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Semantic self-knowledge and episodic self-knowledge: Independent or interrelated representations?

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In this study of the structure of self-knowledge, we examined priming effects for the recall of personal episodes in order to investigate whether abstract trait knowledge and personal episodes are independent mental representations. We found that accessing similar abstract representations of traits facilitated a faster recall of related personal episodes than did accessing irrelevant abstract representations of traits (Experiments 1 and 2), reading a nonword prime (Experiments 2 and 3), accessing knowledge of one's mother (Experiment 3), or accessing semantic knowledge (Experiment 3). Contrary to previous findings, which indicated that abstract trait knowledge is represented independently of related personal episodes (e.g., Klein & Loftus, 1993; Tulving, 1993), our results suggest that abstract trait knowledge is associated with personal episodes, and therefore that semantic self-knowledge is associated with episodic self-knowledge in long-term self-knowledge.

The cognitive information-processing approach, which has been the dominant influence in the investigation of the self, discusses the self in terms of cognitive structures that include a relatively large quotient of self-relevant knowledge (e.g., Kelly, 1955; Markus, 1977; Markus & Wurf, 1987). Researchers have focused on two kinds of knowledge (Klein, Loftus, & Kihlstrom, 1996a): episodic and semantic self-knowledge. Episodic self-knowledge consists of memories of specific events involving the self; for example, autobiographical memories (personal episodes) of when the individual's behaviours were consistent or inconsistent with specific personality traits, such as kindness, outgoingness, or laziness. In contrast, semantic self-knowledge is information that has been abstracted from personal episodes, such as a self-concept or the abstract trait knowledge that the individual is kind, outgoing, or lazy.

To date, researchers have argued that these two types of self-knowledge interact in multiple ways (e.g., Brewer, 1986; Conway & Pleydell-Pearce, 2000). Robinson (1986) proposed that autobiographical memories are resources of the self that could be used to sustain or change it. Aligned to this idea, other researchers have pointed out that episodic self-knowledge is closely related to personality (e.g., Woike, Gershkovich, Piorkowski, & Polo, 1999), that self-defining personal memories are crucial to a person's current goals and psychological well-being (e.g., Blagov & Singer, 2004), and that personal memories are distorted to favour a person's current self-concept (e.g., Ross, 1989; Wilson & Ross,

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2003). Other researchers have also shown that people tend to selectively access personal episodes consistent with their motivations, thus resulting in revised views of themselves (e.g., Kunda, 1990; Kunda & Sanitioso, 1989; Markus & Kunda, 1986; Sanitioso, Kunda, & Fong, 1990).

These various forms of interaction between semantic and episodic self-knowledge seem to imply that semantic self-knowledge is closely associated with episodic self-knowledge in long-term representations, which serve as the basic mechanism for dynamic interactions between semantic and episodic self-knowledge. This suggestion is consistent with representational models of self-knowledge (e.g., Bower & Gilligan, 1979; Markus, 1977). For example, the Self-Memory System (SMS) model assumes that personal episodes are linked with a general knowledge of past self (e.g., knowledge of significant others, activities, and locations), which is represented in the autobiographical knowledge base (Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004). The SMS model also theorised that the conceptual self, such as abstract trait knowledge of the self, is associated with not only the autobiographical knowledge base, but also personal episodes.

However, when researchers have empirically examined the structures of self-knowledge mental representations, these models of self-knowledge have sometimes not been supported. Substantial research on the self-knowledge of traits found that abstract trait knowledge is represented independently of personal episodes (e.g., Klein, Babey, & Sherman, 1997; Klein & Loftus, 1993; Klein, Loftus, & Plog, 1992a; Klein, Loftus, Trafton, & Fuhrman, 1992b; Tulving, 1993). Thus, the results of studies on the underlying mental representations of an individual's trait knowledge do not fit the growing body of evidence that semantic self-knowledge closely interacts with episodic self-knowledge. This incongruity seems to pose difficulties in developing comprehensive theories of the relationship between semantic and episodic self-knowledge. To resolve this apparent inconsistency, our study aimed to clarify whether abstract trait knowledge is represented independently of personal episodes in long-term self-knowledge.

