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The Self-Concept: New Insights from Implicit Measurement Procedures

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"But it was his search for self that defined him"

Video clip for Barack Obama's 2008 presidential campaign

The times that "the ego (or self) became sidetracked and lost to view" (Allport, 1943, p. 451) are long gone. Over the past 30 years, the self has attracted the attention of both lay and scientific psychology (e.g., Byrne, 2002) and interest in the self has even increased with the development of new implicit measurement procedures like the Implicit Association Tests (IATs, Greenwald, McGhee, & Schwartz, 1998) or priming procedures (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Implicit procedures have the potential to provide access to aspects of the self, that are inaccessible or only partially accessible by conscious introspection (Greenwald & Banaji, 1995), but that may have an essential impact on how one thinks, feels, and behaves.

This chapter reviews theories and research that deal with the dissociation between the implicit and the explicit self-concept and discusses how implicit measures may help to get a deeper and more complete understanding of the self. We start with a general definition of the self-concept and briefly discuss basic issues in traditional self-concept theories. Second, we compare and contrast the implicit and the explicit self-concept. Third, we review research on different self-concept domains and the behavioral validity of the implicit personality self-concept. Fourth, we discuss how individual differences may moderate the predictive validity of implicit and explicit self-concept measures. Finally, we have a look at questions related to the stability of the implicit self-concept.

<div align="center">Definition of the Self-Concept</div>

On a very broad level, the self-concept can be defined as an associative network containing associations between the concept of self and attribute concepts (Greenwald et al., 2002). However, not only attribute traits per se (e.g., outgoing) but also roles (e.g., teacher), groups (e.g., one's family of origin, anti-nuclear activists), objects (e.g., preferred brands), and

activities (e.g., hiking) belong to the attribute concepts that may be associated with the concept of self. Generally speaking, the self-concept consists of associations between the concept of self and other concepts. The associations of the self with valence – either direct or mediated through components of the self-concept – refer to one's self-esteem (Greenwald et al., 2002; see also Zeigler-Hill & Jordan, this volume). This makes evident that it is difficult to draw a clear distinction between evaluative and specific semantic content of the self-concept (cf. Schnabel, Asendorpf, & Greenwald, 2008a), and that self-esteem rather represents the affective part of the self-concept than an entity independent from the self-concept.

In order to meet the complexity of the self, Baumeister (1998) differentiated between three basic aspects. The first aspect was called *reflexive consciousness* and refers to the fact that the human mind is capable to turn its attention back toward its own source. People can be self-aware, they are able to observe themselves in various situations, and they can collect knowledge about their own person (see also Hofmann & Wilson, this volume). The second aspect refers to the *interpersonal nature* of the self. The self is always part of social groups and relationships, and a crucial function of the self refers to its capability to relate to others. Social interactions are influenced by the self, and social interactions influence in turn how one perceives and experiences oneself. The third aspect refers to the *executive function* of the self and describes its ability to exert control over its actions. The self is able to make choices and decisions, execute actions, and take responsibility.

Considering the executive function of the self and its implications on both self-evaluation and social behavior, Greenwald and Pratkanis (1984) differentiated between four different self aspects that show some similarity with Freud's concepts of id, ego, and super-ego. Their hierarchically organized system describes four self components that are aimed at different targets (ego tasks) and contribute differently to self-evaluation and self-esteem. Achieving targets results in an increase of self-esteem, missing targets decreases the self-

esteem. The first subsystem or facet of the self was called the *diffuse self*. It is the most primitive self-component and does not distinguish sharply between self and others. Its main target is hedonic satisfaction, that is, achieving positive affective states. This self-component can be activated under the influence of drugs or in situations that provide anonymity in groups. The simple pursuit of hedonic satisfaction frequently results in the violation of norms.

The main target of the second subsystem, the *public self*, is to win positive approval by significant others. Its responsiveness to the positive evaluation of others may result in the use of self-presentational strategies. The development of the public self implies the abilities to discriminate between self and others and to identify the aspects of one's behavior that influence the impression on others. The public self can be activated in a state of public self-consciousness. Besides winning social accreditation, another important ego task of the public self is to internalize the evaluative standards of significant others.

The internalization of social standards and norms may lead to the development of the third self-component, the *private self*. Its ego task is individual achievement, that is, the pursuit of personal targets according to internal standards. The private self allows for self-evaluation that is independent from the estimation of others. It is activated by a state of private self-consciousness.

The fourth self-component, the *collective self*, may develop when the goals of groups that function as personal reference groups are internalized. Its ego task is collective achievement. Whereas the public self merely results in the adaptation to external standards, the collective self deals with internalizing the goals of significant others and groups. The collective self may be activated when aspects of the reference group are made salient. Even though Greenwald and Pratkanis' (1984) approach represents rather a theoretical model than empirically based evidence, it is very useful to illustrate the complexity of the self and to organize its broad consequences on social behavior and self-evaluation.

Implicit and Explicit Self-Concept

The dissociation between associative and propositional processes (see Deutsch & Strack, this volume) is also relevant for the self-concept. In line with dual process models in social cognition research, differences between the implicit and the explicit self-concept can be explained in terms of their underlying processes as differences between an associative and a propositional way of information processing (Gawronski & Bodenhausen, 2006). Many dual process models (e.g., Strack & Deutsch, 2004) assign associative and propositional processes to different systems of information processing (e.g., the impulsive and reflective system). The conceptualization of different systems implies that they are instantiated in different brain networks. However, the neurophysiological identification of different brain networks for the two systems remains an issue of further research and the differentiation between associative and propositional processes does not necessarily call for two different systems. Therefore, we refrain from using the term "system" and simply contrast between associative and propositional processes.

Associative processes operate fast and automatically and correspond to spread of activation processes across associations that are represented in an associative store (Strack & Deutsch, 2004). Associations consist of concepts (e.g., the concepts "I" and "extraverted) that are associatively linked (e.g., "I-extraverted" with "-" representing the associative link) and develop on the basis of feature similarity and spatio-temporal contiguity between the involved concepts. For instance, if a person is repeatedly gregarious and outgoing in various situations, s/he may develop an associative link between the self-concept and the concept of extraversion that is represented in the associative store. The associative link triggers the fast and automatic co-activation of the two concepts whenever one of both concepts is activated.

In contrast, *propositional processes* operate slowly but consciously and correspond to explicit reasoning processes. The reasoning processes retrieve information from the associative store and transform it from an associative format into a propositional format. Differently from associations, propositions consists of concepts that are linked by a relation

(e.g., "I am extraverted" with "am" representing the relation). The relational link between the concepts is the result of syllogistic inferences that gauge the validity of the proposition. As a consequence, the resulting propositions can be either accepted as true or rejected as false. For instance, if a person is asked to self-rate his or her extraversion, s/he may have some introspective access to the automatic associations that are activated in the associative store. At the same time, s/he may think about the adequacy of these associations and modify the resulting propositions on the basis of syllogistic rules (e.g., "I can't be extraverted, if I don't like parties.") and self-presentational concerns (e.g., "If I describe myself as extraverted, I will get the job.").

