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Temporal Self-Extension: Implications for Temporal Comparison and Autobiographical Memory

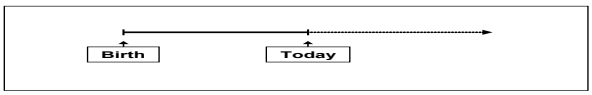
***Abstract**: Research on temporal comparison has shown that people dissociate themselves from their past to attain a positive self view. Social comparison research has demonstrated that the distinctness of contextually activated information determines whether a recalled self exerts assimilation or contrast effects on the current self. However, hardly any study addressed individual differences. Also, very little is known about whether the ease or difficulty to date past events and experiences influences current self-judgments. We present a new scale capturing the degree of the current self time extension. Three studies support the notion that temporal self-extension determines how past selves are accessed and processed, regarding both the abstractness with which self-knowledge is retrieved and the experienced temporal distance to the past. These findings have important implications for temporal as well as social comparison processes.*

***Key words:** Temporal Comparison, Self, Temporal Distance, Visual Perspectives*

This paper addresses the subjective sense of the self extended in time. More specifically, we develop a measure of temporal self-extension that captures the extent to which the current self stretches into the personal past. *Temporal self-extension* is thus regarded as an individual difference variable. By temporal self-extension, we refer to the degree to which the current self ("who I am") is experienced either as temporally extended or bounded (i.e. "How long have I been what I am now?"). Although we conceive temporal self-extension primarily as a meta-cognitive judgment about the self, the impression that the self as it appears now has a long or brief history should also be affected by experiential information (e.g. emotions, bodily sensations, ease of retrieval, etc.). We aim to show here that temporal self-extension has important implications for temporal comparison processes and other memory-related phenomena.

The temporal self-extension measure employed in the present studies consisted of three scales. First, we asked participants to place a mark on a continuous line with the endpoints labeled *birth* and *today* (see Figure 1) to indicate how long they had perceived themselves to be as they were now ("Please consider your current self, how you currently perceive and understand yourself").

Figure 1. Graphical scale used to assess temporal self-extension.



Second, participants indicated how long they had held these representations of their current selves (1 = *for a very short time*; 7 = *always*), and third, how much their current self-perception dated back into the past (1 = *just a little bit*; 7 = *very much indeed*). We propose a simple two-step model, similar to Ross and Conway's (1986) model of personal memory. At the first step, people retrieve general self-knowledge. At the second step, they use this activated self-knowledge to determine whether and when their current images of the self changed. We believe then that people review their personal past and search for thematic or phenomenal boundaries. This process should be sensitive to information accessible at the time the judgment is being made. However, all else being equal, people should also chronically differ in how far their current self subjectively reaches into the past. The model of personal memory (Ross,

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1989; Ross & Conway, 1986) posits that people infer their past standing on a personal attribute (e.g. social skills) through a two-step process. First, they assess their current standing on the attribute to be recalled. Second, they consult their naïve, attribute-related theories about how their current standing may or may not differ from their past standing. According to this model, the extent to which memories of past attributes are distorted hinge on the accuracy of people's beliefs about how particular attributes or features will passively develop over time (cf. McFarland, Ross, & Giltrow, 1992). If attributes are believed to be stable, the past will be recalled consistent with one's current standing. That research has also revealed a tendency to derogate the past when one wants to see one's current self positively. Moreover, remote past selves are more likely to be derogated than recent past selves (Ross & Wilson, 2002; Wilson & Ross, 2001). Unlike Ross and colleagues, however, we do not focus either on particular attributes or on implicit theories of change. Temporal self-extension is likely to be influenced by multiple factors, some of which will be discussed below. However, temporal self-extension is conceived as a non-evaluative judgment of the self in time, even though self-enhancement motivation may to some extent influence perceived temporal self-extension. There should be a positive, albeit weak, relation between derogations of past selves and the temporal extension of the current self. This relation should be weak because there are many sources of temporal self-extension, above and beyond the desire to gain a positive view of the current self.

Some basic findings in the literature on autobiographical memory seem relevant for a better understanding of the concept of temporal self-extension. Research on autobiographical memory shows that approximately at the age of 2 children begin to understand that they themselves are "entities" distinct from the surrounding world as they develop the so called *cognitive self* (Howe & Courage, 1997). One's cognitive self is a specific knowledge structure organizing memories of what has happened to oneself. Thus, this may be considered to be the starting point of one's autobiographical memory, though its first symptoms may be traced as early as at the age of 18 months (cf. Reese, 2002), i.e. when children address their own past in very simple two-word utterances. However, it is usually approximately at the age of 3 when children develop the ability to relate memories to their own selves (e.g. Barclay, 1996; Perner, 2000; Welch-Ross, 2001). One's sense of temporal self-extension might also first occur at that age because very few, if any, memories are available from the period before one was 3 years old (the so-called infantile amnesia, cf. Rubin & Schulkind, 1997).

The other changes occurring with age in the functioning of one's autobiographical memory, i.e. the recency effect and the reminiscence bump (Piolino, Desganges, Benali, & Eustache, 2002), might also be related to one's sense of temporal self-extension. The recency effect (resulting from the retention function) is the recollection of events in the first 20 to 30 most recent years of one's life. The reminiscence bump, occurring approximately after the age of 40, is characterized by a rise in the retrieval of memories dating from the period starting when one was about 15-16 years old, and ending when one was about 30-35. Additionally, younger adults' memories are more episodic (i.e. they pertain to what the people really experienced) as compared to those of older adults whose memories become more semantic, i.e. deprived of the specific temporal and spatial context, consisting more of general information than specific details of a particular event or time, (cf. Piolino et al., 2002, for detailed reviews on autobiographical memory in the lifespan see e.g.: Conway, 2005; Conway & Pleydell-Pearce, 2000; Draaisma, 2006; Maruszewski, 2005; Williams, Conway, & Cohen, 2008). For younger adults then, the recency effect might result in a self temporally more extended as compared to that of older adults. What one experienced 10, 15 or even 20 years before may subjectively feel totally different depending on one's age. To younger adults, even though that period may actually encompass almost their entire life, the memories, being episodic rather than semantic, i.e. still "fresh" and "lively", probably bear on their current selves. The same recent period usually feels much shorter to older adults (cf. Draaisma, 2006) and although their memories may also bear on their current selves, the subjectively perceived brevity of the period may contribute to the personal sense of limited temporal self-extension. As for the reminiscence bump and its relation to one's sense of temporal self-extension, it might seem that older adults, easily retrieving memories from the period when they were young, should feel close to that period, which could result in extension of their current selves. However, as the memories are usually semantic rather than episodic (see above), they can hardly be thought to still bear on the people's lives, which should not contribute to their sense of temporal self-extension.

The exact character of the relation between autobiographical memory and one's temporal self-extension in the lifespan, however, remains speculative. Previous studies provide merely indirect and incomplete evidence as they offer no clear and unambiguous answer to crucial questions such as: Whether or not one's temporal self-extension determines the functioning of one's autobiographical memory at various life stages, or whether the memory affects one's sense of temporal self-extension, or, alternatively, whether the influence is mutual. Bluck and Alea (2008, 2009), for example, have merely observed that younger adults use autobiographical memory to form a sense of self-continuity more often than other age groups (see also: McLean & Lilgendahl, 2008, Rice & Pasupathi, 2010; Webster, 1995). These results are consistent with the task that is developmentally ascribed to the younger adulthood, namely that of exploring and consolidating one's sense of self and thus creating a clear and coherent identity (Erickson, 1968, 1980; Habermas & Bluck, 2000; McAdams, 1999). Bluck and Alea (2008, 2009) posit, however, that it is not necessarily being young *per se* that prompts the use of autobiographical memory for the self function more often by this age group. The researchers point to younger adults' lower levels of self-concept clarity that should explain, at least partially, the relation. Bluck and Alea emphasize that self understanding and identity clarification

is particularly needed at that point in the lifespan, and that autobiographical memory meets this demand in a very functional way.

