <sub>ac</sub>	0.78
PERMA	174	5.52 <sub>a</sub>	1.11	3.22 <sub>ac</sub>	0.66
PCG	196	5.23 <sub>b</sub>	1.20	3.01 <sub>b</sub>	0.79

*Note.* A shared subscript indicates that these groups did not differ at  $p < .05$  (LSD-procedure). Liking: How participants liked the exercise (1 = not at all, 7 = very much). Benefit: The extent to which participants perceived a benefit from the exercise (1 = not at all, 5 = very high).

Table 6 shows that participants liked the interventions for pleasure, positive relationships, and PERMA better than the placebo control exercise and indicated that they benefited

more from most exercises (except for engagement) than from the placebo control condition. Moreover, there were some differences among the interventions: For example, participants indicated greater liking of the pleasure-, positive relationships-, and PERMA-interventions than the engagement- and the accomplishment-interventions. They also reported perceiving more benefit from the pleasure- or the positive relationships-intervention than from the engagement intervention.

### **Discussion**

This study shows that self-administered online-interventions based on pleasure (P), engagement (E), positive relationships (R), meaning (M), or accomplishment (A) are effective for increasing happiness and alleviating depressive symptoms for up to six months. The study confirms earlier findings of Giannopoulos and Vella-Brodrick (2011) and is the first study to directly evaluate interventions based on the five components of Seligman's (2011) Well-Being Theory.

We successfully replicated the findings of Giannopoulos and Vella-Brodrick (2011) on the effectiveness of interventions based on pleasure, engagement, and meaning, and we additionally extended previous knowledge by showing that the effects of these interventions can be found for longer time periods than expected, namely for up to three months for engagement and meaning and for up to six months for pleasure. Moreover, we also considered changes in depressive symptoms and found the interventions to alleviate depressive symptoms in the short term (engagement), up to one month (meaning), or several months later (pleasure).

The findings for the interventions based on positive relationships and accomplishment are encouraging: Both interventions increased happiness for three and six months but had differential effects on depressive symptoms. Whereas no overall effect for the reduction in depressive symptoms was found in the accomplishment condition (only at the immediate

posttest and at the six-month follow-up), the participants in the positive relationships-condition reported strong decreases in depressive symptoms at every time point and yielded by far the strongest effects of all conditions. The results for the accomplishment-condition should be interpreted with some caution since participants in this condition reported the highest levels of depressive symptoms and the lowest levels of happiness at baseline (although not significantly different from the baseline levels of the other conditions). This might have had an impact on the effectiveness of the intervention. However, this restriction does not apply to the positive relationships-condition, and our results seem to corroborate the notion that “[...] other people are the best antidote to the downs of life” (Seligman, 2011; p. 20). Thus, from an applied perspective, focusing on positive relationship experiences might be a potent strategy for reducing depressive feelings in non-depressed participants, which should be examined in further detail. However, future studies should also examine exactly what participants did (e.g., whether the intervention lead to cognitive changes in the appreciation of one’s relationships or also lead to an increase in the time spent with other people) to offer a more thorough insight in the mechanisms of this intervention. Furthermore, information on the size and quality of the participants’ social networks should be considered since these factors might be important moderators for the effectiveness of this intervention.

In comparison with earlier studies (Giannopoulos & Vella-Brodrick, 2011), we only found moderation effects for the engagement condition (moderated by the baseline scores in pleasure), and the meaning condition (moderated by the baseline scores in meaning). However, taking the large number of comparisons into account, these effects were relatively small and we have refrained from interpreting them. We also found (trends for) moderation effects of the baseline scores in happiness and depressive symptoms for most interventions. This provides first evidence for a basic idea in positive psychology, namely that these interventions are most effective for those people in the middle range of the well-being continuum and po-

tentially less useful for those who are very depressed or already flourishing. Since meta-analyses reported stronger effects for those participants with elevated scores in depression or those suffering from specific psychosocial problems (Bolier, Haverman, Westerhof, et al., 2013; Sin & Lyubomirsky, 2009), it might be the case that this finding only applies to self-administered interventions, where the participants' self-regulation might play a more important role than when interventions are overseen by a therapist (see also Proyer, Ruch, & Buschor, 2013).

As in the study by Giannopoulos and Vella-Brodrick (2011) the combined condition that focused on all aspects simultaneously did not outperform the other conditions but showed numerically rather small effects in comparison. It could be argued that this exercise is cognitively different from the other exercises since it fosters a more superficial engagement across different topics, whereas the other exercises focus on one particular topic. Thus, this exercise might also differ with regard to its emotional impact since it could be frustrating if no examples for all of the PERMA domains can be found.

Although we were not able to collect information on exactly what the participants did in the interventions, there is evidence that the tested interventions – despite using the same intervention strategy (i.e., writing down three positive things on a daily basis) – represent different ways of addressing well-being. Firstly, our results suggest that different interventions yield differential results; whereas some interventions have strong and long-lasting effects on the reduction of depressive symptoms (positive relationships), others show small, or no effects at all on depressive symptoms (accomplishment). Secondly, we find differences in the preferences for each intervention since some interventions were better liked (e.g., pleasure vs. engagement) or rated higher in terms of whether participants subjectively benefited from them (e.g., positive relationships vs. engagement). Nonetheless, these findings are indicative of differences among the conditions, which should be examined in more detail in future studies.

Several limitations of this study have to be acknowledged. As with many other studies examining positive psychology interventions (i.e., Bolier, Haverman, Kramer, et al., 2013; Gander et al., 2013; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011; Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009), the present study did not have a balanced gender-ratio. Although we have no reason to expect gender effects, and no study so far has reported an impact of gender on the effectiveness of positive psychology interventions, it would be worth examining why such positive psychology interventions attract more females than males or whether gender makes a difference when participants are not self-selected. Also, we found that dropout rates decrease with age, whereas Sin and Lyubomirsky (2009) report an increase of intervention effectiveness with age. Both findings could be attributed to the increase of self-regulation with age (e.g., Ruch, Proyer, et al., 2010). For practical applications it may be helpful to redesign the interventions for younger individuals; for example, by increasing the commitment through having participants to sign an agreement for completing all parts of a program, or sending daily reminders to complete an exercise.

Further, a considerable part of the sample that was assigned an intervention dropped out (i.e., did not complete the posttest or did not complete the assigned exercise; 16.3%), or did not complete all of the follow-ups (44.9%). This is a common problem in online intervention studies, and these rates are rather low in comparison to other studies (cf. Gander et al., 2013; Mitchell, Vella-Brodrick, & Klein, 2010). We cannot rule out that our findings are affected by the missing information. However, the highly parallel results for the intention-to-treat analyses suggest that no large differences to the obtained results could be expected had the complete information been available. Finally, it cannot be ruled out that the finding that intervention works best in the middle-range of the well-being continuum is due to measurement issues, such as ceiling or floor effects. However, previous investigations of the scale suggested that this is rather unlikely (see Proyer et al., 2016).

### **Conclusion**

The present study revealed three major outcomes: (1) Interventions based on accomplishment and positive relationships are effective strategies for increasing happiness, whereas a positive relationships-based intervention also ameliorated depressive symptoms; (2) the study replicated the findings of Giannopoulos and Vella-Brodrick (2011) and confirmed that interventions based on pleasure, engagement, and meaning are effective in increasing well-being and ameliorating depressive symptoms across different cultural settings and for longer time periods than expected; and (3) provides initial support for the notion that self-administered positive psychology interventions based on the PERMA-model are most effective for those people in the middle range of the well-being continuum.

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**PART III:**  
**AN INITIAL PLACEBO-CONTROLLED ONLINE STUDY ON POTENTIAL MEDIATORS OF A  
PLEASURE-BASED POSITIVE PSYCHOLOGY INTERVENTION: THE ROLE OF EMOTIONAL AND  
COGNITIVE COMPONENTS.**

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Manuscript submitted for publication

**Abstract**

While broad evidence exists that positive psychology interventions are effective in increasing well-being, less is known about the working mechanisms behind this process. We examine the impact of subjective changes in affectivity (i.e., elicitation of positive emotions) and cognitive processes (i.e., the gaining of insights) in three variants of a pleasure-based placebo-controlled online intervention (N = 509 adults). The variants were designed that they have (1) a cognitive focus, (2) an emotional focus, or (3) both cognitive and emotional foci. We assessed happiness and depressive symptoms before the intervention, immediately after the intervention, and at follow-ups after two weeks, one month, and three months, and collected subjective ratings on potential working mechanisms. Findings indicated that both variants with a cognitive focus increased happiness in comparison to the control condition, whereas only those interventions that fostered the experience of positive emotions reduced depressive symptoms. Positive emotions mediated the effects of the intervention on happiness and depressive symptoms, whereas insights only mediated the effects on happiness. The findings support the important role of positive emotions in positive interventions and provide new evidence for the relevance of cognitive changes in such interventions.

*Keywords: positive psychology, well-being, positive emotions, positive intervention, working mechanisms, online intervention*

### **Introduction**

Positive psychology interventions are “[...] treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions” (Sin & Lyubomirsky, 2009; p. 468). Two recent meta-analyses support the notion that such interventions are effective strategies for increasing well-being and ameliorating depression (Bolier et al., 2013; Sin & Lyubomirsky, 2009). However, it is still widely unknown *how* these interventions work—namely, what mechanisms are involved in increasing well-being and reducing depression. In addition to a deepened understanding of why positive interventions work, more knowledge on working mechanisms can be important for both increasing the efficacy of current interventions and for facilitating the creation of new positive interventions.

A frequently mentioned working mechanism of positive interventions in the literature is the elicitation of positive emotions (e.g., Cohn & Fredrickson, 2010; Gander, Proyer, Ruch, & Wyss, 2013; Martínez-Martí, Avia, Hernández-Lloreda, 2010; Otake et al., 2006; Quoidbach, Mikolajczak, & Gross, 2015; Sheldon & Lyubomirsky, 2012). According to Fredrickson’s (2004) broaden-and-build theory, positive emotions broaden the thought-action repertoire and build up physical, social, intellectual, and psychological resources that might elicit further positive emotions and, thereby, create a positive upward spiral, and thus increase well-being. Lyubomirsky and Layous (2013) presented a global framework of mechanisms of positive interventions. They suggest further working mechanisms; namely, the elicitation of positive thoughts, positive behaviors, or need satisfaction. Whereas this model is a very important first step in furthering the understanding and development of positive psychology interventions, more work in this area is needed for several reasons. The proposed model presents a global framework for studying potential mediators in PPIs. These studies will also be helpful in providing empirical verification to the model and advance the field (e.g., by proposing an operationalization for the measurement of positive thoughts and positive behaviors). Howev-



er, it needs to be considered that, most likely, depending on the specific type of the intervention, different mechanisms might play a more important role than others. The present study aims at narrowing a gap in the literature by conducting an initial experimental test of working mechanisms in positive interventions.