Associative and propositional processes differ with respect to the format in which information is made available. We call information that is made available by associative processes *associative representations* and information that is made available by propositional processes *propositional representations*, respectively. Associative and propositional representations refer to information that is activated within a given situation. They do not necessarily need to be stored in long-term memory. Considering the self-concept, we refer to the *explicit self-concept* as propositional representations that describe the self and that are the output of reasoning processes. In contrast, we refer to the *implicit self-concept* as associations between the self and other concepts that are the result of automatic activation processes. On one hand, self-associations develop as the consequence of individual experiences that are encoded in the associative store. On the other hand, self-associations are activated situationally as the consequence of a particular set of external input stimuli. Thus, the pattern of self-associations that is activated in a given situation depends on the relative fit between the particular context on one side and the preexisting structure of self-associations in the associative store on the other side. For instance, associations between the self and anxiety may be activated in socially anxious people that love dogs when they deliver a public speech

but not when they meet a giant dog, whereas the opposite may be true for passionate speakers that are dog-phobic.

Greenwald and Pratkanis' (1984) differentiation of the diffuse, the public, the private and the collective self (see above) shows some parallels to the differentiation of the implicit and the explicit self-concept. The implicit self-concept may be seen as related to the diffuse self because both are strongly influenced by spontaneous processes and the satisfaction of basic needs. The explicit self-concept seems to be more similar to hierarchically higher self-aspects, because it also deals with gaining public, private, or collective acceptance by its behavior. Nevertheless, aspects of the public, the private and even the collective self-concept may become part of the implicit self-concept if individual learning experiences integrate these aspects in one's associative self-representations.

The conceptualization of the explicit and the implicit self-concept as propositional versus associative representations is useful to describe and explain their dissociations that occur with respect to (a) the explicit and implicit measurement procedures that assess the self-concept, (b) the predictive validity of those procedures for the prediction of behavior, and (c) the stability and malleability of the explicit and implicit self-concept. Even though calling the measurement procedures "explicit" or "implicit" implies that they assess solely propositional or associative representations, there is now considerable consensus between researchers that this is not the case (see Sherman, Klauer, & Allen, this volume). Nevertheless, we use the labels "explicit" and "implicit" also for the measurement procedures, because this labeling is now deeply entrenched in the literature. Furthermore, we consider it adequate to adopt an operational definition of the explicit and implicit self-concept. Thus, we talk about the explicit self-concept when we refer to information about the self that is assessed by explicit questionnaire measures, and about the implicit self-concept when we refer to information about the self that is assessed by implicit measurement procedures (cf. Asendorpf, Banse, & Mücke, 2002).

Different from using the labels "explicit" and "implicit" for both the measurement procedures and the constructs that are assessed, De Houwer (2006) suggested to use these labels only for the measurement outcomes. Accordingly, an implicit measure is defined as a measurement outcome that reflects the assessed construct in an automatic way. This definition highlights the functional properties (i.e. automaticity) of the measurement outcome. Automaticity itself refers to several functional features of the measurement process, such as unawareness, unintentionality, efficiency, and uncontrollability (Bargh, 1994). When so-called implicit measures are examined with respect to these functional features, it becomes evident that most measures rely on a mixture of automatic and nonautomatic processes (De Houwer, 2006). In contrast to the measurement outcomes, De Houwer suggested to define the measurement procedures as "direct" or "indirect", dependent on whether they directly ask the participant to describe her/himself or whether they indirectly assess a respective trait, attitude, or cognition by examining its effects on behavior. As noted above, we do not adopt this terminology because the labels "implicit" and "explicit" are now largely used for both measurement outcomes and measurement procedures.

Differences between explicit and implicit procedures and between different variants of implicit procedures are discussed extensively at the theoretical and operational level in Section I and II of this volume. Even though most research used the IAT, assessment of the implicit self-concept is possible also with other procedures like the GNAT (Boldero, Rawlings, Haslam, 2007), the Single Block IAT (Teige-Mocigemba, Klauer, & Rothermund, 2008), or the IAP (Schnabel, Banse, & Asendorpf, 2006a) but seems less promising with the EAST (Teige, Schnabel, Banse, & Asendorpf, 2004). Here, it is important to note that propositional and associative self-representations as assessed by explicit and implicit measurement procedures, respectively, do not necessarily need to diverge. Individuals may, by default, base the information that they use to inform about their self on their associative self-representations (cf. Gawronski & Bodenhausen, 2006). However, higher order processes

of propositional reasoning will typically lead to the rejection of some self-associations that are considered as inadequate. The remainder of this chapter deals with the dissociations between the explicit and implicit self-concept that result from those reasoning processes with regard to different self-concept domains, the prediction of behavior, and the stability of the implicit and explicit self-concept.

<div align="center">Domains of Implicit Self-Concept</div>

In this section we discuss research that deals with dissociations between the implicit and explicit self-concept with respect to different self-concept domains. Thereby, we refer to the self in balanced identities, the personality self-concept, and the role of the implicit self-concept in adult attachment.

The Self-Concept in Balanced Identities

A powerful example that the self is meaningfully connected to social entities that go beyond the individual self is provided by research on balanced identities. Balanced identity designs were introduced within an unified theory of social cognition by Greenwald and colleagues (2002) and conceptualize knowledge about the self as a network of associations between the self, a social category, and an attribute. The association networks are conceptualized as cognitive triads and typically assessed by three IATs that measure associations between (a) the self and a social category (e.g., female versus male, young versus old, American versus German), (b) the self and an attribute (e.g., warm versus cold, smoking versus nonsmoking, pleasant versus unpleasant), and (c) between the attribute and the social category. As these examples make evident, a sharp differentiation between attribute and social category is not always possible, because many attributes represent social categories.

The triads were called balanced identities, because the pattern of associations within the triads was expected to follow principles of Heider's (1958) *balance theory*, and because the triads always contain an *identity association*. Identity associations were defined as an association between the self and a social category. It is evident that social categories (e.g.,

male versus female) are sometimes difficult to be separated from attributes (e.g., smoking versus nonsmoking) such that attributes may also represent a social category or group. As a consequence a balanced identity triad may in fact contain more than one identity association.

This view slightly differs from Greenwald et al.'s (2002) definition that strictly separates associations between the self and social categories or groups (i.e. identity associations) from associations between the self and attribute concepts. Furthermore, Greenwald et al. (2002) labeled self-attribute associations either as self-esteem associations or as self-concept associations dependent on whether the attribute concept is a valence concept (e.g., pleasant versus unpleasant) or a specific semantic concept (e.g., smoking versus nonsmoking), respectively. In the same way, associations between the social category and the attribute concept were labeled either as attitude associations or as stereotype associations dependent on whether the attribute concept is a valence concept or not. These definitions make evident that balanced identities are able to build an integrative framework for the most prominent concepts in social psychology.