EVIDENCE FOR THE STRUCTURAL INDEPENDENCE OF ABSTRACT TRAIT KNOWLEDGE AND PERSONAL EPISODES

The initial evidence for the structural independence of abstract representations of traits and personal episodes comes from the clinical literature on amnesia. Several studies have reported that, despite having lost the ability to access personal episodes, amnesic patients could still access abstract trait knowledge of the self (e.g., Klein, Cosmides, Costabile, & Mei, 2002a; Klein et al., 1996a; Klein, Rozendal, & Cosmides, 2002c). For example, Tulving (1993) reported that K.C., a patient exhibiting profound retrograde amnesia regarding specific experiences, was still able to make reliable judgements about whether a presented stimulus trait word was self-descriptive. Other researchers (e.g., Viskontas, McAndrews, & Moskovitch, 2000) have also shown that patients could have impaired knowledge of personal episodes but intact personal semantic knowledge (e.g., where one went to school or one's address at different points in the past). These findings seem to suggest that episodic and semantic self-knowledge are stored in different areas of the brain, and that abstract trait knowledge and personal episodes are independently represented in different memory systems.

However, these studies of amnesic patients cannot allow us to conclude that abstract trait knowledge is represented independently of personal episodes (e.g., Squire & Knowlton, 1995). Personal episodes are specific to events that cannot be repeated, while abstract trait representations are extracted from a set of related episodes (Klein et al., 1996a). This suggests that abstract trait knowledge produces stronger memory traces than personal episodes, which could result in impaired knowledge of personal episodes but preserved abstract trait knowledge. This possibility could be refuted by showing that individuals with no access to abstract trait knowledge can still recall personal episodes.

However, even if we find amnesic patients with the ability to access personal episodes despite their inability to access abstract trait knowledge, we cannot exclude the possibility that abstract trait knowledge is represented with related

personal episodes. In the literature regarding episodic and semantic memory, for example, many studies have reported that these two types of memory can become dissociated in patients with brain damage (see Kapur, 1999, and Wheeler & McMillan, 2001, for reviews). However, recent research has clearly indicated that semantic and episodic memories are interrelated (e.g., Westmacott, Black, Freedman, & Moscovitch, 2003; Westmacott & Moscovitch, 2003). The same can be said for the dissociation between abstract trait knowledge and personal episodes. Research regarding amnesic patients cannot allow investigators to dismiss links between personal episodes and abstract trait knowledge.

A second type of evidence for the structural independence of abstract trait knowledge and personal episodes comes from the studies of Klein, Loftus, and their colleagues (e.g., Klein et al., 1997; Klein & Loftus, 1993; Klein, Loftus, & Burton, 1989; Klein et al., 1992a; Klein et al., 1992b). They collected most of their data using the task facilitation paradigm, which examines the priming effects of abstract representations of traits on the recall of personal episodes. This paradigm employs three tasks: descriptive, define, and autobiographical. In the descriptive task (to access abstract representations of traits), participants are asked to judge whether a stimulus trait word is self-descriptive. In the define task (to access memory, but not necessarily self-knowledge), participants are asked to generate a definition for the stimulus trait word. Finally, the autobiographical task asks participants to access personal experiences by remembering a specific life experience connected to the stimulus trait word. To determine whether their performance on the initial task primed responses on the second target task, Klein Loftus, and colleagues (1992b) asked participants to perform two tasks sequentially (an initial task and a target task) for a single trait word. All possible combinations of the three types of tasks were used as the initial-target task pairs.

If abstract representations of traits were linked to personal episodes, the activation of a node for abstract representations of traits should activate nodes for related personal episodes. Thus, recall of a personal episode should be faster when the initial task is the descriptive task rather than the define task. However, Klein and colleagues repeatedly found that response latencies for the autobiographical target task did not differ significantly, regardless of whether the initial task was the descriptive or the define task (e.g., Klein & Loftus, 1993; Klein et al., 1992a; Klein et al., 1992b). Thus, they concluded that ''within the realm of long-term self-knowledge, knowledge of one's traits is represented and accessed independent of knowledge of one's behaviours'' (Klein & Loftus, 1993, p. 35).

However, because Klein and Loftus (1993) used the define task as the no-facilitation effect baseline from the descriptive to the autobiographical task, their conclusion assumed that the define task does not facilitate the recall of autobiographical memories (Brown, 1993; Keenan, 1993). If this assumption was not valid, their results could indicate that the descriptive and define tasks facilitate the autobiographical task equally. Thus, the independence of abstract trait knowledge and personal episodes would not be substantiated.