One of the most frequently used and well-validated positive psychology interventions is the “three good things”-interventions (Seligman, Steen, Park, & Peterson, 2005; see also Gander et al., 2013; Mongrain & Anselmo-Matthews, 2012; Proyer, Gander, Wellenzohn, & Ruch, 2014; Schueller & Parks, 2012). The instruction for the original intervention requires participants to “[...] write down three things that went well each day and their causes every night for one week. In addition, they were asked to provide a causal explanation for each good thing” (Seligman et al., 2005, p. 416). Several variants of the original intervention exist; e.g., based on humor (Gander et al., 2013), pleasure, engagement, and meaning (Giannopoulos & Vella-Brodrick, 2011), or positive relationships, and accomplishment (Gander et al., 2016). Some of these variants were effective for up to six months in placebo-controlled settings, but, again, comparably little knowledge exists about *how* they work. Quoidbach et al. (2015) suggested that the main working mechanism for an intervention that is comparable to the three good things-intervention (i.e., *counting blessings exercise* that requires participants to note things for which they are grateful) is to enable a *cognitive change*—it alters the appraisal of a situation: One might gain new *appraisals* or *insights* (e.g., finding good things every day of one’s life might lead to the idea that one’s life is actually quite good; cf. Quoidbach et al., 2015). The question emerges on whether such an insight-component could also be found in other interventions and, especially, how this compares to the idea of positive emotions (more precisely: the elicitation of positive emotional states and feelings by re-experiencing and savoring them) as a working mechanism.

**The present study**

The main aim of the present study was examining and comparing the *elicitation of positive emotions* and *cognitive changes* as potential working mechanisms of positive psychology interventions. Variants of a well-established intervention that focus on each of these two working mechanisms, or a combination of both, will be compared with each other. We chose the “three pleasurable things” intervention as it is more directly related to a theoretical framework than many other interventions. The pleasurable life (a life focused on the experience of positive emotion) is one of the five components of Seligman’s (2011) Well-Being Theory.

Giannopoulos and Vella-Brodrick (2011) have developed an intervention for fostering the pleasurable life (i.e., “three pleasurable things”), a variant of the “three good things” intervention. The authors found effects for up to two weeks in a placebo-controlled design. Findings have been replicated and extended recently (Gander et al., 2016) with increases in happiness for up to six months (placebo-controlled). Further, we opted for this exercise since “pleasurable things” are more specific than “good things”, and we expected that pleasurable experiences could be more easily manipulated than other positive experiences.

We created three variants of this exercise that were aimed at experiencing the expected mechanisms to varying degrees. All variants included spending 5 minutes with writing down pleasurable situations experienced on that day as neutrally as possible, and 10 minutes with an intervention-specific component. The first intervention condition (IC1) had a cognitive focus and was closest to the original “three good things” instruction. In the instruction the cognitive focus was emphasized and emotional aspects were reduced by instructing participants to describe *why* the pleasurable situations happened and what conclusions could be drawn in as neutral and objective terms as possible, in order to foster insight-related thoughts. The second intervention condition (IC2) had both an emotional and a cognitive focus: Participants were

instructed to re-experience the emotions during the pleasurable situations and describe them in detailed and explicit terms. While this exercise did not directly target cognitive aspects, the remembering and reflecting of situations might also foster insight-related thoughts. The third intervention condition (IC3) had an emotional focus only: We tried to eliminate cognitive aspects as much as possible by avoiding the reflective element. Instead, participants in this condition were instructed to spend the full fifteen minutes of time with something pleasurable and, thus, focus solely on experiencing, but not re-experiencing positive emotions. The instructions for the three variants are shown in Table 1.

## PART III

Table 1

*Descriptions of the Three Intervention Conditions and the Placebo Control Condition.*

Label	Focus	Instruction
		Please take 15 minutes on every evening for a week after dinner....
IC1	Cognitive Focus	Firstly, spend 5 minutes to write down what situations you have experienced today that elicited pleasure, joy, and fun. Describe these situations in keywords and as neutral and objective as possible. Secondly, spend 10 minutes to write down why these situations happened and what conclusions could be drawn, as neutral and objective as possible.
IC2	Emotional & Cognitive Focus	Firstly, spend 5 minutes to write down what situations you have experienced today that elicited pleasure, joy, and fun. Describe these situations in keywords and as neutral and objective as possible. Secondly, spend 10 minutes to re-experience your emotional state in these situations as lively and intensive as possible and write down your feelings as extensive as possible.
IC3	Emotional Focus	Firstly, spend 10 minutes with an activity that you would not have conducted otherwise and that elicits pleasure, joy, and fun. Secondly, spend 5 minutes to describe in keywords what you just did as neutral and objective as possible.
PCC	Early memories	Remember one early childhood memory and write down this memory as detailed as possible.

*Note.* IC = Intervention condition. PCC = Placebo control condition.

As a placebo control, we included a condition in which participants had to write down early childhood memories (Seligman et al., 2005). Before the intervention, after the intervention, and at follow-ups after two weeks, one month, and three months, participants in all conditions completed measures on happiness and depressive symptoms. Additionally, participants were asked immediately following the intervention to what extent the assigned exercise elicited *positive emotions or insights*.

We hypothesized that all interventions would increase happiness and ameliorate depressive symptoms. However, we expected stronger effects for IC1 and IC2, than for IC3, since we anticipated that changes on a more cognitive level are relevant for more sustainable increases in well-being. Further, we assumed that participants in IC1 would report the highest level of insights, followed by IC2 and IC3. Also, we assumed that those in IC3 would report

the highest level of positive emotions, followed by IC2 and IC1. Finally, we also expected that positive emotions and insights would mediate the effect of the intervention on well-being and depressive symptoms.

## Method

### Participants

A total of  $n = 1,351$  participants registered on a website offering a free positive psychology intervention program, and  $n = 1,002$  participants provided basic demographic information, and completed the baseline measures. Of these, 95 participants were excluded since they did not fulfill the inclusion criteria ( $n = 45$ ; see below) or showed implausible response patterns ( $n = 50$ ). The remaining 907 participants were randomly assigned to one of three intervention conditions or the placebo control condition. The final sample consisted of  $N = 509$  participants (aged 19 to 86;  $M = 48.16$ ,  $SD = 12.56$ ) who completed the assigned exercise and all follow-ups. The detailed flow of participants is given in Figure 1.

Most participants were women (82.7%) of German (62.3%), Swiss (27.5%), or Austrian (7.3%) nationality. More than half of the sample identified as being in a partnership (67.6%), 18.5% were single, 10.8% were divorced or separated, and 3.1% were widowed. The majority of the sample (59.9%) held a degree from a university or a university of applied sciences, and 20.0% held a diploma allowing them to attend these schools; 17.5% had completed vocational training, and 2.6% had completed secondary education.

PART III

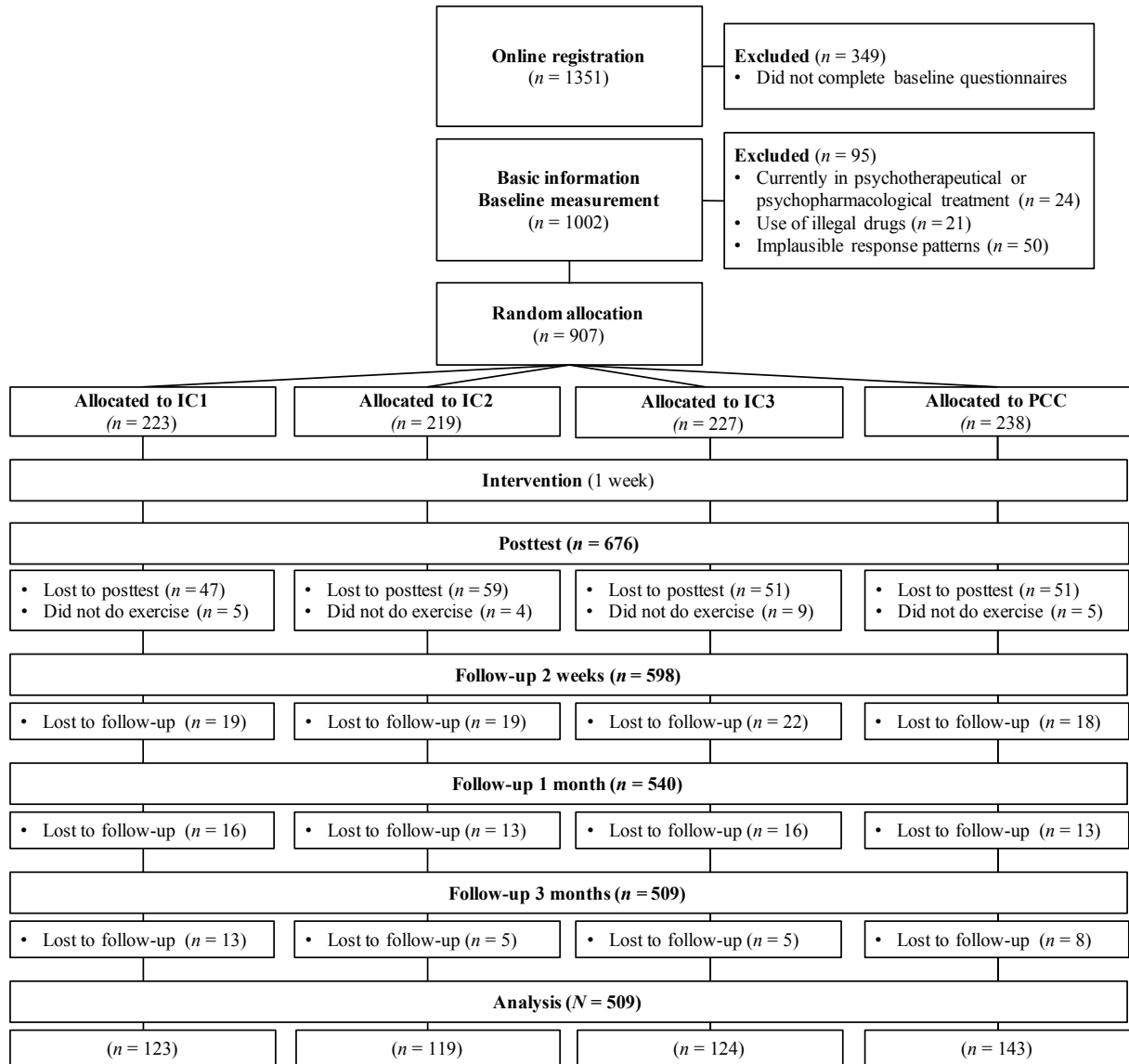


Figure 1. Flow of Participants through each stage of the study. IC1 = Cognitive Focus, IC2 = Emotional & Cognitive Focus, IC3 = Emotional Focus, PCC = Placebo Control Condition.