Thus, studies about balanced identities reveal a great deal about the self, because they always include two associations of the self with other concepts. Additionally, they allow to explore how associations of the self with other concepts are related to associations between those other concepts. Most importantly, results for balanced identity studies showed evidence for implicit-explicit dissociations such that certain predicted cognitive consistency patterns were evident for implicit measures but not for parallel explicit self-report measures (Greenwald et al., 2002).

The predictions of consistency effects on the balanced identity triads drew their inspiration from theories of affective-cognitive consistency, particularly from Heider's (1958) balance theory, and were based on (a) the balance-congruity, (b) the imbalance-dissonance, and (c) the differentiation principle. The balance-congruity principle postulates that the association between two unassociated or weakly associated concepts should be strengthened if

the two concepts are both associated with a third concept. For instance, the association between the concepts 'male' and 'smoking' should be strengthened, if both concepts are associated with the self.

In contrast, the imbalance-dissonance principle states that the formation of new associations between two concepts should be suppressed if both concepts are associated with bipolar-opposed concepts. For instance, tendencies to create an association between 'male' and 'smoking' should be suppressed, if 'male' is associated with positive valence and 'smoking' is associated with negative valence. The suppression of tendencies to create an association between 'male' and 'smoking' may conflict with the balance-congruency principle that suggests an association between those concepts due to their shared association with self. As a consequence, 'male' and 'smoking' become so-called pressured concepts that are pushed to develop associations to both of two bipolar-opposed concepts, in this case positive and negative valence.

The third principle, the differentiation principle deals with a solution for pressured concepts, assuming that they tend to split into subconcepts that are each associated with a different one of the pressuring bipolar opposed concepts. For instance, 'smoking' may be pressured to develop a sub-concept that links 'youth smoking' with positive valence and allows for an association with 'male' that is itself associated with positive valence.

In their article, Greenwald et al. (2002) tested predictions that follow primarily from the first principle (i.e. balance-congruity) and formulated additional but untested predictions that result from the second (i.e. imbalance-dissonance) and third principle (differentiation). Balance-congruity hypotheses were tested by exploring interaction patterns between the three IATs that assessed the respective balanced identity triad. We illustrate balance-congruity hypotheses with the balanced identity investigation of gender attitude in a female sample. For females, the association between self and the concept 'female' should be strong (female gender identity), and the same should be true for the association between self and positive

valence (positive self-esteem). According to the balance-congruity principle, the existence of these associations should also strengthen the association between the concept 'female' and positive valence (positive gender attitude). More concretely, the strength of a positive attitude toward females as the criterion should be the multiplicative product of the strengths of positive self-esteem and female gender identity as the criteria. The results supported this prediction: As the positive attitude toward females increased, so did positive self esteem *and* female gender identity (cf. Experiment 1 by Rudman & Goodwin, 2004). Further support for related hypotheses was evident in studies on age and race identities as well as in studies that included nonevaluative attribute concepts and assessed balanced identities that included, for instance, gender stereotypes (cf. Aidman & Carrol, 2003; Nosek, Banaji, & Greenwald, 2002; Rudman, Greenwald, & McGhee, 2001).

Interestingly, such effects of the balance-congruity principle were only obtained when tested with implicit measures but received no support when tested with explicit measuring tools. These implicit-explicit dissociations may be explained by the differences between associative and propositional information processing that were discussed earlier in this chapter. More precisely, the assessment of consistency between explicit propositions in the process of propositional reasoning may lead to the rejection of the automatic associations that are implied by the balanced identity triads (Gawronski & Bodenhausen, 2007). Motivational or response factors and introspective limits that affect information processing at the propositional level may be an additional source of implicit-explicit dissociations (cf. Greenwald & Banaji, 1995).

Concerning the implicit self-concept, it may be interesting to explore differences between balanced and unbalanced association triads with respect to their effects on (a) the stability of self associations and (b) the consistency between explicit and implicit self-concept measures. According to the balance-congruity principle, the associations in a balanced triad should strengthen each other and, as a consequence, also stabilize each other. In contrast,

reciprocal strengthening between the associations is missing in an unbalanced triad due to the imbalance-dissonance principle. For instance, if somebody has a positive self-esteem and associates her or himself with shyness, he or she may associate shyness with either positive valence (balanced triad) or negative valence (imbalanced triad). In this example, positive associations with shyness seem to be plausible for people who have a preference for being unobtrusive or cautious whereas negative associations with shyness seem to be plausible for people who associate shyness with a lack of self-security. Expecting that associations in balanced triads are more stable, test-retest correlations of implicit measures should be higher for participants that show a balanced pattern of associations within a given association triad than for participants with an imbalanced triad.

According to the same logic, implicit-explicit correlations are expected to be higher for participants with balanced triads than for participants with imbalanced triads. If the propositions that are generated to inform about the self within a questionnaire are based on one's automatic associations (Gawronski & Bodenhausen, 2006), there should be more conflicting associations when generating the explicit self-report for participants with imbalanced triads than for participants with balanced triads. Those conflicting associations may be a reason for participants not to base their, for instance, shyness self-report on their spontaneous self-shyness associations but rather on additional processes of propositional reasoning (cf. Briñol, Petty, & Wheeler, 2006). As a consequence, there should be smaller correlations between implicit and explicit shyness measures for participants with imbalanced association triads than for participants with balanced association triads. These correlational differences should occur even after controlling for the reduced retest reliability that is expected for the implicit measures in the group of participants with imbalanced association triads. To our knowledge, these hypotheses concerning the stability of self-associations and their implicit-explicit consistency have not yet been tested, but they may represent an interesting starting point for future studies. It should be noted that in the strict sense of the

spread of activation model that is used to describe associative processes (see above) cognitive imbalance is impossible at the associative level (Gawronski, Strack, & Bodenhausen, 2009). Nevertheless, implicit imbalance in the sense of conflicting associations between concepts may be reflected by implicit measures that do not exclusively rely on spread of activation processes.

Interestingly, theoretical assumptions according to the Associative-Propositional Evaluation Model (APE Model; Gawronski & Bodenhausen, 2006, 2007) state that consistency is only a concern of propositional information processing and does not play a role in associative processes (Gawronski & Strack, 2004; Gawronski, et al., 2009). This conceptualization is in conflict with the results for balanced identities (Greenwald et al., 2002) showing that effects of consistency between associations were obtained only for implicit but not for explicit measures. The reason for the differences between these models may stem from their different ways to define cognitive consistency. Greenwald and colleagues (2002) defined consistency as a balanced triad of associations within the balanced identity design. Gawronski and Bodenhausen (2006, 2007) defined consistency as the result of a propositional process that assesses the consistency between propositions by the application of syllogistic rules and the assignment of truth values. According to this model, consistency between two propositions is achieved when both propositions are regarded as true and when they do not contradict each other. In contrast, two propositions are inconsistent with each other when both are regarded as true but one implies the opposite of the other. Inconsistency may be resolved by changing the truth value of one proposition or by generating another proposition that removes the inconsistency. Importantly, all of these consistency considerations take place only at the level of propositional reasoning but not at the level of associative information processing.