Apart from the research on autobiographical memory, some basic findings in the literature on temporal comparison seem also relevant for a better understanding of the concept of temporal self-extension Theories of social comparison address the role accessible information plays in the construction of judgments (see Schwarz & Bless, 2007 for a review). A central tenet of these models is that the same contextually accessible information can produce assimilation or contrast effects on the target category (cf. Blanton, 2001; Mussweiler, 2003; Schwarz & Strack, 1991). Thus, the effect that the recalled self-knowledge (i.e. past selves) exerts on the current self depends on whether past selves are included in or excluded from mental representations of the current self. Contrast effects require that past selves are separate and distinct and thus no longer representative of the present self. In addition, contrast effects become more likely the more distant the past appears (Beike & Niedenthal, 1998; Broemer, Grabowski, Gebauer, Ermel, & Diehl, 2008; Gebauer, Broemer, Haddock, & von Hecker, 2008). On the other hand, information that is included in the representation of the target category is likely to yield an assimilation effect. In support of this notion, Strack, Schwarz, and Gschneidinger (1985) showed that a recalled self produced an assimilation effect when it was seen as still being representative of one's current living conditions. Conversely, a past self produced a contrast effect when it was seen as no longer pertaining to the current self.

A second factor that determines whether a given piece of information exerts an assimilation effect on the target is the internal heterogeneity of the target category. A given piece of information is more likely to be included in heterogeneous than in homogeneous representations of the target (Schwarz & Bless, 1992, 2007). Thus, for assimilation effects to occur, there must be room in one's self-view for inclusion. This is more likely to be the case when the self is perceived as mutable (unclear) rather than as a fixed (clear) entity. Self-concept clarity has been defined as the degree to which a self-concept is clearly and confidently defined (i.e. the degree to which one knows who one is), appears internally consistent (i.e. whether people behave similarly across different occasions), and temporally stable (Campbell, Trapnell, Heine, Katz, Lavallee, & Lehman, 1996).

Taken together, studies on temporal comparison processes suggest that the self should be perceived as more extended in time if recalled past selves are included in mental representations of the current self. Assimilation is more likely when people hold an unclear or heterogeneous representation of their current self. On the other hand, the current self should be perceived as relatively bound or narrow when it is contrasted away from recalled past selves. In our view, however, temporal self-extension is unlikely to co-vary with the impression that the self can be clearly and confidently defined. And the self can be clearly and confidently defined even though people emphasize recent developments and changes. Despite the discontinuity, the self is still experienced as the same person, even if one has changed one's preferences several times. Moreover, a clear and confident self-definition may include the awareness that one is unreliable, moody, and volatile. Furthermore, a temporally extended self need not inevitably be more heterogeneous than a temporally narrowed self, although the passage of time implies that an individual makes different experiences. Moreover, the clarity or *strength* of perceived boundaries between the current self and former lifetime periods (or past selves) should be similar for temporally extended or narrowed selves. In other words, even if the current self is perceived as temporally extended, past events or experiences that no longer bear on the current self are perceived as distinct and separate from the self. However, temporal self-extension should determine judgmental effects in terms of assimilation and contrast when it is difficult or impossible to date past events or experiences. If it is uncertain when a particular event occurred in the past or if a past self is temporally fuzzy or indistinct (i.e. its boundaries are difficult to identify), recall is more likely to yield assimilation effects the more extended the current self is. This hypothesis will be addressed in two studies.

Temporal self-extension should influence how people recall their personal past. Recalled events should be perceived as temporally closer to the present the more extended in time the current self is. This prediction, however, only applies to temporally unfocused events. What we mean by unfocused events is that people do not know the particular point in time when an event occurred (cf. Madey & Gilovich, 1993, for future expectations). Moreover, the recall of temporally unfocused events should evoke more abstract or general memories the more extended the current self is in time. Temporal self-extension should thus determine whether people conjure up abstract or concrete representations of a past self when it is relatively difficult to exactly date a past self. These predictions are consistent with findings from two lines of research. On the one hand, events that are more distant in the past have been shown to elicit the use of more abstract terms than more recent events (Semin & Smith, 1999). Moreover, people search for representative information about themselves when defining themselves and thus recall general rather than specific memories. General memories are relatively abstract and represent repeated or interrelated events over a period of time (Conway & Pleydell-Pearce, 2000; cf. Klein, Loftus, & Sherman, 1993, Sherman & Klein, 1994).

Studies on visual perspectives in memory revealed that people recall more remote behavioral scenes from the perspective of an external observer and thus view past behaviors as determined by relatively stable, internal causes (Frank & Gilovich, 1989). More recent behavioral scenes, however, tend to be recalled by adopting an actor-like perspective in memory. Past behaviors or events that are recalled from an actor-like perspective are perceived as temporally closer to the present than past behaviors or events that are recalled from an observer-like perspective, presumably because internal thoughts and feelings are more salient when people adopt an actor-like visual perspective on those memories (Broemer et al., 2008; Nigro & Neisser,

1983; Sanitioso, 2008). Consistent with these findings, we expect temporal self-extension to determine how close temporally unfocused memories appear and how abstract or schematic self-relevant memories are when they are retrieved.

Overview of the Studies

In Study 1, we investigated the convergent validity of a newly developed scale to assess temporal self-extension. In the next three studies, we tested whether individual differences in temporal self-extension determine how people access and process information about the self in time. In Study 2, participants were to recall a past self that was temporally unfocused (3-5 years ago). Thus, there was considerable leeway regarding actual and subjective temporal distance to the past. Under these circumstances, temporal self-extension should determine how one accesses one's past self. Previous studies on attribution processes in memory revealed that more distant events are recalled in more abstract terms because perceivers take an observer-like perspective (Frank & Gilovich, 1989; Nigro & Neisser, 1983; Pronin & Ross, 2006; Semin & Smith, 1999). Individuals with narrowly defined current selves were thus expected to recall their past selves in relatively abstract terms, whereas those with relatively extended current selves were expected to recall the past selves in more concrete terms. In Study 3, the role of a temporally focused versus unfocused past self was tested more directly. Participants recalled a past self that was not specified by contextual features. Dating that self was either difficult or easy to accomplish. We expected temporal self-extension to be particularly influential when the past self was difficult to date. In Study 4, participants recalled either a temporally distinct or indistinct past self. Similarly as in Study 3, we expected temporal self-extension to determine how people access and process information about a past self. If the past self is temporally unfocused or indistinct, temporal self-extension should exert its effects on current self-judgments through its influence on subjective distance as well as the perspective people take during recall. Support for these predictions would essentially extend previous findings.

STUDY 1

In this study, we sought to attest the convergent validity of a newly developed Temporal Self-Extension Scale (TSES). We expect one's current self to be perceived as relatively extended when one tries to understand it by recollecting past events and experiences. Moreover, self-extension should, to some extent at least, reflect the desire both to connect a cheerless present with a better past and to leave a negative past behind. However, temporal self-extension is not assumed to primarily reflect the motivation to see the current self positively. Moreover, both one's heightened attentiveness toward the past and reflection do not necessarily imply that one views one's self as temporally extended. Still, people who possess a clearly and confidently defined self-view or who view their life as meaningful may perceive their self as more authentic and thus probably also more durable. Thus, modest relationships between temporal self-extension, epistemic concerns, and mutability of the self should be obtained.

Method

The sample consisted of 224 participants who completed a set of personality scales. The mean age of the participants was 25.7 years (SD = 6.23). The study was conducted online. Most participants were female (71%) and had German nationality (76%). The language of the study was German. Participants first completed a 3-item measure of temporal self-extension. The first item was a graphical scale (see Figure 1) on which participants marked how long they had perceived themselves to be as they were now ("Please consider your current self, how you currently perceive and understand yourself"). In addition, they indicated on 7-point scales (1 = *for a very short time/ just a little bit*; 7 = *always/ very much indeed*) "How long have you held this image of your current self?" and "How much does your current self date back into the past?". Higher scores indicate greater temporal self-extension (Cronbach's α = .91). The distribution of the first item (markers on the solid 50 mm line, see Figure 1) was positively skewed, with mostly narrow and relatively fewer extended views. Therefore, scores on the three items were logarithmically transformed. The distribution of the transformed scores was normal (kurtosis: -.45; skewness -.33). After completing the TSES, participants were given, in a randomized order, several scales seizing particular functions of autobiographical remembering: The self-continuity subscale of the Thinking About Life Experiences scale (TALE, Bluck, Alea, Habermas, & Rubin, 2005), the Nostalgic Inventory (Batcho, 1995), two subscales of the Zimbardo Time Perspective Inventory (ZTPI, Zimbardo & Boyd, 1999), and the Southampton Nostalgia Scale (Routledge, Arndt, Sedikides, & Wildschut, 2008). The self-continuity scale (Bluck et al., 2005) measures the frequency of autobiographical remembering to determine whether one is still the same person as earlier in life. The Nostalgic Inventory (Batcho, 1995) assesses the extent to which people wish certain aspects of their past were still present and regret what seems to have been irredeemably lost (e.g. "someone I loved"). The past-negative scale (Zimbardo & Boyd, 1999) reflects a pessimistic, negative attitude toward the past (e.g. "The past has too many unpleasant memories I prefer not to think about"). The past-positive scale reflects a nostalgic, positive construction of the past (e.g. "I like family rituals and traditions that are regularly repeated"). The Southampton Nostalgia Scale (Routledge et al., 2008) captures the propensity to think positively about the past (e.g. "How prone are you to feeling nostalgic?"). We expect temporal self-extension to show positive but modest relationships with the self-continuity scale (Bluck et al., 2005), nostalgia proneness (Routledge et al., 2005), and the positive-past subscale of the ZTPI (Zimbardo & Boyd, 1999). Temporal self-extension should be negatively related to scores on the Nostalgic Inventory (Batcho, 1995) and the negative-past subscale of the ZTPI.