**Instruments**

The *Authentic Happiness Inventory* (AHI, Seligman et al., 2005; used in the German version as in Ruch et al., 2010) is a subjective measure for the assessment of global well-being comprising aspects of subjective and psychological well-being. It utilizes 24 sets of five statements (e.g., ranging from 1 = “I feel like a failure” to 5 = “I feel I am extraordinarily successful”) from which one statement has to be selected that most aptly describes one’s feelings in the past week. Proyer, Gander, Wellenzohn and Ruch (2016) report good psychometric properties and support its usefulness in intervention studies due to its sensitivity to upward changes in well-being. The AHI has often been used in research (e.g., Proyer et al., 2014; Ruch et al., 2010; Schiffrin & Nelson, 2010; Schueller & Seligman 2010; Shapira & Mongrain, 2010). Internal consistency at pretest was high ( $\alpha = .93$ ).

The *Center for Epidemiologic Studies Depression Scale* (ADS, Radloff, 1977; in the German adaptation by Hautzinger & Bailer, 1993) is a 20-item measure for the subjective assessment of the frequency of depressive symptoms in the past week. All items use a 4-point Likert-style scale ranging from 0 = “rarely or none of the time (less than 1 day)” to 3 = “most or all of the time (5-7 days)”, and four of the 20 items are negatively keyed. A sample item is “I felt sad”. The CES-D is among the most frequently used measures for depression screening. The internal consistency in the present study at pretest was high ( $\alpha = .90$ ).

For examining subjective changes due to the intervention, two single, face-valid items were created, assessing the proposed working mechanisms of positive emotions (“To what extent did the exercise elicit positive emotions?”), and the cognitive aspects of gaining new insights (“To what extent did the exercise elicit new insights?”). Both items were rated on a 10-point Likert-style scale ranging from 0 = “not at all” to 9 = “to a very high extent”.

**Procedure**

The study was conducted on a website affiliated with an institute of higher education.

We recruited participants via press releases in several newspapers and magazines that included a call for participation in a positive psychology intervention program. The program was advertised as a training program for character strengths and other positive traits. Participants could self-register on the website by indicating that they fulfill the inclusion criteria (i.e., at least 18 years of age, currently not undergoing psychotherapeutic or psychopharmacological treatment, and not having professional interest in participation) and giving informed consent. Registered participants had to complete basic demographic information and were asked again whether they fulfill the inclusion criteria. If they indicated that they did not, they were excluded from all further analyses. Participants could decide for themselves when to start the training program. As soon as they did so, they had to complete the baseline measurement of the dependent measures (i.e., AHI, CES-D), were randomly assigned to one of the four conditions (using an automated algorithm based on a Mersenne-Twister), and received their assigned exercise that had to be conducted every day for one week. Directly after the week of the intervention, as well as two weeks, one month, and three months afterwards, participants completed follow-ups of the dependent measures. Additionally, participants were asked after the intervention week to what extent the exercise elicited positive emotions, or led to new insights (single item ratings), and whether or not they completed the assigned exercise. Those who indicated that they did not complete the exercise were excluded from subsequent analyses. After the end of the program, participants received an individualized, automated feedback on their scores in the completed questionnaires.

## **Results**

### **Preliminary analyses**

Firstly, we conducted an analysis of the dropouts. Those participants who completed all assignments were on average 2 years older, happier, and less depressed at baseline (age:  $t[905] = -2.46, p = .02, d = .16$ ; happiness:  $t[905] = -4.60, p = .01, d = .31$ ; depression:  $t[905]$



= 3.84,  $p < .001$ ,  $d = .26$ ) than those who dropped out of the study. However, there was no differential dropout rate among the conditions,  $\chi^2(3, N = 907) = 2.09, p = .55$ .

Secondly, we tested whether randomization was successful. The four conditions did not differ regarding demographics (age:  $F[3, 505] = 1.69, p = .17$ ; gender ratio:  $\chi^2[3, N = 509] = 2.30, p = .51$ ; relationship status:  $\chi^2[9, N = 509] = 13.14, p = .16$ ; education:  $\chi^2[9, N = 509] = 14.95, p = .09$ ), nor in the baseline scores of the dependent variables (happiness:  $F[3, 505] = 1.53, p = .21$ ; depression:  $F[3, 505] = 1.40, p = .24$ ).

### **Changes in Happiness and Depressive Symptoms**

Means and standard deviations for the conditions at the different time points are given in Table 2.

Table 2 shows that mean scores for happiness increased and depressive symptoms decreased from the pretest to the subsequent time points. For testing whether the changes in the intervention conditions exceed those in the placebo control condition, we compared each intervention condition separately with the placebo control condition. In a series of ANCOVAs, we checked for effects of the condition for all time points after the intervention combined, as well as for every time point separately (Table 3).

PART III

Table 2

*Means and Standard Deviations of the Four Conditions at the Five Time Periods for Happiness and Depressive Symptoms.*

	<i>N</i>	Pre		Post		2 Weeks		1 Month		3 Months	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Happiness</i>											
IC1	123	3.14	0.55	3.26	0.55	3.25	0.61	3.28	0.59	3.34	0.57
IC2	119	3.18	0.54	3.31	0.56	3.32	0.59	3.35	0.58	3.34	0.64
IC3	124	3.06	0.53	3.16	0.53	3.15	0.55	3.15	0.55	3.18	0.58
PCC	143	3.19	0.49	3.23	0.50	3.25	0.52	3.27	0.56	3.23	0.53
<i>Depressive Symptoms</i>											
IC1	123	0.61	0.45	0.53	0.47	0.53	0.48	0.51	0.46	0.53	0.46
IC2	119	0.58	0.42	0.44	0.38	0.45	0.42	0.43	0.38	0.48	0.41
IC3	124	0.69	0.44	0.50	0.39	0.53	0.45	0.54	0.46	0.56	0.41
PCC	143	0.65	0.44	0.57	0.46	0.53	0.41	0.53	0.44	0.58	0.51

*Note.* Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale. IC1 = Cognitive Focus, IC2 = Emotional & Cognitive Focus, IC3 = Emotional Focus, PCC = Placebo Control Condition.

Table 3

*ANCOVA Results for Comparisons Between the Intervention Conditions and the Placebo Control Condition in Happiness and Depressive Symptoms.*

	<i>df</i>	Overall		Post		2 Weeks		1 Month		3 Months	
		<i>F</i>	$\eta^2$	<i>F</i>	$\eta^2$	<i>F</i>	$\eta^2$	<i>F</i>	$\eta^2$	<i>F</i>	$\eta^2$
<i>Happiness</i>											
IC1	1, 263	4.60*	.02	2.91*	.01	0.95	–	1.16	–	10.96***	.04
IC2	1, 259	6.30**	.02	5.29*	.02	3.61*	.01	4.41*	.02	5.55**	.02
IC3	1, 264	0.28	–	0.77	–	0.00	–	0.05	–	1.17	–
<i>Depressive Symptoms</i>											
IC1	1, 263	0.02	–	0.35	–	0.73	–	0.00	–	0.53	–
IC2	1, 259	3.04*	.01	4.20*	.02	0.58	–	1.66†	.01	1.46	–
IC3	1, 264	2.30†	.01	6.58**	.02	0.30	–	0.07	–	1.34	–

*Note.*  $N = 509$ . Happiness = Authentic Happiness Inventory, Depression = Center for Epidemiologic Studies Depression Scale. IC1 = Cognitive Focus, IC2 = Emotional & Cognitive Focus, IC3 = Emotional Focus, PCC = Placebo Control Condition

† $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$  (one-tailed).

Table 3 shows that in comparison with the placebo control condition (PCC), happiness increased in both conditions with a cognitive focus (IC1 and IC2). Additionally, in the condition that had both an emotional and a cognitive focus (IC2), happiness was higher than in the PCC at all time points. In the condition that mainly focused on cognitive mechanisms (IC1), we observed changes at the immediate posttest and at the follow-up after three months. We found no differences from the PCC in the condition that mainly focused on emotional mechanisms (IC3). For depressive symptoms, a different pattern was observed: Whereas no reduction in depressive symptoms was observed in the condition that mainly focused on cognitive

mechanisms (IC1), both conditions with an emotional focus (IC2 and IC3) reported a reduction in depressive symptoms, however, this finding was limited to only the immediate post-test. Further, as expected, IC1 and IC2 showed stronger increases in happiness than IC3 as well ( $F[1, 363] = 3.71, p = .03, \eta^2 = .01$ ), whereas no effects for depressive symptoms were found ( $F[1, 363] = 0.22, p = .64$ ).

### Subjective Changes due to the Interventions

Next, we examined whether the hypothesized differences in the working mechanisms were also reflected in participants' subjective ratings. Means and standard deviations of the ratings and their differences are given in Table 4.

Table 4

*Means and Standard Deviations of Ratings on Positive Emotions, Insights, and Their Difference.*

	Positive Emotions		Insights		Difference	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
IC1	5.62	2.01	6.20	1.85	-0.58	1.69
IC2	5.97	2.14	6.10	1.96	-0.12	1.86
IC3	6.11	1.89	5.87	2.27	0.24	1.81

*Note.*  $N = 366$ . Difference = Difference between the rating for Positive Emotions and Insights. IC1 = Cognitive Focus, IC2 = Emotional & Cognitive Focus, IC3 = Emotional Focus.