Evidence for such consistency effects at the propositional but not at the associative level was shown in several studies (Gawronski & Strack, 2004). However, none of these

studies involved balanced identity triads as used by Greenwald and colleagues (2002) in order to assess patterns of cognitive consistency effects. Additionally, the studies by Greenwald and colleagues showed consistency effects on implicit measures for 16 different IATs and included studies with fairly large sample size (cf. the comment on sample sizes in correlational studies in Schnabel, Asendorpf, & Greenwald, 2008b). Further evidence for consistency effects at the implicit level may result from associative transfer effects that were evident in two studies by Gawronski, Bodenhausen, and Becker (2007, Experiment 3 and 4). In these studies, participants had to choose between two equally attractive pictures. Results showed that participants' implicit attitude toward the chosen picture (but not toward the rejected picture) correlated with their implicit self-esteem. Even though these studies did not assess associations for the complete triad and the association between the self and the chosen picture remained unassessed, they may indicate effects of cognitive consistency at the associative level. Associative consistency appeared in a way that objects that were related to the self were evaluated rather positively or negatively dependent on whether the self was evaluated rather positively or negatively.

Together, the diverging findings on consistency effects in the studies by Gawronski and Strack (2004) and Greenwald et al. (2002) seem less contradictory if the differences in the way how consistency was defined are recognized. For example, Gawronski et al. (2009) argued that the balanced identity patterns in Greenwald et al.'s (2002) studies reflect the operation of spreading activation processes at the associative level, which are conceptually distinct from the notion of logical consistency in Gawronski and Strack's (2004) research. An opportunity to combine both approaches and an interesting avenue for further studies may be to explore whether inconsistency at the associative level in the sense of Greenwald et al. (2002) increases efforts to achieve consistency at the propositional level in the sense of Gawronski and Bodenhausen (2006, 2007) due to the fact that the spontaneously generated propositions should be more contradictory. As discussed earlier in this section, the lack of

cognitive consistency at the implicit level should also reduce implicit-explicit consistency. Preliminary evidence for this assumption may be derived from studies that show that cognitive elaboration decreases the correlation between implicit and explicit measures (cf. Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Given that cognitive consistency is a concern of propositional reasoning (Gawronski & Bodenhausen, 2006), the degree of cognitive elaboration at the propositional level should be higher when cognitive consistency is inexistent already at the associative level. These patterns of cognitive inconsistency at the associative level may be able to explain a lack of reflexive consciousness in the sense of Baumeister (1998, see above) at the propositional level. Thereby, the differentiation between associative and propositional processes helps to get a deeper understanding of possibilities and limitations of reflexive consciousness.

The Personality Self-Concept

The part of the self-concept that refers to personality describing attributes and that may be assessed by the use of personality measures is called the personality self-concept (cf. Asendorpf, Banse, & Mücke, 2002). Personality describing attributes are individual, relatively stable, and nonpathological characteristics of the person (Asendorpf et al., 2002). The most comprehensive studies on the validity of implicit and explicit personality self-concept measures were completed by Egloff and colleagues (Back, Schmukle, & Egloff, 2008; Schmukle, Back, & Egloff, 2008) and included IATs for all Big Five personality dimensions (i.e. neuroticism, extraversion, openness, agreeableness, and conscientiousness). Implicit personality self-concept measures were also used for the assessment of morality (Aquino & Reed, 2002) and exercise behavior (Banting, Dimmock, & Lay, 2009). Banting et al. (2009) used an exerciser self-concept IAT with 'exercise' versus 'sedentary' as attribute categories and explored its predictive validity for the prediction of exercise behavior. Results showed that both the exerciser self-concept IAT and the respective explicit measure were independent predictors of exercise behavior. Aquino and Reed (2002) explored correlations of a moral

identity IAT that assessed associations between the self-concept and moral traits. They found significant correlations between the moral identity IAT and explicit judgments of the self-importance of moral traits. However, correlations were significant only when the explicit judgments referred to private aspects of the self-importance of moral identity traits. In contrast, implicit-explicit correlations were non-significant when the explicit judgments referred to rather public or self-presentational aspects of moral identity.

A set of two studies by Schmukle et al. (2008) explored the psychometric properties of IAT measures for all Big Five dimensions. Results of confirmatory factor analyses validated the five factor structure not only for the explicit but also for the implicit Big Five personality measures (Schmukle et al., 2008). Given the facts that all Big Five personality dimensions are confounded with positive and negative valence and that self-concept IATs may be particularly affected by a valence confound (Banse & Greenwald, 2007; Schnabel et al., 2008a; Schnabel, Asendorpf, & Greenwald, 2008c) it is an important finding to show that their factorial structure can not be reduced to a single evaluation factor.

In addition, the studies by Schmukle et al. (2008) revealed satisfactory internal consistencies for the Big Five IATs and showed that the patterns of means and correlations between the Big Five factors were highly similar for IATs and explicit self-reports. This structural equivalence between implicit and explicit measures was evident even though implicit-explicit correlations were relatively small (mean correlation of .13) and significant only for extraversion and conscientiousness. Interestingly, the authors explained structural equivalence by similar evaluation processes in implicit and explicit measures. Thus, observed means were below zero on the IAT and below the scale midpoint on the explicit self-report measures only for the more negatively evaluated dimension neuroticism but not for the other Big Five dimensions. Similarly, only neuroticism was consistently negatively correlated with the other more positively evaluated dimensions extraversion, openness, agreeableness, and conscientiousness that were all positively correlated with each other. Thus, valence effects

may explain the structural equivalence between implicit and explicit measures even though the factorial structure could not be reduced to a single evaluation factor for implicit as well as for explicit measures.

Further and even more compelling evidence for the assumption that the positive-negative valence polarity of the Big Five IATs does not represent a threat to their validity is provided by the study by Back et al. (2008). Most importantly, this study dealt with the prediction of actual (i.e. directly observable) behavior and explored the predictive validity of all Big Five dimensions both at the level of implicit IAT and explicit self-report measures (see also Steffens & Schulze-König, 2006, for a small-sample study of this type). Back et al. (2008) assessed 50 behavioral indicators for the Big Five dimensions in 13 different experimental situations, and the behavioral indicators were assigned to the Big Five dimensions on the basis of *a priori* considerations. Subsequently, the behavioral indicators for each Big Five dimension were aggregated in order to obtain a single behavioral validation criterion for this dimension. The results showed that explicit self-reports predicted actual behavior for all Big Five dimensions whereas only the neuroticism IAT and the extraversion IAT, but not the other Big Five IATs, were able to predict actual behavior. Nevertheless, the implicit measures showed incremental validity over and above explicit measures, and behavior predictions for the neuroticism and extraversion IAT remained significant even after controlling for explicit measures.