Furthermore, we assessed several personality factors that we assumed would relate to temporal self-extension: Self-concept clarity (Campbell et al., 1996), reflective thinking style (Trapnell & Campbell, 1999), and meaning in life (Crumbaugh & Maholick, 1964; cf. King & Hicks, 2007; Ryan & Deci, 2001). Self-concept clarity refers to the degree to which people have a clear sense of who they are. This impression involves three related aspects: internal consistency, confidence about who one is, and temporal persistence. According to Trapnell and Campbell (1999), a reflective thinking style refers to "self-attentiveness motivated by curiosity or epistemic interest in the self" (p. 297; e.g. "I often love to look at my life in philosophical ways"). Finally, meaning in life reflects to a large extent the pursuit of meaningful endeavors associated with core values or authentic self (e.g. "My personal existence is very purposeful and meaningful"). We expect temporal self-extension to be positively but modestly related to self-concept clarity, reflective thinking, and meaning in life.

Results and Discussion

Table 1 presents the correlations between the newly developed 3-item measure of temporal self-extension (TSES) and the other personality factors. As can be seen, the scales were sufficiently reliable. The third column shows significant relations between TSES and the scales that were administered to attest the convergent validity of the TSES, with the exception of reflective thinking style (Trapnell & Campbell, 1999).

As expected, positive but modest relations were obtained with respect to self-continuity, positive attitudes toward the past, nostalgia proneness (SNS), self-concept clarity, and meaning in life. These scales represent different concepts, with an emphasis on either epistemic concerns (Self-Continuity, Self-Concept Clarity) or the desire to see one's life as positive and meaningful (Nostalgia Proneness, Meaning in Life). Accordingly, negative relations were obtained between scores on the TSES, the tendency to miss certain aspects of the past (Nostalgic Inventory) and to view the past as negative (ZTPI). It seems contradictory that the two measures of nostalgia were differently related to TSES. Note however, that Nostalgia Proneness (Routledge et al., 2008) captures the propensity to think positively about the past, whereas the Nostalgic Inventory (Batcho, 1995) assesses a tendency to wish certain aspects of the past were not gone and to regret what has been lost. Although speculative, we believe that people miss aspects of their past more when they view the past as irredeemably lost. In other words, the more narrowly the current self is defined, the more past events or experiences seem as pertaining to a former lifetime period that is clearly distinct from one's life now. To examine the predictive power of each scale, a multiple regression analysis was conducted, in which scores on the TSES were regressed simultaneously on the personality scales. In this analysis, nostalgia (Nostalgic Inventory) and Meaning in Life were no longer predictive of temporal self-extension. The standardized beta-coefficients are shown in the last column of Table 1. Taken together, the TSES is a reliable and valid measure of temporal self-extension that is brief and easy to administer.

STUDY 2

In this study, we tested whether people who perceive their current self as temporally extended would recall information pertaining to a temporally unfocused past self in more concrete terms than people who perceive their current self as relatively bounded. To test this hypothesis, participants were to recall a life scene that had happened 3-5 years earlier. This period of time was kept relatively indistinct, and the instruction left it unspecified whether the recalled scenes should pertain to a former life-time period or may still bear on participants' life now. Studies on personal memories have shown that, with the passage of time, memories tend to be organized as schematic representations (e.g. Conway & Pleyell-Pearce, 2000; Frank & Gilovich, 1989; Reiser, Black, & Abelson, 1985). What seems to be particularly important, subjective temporal distance to the past has a similar effect to objective calendar time (Broemer et al., 2008; Herzog, Hansen, & Wänke, 2007). As we expected temporal self-extension to moderate subjective distance to temporally unfocused past events, we chose a period of time (3-5 years) that seemed to be

Table 1. Regression Analysis Predicting Temporal Self-Extension, Study 1

	No. of items	α	simple *r*	β
Scale				
Self-Continuity (SCS)	4	.78	.36***	.21**
Nostalgic Inventory (NI)	18	.80	-.33***	-.12
Positive Past (ZTPI)	10	.86	.35***	.25**
Negative Past (ZTPI)	7	.85	-.26***	-.14*
Nostalgia Proneness (SNS)	5	.78	.30***	.25**
Self-Concept Clarity (SCC)	12	.91	.41***	.31***
Reflection (RRQ)	12	.87	.11	.03
Meaning in Life (PL)	4	.82	. 20**	.12

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

sufficiently indistinct in this respect. To avoid a confound between temporal distance and the abstractness of personal memories, participants either recalled relatively abstract information about their past self or relatively concrete information.

Half the participants were to recall their past self in terms of self-descriptive traits, whereas the other half were to recall concrete behaviors. Thus, these particular memories were activated in memory. Nonetheless, we expected that people with a temporally extended self would be faster to indicate whether some concrete information (e.g. a behavior) is characteristic of their past self, whereas participants with a narrowly defined self would be faster to indicate whether some abstract information (e.g. a trait) is characteristic of their past self.

Method

Participants and design

The participants were 92 university students (36 women and 56 men; mean age = 22.4 years). Participants were assigned to one of the two conditions (level of abstractness: abstract, concrete). Gender did not interact with the independent variable and was thus not included as an additional factor.

Procedure and measures

Participants completed the experiment in groups of 3-4. The experiment was conducted on laptops for stimulus presentation and for recording response latencies. Participants were led to believe that they would be participating in two unrelated studies, the first about self-awareness and the second about memory accuracy. They were first asked to complete a personality questionnaire. Amongst these items, the TSES was interspersed (Cronbach's α = .88). Participants were then asked to generate a detailed visual imagery of their life 3-5 years earlier. They were instructed to close their eyes and to visualize in a manner as detailed as possible this former life scene. We adopted a procedure used by Walton and Banaji (2004) to manipulate the abstractness of self-perceptions. Participants in the Study by Walton and Banaji (2004; Study 2) completed blanks in two types of self-descriptive sentences that featured either a noun label (e.g. "I am a night person") or descriptive actions verbs (e.g. "I stay up late"). Self-perceptions were judged as more stable, resilient, and stronger when sentences featured nouns rather than action verbs. In the present study, participants were to recall at least 8 traits descriptive of their past self or 8 distinct behaviors that they repeatedly enacted at that time. Traits and behaviors were recalled using an open-ended format. For this purpose, a box was presented on the screen that was headed either with "At that time, I was …" or "At that time, I … a lot". Participants were reminded to recall distinct, non-redundant traits or behaviors.

For each trait/behavior, participants indicated the perspective they had taken while recalling the life scene (cf. Libby, Eibach, & Gilovich, 2005; Pronin & Ross, 2006). The endpoints of the 7-point scale were labeled "*first*-person perspective" (1) and "*third*-person perspective" (7). These two different perspectives were defined to participants (first-person perspective: "You recall the scene from your original point of view. You were looking at the scene through your own eyes"; third-person perspective: "You saw the scene as an observer. You were looking at the scene through the eyes of an observer").