Inspecting the mean scores shows that, as expected, participants in all intervention conditions reported subjective levels of positive emotions and insights of medium size (scores > 5 on a scale from 0 to 10). As expected, the condition that mainly focused on emotional mechanisms reported the numerically highest scores of positive emotions, followed by IC2, whereas IC1 reported the lowest scores. For insights, the expectations were also confirmed: The highest scores were reported by IC1, followed by IC2 and IC3. However, analyses showed no statistically significant differences among the groups, neither for positive emotions ( $F[2, 363] = 1.98, p = .14$ ), nor for insights ( $F[2, 363] = 0.83, p = .44$ ). A repeated measurement ANOVAs (within-factor: positive emotions, insights; between-factor: condition) showed that the differences between positive emotions and insights varied among the conditions ( $F[2, 363] = 6.49, p = .002, \eta^2 = .03$ ). Subsequent simple effects analyses showed that, as expected, more insights than positive emotions were reported in IC1 ( $F[1, 363] = 11.33, p < .001$ ), more positive emotions than insights were reported in IC3 ( $F[1, 363] = 2.96, p = .04$ ), whereas no differences in the levels of positive emotions and insights were found in IC2 ( $F[1, 363] = 1.10, p = .15$ ; one-tailed tests).

### **Mediation Effects**

For examining the role of the suggested working mechanisms in the increase of happiness and the reduction of depressive symptoms, we conducted a series of multiple mediation analyses. We used bootstrapping (with  $z = 5,000$  samples) for computing 95% confidence intervals of indirect effects (Preacher & Hayes, 2008). The independent variable was the condition (0 = placebo control condition; 1 = intervention condition), the dependent variables were happiness or depressive symptoms, and the mediators were the subjective changes in positive emotions and insights, while controlling for the baseline scores in happiness or depressive symptoms. Standardized indirect effects are given in Table 5.

Table 5

*Standardized Indirect Effects of Positive Emotions and Insights in the Relationship between the Condition (Placebo Control vs. Intervention) and Happiness and Depressive Symptoms After the Intervention, Controlled for Baseline Happiness Scores.*

	<i>df</i>	Overall		Post		2 Weeks		1 Month		3 Months	
		PE	IN	PE	IN	PE	IN	PE	IN	PE	IN
<i>Happiness</i>											
IC1	1, 263	.03*	.02*	.05*	.00	.02*	.03*	.03*	.02*	.02	.02
IC2	1, 259	.03*	.02*	.05*	.00	.03	.02*	.04*	.01	.02	.02
IC3	1, 264	.03*	.01*	.05*	.01*	.02	.01*	.02	.01	.02	.01*
<i>Depressive Symptoms</i>											
IC1	1, 263	-.03*	.00	-.07*	.00	-.03*	-.01	-.03*	.00	-.01	-.02
IC2	1, 259	-.04*	.00	-.07*	.00	-.03*	.00	-.04*	.01	.00	-.02
IC3	1, 264	-.04*	.00	-.09*	.00	-.03*	.00	-.03*	.00	-.02	-.01

*Note.*  $N = 509$ . PE = Positive Emotions, IN = Insights. IC1 = Cognitive Focus, IC2 = Emotional & Cognitive Focus, IC3 = Emotional Focus. An asterisk indicates that the bootstrapped 95% confidence interval did not include zero.

Table 5 shows that for overall changes in happiness, both positive emotions and insights mediated the relationship between the condition and happiness. However, different patterns were obtained when inspecting the time points separately: At the posttest, for example, positive emotions played a role in all intervention conditions, whereas effects for insights were only found in IC3. At the two-weeks follow-up, insights were relevant in all conditions, whereas positive emotions only showed an effect in IC1. For depressive symptoms, positive emotions showed mediating effects in all conditions at the posttest and at the follow-ups after two weeks and one month. There were no mediating effects of insights for depressive symptoms.

### **Discussion**

The study provides support for the notion of the important role of positive emotions in a pleasure-based positive intervention and provided additional empirical support for the role of cognitive changes in positive interventions. The study aimed at comparing three variants of the “three pleasurable things”-intervention that emphasize the experience of positive emotions and cognitive change (insights) to varying degrees. This also provides support for the model proposed by Lyubomirsky and Layous (2013) and earlier work done on these variables (e.g., Cohn & Fredrickson, 2010; Quoidbach et al., 2015).

In line with expectations, two instructions that aimed at eliciting cognitive changes (IC1 and IC2) increased overall happiness in comparison with a placebo-control exercise, and showed stronger increases in happiness than a condition without the cognitive aspects (IC3). Contrary to our expectations, no effects on happiness were found for the condition that only aimed at increasing positive emotions and avoided cognitive aspects (IC3). In the same vein, two out of our three expectations with regard to depressive symptoms were confirmed: Only the conditions that included emotional aspects (IC2 and IC3) were effective in reducing depressive symptoms. Further, the study demonstrated that both positive emotions and insights mediate the relationship between the condition and happiness, but only positive emotions are involved in the mediation of depressive symptoms.

Thus, the study suggests that interventions that mainly elicit positive emotions are not a sufficient sustainable strategy for increasing well-being if they are not accompanied by components that allow for cognitive changes, such as gaining new insights. This finding might represent an important addition to models that aim at explaining the increase in well-being following positive change (Sheldon & Lyubomirsky, 2012). For the reduction of depressive symptoms, however, the opposite seems to be true based on the findings of this study, which, of course, warrant replication. Findings also show that positive emotions played

an important role in the reduction of depressive symptoms, this was not the case for cognitive changes. Nevertheless, we do not argue that cognitive changes are not important for the amelioration of depressive symptoms. This finding also needs to be interpreted with respect to the measure used in this study for the assessment of depressive symptoms (CES-D; Radloff, 1977). This scale has an emphasis on the emotional aspects of depression, while omitting the more cognitive dimensions of depressive symptoms. Thus, it is possible that different results would be obtained with a more nuanced depression measure that more specifically examines both the emotional and cognitive facets behind depression.

The goal of the present study was to create instructions that emphasize particular working mechanisms while minimizing the contribution of other components. As a limitation it needs to be noted that it seems not entirely possible to completely disentangle these mechanisms from each other—especially, in web-based settings where there is only limited control on how participants work with the activities. As expected, comparable increases in levels of positive emotions and insights are reported when writing down pleasurable things, regardless of whether the instruction emphasizes emotional aspects or cognitive aspects. Thus, we argue that those different potential working mechanisms influence and promote each other. One of the aims of future studies should, therefore, be further examining the interplay between changes on emotional and cognitive levels as working mechanisms in positive psychology interventions in order to further the understanding of how these interventions work, and foster the development of more effective and sustainable interventions.

The present study has only addressed potential working mechanisms in pleasure-based variants of the “three good things”-intervention. It can be assumed that depending on the context of the intervention, other working mechanisms might be more important. When using Seligman’s (2011) Well-Being Theory as a framework for intervention studies, it can also be assumed that the elicitation of positive emotions plays a more important role in pleasure-



based interventions than in interventions that aim at fostering engagement, meaning, positive relationships, or accomplishment (cf. Gander et al., 2016).

Several limitations have to be noted. Firstly, the present study is only an initial examination of the proposed working mechanisms. Thus, the findings warrant replication. Also, we focused on two potential working mechanisms and did not consider other possible factors that were suggested by Lyubomirsky and Layous (2013). Further, more potential working mechanisms that are not considered by Lyubomirsky and Layous (2013), such as an attentional shift (Wellenzohn, Proyer, & Ruch, 2016) could also play an important role.

Secondly, the generalizability of the findings is limited due to the differences in demographics and well-being between those participants who completed the intervention and all measurement periods, and those who failed to do so. Thirdly, we did not collect the participants' notes and, therefore, do not know how well they had complied with the instructions and whether the productions truly reflect the instructions. Fourthly, it was not possible to create fully parallel intervention conditions. For example, whereas in IC1 and IC2 participants were instructed to complete the writing component of recording their experiences throughout the day first, and then completed the intervention-specific component, this sequence had to be reversed for IC3. Fifthly, we used one-item self-report measures for the assessment of the potential working mechanisms. Although this is a useful approach for an initial study, there is the downside that such measures are hardly reliable and effects are probably underestimated, and the use of better instruments is advised, such as assessing a range of discrete positive emotions on a daily basis. Also, it is possible that the interventions affect well-being also via automatic, or unconscious processes that can therefore not be measured via self-report measures that directly ask about conscious changes.

Finally, the suggested mediators were only collected at one time point, and no conclusions about direction or causality of the relationship between positive emotions and insights

with happiness or depressive symptoms can be made.

**Conclusion**

The present study has two major outcomes: (1) The findings support the notion of an important role of positive emotions in a pleasure-based positive psychology intervention, (2) but also provided initial evidence for the role of cognitive changes, such as gaining new insights, in positive psychology interventions.

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**GENERAL DISCUSSION**

**Overview over Main Results**

The main aim of this thesis was threefold: (1) Examining whether the endorsement of positive relationships and accomplishment can be measured independently from pleasure, engagement, and meaning, and how this endorsement relates to well-being; (2) examining the effectiveness of interventions based on the components of Seligman's (2011) Well-Being Theory, and exploring for whom they work best; and (3) exploring possible working mechanisms in such interventions. The first part aimed at developing short scales for the endorsement of positive relationships and accomplishment. The expectations were widely met and the research assumptions in Part I were, for the most parts, confirmed: Part I showed that the endorsement of positive relationships and accomplishment can be assessed independently from the endorsement of pleasure, engagement, or meaning, and that positive relationships and accomplishment add to the prediction of indicators of well-being, such as life satisfaction or flourishing, above and beyond the influence of pleasure, engagement, and meaning. Furthermore, the endorsement of positive relationships and accomplishment was stable for periods of up to six months and showed comparable test-retest correlation. An initial intervention study revealed that focusing on all components of Seligman's (2011) Well-Being Theory simultaneously increases subjective well-being and the endorsement of these components.

Part I also included information on the convergent and discriminant validity of the newly developed scales. Table 1 summarizes these findings and also includes additional, hitherto unpublished data on correlates of positive relationships and accomplishment.

Most unpublished data was collected as part of a large online intervention program, where participants were randomly assigned to a broad variety of interventions (among these are the interventions presented in Part II). The full sample consisted of  $N = 6714$  adults, (78.1% women), aged 17-86 ( $M = 45.07$ ;  $SD = 12.03$ ). The data stems from (random) sub-

samples of this sample that completed different questionnaires as a part of the baseline assessment.