Additionally, these effects were unaffected if they were controlled for valence. Valence influences were assessed by a self-esteem IAT and an explicit self-esteem measure. Results showed relatively weak correlations of the Big Five IATs with the self-esteem IAT (highest correlation was .30), and somewhat higher correlations of the Big Five self-reports with the explicit self-esteem measure (highest correlation was .50, cf. Grumm & von Collani, 2007). Furthermore, neither the predictive validity of explicit measures nor the predictive or

incremental validity of implicit measures was reduced if the influence of valence was controlled for.

The fact that only neuroticism, extraversion, and – to a smaller extent – agreeableness were able to predict behavior at the level of implicit measures was theoretically explained on the basis of whether the Big Five dimensions refer to behavior that is influenced by automatic processes and basic motivational orientations. Back and colleagues (2008) based their theoretical assumptions on a Behavioral Process Model of Personality (BPMP) that represents a personality-oriented adaptation of the Reflective-Impulsive Model by Strack and Deutsch (2004). According to the BPMP, associative representations of the self develop from the repeated activation of the self together with association patterns that trigger impulsive behavior. These association patterns are characterized by perceptual features of the situation, automatic motivational tendencies, the resulting impulsive behavior, and the trait concept representing that behavior. Thus, associative representations of the personality self-concept are considered to reflect past activation of automatic behavior that is condensed in an associative format. In contrast, propositional representations of the personality self-concept are considered to reflect past activation of controlled behavior that is condensed in a propositional format. Controlled behavior is triggered by reflective processes and is evident in the way how situations are typically perceived and categorized, in the behavioral options that are preferred, and in the deliberate realization of the preferred behavior.

Based on these theoretical assumptions, self-concept IATs were expected to be valid for the prediction of behavior only if they assess self-trait associations that are based on the frequent co-activation of the concept of self and impulsive behavioral tendencies. In contrast, self-concept IATs were expected to be less valid if they refer to behavior that is primarily guided by propositional reasoning and offers fewer opportunities to develop chronic associations between the self and impulsive behavioral tendencies. Considering extraversion, neuroticism, and agreeableness, Back and colleagues argued that these traits are more closely

related to impulsive behavior activation than openness and agreeableness. However, this argumentation is not fully convincing. For instance, several aspects of low conscientiousness (e.g., sloppy) may be guided by impulsive information processes and therefore also be represented as chronic self-associations. More research is needed that replicates this finding of differential predictive validity for different Big Five factors and offers a more convincing explanation for it.

A similar pattern of results – explicit self-concept measures were related to controlled behavior whereas implicit self-concept measures were related to spontaneous behavior – was found by Asendorpf and colleagues (2002) for the personality trait of shyness. Different from Back et al. (2008), Asendorpf et al. differentiated between explicit and implicit measures not only at the theoretical level and with respect to different self-representations but also at the operational level and with respect to different behavioral indicators of actual shy behavior. Within a double dissociation model, the results by Asendorpf et al. showed that the explicit shyness measures uniquely predicted indicators of controlled but not spontaneous shy behavior whereas the shyness IAT uniquely predicted indicators of spontaneous but not controlled shy behavior. Double dissociation designs are an excellent way to demonstrate the specific validity of implicit measures for the prediction of spontaneous behavior while simultaneously ruling out that this effect should be attributed to a general lack of behavioral validity of the corresponding explicit measure.

Results that show the validity of double dissociation models for implicit and explicit measures are rare (Asendorpf et al., 2002, Egloff & Schmukle, 2002; McConnell & Leibold, 2001). In contrast, more evidence was found for additive models that conceptualize implicit and explicit measures as explaining different portions of variance of a relevant criterion. This is true for studies that used personality self-concept measures (Back et al., 2008; Schnabel et al. 2006a; Schnabel, Banse, & Asendorpf, 2006b) as well as for studies that explored other domains in social psychology (Greenwald, Poehlman, Uhlmann, & Banaji, in press). On one

hand, the relatively scarce evidence for double dissociation models may be explained by the difficulty of finding adequate behavioral indicators for spontaneous and controlled behavior. Not only that behavioral observations are generally complex and costly, they take even more time and effort if different behavioral indicators need to be identified. On the other hand, the differences between implicit and explicit self-concept measures may be relative rather than absolute in nature. Associative and propositional processes are related to each other because propositions are generated on the basis of associative representations (Gawronski & Bodenhausen, 2006, 2007). Additionally, indicators of spontaneous behavior as well as measures of the implicit self-concept are not process pure and different implicit measures may vary in their extent to which they tap into associative or propositional processes (cf. Sections I and II of this volume).

Together, the results for implicit measures of the personality self-concept provide compelling evidence that implicit neuroticism and extraversion measures show incremental validity for the prediction of behavior over and above their corresponding explicit self-report measures (Back et al., 2008). In this context, the incremental validity that was found for implicit shyness measures (Asendorpf et al., 2002) may be explained by the fact that shyness is positively related to neuroticism and negatively related to extraversion. Importantly, no evidence was found for the hypothesis that a valence confound represents a threat to the validity of implicit self-concept measures (Back et al., 2008).

In a similar vein, other studies have shown the validity of IAT measures for the assessment of specific semantic content as distinct from a general evaluative dimension. For instance, Perkins and Forehand (2006) disentangled influences of semantic meaning and valence in self-concept IATs and revealed independent effects for both the positive and negative valence of personality describing attributes and their specific semantic meaning. Amodio and Devine (2006) separated stereotyping and evaluation effects in implicit race biases and used both stereotyping (mental versus physical) and evaluative (pleasant versus

unpleasant) race IATs. Their results showed discriminant behavioral validity for the stereotype and the attitude IAT. Concerning the incremental validity of implicit over and above explicit measures, the search for individual and situational factors that moderate the predictive validity of implicit and explicit measures represents another approach to explore their differential validity (Friese, Hofmann, & Schmitt, in press). Such moderators are discussed in more detail in the following section that deals with the prediction of behavior through implicit self-concept measures. Before that, we will take a brief look at how the self-concept is related to adult attachment.

The Role of the Implicit Self-Concept in Adult Attachment

The role of associative and propositional processes in interpersonal relations are extensively discussed by Baldwin, Lydon, McClure, and Etchison (this volume) elsewhere in this book. Here, we just point to two studies that deal with the role of the implicit self-concept or, more precisely, of implicit self-esteem in adult attachment. A study by Dewitte, De Houwer, and Buysse (2008) and a study by Zayas and Shoda (2005) explored the relationship between a *self-esteem IAT* and attachment variables. Whereas the self-esteem IAT in the study by Zayas and Shoda was not related to explicit measures of adult attachment styles, Dewitte and colleagues found meaningful correlations between a relational self-esteem IAT and adult attachment orientation. The relational self-esteem IAT aimed to assess relation-specific rather than global self-esteem and used 'relationally worthy' versus 'relationally worthless' as attribute categories and the corresponding attributes as stimuli (e.g., loved, liked versus inferior, rejected). The results showed a significant negative correlation of the relational self-esteem IAT with the preoccupied scale of the Relationship Questionnaire (RQ, Bartholomew & Horowitz, 1991) but no significant correlations with the other three RQ scales. This is only partially consistent with Bartholomew and Horowitz' (1991) attachment model, that deals with the correlations between self-esteem and attachment styles and postulates that preoccupied and fearful attachment are characterized by a negative evaluation of the self

whereas secure and dismissing attachment are characterized by a positive evaluation of the self.