After completing some filler items, participants were then presented either a list of 24 traits or a list of 24 behaviors. Traits and behaviors the participants had recalled themselves were randomly interspersed. Participants' task was to indicate as quickly and accurately as possible whether the trait or behavior adequately describes their past self ("D" key = *not at all characteristic*; "K" key = *perfectly characteristic*). Response latencies were recorded for each item. Latency was measured from the time the stimulus sentence was displayed to the point at which participants indicated their responses. With regard to their past self ("The kind of person you were then"), participants indicated on two scales (r = .68, p < .001) how near or distant their past self appears to them subjectively (1 = *no more true/very distant*; 7 = *feels like yesterday/very near*). Moreover, they indicated how vivid this image of their past self was (1 = *not at all vivid*; 7 = *extremely vivid*) and how easy or difficult they found it to recall their past self (1 = *very difficult*; 7 = *very easy*). The answers to these latter two items were averaged, r = .58, p < .001.

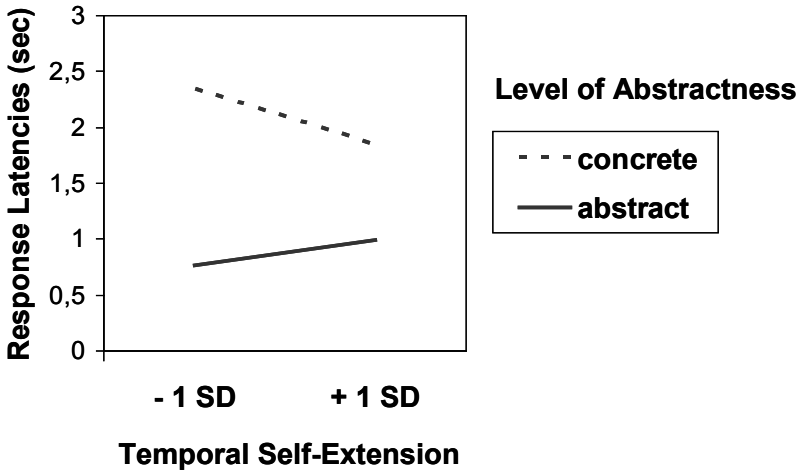
Results

To analyze the data, the condition was dummy coded (concrete/behaviors = -1; abstract/traits: +1) and scores on the TSES were centered (cf. Aiken & West, 1991). To check whether the manipulation of abstractness was successful, ratings of the visual memory perspective that participants adopted in recalling their past selves were regressed onto condition, scores on the TSES and the cross-product of condition and TSES. This analysis revealed a significant effect for condition, β = .25, $t(88)$ = 2.42, p < .05. Participants who recalled past traits tended to adopt an observer-like, third-person perspective, whereas participants who recalled past behaviors inclined to an actor-like, first person perspective. Moreover, memories of past behaviors were more detailed and vivid than memories of past traits, β = -.31, $t(88)$ = 3.11, p < .01. Thus, the abstractness with which memories were retrieved was successfully manipulated.

Next, we examined whether temporal self-extension determines how fast people recall past self-knowledge. Response latencies were regressed onto condition, TSES, and condition X TSES. This analysis revealed a significant TSES X recall condition interaction, β = .21, $t(87)$ = 5.52, p < .001. Baseline response latencies obtained from the personality questionnaire were controlled. Response latencies were log-transformed in this analysis. Figure 2 illustrates the interaction (untransformed latencies).

Temporal self-extension was set one standard deviation above and below the overall mean (cf. Aiken & West, 1991). This leads to a relatively small sample size within conditions. Nonetheless, contrast analyses revealed that, within the concrete recall condition (where

Figure 2. Response latencies (self-descriptive judgments) as a function of abstractness and temporal self-extension (1 *SD* above and below the overall mean), Study 2.



participants recalled specific behaviors), participants with a temporally extended self (+1 *SD*) responded more quickly than participants with a narrowly defined self (-1 *SD*), $t(19) = 3.95$, $p < .01$. Conversely, within the abstract recall condition (where participants recalled traits descriptive of their past self), participants with a narrowly defined self (-1 *SD*) were faster to respond than participants with a temporally extended self (+ 1 *SD*), $t(17) = 3.34$, $p < .01$. As the subsamples were rather small in size, we also computed the relationship between temporal self-extension and response latencies within experimental conditions. In the abstract recall condition, the more bounded the current self was, the faster the judgments were, $\beta = .48$, $t(43) = 3.62$, $p < .01$. In the concrete condition, however, the more extended the current self was, the faster the judgments also were, $\beta = -.57$, $t(43) = 4.65$, $p < .001$. These results clearly support the notion that temporal self-extension influences how people retrieve features pertaining to a past self. Please note that response latencies were much longer in the concrete than in the abstract condition. This effect is trivial as it simply documents that it is subjectively easier to determine whether abstract traits are characteristic of the self rather than specific, repeatedly enacted behaviors (cf. Klein et al., 1993).

Regarding subjective temporal distance, the respective regression analysis revealed that the more extended the current self was perceived, the more recent the past selves appeared, $\beta = -.23$, $t(87) = 2.24$, $p < .05$. Objective calendar time was controlled in this analysis (i.e. how long in months the respective life scene dates back). Moreover, past selves appeared more distant when participants recalled traits rather than concrete behaviors, $\beta = .18$, $t(88) = 1.75$, $p < .10$. Theoretically, there are two possible mediators of the effect that temporal self-extension has upon the speed with which information about past selves is judged as being self-descriptive or not. Pronin and Ross (2006) demonstrated that internal thoughts and feelings are more salient when people take an actor-like perspective on their memories, whereas more abstract, dispositional features are given more weight when people take an observer-like perspective. Thus, when people recall traits a past self possessed, the degree to which they adopted an observer-like perspective should correspond to the speed with which they made self-descriptive judgments on these traits.

To test for mediation, visual perspective scores were recoded in the concrete recall condition (i.e. visual perspective and level of abstractness were matched). The perspective perceivers had taken during recall then predicted response latencies, $\beta = -.29$, $t(89) = 2.90$, $p < .01$. Recall was faster when abstract information was recalled from an observer-like perspective. Moreover, temporal self-extension predicted the mediating variable (perspective), $\beta = -.26$, $t(89) = 2.61$, $p < .05$. The more extended the self was, the more likely the perceivers were to adopt an actor-like perspective. To test for mediation, response latencies were regressed simultaneously on visual memory perspective and temporal self-extension. In this analysis, the direct effect of TSES was significantly reduced from $\beta = -.33$, $t(88) = 3.41$, $p < .01$, to $\beta = -.11$, $t(89) = 1.21$, n. s., $z = 2.22$, $p < .05$ (Sobel's test, cf. Baron & Kenny, 1986). Of importance, the relation between the mediating variable and response latencies remained significant, $\beta = -.24$, $t(89) = 2.39$, $p < .05$. Thus, visual perspective largely mediated the relation between temporal self-extension and response latencies. Regarding subjective temporal distance, however, it was not possible to test for mediation, as the relation between temporal distance and response latencies proved to be non-significant, $\beta = .13$, $t(89) = 1.32$, *n. s.*.

Discussion

In this study, we found that temporal self-extension plays an important role in how quickly people

judge information as being descriptive of their past selves. Participants were to recall either past traits or past behaviors that they had repeatedly performed 3-5 years earlier. Traits versus behaviors were thus rendered relatively accessible in mind. Still, there was sufficient leeway for temporal self-extension to influence response latencies. We expected temporal self-extension to determine whether information about a past self would be retrieved in abstract or more concrete terms. This prediction, however, was confined to a past self that is temporally vague or indistinct. In other words, if people can unambiguously determine whether a past self is still representative of the current self or not, temporal self-extension should play a minor role in recall. Irrespective of whether the current self is temporally narrow or broadly defined, a past self that is definitely historic should be recalled in more abstract terms. The remote past should be perceived as caused by stable, dispositional features (cf. Frank & Gilovich, 1989). Conversely, a past self that definitely bears on the current self should be recalled in more concrete terms. In other words, internal thoughts and feelings should be more salient when people recall a past that is still representative of the current self (Neisser, 1988; Pronin & Ross, 2006). Accordingly, the visual perspective participants took in memory mediated the influence of temporal self-extension on the speed with which information was judged as being descriptive of the past self. A limitation of this study is that participants were explicitly asked to generate information that is to a strong degree descriptive of their past selves. This may have rendered the judgment rather easy for participants. Moreover, we cannot say whether temporal self-extension would moderate response latencies if information about past selves is generated spontaneously. The results regarding response latencies are consistent with this notion, albeit they provide only indirect support for this claim. As we did not manipulate temporal focus of the past self, it remains somewhat speculative whether the recalled life scenes were representative of the current self or not. This issue is addressed more directly in Study 3.