All participants in this sample completed the Satisfaction with Life Scale (Diener et al., 1985), the Authentic Happiness Inventory (Seligman et al., 2005), and the Center for Epidemiologic Studies Depression Scale (Radloff, 1977; see Parts I and II for a detailed description of these instruments). Additionally, subsamples completed three further inventories: the Work-Life Questionnaire (Wrzesniewski et al., 1997) that assesses the attitude toward work as job, career, or calling, and work satisfaction with a single item measures on a four-point scale; the Inventory of Minimal Redundant Scales (Ostendorf, 1990), using 25 bipolar adjectives on six-point scale for the assessment of extraversion, emotional stability, agreeableness, conscientiousness, and culture; and the Values in Action Inventory of Strengths (Ruch et al., 2010), which assesses the 24 character strengths suggested by Peterson and Seligman's (2004) classification of strengths with 240 items on a five-point scale. Finally, single items were included asking for aspects of relationships (i.e., duration of longest partnership, number of partnerships, and expression of positive relationships and accomplishment in the partner, and the best friend), and work (i.e., number of average weekly working hours, and "size of staff", i.e., number of people directly reporting to the person answering the question).

Data on intelligence and academic performance were collected in a sample of  $N = 212$  students (161 women) aged 20 to 52 ( $M = 24.16$ ;  $SD = 4.54$ ). All participants were fifth semester psychology students in an introductory course on psychological assessment and completed measures of intelligence and a final exam (the measure of academic performance) as course requirements. However, students could choose whether the data of the final exam could be used for research purposes.

This sample completed the Intelligence Structure Test 2000 R (Liepmann, Beauducel, Brocke, & Amthauer, 2007) a multidimensional intelligence test assessing verbal, numerical,



and figural (i.e., visuo-spatial) intelligence, global intelligence (as a total score), and memory. In addition, scores in the final exam of the introductory psychology course were used as a measure of academic performance.

Table 1 shows that both scales are robustly correlated with different indicators of well-being, whereas accomplishment showed numerically higher correlations than positive relationships. The scales were related to different aspects of partnership and work, respectively, in the expected direction: Those with high scores in positive relationships were more likely to be in a partnership, and their partnerships lasted longer than for those with low scores. High scores in accomplishment went along with more weekly working hours, a larger number of staff members in their teams, considering their work less as a job but more as a career or a calling, and being more satisfied with work. Both scales were also related to personality without indicating redundancy. In addition, a meaningful pattern of relationships with character strengths was obtained. Positive relationships showed the numerically strongest relations with strengths of humanity and justice (e.g., teamwork, love, kindness) whereas accomplishment was mostly related to strengths of courage (e.g., persistence, zest, bravery), curiosity, and hope. Finally, both scales were widely unrelated to performance measures, such as psychometric and self-estimated intelligence, or academic performance. Thus, these results further support the convergent and discriminant validity (e.g., expected relationships to character strengths, no relationships with measures of intelligence and performance), and criterion validity of the scales (e.g., correlations with more objective indicators, such as duration of partnerships, and number of working hours, or staff members).

GENERAL DISCUSSION

Table 1

*Correlates of the Endorsement of Positive Relationships and Accomplishment, Controlled for Sex and Age.*

	<i>N</i>	<i>R</i>	<i>A</i>
<b>Demographics</b>			
Age	233–336 <sup>a</sup>	-.14* – -.17**	-.20*** – -.39***
Sex	233–336 <sup>a</sup>	.04 – .09	-.03 – .02
Education	233–336 <sup>a</sup>	-.04	-.01 – .19***
Time spent with activities related to R/A	125 <sup>a</sup>	.22* – .44***	.18* – .22*
<b>Indicators of Well-Being</b>			
Life Satisfaction (SWLS)	126–333 <sup>a</sup>	.17** – .25***	.30*** – .40***
Flourishing	126–333 <sup>a</sup>	.24** – .35***	.50*** – .52***
Happiness (AHI)	5150 <sup>b</sup>	.16***	.50***
Depression (CES-D)	5150 <sup>b</sup>	-.08***	-.25***
<b>Partnership / friendship</b>			
Partnership	233–336 <sup>a</sup>	.20**	.07
Duration of longest partnership	2401 <sup>b</sup>	.14***	.05*
Number of partnerships	2401 <sup>b</sup>	-.05*	-.01
Expression of R/A in partner	587 <sup>b</sup>	.04	.10**
Expression of R/A in best friend	791 <sup>b</sup>	.09***	.13***
<b>Work</b>			
Weekly working hours	6376 <sup>b</sup>	-.01	.12***
Size of staff	6264 <sup>b</sup>	.04	.15***

(continued)

GENERAL DISCUSSION

Table 1 (continued)

	<i>N</i>	<i>R</i>	<i>A</i>
Work as Job (WLQ)	649 <sup>b</sup>	-.01	-.21***
Work as Career (WLQ)	649 <sup>b</sup>	.03	.18***
Work as Calling (WLQ)	649 <sup>b</sup>	.03	.23***
Work satisfaction (WLQ)	649 <sup>b</sup>	.08	.26***
Personality (MRS-25)			
Extraversion	795 <sup>b</sup>	.45***	.27***
Emotional stability	795 <sup>b</sup>	.08	.34***
Conscientiousness	795 <sup>b</sup>	.02	.29***
Agreeableness	795 <sup>b</sup>	.23***	.16***
Culture	795 <sup>b</sup>	.02	.28***
Character Strengths (VIA-IS)			
Creativity	5529 <sup>b</sup>	.05**	.32***
Curiosity	5529 <sup>b</sup>	.10***	.44***
Open mindedness	5529 <sup>b</sup>	.04**	.27***
Love of learning	5529 <sup>b</sup>	.04**	.34***
Perspective	5529 <sup>b</sup>	.08***	.34***
Bravery	5529 <sup>b</sup>	.08***	.40***
Persistence	5529 <sup>b</sup>	.11***	.55***
Honesty	5529 <sup>b</sup>	.13***	.28***
Zest	5529 <sup>b</sup>	.22***	.53***
Love	5529 <sup>b</sup>	.37***	.33***
Kindness	5529 <sup>b</sup>	.33***	.23***
Social intelligence	5529 <sup>b</sup>	.21***	.33***

(continued)

GENERAL DISCUSSION

Table 1 (continued)

	<i>N</i>	<i>R</i>	<i>A</i>
Teamwork	5529 <sup>b</sup>	.42***	.21***
Fairness	5529 <sup>b</sup>	.18***	.13***
Leadership	5529 <sup>b</sup>	.25***	.33***
Forgiveness	5529 <sup>b</sup>	.18***	.15***
Modesty	5529 <sup>b</sup>	.05***	-.10***
Prudence	5529 <sup>b</sup>	.05***	.14***
Self-regulation	5529 <sup>b</sup>	.06*	.33***
Appreciation of beauty	5529 <sup>b</sup>	.15***	.21***
Gratitude	5529 <sup>b</sup>	.22***	.32***
Hope	5529 <sup>b</sup>	.18***	.58***
Humor	5529 <sup>b</sup>	.26***	.27***
Religion	5529 <sup>b</sup>	.07***	.23***
Psychometric intelligence (IST-2000 R)			
Verbal	133–212 <sup>c</sup>	.01	-.02
Numeric	133–212 <sup>c</sup>	.02	.03
Figural	133–212 <sup>c</sup>	-.02	-.08
Memory	133–212 <sup>c</sup>	.06	.00
Self-estimated intelligence			
Verbal	133–212 <sup>c</sup>	.13	.03
Numeric	133–212 <sup>c</sup>	-.02	.09
Figural	133–212 <sup>c</sup>	-.02	.05
Memory	133–212 <sup>c</sup>	.12	.18**
Academic performance	133–212 <sup>c</sup>	-.12	.06

*Note.* <sup>a</sup> = Data from Part I, <sup>b</sup> = Unpublished data from a large intervention study, <sup>c</sup> = Data from an introductory psychology class; Education: 1 = not finished compulsory school to 5 = university degree, Partnership: 0 = single, 1 = in a partnership. SWLS = Satisfaction with Life

## GENERAL DISCUSSION

Scale (Diener et al., 1985), AHI = Authentic Happiness Inventory (Seligman et al., 2005), CES-D = Center for Epidemiologic Studies Depression Scale (Radloff, 1977), WLQ = Work-Life Questionnaire (Wrzesniewski et al., 1997), MRS-25 = Inventory of minimal redundant scales (Ostendorf, 1990), VIA-IS = Values in Action Inventory of Strengths (Ruch et al., 2010); IST-2000 R = Intelligence Structure Test 2000 R (Liepmann, Beauducel, Brocke, & Amthauer, 2007), Academic performance = Scored points in the final exam of a psychology course.

Therefore, the endorsement of positive relationships and accomplishment (although the relationships are rather weak) might foster relevant outcomes related to work or interpersonal relationships (or vice versa, since the causality and the direction of effects cannot be established).

In examining whether certain combinations of the endorsement of the components of Seligman's (2011) Well-Being Theory are more frequent than others, a person-centered approach was applied and cluster analyses were computed using samples 1 and 2 of Part I (following the procedure described by Asendorpf, Borkenau, Ostendorf, & van Aken, 2001). In line with previous findings (Avsec, Kavčić, & Jarden, 2015), four clusters emerged (see Table 2).

Table 2

*Cluster centroids (z-standardized)*

Cluster	<i>N</i>	P	E	R	M	A	Description
1	141	0.90	0.85	0.42	0.83	0.77	Flourishing
2	102	-0.92	-1.13	-0.82	-0.91	-1.33	Languishing
3	136	-0.57	0.39	-0.64	0.44	0.27	"Eudemonic"
4	190	0.23	-0.30	0.59	-0.44	-0.06	"Hedonic"

In addition to the two clusters that could be described as flourishing or languishing (high or low expressions in all components, respectively), a cluster was obtained that showed elevated scores in pleasure and positive relationships, average scores in accomplishment, and reduced scores in engagement and meaning (labeled "hedonic"), and a cluster that showed

elevated scores in engagement, meaning, and accomplishment, and low scores in pleasure and positive relationships (labeled “eudemonic”). When inspecting the mean levels of life satisfaction, large differences among these clusters were found,  $F(3, 553) = 22.07, p < .001, \eta^2 = .11$ . Post-hoc tests revealed that those in the flourishing cluster reported the highest scores, followed by those in the eudemonic and the hedonic cluster (differing from those in the flourishing cluster with  $d = .20$ , but not significantly from each other), whereas those in the languishing cluster reported the lowest scores (differing from those in the flourishing cluster with  $d = 1.00$ ). The four clusters and their relation to life satisfaction are highly similar to the findings of Avsec et al. (2015), although two further orientations were considered. Thus, although the orientation towards all five components of Seligman’s (2011) Well-Being Theory can be distinguished, people seem to frequently endorse all of them, none of them, or focus on the more eudemonic components (i.e., engagement, meaning, and accomplishment), or on pleasure and positive relationships. This finding does not contradict (nor support) Seligman’s (2011) Well-Being Theory. Although the different approaches to well-being seem to co-occur more frequently in certain patterns, this does not mean that they are not separate, distinguishable paths to well-being.