Given that results for the correlations of implicit self-esteem with different attachment styles were somewhat mixed, more research is needed in order to elucidate these inconsistent findings. Further studies on the influences of associative processes on attachment orientation and behavior seem especially worthwhile, because many aspects of attachment behavior should operate in an impulsive way. Additionally, different attachment styles can be categorized along the dimensions attachment related anxiety and attachment related avoidance (Brennan, Clark, & Shaver, 1998), while at least for anxiety as a personality trait there is now compelling evidence for meaningful and significant implicit-explicit dissociations (cf. Back et al., 2008). Generally, further studies are needed that explore the effects of different attachment styles on behavior and that allow to examine the differential validity of implicit and explicit attachment measures for the prediction of behavior.

Moderators of the Predictive Validity of the Implicit and Explicit Self-Concept

The predictive validity of the implicit personality self-concept for the prediction of behavior has already been discussed in the previous section. In this section, we refer to situational and particularly to individual aspects that were shown to moderate the predictive validity of implicit and explicit self-concept measures. Recently, Friese, Hofmann, and Schmitt (in press) provided a comprehensive review over moderators that influence the predictive validity of implicit and explicit measures. The authors organized these moderators along two dimensions. The first dimension describes different determinants of moderation and distinguishes between moderators according to whether they influence the opportunity to control, the motivation to control, or the reliance on automatic or controlled processes. The second dimension describes different modes of functioning and categorizes the moderators of the first dimension according to whether they refer to an individual disposition, a situational factor, or the behavior itself. These moderators of the predictive validity of implicit and

explicit measures tell a great deal about the executive function of the self that was described as an important self-aspect by Baumeister (see above). Considering these moderators allows to draw specific conclusions about the preconditions and consequences of the self's ability to exert control over its actions.

The first two moderators of the first dimension, opportunity and motivation to control, were derived from dual-process models (e.g., Fazio, 1990). According to these models, the opportunity and motivation to control can change the relative influences of automatic and controlled processes on behavior. Because controlled processes are effortful, they will only influence behavior if the opportunity to engage in effortful information processing is given and if the person is motivated to do so. Without the opportunity or motivation for controlled information processing, automatic processes will have a larger impact.

However, opportunity and motivation to control are not the only determinants that influence the relative weight of controlled and automatic information processing in guiding behavior. Therefore, Friese and colleagues included a third determinant of moderation, process reliance, that describes the extent to which individuals rely on either automatic or controlled processes without any changes in opportunity and/or motivation to control behavior (cf. Bless & Schwarz, 1999). Examples of process reliance are reliance on one's intuition, on one's inner affective reactions, or on one's mood (Smith & DeCoster, 2000). The second dimension of Friese et al.'s classification scheme categorizes the determinants of the first dimension across different modes of functioning. This dimension distinguishes whether the moderators pertain to an individual disposition, a situational factor, or an actual behavior that may be more or less easy to control (cf. Asendorpf et al., 2002). In the following, we mainly focus on the dispositional moderators of the validity of implicit and explicit measures because they are most closely linked to the concept of self.

Dispositional moderators that reduce the opportunity to control behavior and that were explored in previous studies are low working memory capacity, low trait self-control, high

trait impulsivity and low control over nonverbal behavior. In a study by Hofmann, Gschwendner, Friese, Wiers, and Schmitt (2008, Study 1) that explored moderator effects of individual differences in *working memory capacity* (WMC), a Single Category Implicit Association Test (SC-IAT, Karpinski & Steinmann, 2006) was used in order to assess the attitude toward erotic pictures. The SC-IAT predicted viewing time of erotic pictures in a later task only for participants with low WMC but not for participants with high WMC. The opposite pattern was evident for an explicit attitude measure. Similar results emerged in a second study that predicted candy consumption by implicit and explicit attitudes towards candies. A third study was more closely related to self-concept measures and showed that an angriness self-concept IAT predicted negative social feedback to a provocateur after a mild provocation only for participants with low but not high WMC. In contrast, self-reported anger control had a buffering effect on negative social feedback only for participants with high but not low WMC. Similar results were obtained in studies that predicted alcohol and/or tobacco consumption by implicit and explicit measures (Grenard et al., 2008; Thush et al., 2008).

Friese and Hofmann (2008) employed a *trait self-control* scale (Tangney, Baumeister, Boone, 2004) and a *trait impulsivity* scale (Eysenck, Daum, Schugens, & Diehl, 1990) in order to explore moderator effects on the predictive validity of implicit and explicit measures. Whereas results for the trait impulsivity scale were rather mixed, the trait self-control scale moderated the predictive validity of implicit measures in several studies. One study used an SC-IAT in order to assess attitudes toward potato chips and revealed that the SC-IAT predicted potato chips consumption in a later taste-and-rate task better for participants with low trait self-control than for participants with high trait self-control. Two other studies replicated this finding for an SC-IAT and an Affect Misattribution Procedure (AMP, Payne, Cheng, Govorun, & Stewart, 2005) that predicted self-reported alcohol consumption for participants with low but not for participants with high trait self-control. Additionally, these effects remained significant when they were controlled for the influence of trait impulsivity.

In two studies that explored attitudes toward gays with a gay-heterosexual IAT, Dasgupta and Rivera (2006) also used self-report measures in order to assess the *control over nonverbal behavior* and the *motivation to be egalitarian*. Whereas control over nonverbal behavior was subsumed to dispositional moderators pertaining to the opportunity to control, motivation to be egalitarian was subsumed to dispositional moderators pertaining to the motivation to control behavior (Friese et al., in press). The results of the two studies by Dasgupta and Rivera (2006) revealed that the correlation between the gay-heterosexual IAT and negative nonverbal behavior was stronger for participants with both low motivation to be egalitarian and low behavioral control than for participants with low motivation to be egalitarian and high behavioral control. Among participants with high motivation to be egalitarian, implicit attitudes toward gays were uncorrelated with nonverbal behavior and this correlation was unaltered by high or low behavioral control.

In addition to the motivation to be egalitarian, *need for cognition* and *motivation to control prejudiced reactions* were conceptualized as further dispositional moderators pertaining to the motivation to control (Friese et al., in press). However, evidence for need for cognition as a moderator of the behavioral validity of implicit measures is rather mixed, and the moderating role of motivation to control prejudiced behavior has not yet been studied with respect to observed behavior. Therefore, we do not discuss these possible moderators in further detail.