STUDY 3

In this study, we aimed to demonstrate that temporal self-extension influences judgmental effects in terms of assimilation and contrast when it is subjectively difficult or impossible to date a past self. Many past selves are temporally fixed and can easily be dated (e.g. "When I was a university student"), many others, however, are not. For example, it is often difficult to reconstruct when a relationship changed for the worse. Similarly, people often re-experience with great certainty that they once were happy or depressed, even though they usually do not know how long that emotional state was experienced. It is particularly true when repeated events or experiences are concerned. In this study, participants were asked to recall a time when they had felt much younger than now. Two hypotheses were tested with this study. First, we expected current experienced age to be influenced by temporal self-extension in the difficult recall condition in which the dating of the past self was subjectively difficult. All else being equal, participants holding a chronically extended view of the self were expected to assimilate their judgments to the recalled past self and thus to feel relatively young. Participants with a narrowly defined self, however, were expected to contrast their current experienced age away from the recalled past self and thus to feel relatively old. Second, we predicted that subjective temporal distance should mediate the impact of recalled past selves on current experienced age. However, as temporal self-extension is assumed to moderate temporal comparison effects only when it is difficult to date a past self, we expected the mediation in the difficult recall condition, i.e. a moderated mediation pattern (cf. Muller, Judd, & Yzerbyt, 2005).

Method

Participants and design

A total of 192 participants were randomly allocated to one of three conditions (recalled past self: easy to date, difficult to date, no-recall control), with approximately equal proportions of men and women across conditions. The study was conducted online. The mean age of the participants was 28.1 years (SD = 10.61). Most participants were female (65%) and had German nationality (82%). The language of the study was German. Gender did not interact with any independent variable and was thus not included as an additional factor.

Procedure and measures

Prior to the recall task, participants completed the measure of temporal self-extension. Scores on this measure were z-transformed (Cronbach's α = .85). To disguise the goals of the study, this measure was embedded in a series of questions about self-knowledge. As a cover story, participants were led to believe that people differ in their propensity to access their self-knowledge through a rational or through an intuitive-experiential path and that the experimenters have designed two separate tests for this purpose. The recall task was embedded in a "feeling-and-intuition test", and the measure of temporal self-extension in a "rationality-and-logic test".

Participants were to recall a temporally unfocused past self. To this end, they were requested to "…remember a time when you felt much younger than today". We adopted a procedure by Ruvolo and Markus (1992), and so participants were asked to answer in mind what they were thinking and feeling at that time. This instruction was intended to urge them to conjure up detailed and vivid memories of their personal past. Participants were then asked to try to determine either the exact day (*difficult* recall condition) or the exact year (*easy* recall condition) in which they had felt much younger than now. Next, they indicated how old or young they had felt at that time (past experienced age) on a 7-point scale ranging from 1 (*pretty old*) to 7 (*pretty young*). Finally, they indicated how old or young they felt now (current experienced age). Participants in the control condition simply indicated how old they felt now. In every condition, participants also indicated how temporally distant

their recalled past self felt (1 = *very near*; 7 = *far away*) and how vivid and detailed their memories were (1 = *not at all vivid/detailed*; 7 = *extremely vivid/detailed*). Regarding subjective temporal distance to the past self, participants also indicated how certain they were their judgments were correct. This measure served as a manipulation check. After completing the materials, participants were fully debriefed about the purposes of the study via e-mail.

Results

At a first step, ratings of certainty regarding temporal distance to the recalled past self (i.e. how near or distant the participants felt to the past self) were regressed onto the z-transformed scores on the temporal self-extension scale (TSES), the dummy-coded condition variable (-1 = recall-difficult; +1 recall-easy), and the cross-product of TSES and condition. This analysis revealed that participants were less certain about their judgments of temporal distance when they had to indicate the exact day rather than the year of the lifetime period to which the past self pertains, $\beta = .52$, $t(124) = 4.76$, $p < .001$. The manipulation was thus successful. Next, past experienced age, vividness of recall, and subjective temporal distance as criterion variables were regressed separately on TSES, condition variable, and the cross-product of TSES and condition. These analyses revealed no effects either for past experienced age ($ts < 1.1$) or for vividness of recall ($ts < 1.6$). However, there was a significant interaction regarding subjective temporal distance, $\beta = .28$, $t(124) = 3.25$, $p < .001$. To illustrate this interaction, the zero value for temporal self-extension was set one standard deviation above and below the overall mean (cf. Aiken & West, 1991). For participants with a narrowly defined self, the past self was perceived as more distant when it was difficult to date the past self, $\beta = -.41$,

Figure 3. Temporal distance as a function of the ease with which the past self could be dated and temporal self-extension (1 *SD* above and below the overall mean), Study 3.

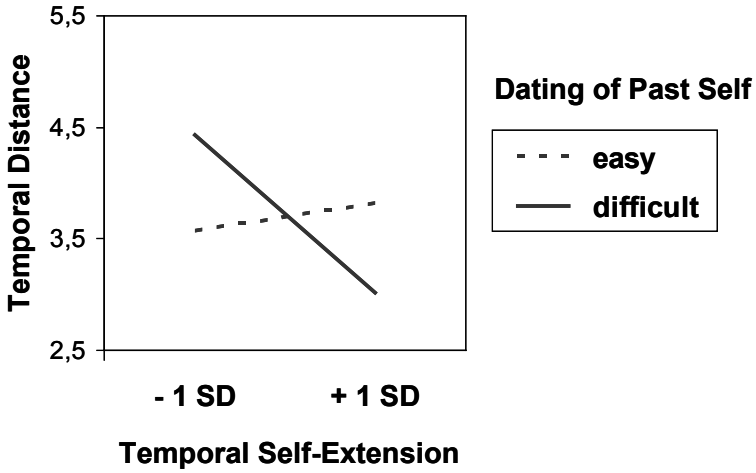
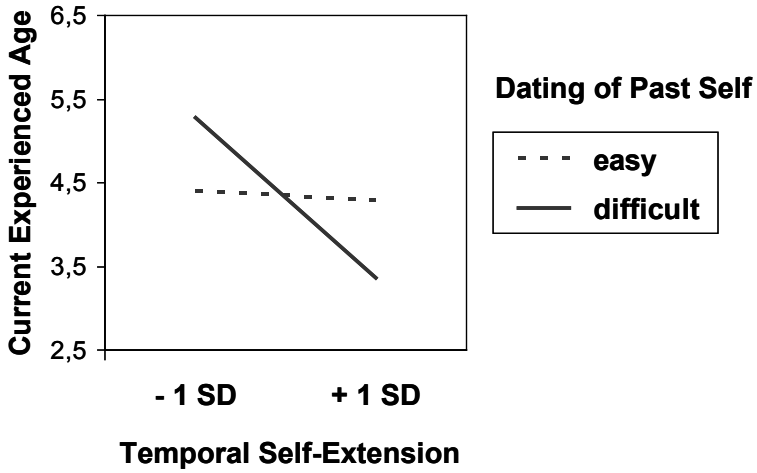


Figure 4. Current experienced age as a function of the ease with which the past self could be dated and temporal self-extension (1 *SD* above and below the overall mean), Study 3.



$t(26) = 2.29$, $p < .05$. For participants with an extended self, however, the past self tended to be perceived as more recent when it was relatively difficult to date, $\beta = .35$, $t(19) = 1.61$, *n. s.*. The means are depicted in Figure 2. Contrast analyses showed that, within the difficult recall condition, the past self was perceived as more distant when the current self was narrowly rather than broadly defined, $M = 4.43$ vs. $M = 3.02$, $t(23) = 3.14$, $p < .01$. Within the easy recall condition, however, no significant difference was obtained, $t(22) = 0.62$, *n. s.*. More importantly, a comparison between the control condition and the difficult recall condition revealed that the past was perceived as more distant in the difficult recall condition when the current self was narrowly defined (control: $M = 3.25$), $t(24) = 2.90$, $p < .01$. When the self was relatively extended, there was a tendency to perceive the past self as more recent (control: $M = 3.79$), $t(23) = 1.89$, $p < .07$. Taken together, these analyses document that temporal self-extension has a moderating influence on perceived temporal distance, but only when the past self is difficult to date.