The main aim of Part II was to replicate previous findings (Giannopoulos & Vella-Brodick, 2011) on the effectiveness of interventions based on pleasure, engagement, meaning, and extend these findings by testing interventions based on positive relationships, and accomplishment. Additionally, moderating effects of the endorsement of these components on intervention effectiveness were considered. Again, the expectations were widely met and most research questions were positively answered: Results showed that all interventions were effective in increasing happiness and, except for the accomplishment-based intervention, were also effective in decreasing depressive symptoms. The pleasure-based condition increased happiness for up to six months, whereas depressive symptoms were decreased for up to six

months in the positive relationships and the accomplishment conditions. Thus, previous findings of intervention effectiveness (Giannopoulos & Vella-Brodrick, 2011) were successfully replicated, and the results support the effectiveness of the interventions based on positive relationships and accomplishment. Contrary to expectations, no moderating effects of the baseline scores for pleasure, engagement, meaning, positive relationships, or accomplishment were observed. In addition, the intervention effectiveness did not depend on cluster membership (not shown in Part II), although there was a tendency for the interventions to yield stronger effects on happiness for those in the eudemonic cluster. However, the results showed that the interventions worked best for those in the middle-range of the well-being continuum. Thus, Part II showed that focusing on the endorsement of one of the components of Seligman's (2011) Well-Being Theory yields long-term increases in well-being. These findings might be relevant from a clinical perspective: Positive psychology interventions, such as those used in Part II, seem to be qualitatively different from the interventions normally used in clinical psychology and are aimed at helping those people in the lower end of the well-being continuum. Thus, such positive psychology interventions indeed address one of the central ideas of positive psychology, namely that of making "relatively untroubled people happier" (Seligman, Parks, & Steen, 2004; p. 1379).

The aim of Part III was to examine potential working mechanisms in these interventions. For this purpose, three variants of the pleasure-based intervention were developed that emphasized the emotional, the cognitive, or both components, while reducing the influence of the other aspect. The expectations were partially met: Results showed that both interventions with a cognitive focus happiness compared to a placebo control condition, whereas only the interventions that included an emotional component reduced depressive symptoms. Further, positive emotions mediated the effects of the intervention on both, happiness and depressive symptoms, whereas the gaining of insights only mediated the effects on happiness. Thus, Part

III suggested that both emotional and cognitive aspects play an important role in positive psychology interventions.

Overall, the three studies showed that the endorsement of the components of Seligman's (2011) Well-Being Theory contributes to well-being. This was supported by cross-sectional studies (Part I), and interventions studies (Parts I, II, and III). In addition, the interventions were generally well received by the participants. In Part II, between 77.5% (in the engagement condition) and 93.5% (in the pleasure condition) of the participants indicated that they liked the exercise, whereas only 0.8% (in the pleasure condition) to 7.9% (in the accomplishment condition) indicated that they did not like the intervention. This further corroborates the notion that the components of Seligman's (2011) Well-Being Theory are easily understood and well received by the public, which supports the use of this framework for applied purposes.

Further, the examined interventions in this set of studies added to the existing repertoire of positive psychology interventions. A few alternative pleasure-based (e.g., savoring, Peterson, 2006), or positive relationships-based (e.g., gift of time, Peterson, 2006, or active-constructive responding, Gable, Reis, & Impett, 2004) interventions have been previously suggested, whereas even fewer interventions based on engagement, meaning, and accomplishment have been developed.

Contrary to the preliminary expectation, no moderating effects of the baseline scores for these components on intervention effectiveness were found; thus, the interventions seem to work comparably well for all people, regardless of their endorsement of pleasure, engagement, etc. Thus, the expectation that the person  $\times$  activity-fit could be increased by assigning people to conditions that match their most (or their least) preferred way to well-being has not been met. However, although this researcher-directed approach to increasing the fit was not successful, it has been shown that interventions are more effective and compliance is higher



for those who liked the intervention (Proyer, Wellenzohn, et al., 2014; Schueller, 2010). Thus, the fit might be increased if participants are allowed to select the interventions themselves; for this purpose, it would be helpful to have a large variety of effective interventions. In addition, it is important to have a large array of effective interventions that address well-being from different angles in order to avoid participants becoming bored, which may adversely affect the potential beneficial effects of an intervention (Gander et al., 2013; Lyubomirsky, 2008).

The effectiveness of the pleasure-based interventions in Parts II and III also has important theoretical consequences. They support the notion that focusing on hedonic happiness directly yields increases in happiness. This notion has already been empirically supported by Fordyce's (1977, 1983) studies, but is still often disputed (e.g., Martin, 2007). In addition, we found that fostering an individual's endorsement of pleasure goes along with increased happiness scores. A recent study suggested that valuing (hedonic) happiness might have negative consequences on happiness under certain circumstances, such as when individuals experience low levels of stress (Mauss, Tamir, Anderson, & Savino, 2011). The authors argue that highly valuing happiness increases the probability of feeling disappointed. However, some caveats must be noted. Firstly, Mauss et al. (2011) assessed "valuing happiness to a potentially extreme degree" (p. 808). Secondly, the seven-item measure of Mauss et al. (2011) for valuing happiness also included items as "I would like to be happier than I generally am" or "If I don't feel happy, maybe there is something wrong with me" – items that do not necessarily assess "valuing happiness" but seem to be strongly related to unhappiness, or neuroticism, respectively. Thus, the findings of Mauss et al. (2011) should be considered carefully and do not challenge the conclusion that addressing (hedonic) happiness and the orientation to pleasure is beneficial for happiness.

In summary, the present set of studies showed that it is possible to distinguish (theoretically and empirically) among five different approaches to well-being, namely the endorse-

ments of pleasure, engagement, meaning, positive relationships, and accomplishment based on the elements of Seligman's (2011) Well-Being Theory, and that they can be promoted and that this results in increases in happiness and reduction of depressive symptoms. Further, it has been shown that they work best for people in the middle range of the well-being continuum, but that their effectiveness does not depend on baseline levels of the endorsement of pleasure, engagement, meaning, positive relationships, and accomplishment. Finally, the present set of studies has provided initial support for the notion that multiple mechanisms are involved in positive psychology interventions, and suggests that changes on both an emotional and cognitive level are involved in such interventions and are relevant to increasing happiness.

### **Strengths and Limitations**

Part I provided a large array of findings supporting the validity of the scales for assessing the endorsement of positive relationships and accomplishment in several samples and studies. However, all parts have focused on self-report; other sources of information, such as peer-ratings or "Life-Criteria data" (sensu Cattell, 1957; p.51) have not been considered so far. While self-reports have to be considered the best and most reliable source of information for various indicators of well-being, Seligman (2011) also argues for the consideration of other data sources. However, with respect to intervention studies, the use of self-reporting is only a minor issue, due to the use of control conditions.

Further, positive relationships and accomplishment were assessed in the same framework as the OTH, thus, assessing the *endorsement* of these components while not ascertaining whether those people who indicated that they endorse accomplishment actually achieve something more frequently. Thus, it would be highly interesting to pair these scales with an instrument that measures the *presence* of pleasure, engagement, meaning, positive relationships, and accomplishment.

Across all three parts, the interventions caused changes in well-being (in comparison to the placebo control condition) that should be considered, in terms of effect sizes, small effects. However, this is not surprising given the design of the interventions used. The study used self-administered short-term interventions (one week) for non-depressed individuals, and compared the results with a placebo control condition—these are all factors known to go along with small effect sizes in positive psychology interventions (Sin & Lyubomirsky, 2009). Bolier et al. (2013) also emphasize that study quality is an important moderator for effect sizes. They define high-quality intervention studies by the following criteria: Randomization concealment, blinding of subjects to condition, comparability of conditions at baseline, sample sizes larger than 50, intention-to-treat analyses, and attrition analysis and loss to follow-up < 50%. Only one of the 39 studies in their meta-analysis received the label “high-quality study” (Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009); this study fulfilled five of their six criteria. The intervention study presented in Part II would fulfill all of these criteria, while the studies in Part I and Part III would fulfill most of these criteria and have, therefore, to be considered to be among the qualitatively highest studies that have been conducted in this field so far. Despite a number of design factors that negatively influence intervention effectiveness, robust effects on well-being were found. Thus, it can be assumed that effects would be markedly stronger in more applied settings when several interventions are delivered by a therapist in a long-term program.

A further strength of this set of studies is that it also considered long-term changes in well-being. In the meta-analysis by Bolier et al. (2013), only 9 out of 39 studies included follow-ups after three or more months. The present set of studies was able to show that the most interesting feature of self-administered online-delivered positive psychology interventions is not their strong effect size, but the sustainability of these effects – all interventions were effective for up to three months, and in some cases, for up to six months. However, long-term

follow-ups might come at the cost of high dropout rates that might affect the outcome of the study. However, in Part II, it has been shown that when conducting intention-to-treat analyses and estimating missing data, results remain highly similar, although with slightly smaller effect sizes (which is not surprising given this analysis also includes participants that did not conduct the intervention).

Since the interventions in all parts relied on reflective exercises and no information on what participants actually did was collected, it is unknown whether, or to what extent, the exercises caused changes in cognitions, emotions, or actual behavior. Part III provided some initial support for the notion that the exercises in fact yield cognitive and emotional changes. Whereas these studies should be replicated using more elaborate measures of cognitions and emotions, there has been no study so far that examined behavioral consequences of such reflective exercises. It can be assumed that the interventions are most effective in those that experience changes in their emotions, their cognitions, and their behavior pattern, however, this hypothesis should be empirically examined in future studies.