Dispositional moderators pertaining to process reliance are (a) the *preference for intuition*, and (b) *chronic regulatory focus*. In a study by Hofmann and Baumert (in press), implicit attitudes toward moral stimuli were assessed with the AMP and participants also completed a preference for intuition measure. The AMP predicted whether an offer to split money in an unfair way between the participant and an ostensibly second participant was rejected for participants high in preference for intuition but not for participants low in preference for intuition.

Differences in chronic regulatory focus differentiate between whether individuals rather focus on the promotion of positive outcomes or on the prevention of negative outcomes (Higgins, 1998). Whereas a prevention focus is related to controlled information processing, a promotion focus fosters the reliance on automatic processes such affective responses. Notably, influences of different prevention and promotion focus appear independently from different motivations to control (Pham & Avnet, 2004). Influences of chronic regulatory focus on the predictive validity of implicit measures have not yet been studied with regard to real behavior. However, these influences may be an interesting subject for further studies.

Together, the two dimensions by Friese et al. (in press) offer an excellent opportunity to organize different moderators of the predictive validity of implicit measures with regard to their influences on automatic versus controlled information processing. Nevertheless, especially with respect to dispositional moderators, more research is needed that explores the independence and differential validity of these moderators. For instance, Levesque and Brown (2007) explored mindfulness as a dispositional moderator of the validity of an autonomy self-concept IAT. Results showed that implicit autonomy orientation predicted self-reported day-to-day levels of experienced autonomy only for participants low in dispositional mindfulness. Participants high in dispositional mindfulness reported more autonomously motivated behavior independent from their implicit autonomy orientation. Importantly, this moderator effect was specific for dispositional mindfulness and did not appear for dispositional self-consciousness or self-reflection. Thus, the pre-reflexive awareness of inner states and actual behavior that is specific for dispositional mindfulness seemed to be crucial for this moderator effect.

As another moderator of the behavioral validity of implicit measures, Gschwendner, Hofmann, and Schmitt (2008a) explored the *correspondence* between different implicit and explicit anxiety measures and anxious behavior. More precisely, these authors varied the content similarity (spider versus speech anxiety) and specificity similarity (general versus

situation-specific anxiety) of implicit and explicit anxiety measures and explored their predictive validity for the prediction of anxious behavior during a stressful speech. For each participant, three different types of implicit and explicit anxiety were measured: general anxiety, speech anxiety, and spider anxiety. The general anxiety IAT assessed associations between 'self' versus 'other' as target concepts and between 'anxiety' versus 'calmness' as attribute concepts. The speech IAT and the spider IAT used the identical attribute concepts but used 'public speech' versus 'take-home exams' and 'spider' versus 'butterflies' as target concepts, respectively. As explicit measures, questionnaires were used that assessed these different types of anxiety.

The results showed that correlations between implicit and explicit anxiety measures were significant only when their content and their specificity level were equal. Additionally, confirmatory factor analyses corroborated this finding and revealed best model fit for a model that conceptualized different factors for implicit and explicit measures within each of the three types of anxiety, resulting in six latent anxiety factors. Of the two variants of this model that were tested, the model that allowed for correlations between implicit and explicit measures only within the three types of anxiety showed better model fit than the model that allowed for implicit-explicit correlations across different anxiety types.

With respect to the effects of specificity similarity and content similarity on the predictive validity of implicit and explicit anxiety measures, Gschwendner et al. (2008a) regressed latent speech anxiety behavior on the six latent anxiety factors that were previously determined. Latent speech-anxiety behavior was estimated by four different behavioral indicators of speech-anxiety (speech dysfluency, overall impression, eye contact, and speech duration). Results showed that only implicit and explicit speech anxiety predicted speech anxiety behavior, whereas general anxiety and specific spider anxiety did not contribute significantly to the prediction of behavior. Notably, implicit and explicit speech anxiety measures predicted unique variance portions and contributed independently to the prediction

of speech anxiety behavior. In sum, the study by Gschwendner and colleagues highlights the important role of correspondence between implicit and explicit measures and relevant behavioral criteria for the behavioral validity of these measures.

<center>Stability of the Implicit Self-Concept</center>

A necessary precondition for the assessment of individual differences with implicit and explicit measures is, apart from their internal consistency, sufficient temporal stability (test-retest reliability). For IAT measures, test-retest reliabilities have been observed to be considerably lower than their internal consistencies in several studies. A meta-analysis by Hofmann and colleagues (2005) showed high internal consistencies for different IAT measures with an average of .79 and much lower test-retest reliabilities with an average of .51. Similar results were obtained by Nosek, Greenwald, and Banaji (2006) for different IAT measures that showed a median test-retest reliability of .56. For an anxiety IAT, Egloff, Schwerdtfeger, and Schmukle (2005) report test-retest reliabilities that ranged from .62 (2-week interval) to .47 (1-year interval). Attempts that tried to separate enduring individual differences and systematic situation-specific effects on IAT measures showed that IATs capture both reliable trait-specific and situation-specific variation (Schmukle & Egloff, 2005; Steffens & Buchner, 2003).

Two studies by Gschwendner, Hofmann, and Schmitt (2008b) aimed to identify one situation-specific (contextual constraints) and one individual-specific (chronic accessibility) influence on the stability of IAT measures. Study 1 used different versions of an anxiety IAT and revealed higher test-retest reliabilities for IAT versions that embedded the IAT stimuli in an anxiety-relevant context (background pictures of a snake or an injection) than for IATs that used an anxiety-neutral context (background picture of a park bench). Study 2 replicated this finding for an IAT that assessed racial attitudes toward Turks and Germans. Again, test-retest correlations were higher for the IAT that used an attitude-relevant (mosque) rather than an attitude irrelevant (garden) background picture. Additionally, this context effect was

moderated by individual differences in chronic accessibility of the relevant concept (i.e.

Turks) as assessed by a lexical decision task. In the group that completed the IAT with the

context-relevant background picture, test-retest correlations were especially high for

participants with high chronic accessibility as compared to participants with low chronic

accessibility of the relevant concept.

With respect to the moderator effect of the chronic accessibility variable, more studies

are needed that replicate this double interaction effect. This is especially important because

chronic accessibility as an individual-specific effect failed to be a significant moderator in

Study 1 by Gschwendner et al. (2008b). Additionally, the sample sizes in their Study 2 where

quite small, and internal consistency of the chronic accessibility measure was only .45 and

rather unsatisfactory. Also, further studies may explore whether variants of the original IAT

procedure are less affected by the problem of relatively low test-retest reliability. For instance,

there are now two new IAT variants that avoid effects of different block order on IAT scores

by simultaneously testing different associations within one single IAT block (Bar-Anan,

Nosek, & Vianello, in press; Teige-Mocigemba et al., 2008). Effects of different block order,

however, may be the reason why standard IATs show a systematic attenuation in effect size

from first to subsequent administrations (Greenwald, Nosek, & Banaji, 2003). The decrease of

IAT effect size may be attributed to the fact that the block order that produces the biggest IAT

effect, that is, compatible block first and incompatible block second, is less effective in the

IAT retest, because participants then always have at least some experience with the

incompatible block. Because these variations between test and retest seem to be sidestepped

by new IAT variants, their test-retest reliabilities may achieve levels that are more satisfactory

than those of traditional IATs.