Regarding experienced age, we predicted that if one's past self is difficult to date, the more narrowly one's current self is defined, the more likely one is to contrast it away from the recalled past self. The recalled self is more likely to produce an assimilation effect, however, the more temporally extended the current self is. In other words, as people typically report that they felt much younger in the past than they feel today, individuals should feel older at present when the current self is contrasted away from a past self. Conversely, they should feel comparatively young at present when appraisals of the current self are displaced toward the past self. This moderating influence of temporal self-extension should be limited to situations in which past selves are difficult to date. In the respective regression analysis, current experienced age was regressed onto temporal self-extension (TSES), condition, and their cross-product. Past experienced age was partialed out in this analysis. As predicted, the analysis revealed a significant interaction between recall condition and temporal self-extension, $\beta = .22$, $t(124) = 2.59$, $p < .05$. The means are depicted in Figure 3.

The zero value for temporal self-extension was again set one standard deviation above and below the overall mean. As predicted, participants with a narrowly defined self (-1 *SD*) tended to feel older when it was relatively difficult to date the past self, $t(26) = 1.89$, $p < .05$ (one-tailed). Conversely, participants with a relatively extended self (+ 1 *SD*) tended to feel younger when it was difficult to date the past self, although the respective contrast was not significant, $t(19) = 1.79$, *n. s.* (see Figure 4).

Moreover, when the past self was difficult to date, participants who defined their current self narrowly felt significantly older than participants with a relatively extended self, $t(23) = 3.66$, $p < .001$. When the past self was easy to date, no significant difference was obtained $t(24) = 1.40$, *n. s.*. In addition, comparisons with the control condition revealed that, when the self was difficult to date, participants felt significantly older when their self was narrowly defined, $t(23) = 1.93$, $p < .05$ (one-tailed), but significantly younger when their current self was perceived as temporally extended, $t(24) = 3.09$, $p < .01$. When it was comparatively easy to date the past self, the respective simple contrasts were not significant. Taken together, then, these analyses clearly support the hypothesis that temporal self-extension moderates temporal comparison effects when it is relatively difficult or even impossible to date the past self.

Baron and Kenny's (1986) multiple regression approach was applied to test both the direct effect of temporal self-extension on current experienced age (residualized scores) and mediation by subjective temporal distance. Temporal self-extension predicted experienced age (criterion variable), $\beta = -.40$, $t(62) = 3.38$, $p < .01$, and also temporal distance (mediating variable), $\beta = -.44$, $t(62) = 3.82$, $p < .01$. In accordance with the mediation model, temporal distance predicted experienced age, $\beta = -.39$, $t(61) = 3.11$, $p < .01$, even when temporal self-extension was controlled. Furthermore, when the criterion variable was regressed simultaneously on the independent and mediating variables, the relationship between temporal self-extension and experienced age was no longer significant, $\beta = -.09$, *n. s.*. The reduction because of temporal distance was significant, $z = 2.35$, $p < .01$. Thus, subjective temporal distance to the past self completely mediated the influence of temporal self-extension on experienced age.

Discussion

The results support the hypothesis that self-in-time comparison effects are likely to be moderated by the degree to which the current self is perceived to reach into the personal past. Participants were to recall a past self that was merely specified by one particular impression, a time when they had felt much younger than now. Ironically, most people think that they must have felt younger in the past and also that they will feel older in the future when they focus on the current self, although their standards to judge this feature are likely to be adjusted over the course of time. In reality then, people feel as old or young as they factually are, although this impression should also hinge on preferred external comparison standards. The recalled past self in this study thus denoted a high comparison standard for experienced age (how old or young one feels, subjectively). In consequence, people should feel older when judgments of the current self are contrasted away from this past self, but younger when judgments are displaced toward (assimilated) the past self. The results showed that judgmental effects in terms of assimilation and contrast were determined by temporal self-extension. However, as predicted, temporal self-extension tipped the balance between assimilation and contrast only when it was difficult to temporally locate the past self. Thus, one important conclusion that can be drawn from the present results is that temporal self-extension does not generally influence temporal comparison effects. When it is comparatively easy to date past events or experiences, judgmental effects in terms of assimilation or contrast may hinge on factors other than the temporal extension of the self. We think that this finding, if further substantiated

in future studies, has important practical implications, for instance, in a therapeutic setting where people reflect important personal memories.

STUDY 4

In this study, we explored the influence of salient self-knowledge on current self-definition. Specifically, this study examined whether temporal self-extension moderates the effect that focus of comparison typically has upon self-judgments. What judgmental effects comparisons between a target and a referent yield depends on what information (about the target or the referent) is more salient during the comparisons (Tversky, 1977). Thus, when the target (e.g. the self) is more salient than the referent (e.g. another person), unique information about the target is more salient and the comparison yields a contrast effect. However, when the referent is more salient, comparison is likely to yield an assimilation effect. The strength of this focus of comparison (or self-other asymmetry) effect hinges on the amount of unique features pertaining to the target and the referent (Holyoak & Gordon, 1983; Srull & Gaelick, 1983). There is abundant evidence that focus of comparison determines whether self-evaluations or self-definitions are displaced away or toward a comparison other (e.g. Mussweiler, 2001). However, very little is known about the role that focus of comparison plays in temporal self-comparisons (Beike & Niedenthal, 1998; Broemer et al., 2008). Moreover, there is hardly any evidence that personality factors moderate the strength of the focus of comparison effect. We hypothesize that temporal self-extension moderates this effect when people recall a relatively indistinct past self (i.e. when the boundaries of the past self are difficult to identify). More specifically, when a past self is not precisely anchored in the past (e.g. "a time in your life when you were less mature than today"), people with a temporally extended current self should reveal a weaker focus of comparison effect on current self-perception than people who view their current self as relatively bounded. When the recalled past self is highly distinct, however, temporal self-extension is unlikely to moderate the focus of comparison effect. We expect the focus of comparison effect to be mitigated when perceivers take the same perspective on current and past selves during comparison. This should particularly be the case when the current self is relatively extended. The more bounded the current self is, however, the more likely the perceivers should be to take different perspectives. This notion is consistent with the general proposition that focus of comparison effects are mediated by the perceived similarity between the target and the referent of comparison (e.g. Tversky, 1977).

Participants and design

The participants were 76 university students (62 women, 16men; mean age: M = 23.4 years). In this study, we used a 2 (focus of comparison: past self salient, current self salient) by 2 (past self: temporally indistinct, temporally distinct) between-factor design. Gender was not included as an additional factor.