### **Implications for research and practice**

It has been shown that positive psychology interventions, such as those that were used in the present set of studies, increase the endorsement of pleasure, engagement, meaning, positive relationships, and accomplishment (Part I, and Part III). It would be interesting to examine whether the increase in endorsement also leads to an increase in the presence of these components. The interaction of these endorsements, and the presence of these components in relation to each other, and their role in well-being are not trivial. For example, it has been shown that the presence of meaning, rather than the search for it, is positively related to life satisfaction (Steger, Frazier, Oishi, & Kaler, 2006). The OTH combines several of these aspects, such as considering meaning important, having meaning, and searching for meaning. Thus, it would be interesting to isolate these aspects and examine which of them are most

affected by a particular intervention. Following the same line of argument, no moderating effects of the endorsement of pleasure, engagement, meaning, positive relationships, and accomplishment on intervention effectiveness were found, although it might be the case that the *presence* of these components is a relevant moderator.

Since research in positive psychology interventions has only just started uncovering potential working mechanisms, much more research in this area is needed. For this purpose, it would be worthwhile to study short-term changes in relevant variables, such as the use of daily assessments of positive emotions (Wellenzohn et al., 2014), or the use of experimental manipulation to emphasize certain working mechanisms or minimize their influence (as in Part III). Analyzing the written notes of the participants in diary studies might also give valuable insights in potential working mechanisms. For example, analyzing the amount of positive emotional or insight related words (see also Danner, Snowdon, & Friesen, 2001) could give important insights into how and under what conditions these interventions work.

For more applied purposes, the scales for the assessment of positive relationships and accomplishment can be used along with the OTH in determining to what extent an individual makes use of the different orientations toward well-being. This information could be used in counseling settings to show other, hitherto unused ways of life that lead to well-being, or following the idea of “signature strengths” (Peterson & Seligman, 2004), to foster one’s preferred way to well-being. It has been shown that the interventions can be applied to all individuals regardless of their scores in the endorsement of Seligman’s (2011) Well-Being Theory, but should best be used with individuals in the middle range of the well-being spectrum to obtain the most significant effects.

The present set of studies also suggested that the content and the components of an intervention should be considered depending on the desired outcome. With regard to the content, all interventions in Part II were found to be potent means for increasing happiness. When

a decrease in depressive symptoms was the desired outcome, an intervention focusing on positive relationships yielded the most promising and sustainable results, which fits well to Seligman's (2011) notion that "other people are the best antidote to the downs of life" (p. 20). Similar findings were also reported for a humor-based variant of the "three good things" intervention that showed stronger effects on depressive symptom than the original exercise (Gander et al., 2010). However, more research is needed to determine how and why this exercise specifically addressed depressive symptoms and whether certain conditions have to be met (e.g., an existing supportive social network).

With regard to the components, Part III provided initial evidence for the notion that interventions that elicit positive emotions should be accompanied by cognitive components for creating effects on happiness, whereas emotional components should be included for reducing depressive symptoms. For applied programs, certain changes to the interventions should be made (see also Parks, 2014). Whereas in the present set of studies participants were encouraged to complete the interventions by following the instructions as closely as possible, forcing them to complete the exercises within rather short time periods. For applied programs it may be necessary to leave more freedom to the participant in scheduling their exercises, and to assist them in tailoring the interventions to their specific needs. In addition, applied programs should include multiple components and leave the participants some choice in the selection of the exercises (see above). In a multi-component program, it might be advisable to start with comparatively easy exercises that are liked by most participants (such as the "three pleasurable things" exercise) in order to reduce early dropouts, and suggest more difficult exercises at later stages (see also McGhee, 2010).

Overall, the PERMA-model is not "[...] claimed to be exclusive or exhaustive at this point, but rather a first approximation toward a scientifically usable unpacking of the general construct of 'well-being' " (Jayawickreme, Forgeard, & Seligman, 2011). However, it seems

a good starting point for developing interventions for various reasons: The relevance of its components for well-being is theoretically and empirically well-supported, and there is general agreement that all of these components are essential for well-being (although other approaches use a different vocabulary for similar concepts); it is based on face-valid components, that are also easily understood by lay people; the model uses a simple structure and is comparatively parsimonious, and, includes as few components as possible; whereas these components are clearly distinguishable on a theoretical and an empirical level. Further, developing interventions for each PERMA-component allows well-being to be addressed from different angles, which may contribute to participant compliance with and the resulting efficacy of an intervention.

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EHRENWORT

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EHRENWORT

Hiermit erkläre ich, dass die Dissertation von mir selbst ohne unerlaubte Beihilfe verfasst worden ist.

Zürich, 06.03.2017

Ort und Datum

A handwritten signature in black ink, consisting of a large, stylized initial 'J' followed by a cursive surname.

Unterschrift



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08/09 – 12/10 Research assistant at the Professorship for Social Psychology and Research on Higher Education at the ETH Zurich, and the Evaluation Office of the University of Zurich

**Master-Level**

10/10 – 12/10 Assistant at the development center of the department of human research of the canton of Berne.

05/10 – 09/10 Research assistant at the section of Personality and Assessment at the Department of Psychology, University of Zurich.

01/09 - 02/09 Internship at the Psychiatric Hospital in Brugg

## CURRICULUM VITAE

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- 02/08 – 06/08 Tutorship at the section of Personality and Assessment at the Department of Psychology, University of Zurich.
- 03/07 – 07/08 Research assistant in the Project "Can character strengths be trained?" at the section of Personality and Assessment at the Department of Psychology, University of Zurich.

### AD HOC REVIEWER FOR

- Aging and Mental Health
- Applied Psychology: Health and Well-Being
- Applied Research in Quality of Life
- Behavioural and Cognitive Psychotherapy
- BMC Psychology
- Canadian Journal of Behavioural Sciences
- Current Psychology
- European Journal of Psychological Assessment
- Frontiers in Psychology
- International Journal of Applied Positive Psychology
- Journal of Consulting and Clinical Psychology
- Journal of Happiness Studies
- Journal of Individual Differences
- Journal of Occupational Rehabilitation
- Journal of Positive Psychology
- Personality and Individual Differences
- PLOS ONE
- Spanish Journal of Psychology

### FURTHER ACADEMIC ACTIVITIES

- 2017-present:  
Editorial board member of the Journal of Positive Psychology & Well-Being
- 2015-present:  
Coordinator of the first post-graduate course on Positive Psychology in the German speaking area (Certificate of Advanced Studies in Positive Psychology, University of Zurich)
- 2014-present:  
Webmaster of the Swiss Positive Psychology Association (SWIPPA)
- Organizing Committee of the annual Swiss Positive Psychology Association (SWIPPA) conferences
- 2016: Reviewer Board of the Fifth World Congress of Positive Psychology
- 2015: Organizing Committee of the 13<sup>th</sup> European Conference on Psychological Assessment

### MEMBERSHIPS

- Association for Psychological Science (APS)
- International Positive Psychology Association (IPPA)
- Swiss Positive Psychology Association (SWIPPA; founding member)

### RESEARCH INTERESTS

- Personality, character strengths and virtues
- Well-being
- Positive psychology interventions
- Team roles
- Professional trajectories
- Assessment and research methods

AWARD AND GRANTS

- 2016            The VIA Institute on Character supported the conduct of two studies on team roles; USD 15.900
- 2015            Young talents award of the Swiss Positive Psychology Association (SWIPPA) for the best PhD thesis; 300 CHF

ACADEMIC TEACHING

**Bachelor Level**

- Doing Psychological Experiments (seminar; lecturer): Spring 2011, 2012
- Positive Traits: Moral and Intellectual Excellence (seminar; lecturer): Fall 2016
- Selected Topics of Personality Research (seminar; lecturer): Spring 2016, 2017
- Personality Psychology (lecture; teaching assistant and lecturer on selected topics): Spring 2016
- Psychological Assessment (lecture; teaching assistant and lecturer on selected topics): Fall 2012, 2013, 2015

**Master Level**

- Psychological Reports in Research and Practice (seminar; lecturer): Spring 2016, 2017

**Post-graduate Level**

- Positive Psychology Interventions (Certificate of Advanced Studies in Positive Psychology; lecturer): Spring 2016, 2017

STUDENT SUPERVISION

- 11 B.Sc. theses (2012-2017) on topics from Positive Psychology, Personality, and Assessment
- 2 M.Sc. theses (2016-2017) on Teamwork from a Positive Psychology Perspective

PUBLICATIONS

**Journal articles (with peer-review)**

- Ruch, W., Gander, F., Platt, T., & Hofmann, J. (2016). Team roles: Their relationships to character strengths and job satisfaction. *The Journal of Positive Psychology*. <https://doi.org/10.1080/17439760.2016.1257051>
- Gander, F., Proyer, R., & Ruch, W. (2016). The subjective assessment of accomplishment and positive relationships: Initial validation and correlative and experimental evidence for their association with well-being. *Journal of Happiness Studies*. <http://doi.org/10.1007/s10902-016-9751-z>
- Gander, F., Proyer, R. T., & Ruch, W. (2016). Positive Psychology Interventions Addressing Pleasure, Engagement, Meaning, Positive Relationships, and Accomplishment Increase Well-Being and Ameliorate Depressive Symptoms: A Randomized, Placebo-Controlled Online Study. *Frontiers in Psychology*. <http://doi.org/10.3389/fpsyg.2016.00686>
- Proyer, R. T., Gander, F., & Tandler, N. (2016). Strength-based interventions Their importance in application to the gifted. *Gifted Education International*. <http://doi.org/10.1177/0261429416640334>

- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2016). Addressing the role of personality, ability, and positive and negative affect in positive psychology interventions: Findings from a randomized intervention based on the authentic happiness theory and extensions. *The Journal of Positive Psychology*. <http://doi.org/10.1080/17439760.2015.1137622>
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2016). Nine beautiful things: A self-administered online positive psychology intervention on the beauty in nature, arts, and behaviors increases happiness and ameliorates depressive symptoms. *Personality and Individual Differences*, *94*, 189–193. <http://doi.org/10.1016/j.paid.2016.01.028>
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015). Strengths-based positive psychology interventions: A randomized placebo controlled online trial on long-term effects for a signature strengths- vs. a lesser strengths-intervention. *Frontiers in Psychology*. doi:10.3389/fpsyg.2015.00456
- Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a Better Understanding of What Makes Positive Interventions Work: Predicting Happiness and Depression From the Person × Intervention-fit in a Follow-Up After 3.5 Years. *Applied Psychology: Health and Well Being*, *7*, 108-128. doi:10.1111/aphw.12039
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50-79 years: Long-term effects of placebo-controlled online-interventions on well-being and depression. *Aging and Mental Health*, *18*, 997-1005. doi:10.1080/13607863.2014.899978
- Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence on their potential for enhancing well-being and alleviating depression. *Journal of Happiness Studies*, *14*, 1241-1259. doi:10.1007/s10902-012-9380-0
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013). What good are character strengths beyond subjective well-being? The contribution of the good character on self-reported health-oriented behavior, physical fitness, and the subjective health status. *The Journal of Positive Psychology*, *8*, 222-232. doi:10.1080/17439760.2013.77776
- Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2012). The good character at work: An initial study on the contribution of character strengths in identifying healthy and unhealthy work-related behavior and experience patterns. *International Archives of Occupational and Environmental Health*, *85*, 895-904. doi:10.1007/s00420-012-0736-x
- Proyer, R. T., Gander, W., Wyss, T., & Ruch, W. (2011). The relation of character strengths to past, present, and future life satisfaction among German-speaking females. *Applied Psychology: Health and Well Being*, *3*, 370-384. doi:10.1111/j.1758-0854.2011.01060.x

**Journal articles (without peer-review)**

- Ruch, W., & Gander, F. (2016). Charakterstärken und Wohlbefinden bei der Arbeit: Wann der Job zur Berufung wird [Character strengths and well-being at work: When a job becomes a calling]. *Wirtschaftspsychologie aktuell*, *3*.

**Book chapters**

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). The European Football Championship as a positive festivity: Changes in strengths of character before, during, and after the EURO 2008 in Switzerland. In H. Águeda Marujo & L. M. Neto (Eds.), *Positive nations and communities* (Vol. 6; Cross-cultural advancements in positive psychology; pp. 119-134). Dordrecht, NL: Springer.

**Conference proceedings**

Beermann, U., Gander, F., Hildebrand, D., Wyss, T., and Ruch, W. (2009). Laughing at oneself. In Doris Peham, & Eva Bänninger-Huber (Eds.), *Proceedings of the FACS-Workshop 2007*. Innsbruck, Austria: Innsbruck University Press.

**Invited Talks**

Gander, F. (2016, November). *Interventionen der Positiven Psychologie zur Förderung der Gesundheit [Positive Psychology interventions for fostering health]*. Talk at a meeting of the Swiss Society for Health Psychology. Bern, Switzerland.

Gander, F. (2016, September). *Positive Psychologie*. Talk at a meeting of the Rotary Club. Boswil, Switzerland.

Gander, F. (2015, September). *Positive Psychologie und Nachhaltigkeit [Positive Psychology and sustainability]*. Workshop at the IPU- Sommerseminar (Initiative Psychologie im Umweltschutz). Rämismühle, Switzerland.

Gander, F., & Wellenzohn, S. (2012, March). *Charakterstärken in der Praxis [Character strengths: A practical application]*. Workshop für BeraterInnen des Arbeitsmarktcenters der SBB Olten, Switzerland.

## CONGRESS CONTRIBUTIONS

**Talks**

Proyer, R. T., Gander, F., & Ruch, W. (2016, July). *Personality, psychometric and self-estimated ability, and positive and negative affect in positive psychology interventions: Findings from a randomized intervention based on the Authentic Happiness theory and extension*. Paper presented at the 18th European Conference on Personality, Timisoara, Romania.

Gander, F., Proyer, R. T., & Ruch, W. (2016, June). *Meaning, its amenability to change, and positive psychology interventions*. Paper presented at the 8th European Conference on Positive Psychology, Angers, France. (Presentation held at the Invited Symposium: Meaning, strengths, values, and spiritual accomplishments)

Gander, F., Proyer, R. T., & Ruch, W. (2015, July). *Short Scales for the Assessment of Accomplishment and Positive Relationships: Initial Validation, and Correlative and Experimental Evidence for Their Association with Well-Being*. Paper presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2015, July). *Assessing happiness with the Authentic Happiness Inventory: Evaluation of its psychometric properties, initial validation, and its use in inter-*

- vention studies*. Paper presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.
- Gander, F., & Wellenzohn, S. (2014, July). *Strengths-based online positive psychology interventions and the role of personality*. Paper presented at the 17th European Conference on Personality, Lausanne, Switzerland. (Presentation held at the Symposium: Positive psychology and the study of positive traits: Recent research from adult playfulness to strengths of character)
- Gander, F., Proyer, R. T., & Ruch, W. (2014, July). *An online study comparing the effects of interventions for the components of Seligman's Authentic Happiness Theory plus positive relationships, and accomplishment*. Paper presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands. (Presentation held at the Symposium: Can well-being be trained online? Studies on the effectiveness of self-administered positive interventions)
- Gander, F., Proyer, R. T., & Ruch, W. (2013, June). *Further evidence on the potential of strengths-based online interventions: Increasing happiness and reducing depression*. Paper presented at the 3rd World Congress on Positive Psychology, Los Angeles, USA.
- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, June). *The development of a research-instrument to assess the components of Seligman's (2011) PERMA-theory of well-being*. Paper presented at the 6th European Conference on Positive Psychology (ECP), Moscow, Russia.
- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, June). *Further evidence on the effects of online Positive Psychology interventions*. Paper presented at the 6th European Conference on Positive Psychology (ECP), Moscow, Russia.

### Posters

- Gander, F., Proyer, R. T., & Ruch, W. (2016, June). *Team Roles: Relationships to Character Strengths, Job Satisfaction, and Calling*. Poster presented at the 8th European Conference on Positive Psychology, Angers, France.
- Gander, F., Proyer, R. T., & Ruch, W. (2015, September). *Accomplishment and Positive Relationships: Scale Development, Validation, and Use in Intervention Studies*. Poster presented at the 14th Congress of the Swiss Society of Psychology (SSP), Geneva, Switzerland.
- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2015, July). *The subjective quality of environmental conditions in different life domains and satisfaction with these domains: Assessment and Malleability*. Poster presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.
- Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2015, July). *Measuring the propensity to perceive good things and testing it as a mediator in interventions: The case of the three "good things"-intervention*. Poster presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.
- Gander, F., Proyer, R. T., Wagner, L., & Ruch, W. (2015, June). *Comparing the effects of online interventions based on pleasure, engagement, meaning, positive relationships, and accomplishment – A randomized placebo-controlled study*. Poster presented at the 4th World Congress on Positive Psychology, Lake Buena Vista, Florida, USA.

- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014, July). *Moderating effects of personality on the effectiveness of positive psychology interventions*. Poster presented at the 17th European Conference on Personality, Lausanne, Switzerland.
- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014, July). *Positive psychology interventions in older adults: Effects of a six-months placebo-controlled online intervention*. Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.
- Wellenzohn, S., Proyer, R. T., Gander, F., Hentz, E., & Ruch, W. (2014, July). *The role of positive emotions in positive interventions: A study using daily assessment of positive emotions*. Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.
- Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2014, July). *What intervention-specific characteristics predict happiness and depression in those that participate in positive interventions? A four-year follow-up*. Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.
- Gander, F., Proyer, R. T., & Ruch, W. (2013, September). *Contributions of positive relationships and accomplishment in online interventions*. Poster presented at the 13th Congress of the Swiss Society of Psychology (SSP), Basel, Switzerland.
- Wellenzohn, S., Hentz, E., Proyer, R. T., Gander, F., & Ruch, W. (2013, September). *The role of positive emotions in positive interventions*. Poster presented at the 13th Congress of the Swiss Society of Psychology (SSP), Zurich, Switzerland.
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013, June). *Character strengths and football: Can a nationwide positive event influence character strengths?* Poster presented at the 3rd World Congress on Positive Psychology, Los Angeles, USA.
- Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2013, June). *Character strengths and health behaviors*. Poster presented at the 3rd World Congress on Positive Psychology, Los Angeles, USA.
- Gander, F., Proyer, R. T., & Ruch, W. (2013, June). *Character strengths and patterns of work-related attitude and coping behaviors*. Poster presented at the 3rd World Congress on Positive Psychology, Los Angeles, USA.
- Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, April). „*What’s funny today?*“ – *A humor-based intervention*. Poster presented at the 25th Annual Conference of the Association for Applied and Therapeutic Humor (AATH), Chicago, Illinois, USA.
- Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2012, June). *The good character and football: First evidence on the possible impact of a nationwide positive event on character strengths*. Poster presented at the 6th European Conference on Positive Psychology (ECP), Moscow, Russia.
- Wellenzohn, S., Proyer, R.T., Gander, F., & Ruch, W. (2012, June). *Character strengths and life goals*. Poster presented at the 6th European Conference on Positive Psychology (ECP), Moscow, Russia.
- Wellenzohn, S., Proyer, R.T., Gander, F., & Ruch, W. (2012, June). *Underestimating gelotophobes, overestimating gelotophiles, and realistic katagelasticists? Testing self- and peer-rated character strengths in their relation with dispositions towards ridicule and being laughed at*. Poster presented at the 6th European Conference on Positive Psychology (ECP), Moscow, Russia.

- Gander, F., Proyer, R. T., Wyss, T., & Ruch, W. (2011, July). *Three funny things - A humor intervention*. Poster presented at the Second World Congress on Positive Psychology, Philadelphia, USA.
- Wyss, T., Gander, F., Proyer, R. T., & Ruch, W. (2009, August). *On the relation among Psychoticism, Extraversion, Neuroticism and retrospective, current, and prospective satisfaction with life*. Poster presented at the 11th Congress of the Swiss Psychological Society, Neuchâtel, Switzerland.
- Beermann, U., Hildebrand, D., Gander, F., Wyss, T. & Ruch, W. (2007, September). *If you were a joke - would you find yourself funny? Or: Measuring „Laughing at oneself“*. Paper presented at the International Meeting "Current and future perspectives in facial expression research: Topics and methodical questions", Innsbruck, Austria.
- Hildebrand, D., Wyss, T., Gander, F., Beermann, U., & Ruch, W. (2007, September). *Can you take yourself as a joke? - Laughing at oneself, humor and personality*. Poster presented at the 10th Congress of the Swiss Society of Psychology (SSP), Zurich, Switzerland.