In fact, the define task might facilitate the autobiographical task for several reasons. First, in generating a definition of personality traits, participants might voluntarily refer to their own behaviour, and use personal episodes as a resource for creating a definition (Keenan, 1993; Klein et al., 1997). Autobiographical memory researchers have also suggested that semantic knowledge is linked to personal episodes in memory (e.g., Conway & Bekerian, 1987; Reiser, Black, & Abelson, 1985; see Conway & Pleydell-Pearce, 2000, for a review), which implies that access to semantic knowledge in the define task automatically facilitates the recall of personal experiences. Thus, the validity of assuming that the define task does not facilitate the autobiographical task is questionable (Brown, 1993; Keenan, 1993).

Although Klein et al. (1997) attempted to remedy this problem, they could not entirely rule out the possibility that abstract representations of traits are linked to personal episodes. They replaced the define task with a read-only task, in which participants read the presented trait word and then investigated associations between abstract representations of traits and personal episodes without using the define task. They found that the response latencies for the autobiographical target task were the same, irrespective of whether the initial task was descriptive or read-only. This result seems to support the

structural independence of abstract representations of traits and personal episodes, while excluding the assumption concerning the define task. However, participants may have accessed their semantic knowledge to understand the meanings of the trait words in the read-only task. If so, the conclusion that abstract trait knowledge and personal episodes are independent still rests on the questionable assumption that access to semantic knowledge does not facilitate the autobiographical task. This is contrary to the results of other research, which found that personal episodes are linked to semantic knowledge in memory (e.g., Conway & Bekerian, 1987). Thus, the question of whether abstract trait knowledge and personal episodes are independent mental representations, as suggested by Klein and Loftus, is still unresolved.

THE CURRENT STUDY

The present study addressed the interpretative problems involved in previous research (e.g., Klein & Loftus, 1993) to clarify whether abstract representations of traits and personal episodes are independent mental representations. Experiments 1 and 2 examined whether accessing similar abstract trait representations facilitated better recall of personal episodes than accessing irrelevant abstract trait representations, employing a modified task facilitation paradigm (Experiment 1) and a priming procedure (Experiment 2). Experiment 3 investigated whether the activation of abstract representations of traits promoted better recall of personal episodes in participants than activation of semantic knowledge or than activation of abstract trait knowledge of participants' mothers.

EXPERIMENT 1

Experiment 1 investigated the facilitative effects of the descriptive task on the autobiographical task, without the assumption that the define task would not facilitate the autobiographical task. We used a task facilitation paradigm similar to one used by Klein and Loftus (e.g., Klein & Loftus, 1993; Klein et al., 1989) but modified the selection of stimulus words. Similar to the original task facilitation paradigm, participants in half of the trials were asked to carry out the target task for trait words identical to those presented in the initial task (same-trait condition). The stimulus trait words for the target task in the other trials differed from those in the initial task (different-trait condition). For all trials, the initial task was descriptive, and the target task was autobiographical.

If abstract traits were represented independently of related personal episodes, access to abstract trait representations in the descriptive task would not influence the retrieval of memories, either related or unrelated to those abstract trait representations. Therefore, this independence hypothesis would predict that response latencies on the autobiographical target task would not differ for the same-trait or the different-trait conditions. On the other hand, if abstract trait representations and pertinent personal episodes were associated in memory, activating abstract trait knowledge would activate related personal memories. Therefore, access to abstract trait knowledge in the descriptive task would promote recall of personal episodes related to the abstract trait knowledge more than would that to unrelated memories. Thus, this relation hypothesis predicts that response latencies for the autobiographical task are faster in the same-trait condition than in the different-trait condition.

Method

Participants. Participants were 32 Japanese undergraduate and graduate students (16 men and 16 women; mean age = 25.13, $SD = 2.80$).

Design. The experiment used a within-participants design in which the prime trait stimulus word (same-trait, different-trait) was manipulated. There were 10 trials for the same-trait condition and 10 trials for the different-trait condition, in randomised order. The dependent variable was the length of time participants took to recall a personal experience associated with the stimulus word.

Apparatus and stimuli. Participants were tested individually, seated in front of a personal computer with a colour monitor. All stimuli were presented in the Japanese writing style, i.e., a blend of Chinese characters with Japanese phonetic symbols.

Stimuli: Autobiographical task. A total of 20 trait words were selected from studies of the relation between the Big-Five personality theory and Japanese trait adjectives (Kashiwagi, Wada,

& Aoki, 1993; Wada, 1996). These 20 trait words included two positive and two negative trait words from each of the five dimensions of the Big-Five personality theory. They were assigned so that each of the two conditions involved one positive and one negative trait stimulus from each of the five dimensions of the Big-Five personality theory. The assignment of words to conditions was counterbalanced across participants.