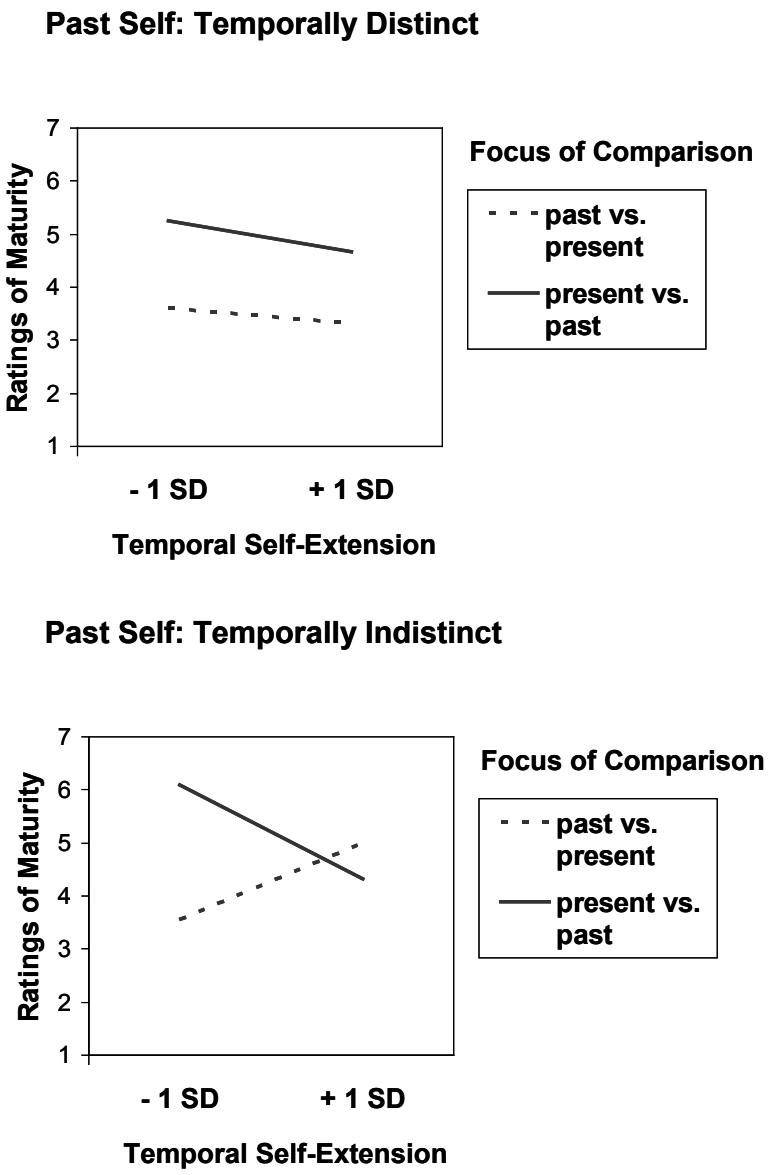
Procedure and measures

Participants were led to believe that they were participating in two unrelated studies, the first about personality and the second about memory processes. After completion of several personality measures including the TSES, participants were asked to write a brief description of a mature personality (i.e. having a differentiated and well-integrated personality structure). They were given an entire page for this task. Depending on condition, they were then asked to recall either "a time in your life at which you were not mature" (temporally *indistinct* condition) or "a former lifetime period in which you were not mature" (*distinct* condition). As a cover story, participants read that the experimenters wanted to learn more about the semantic understanding of what a mature personality entails. Participants were instructed to close their eyes and to visualize this former scene as detailed as possible. To check the effect of the semantic wording of the recall task ("a time in your life" versus "a former lifetime period"), participants were to indicate on two scales (1 = *feels like yesterday/very recent*; 7 = *no more true/very distant*) the subjective temporal distance to the recalled scene ("How distant does this past self feel to you?"). They further indicated how certain they were about this judgment (1 = *not at all certain*; 7 = *very certain*). Objective distance was also assessed (calendar time, in months). Participants in the current-self-salient condition were then asked to determine whether they are currently more or less mature than their recalled past self. In the past-self-salient condition, they were to determine whether their recalled past self was more or less mature than their current self is. Participants further indicated (1 = *same perspective*; 7 = d*ifferent perspectives*) whether they were taking the same perspective during comparison or different perspectives ("How did you execute the comparison process? Were you looking at your past and present selves from one and the same perspective? Or were you looking at them from two different perspectives?"). Finally, participants rated (1 = *not at all*; 7 = *very much*) how mature, differentiated, and well-integrated they think their current self is (Cronbach's alpha = .82).

Results

To check whether temporal distinctness was manipulated successfully, certainty ratings regarding subjective temporal distance were analyzed in a multiple regression design, with temporal self-extension (centered scores), focus of comparison (past-present: -1; present past: +1), temporal distinctness (indistinct: -1; distinct: +1), as well as the respective cross-products as predictor variables. This analysis revealed a significant influence of temporal distinctness, β = .42, $t(67)$ = 4.17, $p < .001$. Participants were more certain about their judgments of the temporal distance of the past self when the past self was temporally distinct and thus easier to date ("a past lifetime period"). Subjective temporal distance was controlled in this analysis. Moreover, the more the participants perceived their current self as temporally extended, the lower certainty they reported, β = .28, $t(67)$ = 2.75, $p < .01$. At least for the

Figure 5. Judgments of the current self (maturity) as a function of temporal distinctness, focus of comparison, and temporal self-extension (1 *SD* above and below the overall mean), Study 4.



present sample, the more the current self was perceived as temporally extended, the more difficult it generally seemed to date the past self. Regarding subjective temporal distance, however, the respective regression analysis did not reveal any significant effects (*t*s < 1.88). Calendar time was controlled in this analysis. Note that there were also no effects on objective temporal distance (*t*s < 1.54). The manipulation of temporal distinctness was thus successful.

Judgments of the current self in terms of maturity were then analyzed. We predicted that a temporally extended self would mitigate focus of comparison effects on the current self when the past self was temporally indistinct and/or difficult to date. The proposed underlying mechanism could be the perspective perceivers spontaneously adopt during comparison. Participants recalled an immature past self which can be seen as a low comparison standard for the current self. Thus, when comparison yields a contrast effect, the current self should be viewed as comparatively mature. This should be the case when the current self is compared with the past self rather than vice versa (cf. Mussweiler, 2001; Tversky, 1977). We suggest, however, that this effect should be mitigated for those whose current self is (relatively) temporally extended and who, at the same time, recall a temporally indistinct past self ("a time in your life"). Under these circumstances, the "extended current self" perceivers should adopt the same perspective on the self, whereas the "bounded current self " perceivers should take different perspectives on the self.

We first examined whether temporal distinctness influenced the perspective that participants took during self-comparisons. In this regression analysis, two effects emerged. Participants with a temporally extended self less

frequently took different perspectives during comparison than participants with a relatively bounded self, β = -.36, $t(68) = 3.32$, $p < .001$. Moreover, a significant interaction between temporal self-extension and temporal distinctness was obtained, $\beta = .31$, $t(68) = 2.89$, $p < .01$. To illustrate this interaction, scores of the TSES were set one standard deviation above and below the overall mean. When the recalled self was temporally distinct, temporal self-extension had no significant effect on the perspective, $t(15) = 0.09$, *n. s.*. However, when the recalled self was temporally indistinct, the more bounded the current self was, the more likely the participants were to take different perspectives, $t(12) = 3.76$, $p < .01$.

Next, we examined the influence of focus of comparison on ratings of maturity. If our hypothesis is correct, a three-way interaction should emerge. In fact, three effects emerged in this analysis. The current self was rated as more mature when the past self was temporally distinct, $\beta = .31$, $t(68) = 2.98$, $p < .05$. Moreover, the current self was rated as more mature when the present self was more salient during comparison than the past self, $\beta = .38$, $t(68) = 3.93$, $p < .01$. More importantly, the three-way interaction proved to be significant, $\beta = .25$, $t(68) = 2.79$, $p < .01$. As Figure 5 shows, the predicted focus of comparison effect was not moderated by temporal self-extension when the past self was distinct. However, when the past self was temporally indistinct, a focus of comparison effect was obtained only when the current self was narrowly defined. In other words, the focus of comparison effect was mitigated when the current self was relatively extended. Under these circumstances, participants with narrowly and broadly defined selves were both assumed to take different perspectives.

To test whether the perspective taken during comparison mediates the influence of comparison focus on self-judgments, we employed the procedure recommended by Baron and Kenny (1986). However, as perspective was unaffected in the distinct recall condition, this analysis was restricted to the indistinct condition. For participants with an extended self, self-judgments were reverse coded. This analysis showed a significant effect of focus of comparison on self-judgments, $\beta = .43$, $t(36) = 4.06$, $p < .01$. Moreover, the mediating variable (perspective) predicted self-judgments even when the influence of focus of comparison was controlled, β = -.47, $t(35) = 4.23$, $p < .01$. Most importantly, the direct effect of focus of comparison was markedly reduced when the mediating variable was entered in the regression equation, $\beta = .11$, $t(35) = 0.92$, *n .s.*. This reduction was significant, $z = 1.92$, $p < .05$ (one-tailed). Perspective thus largely, though not completely, mediated the influence of focus of comparison on self-judgments.

Discussion

In this study, we sought to demonstrate that temporal self-extension influences the way in which people process self-relevant information in temporal comparisons. The literature on social comparison is replete with evidence that distinct information is used as a comparison standard to gauge the self. Distinct comparison information is thus likely to yield contrast effects on the self . Moreover, comparison is likely to yield contrast effects when perceivers attend more to dissimilarities than to similarities between the target and the comparison other (e.g. Mussweiler, 2003). On the other hand, information that is seen as part of the self is likely to be included in the representation of the self and thus to yield assimilation effects (Schwarz & Strack, 1991). In temporal comparisons, judgmental effects in terms of assimilation and contrast hinge on whether past selves are perceived as distinct and thus different from the current self (Beike & Landoll, 1998; Gebauer et al., 2008; Schwarz & Bless, 1992). Still, which judgmental effect occur depends on how the available information is processed. Focus of comparison is one factor among others (e.g. subjective distance) that determines the salience of available information, particularly information that is unique to the target of comparison (Tversky, 1977).