Several studies explored contextual effects on the implicit self-concept and also dealt

with possible long term effects on the formation of the implicit self-concept. A study by

Uhlmann and Swanson (2004) revealed that participants who played a violent video game for

ten minutes associated themselves more with aggressive traits in a self-concept IAT whereas they did not rate themselves as more aggressive on explicit measures. In contrast, both implicit and explicit aggressiveness measures were significantly and independently correlated with self-reported prior exposure to violent video games. Together, these results suggest short term effects of violent media on implicit measures and long term effects on both implicit and explicit measures and indicate that influences on the two measures may be exerted independently from each other. However, due to the cross-sectional design of the study, direction of causality is not clear for the relation between self-reported prior exposure to violent video games and levels of implicit and explicit aggressiveness. Thus, it may also be the case that participants with high scores in implicit and explicit aggressiveness are more interested in and tend to play more violent video games.

Results of Study 1 by Devos, Viera, Diaz, and Dunn's (2007) showed that female participants associated themselves less with college education, if motherhood cues rather than neutral cues were used as task-irrelevant background stimuli within the association task. Whereas this rather subtle manipulation produced assimilation effects in the way that participants assimilated their implicit self-concept to the background stimuli, contrast effects were evident in Study 2 after a rather blatant activation of the motherhood or the academic education concept. When participants had to deliberately reflect on their aspirations to become a college graduate their implicit academic identification was weaker than when they had to reflect on their aspirations to become a mother. This contrast effect was explained by the authors' assumption that deliberately thinking about one's aspirations for academic achievement also activates self-representations that are in conflict with these aspirations. As a consequence, participants might have felt that academic achievement is not the ultimate goal in their life and the experience of such conflicting thoughts might have undermined their implicit academic identification. Interestingly, explicit identification with college education or motherhood was not affected by whether participants had to reflect about their aspirations to

became a college graduate or a mother. In a similar vein, a study by Devos, Viera, Diaz, and Dunn (2007) revealed that students with children showed stronger explicit and implicit motherhood identification than students without children. Due to the cross-sectional design of this study it is however impossible to identify whether increased motherhood identification evolved as a consequence of the situational influences or rather represents a reason why these participants became mothers.

Contrast-like effects were also found in a study by McCall and Dasgupta (2007) that showed that male participants associated themselves stronger with stereotypically male attributes representing power and authority if they were in a subordinate rather than a superior role play position. This compensatory effect was explained as the males' attempt to protect against the threat to their self-concept that was caused by the subordinate position. Interestingly, this effect of different status was not evident in the explicit self-concept measure where male participants generally described themselves as agentic and authoritative independent from whether they were in a subordinate or a superior role. However, authoritative and masculine self-stereotyping on the explicit measure was more pronounced when male participants interacted with a female rather than a male interaction partner. Thus, whereas a threat to the gender self-concept elicited automatic compensatory responses with respect to the implicit self-concept, salience of gender evoked more gender stereotypic self-descriptions with respect to the explicit self-concept.

In contrast, assimilation effects were evident in a study by Haines and Kray (2005). Their results revealed that female participants showed stronger self-power associations and higher explicit self-ratings of power if they were assigned to the leading group rather than the inferior group of a group game. Additionally, female participants showed stronger self-masculine associations if they were assigned to the more powerful recruiter role rather than the less powerful applicant role in a simulated job interview. However, assignment of different roles did not affect explicit self-associations with masculinity. Another study showed

that a group-based cognitive-behavioral treatment was able to decrease implicit and explicit anxiety scores in a group of socially anxious participants (Gamer, Schmukle, Luka-Krausgrill, & Egloff, in press).

In several studies, Pöhlmann and Hannover (2006) explored effects of the independent versus the interdependent self on implicit liking of close friends and family members. Whereas the interdependent self is oriented towards social relations of which the person is part, the independent self is concerned about being separate and different from others. Interestingly, the results revealed that both interdependents and independents showed implicit preference of close others in a name letter task if their respective chronic self was primed. Thus, preference of close others in the name letter task appeared only if the independent self of independents or the interdependent self of interdependents was activated by a preceding priming task. Additionally, only interdependents but not independents showed a name letter effect for the name of their mother but also only if their interdependent self was primed. These results make evident that effects of the implicit self may depend on whether the specific content of the self-concept is made accessible by situational cues or not.

These results on contextual influences make evident that more research is necessary that deals with long-term effects of situational influences on implicit and explicit self-representations. We need to know much more about the formation of the implicit self-concept and about how the accumulation of social experiences crystallizes in implicit and explicit self-representations. The cited studies show that the implicit self-concept can be susceptible already to slight contextual changes that do not have any visible effects on the explicit self-concept. A study by Schmukle, Liesenfeld, Back, and Egloff (2007) indicates possible long-term effects of early developmental influences on the implicit but not on the explicit self-concept. The study explored correlations of individual differences in the ratio of index finger length and ring finger length (2D:4D) with the implicit and explicit gender self-concept. Results showed that, at least for men, 2D:4D ratios correlated with the implicit gender self-

concept, such that men with smaller 2D:4D ratios had a more masculine implicit gender self-concept. In contrast, the explicit gender self-concept showed only weak correlations with 2D:4D ratios for both men and women. Because 2D:4D rations are considered to be a marker of prenatal androgen and estrogen levels, these results suggest that the implicit gender self-concept of men is more greatly influenced by early developmental events than the explicit gender self-concept. Similarly, future research should explore how early social and educational influences affect the implicit and explicit self-concept. Possible influences on both the explicit and the implicit self-concept may be moderated by whether they are self-relevant or self-irrelevant (cf. Pöhlmann & Hannover, 2006). Early developmental influences may play an important role, because they should be crucial in establishing relevant and more irrelevant aspects of the self.

<div style="text-align:center">Conclusion</div>

This chapter illustrates how multi-faceted the self-concept and the research that deals with it are. Whereas self-concept research some 25 years ago was rather theoretical but integrated various developmental and motivational aspects (Greenwald & Pratkanis, 1984), it became more data-driven but less theory-oriented over time. The development of reliable implicit measurement procedures such as the IATs added a new and exciting dimension to the study of the self-concept that began to stimulate new theoretical models that allow to describe and explain differences between implicit and explicit measurement procedures (e.g., Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). This recent research has added new evidence that associative information processes influence human behavior in many and effective ways, and this applies also to the associations within the concept of self. It is one of the great adventures of our time that new measurement methods allow us to open new windows to hardly consciously accessible processes that influence our behavior and that were a largely unexplored terrain before.

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