Stimuli: Initial task. In the same-trait condition, the stimulus trait words for the initial task were the same as those for the autobiographical task; while for the different-trait condition, the stimulus trait words were different (Kashiwagi et al., 1993; Wada, 1996). The stimulus list included two trait words from each of the five dimensions of the Big-Five personality theory, with five positive and five negative trait words. For half of the trials in the different-trait condition, the trait words for the initial task had a similar valence as those in the autobiographical task. For example, the trait word for the initial task was ''lazy'' when ''selfish'' was used in the autobiographical task. For the other half of the trials, the initial task trait words differed in valence from those for the autobiographical task. For example, when ''depressed'' was used in the autobiographical task, ''polite'' was used in the initial task.

In all, there were 20 trait words for the autobiographical task and an additional 10 for the initial task. An additional 12 comparable trait words were used in the practice session. The total of 42 trait words did not include any two that were semantically highly similar. Each word was used only once per participant.

Procedure. Participants were told that the purpose of the experiment was to investigate how people recall their experiences. They were asked to perform the tasks accurately, and to press the keyboard space bar with the forefinger of their dominant hand immediately they had completed each task. Similar to Klein and Loftus (1993), participants were instructed to generate responses to the task questions mentally, not verbally. They were told that for some trials the trait word would be identical for the initial and target tasks, and different in other trials. Participants then completed the practice session, which contained four trials for each condition. Participants were allowed to ask the experimenter questions during the practice session. After they fully understood the procedure, the experiment was started.

At the start of a trial, the word ''Ready'' was displayed on the computer screen. When participants indicated that they were ready to continue by pressing the space bar, the cue for the descriptive task (''Judge whether the word describes you'') appeared. After 1500 ms a trait adjective appeared below the cue, and the timer was activated. When participants indicated by pressing the space bar that they had completed the initial task, the timer was stopped, and both the cue and trait word were replaced by a blank screen for 1000 ms. Then, the cue for the autobiographical target task (''Recall a memory consistent with the word'') appeared on the screen. After 1500 ms a trait adjective was presented below the cue, and the timer was activated. When participants indicated by pressing the space bar that they had recalled a memory, the timer stopped, and the response latencies for the target task were recorded. Following a blank screen for 2000 ms, the next trial was started.

Results

The data from one participant who did not comply with the instructions were not included in the analysis. To correct for skewedness in the distribution of latencies, and to minimise any effects of outliers, the remaining data were logarithmically transformed prior to analysis. The response latencies for the autobiographical task were significantly faster in the same-trait condition ($M = 4773$ ms) than in the different-trait condition ($M = 5890$ ms), $t(30) = 5.88$, $d = 1.07$, $p < .001$.[1] Thus, access to abstract representations of traits in the descriptive task facilitated recall of related personal episodes better than recall of unrelated personal episodes.

[1] A 2 (prime type) $\times$ 2 (gender) mixed analysis of variance (ANOVA) on the transformed latencies yielded a significant main effect for prime type, $F(1, 11) = 87.26$, $p < .001$. However, neither the main effect of gender nor the interaction between prime type and gender was significant ($p > .65$). Additional analysis also revealed that the valence of the personality traits used did not qualify the effects of the prime type ($p > .40$). Moreover, in half of the trials in the different-trait condition, trait words in the initial task had a similar valence to those in the autobiographical task. In the other half, trait words in the initial task differed in valence from those in the autobiographical task. However, response times in the autobiographical task were not significantly different ($M = 5855$ ms, 5835 ms), $F(1, 29) = 0.01$.

Discussion

The results of Experiment 1 suggest that abstract trait knowledge is associated with related personal episodes in mental representations. For two reasons, however, these results cannot allow us to conclude that abstract representations of traits are associated with personal episodes.

First, participants may not have accessed their abstract representations of traits during the descriptive task. Instead, they might have recalled personal episodes to complete the descriptive task, thus possibly facilitating their performance on the autobiographical task in the same-trait condition. Thus, even if abstract representations of traits and personal episodes are not associated in memory, the descriptive task could facilitate the retrieval of autobiographical memories. To address such alternative interpretations, Experiments 2 and 3 used a priming procedure that replaced the descriptive task of the task facilitation paradigm with the simple presentation of the prime stimulus, corresponding to the abstract trait knowledge of the participants. This priming procedure enabled us to activate participants' abstract trait representations more directly than did the descriptive task.[2]

Second, participants could have perceived or processed the stimulus trait words for the autobiographical task more readily in the same-trait condition, which would have enabled them to perform the autobiographical task more quickly. Participants also could have prepared personal episodes for the autobiographical task during the initial descriptive task, thus shortening response latencies for the autobiographical task in the same-trait condition.