In this study, we replicated the well-known focus of comparison effect with respect to personal maturity. More importantly, the results showed that temporal self-extension qualified this effect. The effect was mitigated when the current self was relatively extended. This moderating influence was limited, however, to situations in which participants recalled a past self that was temporally indistinct. It is just under these circumstances that temporal self-extension determines how perceivers process salient information about the self. When a recalled self is temporally indistinct, individual differences in self-perception come into play. Those individuals who view their self as relatively extended tend to focus on activated representations of past and current selves through the same perspective. Stated less dramatically, they tend to view past and present selves as a unit rather than as two distinct entities. However, individuals who perceive their current self as temporally bounded tend to view past and present selves as two distinct entities. In this study, we simply showed that these latter individuals take two different perspectives during comparison. Future studies may thus want to examine more thoroughly whether past and present selves are viewed as two distinct entities or as a conceptual unit. We think that such a shift in perspective can have important practical implications, as it determines whether temporal comparison yields assimilation or contrast effects, at least under conditions where a past self is temporally indistinct. This conclusion is consistent with a general proposition of the inclusion/exclusion model (Schwarz & Bless, 1992, 2007), which states that contextual information is more likely to be included in broader rather than narrower target categories.

General Discussion

This research focuses on how individual differences in perceptions of the temporal extension of the current self-concept influence temporal comparison outcomes. We developed a reliable 3-item measure that is easy to administer. Scores on this scale mirror an individual's impression whether psychologically significant changes in the self have occurred over time. Study 1 documented

the convergent validity of the scale. Three studies then addressed whether retrieval and comparison processes are moderated by temporal self-extension. Previously, a few studies have addressed the role personality factors play in temporal comparisons as studies on temporal comparison have generally been somewhat preoccupied with self-evaluation and one's desire to view one's self positively. Accordingly, the effects that recalled past selves have on the current self have been shown to hinge, for instance, on one's self-esteem and one's current satisfaction with life (Ross & Wilson, 2002; Sedikides, Wildschut, & Baden, 2004). It has also been demonstrated that people differ in whether they use past self-knowledge to understand the current self (Bluck et al., 2005; Conway & Pleydell-Pearce, 2000; Neisser, 1988). In the present research, we are particularly interested in how people access and process past selves.

The concept of temporal self-extension seems particularly relevant as the literature on comparison processes is replete with evidence that the current self is contrasted away from recalled information when this information is distinct and thus not seen as part of the self. When the current self is broadly or vaguely defined, however, recalled information is more likely to yield an assimilation effect (see Schwarz & Bless, 2007 for a review). Several factors influence the perceived distinctness of a given piece of information, for instance, how detailed and vividly a past self is retrieved (Strack et al., 1985). Temporal self-extension is not assumed to influence the distinctness of past selves. However, in some situations, temporal self-extension should determine whether recalled past selves exert assimilation or contrast effects on the current self. Recalled events can be seen as being characteristic of a past self that is definitely bygone or of the current self, irrespective of temporal self-extension. Temporal self-extension is a subjective impression, independent of actual temporal distance. It does not influence the strength of thematic or perceptual boundaries between the past and the present. However, it should determine how near or distant a recalled past self appears when it is subjectively difficult to exactly date a past self or when a past self is temporally indistinct.

Temporal comparison requires that people hold and map two representations of the self simultaneously: The past and present selves. This process should be influenced in multiple ways. The present studies showed that temporal self-extension determines whether past selves are retrieved in concrete or abstract terms, and also whether people take a unifying or contrasting visual perspective during comparison. A key finding of this research is that the effects of temporal self-extension hinge on whether past selves are temporally unfocused or indistinct. A past self is temporally unfocused when people do not know or find it difficult to judge when exactly past events occurred. Of importance, representations of unfocused past selves can be perceived as distinct and separate from one's life now (e.g. "I know that I was happy once."). Thus, a temporally focused memory is not tantamount to a distinct or sharply bounded memory. By "temporally indistinct", we refer to the fact that boundaries denoting past selves are often difficult to discern. Temporal indistinctness does not necessarily imply that memory traces are weak. Recalled emotional states, for instance, may be particularly difficult to delimit, as long as no concrete situational cues are recalled along with the emotion (e.g. "I know that I was depressed once, at the American Bar, where Sarah left me"). But even if we can recall when a certain emotional state rose, we often find it difficult to determine when it declined (e.g. "I stopped loving her on Sunday, the thirteenth of May"). Of course, other, more abstract or schematic memories can also be temporally indistinct.

Past research has emphasized that the desire to view the current self positively motivates individuals to derogate their past and to perceive negative past selves as more distant than positive ones (McFarland & Alvaro, 2000; Wilson & Ross, 2001). Speaking more generally, this self-enhancement proposition implies that a self-enhancement motivation should lead people to define their current self as relatively narrow (cf. Suh, Diener, & Fujita, 1996). However, motives other than self-enhancement can prompt people to view their current self as more or less extended in time. For example, the need to detach oneself from lost possible selves (due to a decrease in subjective well-being) can push people to accept transitions in their lives and thus to cut possible selves. Further, research on nostalgia has shown that people sometimes try to embrace remote events and experiences to cope with fear and threat. Finally, activated goals can provide constraints of what the self has been in the past (Conway & Pleydell-Pearce, 2000; Carstensen, Isaacowitz, & Charles, 1999). We feel that social-cognitive research has somewhat neglected to study how people access and process self-knowledge descriptive of past selves. However, research guided by the inclusion/exclusion model has focused on categorization processes. Moreover, evidence exists that attribution processes determine how distant past events appear (Frank & Gilovich, 1989; Haddock, 2004; Pronin & Ross, 2006).

The present research adds to this literature by showing that perceptions of the self in terms of temporal extension affect temporal comparison outcomes as well as the abstractness with which perceivers retrieve past selves. More importantly, we identified situations in which temporal self-extension is particularly influential. Up to now, no studies have directly examined the subjective ease or difficulty with which people can date and delimit past selves. As shown here, however, this impression can have profound effects on temporal comparison. Future studies may thus want to examine more thoroughly how clearly perceivers can identify thematic or phenomenal boundaries between past and present selves. Furthermore, it may be an interesting avenue for future studies to examine more closely whether temporally unfocused or indistinct memories differ in their vividness or perceived veridicality from temporally focused or distinct memories. Still, as we have suggested that temporal self-extension can be conceived as a trait as well as a state variable, future studies should try to manipulate temporal self-extension.

The present findings have important implications for clinical interventions. Interventions often involve attempts to cope with a negative past and to increase

subjective well-being. Remembering can be a risk factor for individuals with a negative view of the self if reflecting on one's past perpetuates negative self-views. Past periods in which one suffered or was unhappy may invoke very clear and painful memories, and, subjectively, they may seem to have been endlessly long (cf. Draaisma, 2006). Also, lost possible selves may be particularly relevant here (King & Hicks, 2007). It is an open question whether people holding a temporally narrow self find it easier to detach themselves from lost possible selves (i.e. personal hopes and desires that no longer involve the possibility of fulfillment) or past sufferings. Temporal self-appraisal theory suggests that people with a narrowly bounded self should perceive lost possible selves as less relevant and would thus show less intense emotional reactions (e.g. regret) to possible selves (cf. Tykocinski & Steinberg, 2005). People who are still committed to their lost possible selves should reveal more extreme affective reactions when recollecting those possible selves, compared to individuals who were able to cut themselves off their losses. Although speculative, we suggest that people with a temporally extended self, similarly to people who are prone to nostalgic reverie, are more susceptible to the affective implications of the lost possible selves. Temporal self-extension may be a relevant concept here, as it determines how people access this information. It may also determine whether people still see opportunities to act and thus to improve their lives in the future. The literature on counterfactual thinking documents that upward counterfactual thoughts (i.e. imagined alternatives that are better to reality) serve a preparatory function (e.g. Roese & Olson, 1995). Thus, viewing the self as temporally extended may motivate one to take action where others see their past outcomes as inevitable.

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