[2] It could be argued that the prime stimulus presentation activated participants' abstract trait knowledge more weakly than the descriptive task, which would distort the results of the present study. To address this possibility, an additional experiment was conducted ($N = 18$). The procedure was identical to that used in Experiment 1, except the prime sentence was presented for 1500 ms in place of the descriptive initial task. As in Experiment 2, the prime stimulus was the sentence "I am _," where the blank space contained one trait word. The data were entirely consistent with those from Experiment 1: Response latencies for the autobiographical task were significantly faster in the same-trait condition ($M =$ 5092 ms) than they were in the different-trait condition ($M =$ 6499 ms), $t(17) = 2.42$, $d = 0.59$, $p < .05$. Furthermore, a 2 (experimental procedure: descriptive task vs prime presentation) $\times$ 2 (trait stimulus: same vs different) mixed ANOVA conducted on response latencies for the autobiographical task did not yield a main effect of experimental procedure or the interaction between experimental procedure and trait stimulus (ps $> .55$).

EXPERIMENT 2

Experiment 2 attempted to rule out alternative explanations of the Experiment 1 results. For this purpose, the Experiment 1 procedure was modified in two ways. First, presentation of the prime stimulus replaced the descriptive task. That is, participants' abstract representations of traits were activated by using the prime stimulus.

Second, the stimulus words differed. As in the different-trait condition of Experiment 1, trait words for the autobiographical task in the unrelated-trait condition were semantically unrelated to those in the prime stimuli, while in the related-trait condition they were semantically related (but not identical). Thus, to exclude the effects of participants' readiness in perceiving or processing stimulus trait words, Experiment 2 investigated the priming effects of abstract trait knowledge on recall of personal episodes, without repeating an identical stimulus. This procedure also prevented participants from noticing the differences between the related-trait and unrelated-trait trials, thus precluding any preparation of memories during the prime stimulus presentation. Therefore, if the Experiment 1 results were not attributable to perceptual processing or prior preparation of personal memories, we expected a shorter response time for the autobiographical task during the related-trait condition than during the unrelated-trait condition.

However, some alternative interpretations could still apply, even if this prediction were supported. Accessing abstract knowledge of trait A may inhibit access to any material unrelated to trait A, which would increase response latencies in the unrelated-trait condition. To address this possibility, we included a control condition in which participants were presented with a nonword prime. If abstract trait knowledge is linked to related personal episodes in long-term memory, activation of abstract trait knowledge should increase the activation of related personal episodes, resulting in a shorter response time for recalling related personal episodes. Thus, we predicted that participants would recall personal episodes faster in the related-trait condition than in the unrelated-trait or the control condition.

Experiment 2 also examined the effects of trait self-descriptiveness. Although we predicted that

prime stimuli corresponding to an individual's abstract trait representations would facilitate that person's performance of the autobiographical task in the related-trait condition, abstract trait representations for self-descriptive traits could be more accessible than those for traits that are not self-descriptive (e.g., Woike et al., 1999). Therefore, prime stimuli containing self-descriptive traits should increase the accessibility of corresponding abstract trait knowledge more strongly than prime stimuli containing non-descriptive traits, resulting in heightened accessibility of personal episodes related to self-descriptive traits compared to personal episodes related to non-descriptive traits (cf. Tschanz & Rhodewatt, 2001). Thus, we predicted that in the related-trait condition, the autobiographical task would produce shorter response latencies for descriptive traits in the prime stimuli than for non-descriptive traits in the prime stimuli. On the other hand, the trait-descriptiveness of the prime stimuli is irrelevant to the trait-descriptiveness of the autobiographical task in the unrelated-trait condition. Therefore, we predicted that response latencies in the unrelated-trait condition would not differ regardless of whether or not the prime stimuli contained self-descriptive traits. We collected self-descriptiveness ratings for each stimulus trait to examine the effects of trait descriptiveness.

Method

Participants. A total of 34 Japanese undergraduate and graduate students (17 men and 17 women; mean age = 21.5, *SD* = 2.52) took part in individual experiments.

Design. The prime type (related-trait, unrelated-trait, control) was manipulated within participants. The presentation order of trials was randomised across the conditions and counterbalanced for each participant. The dependent variable was the response latency for the autobiographical task.

Stimuli: Autobiographical task. A total of 30 trait words, which included three positive and three negative trait words from each of the five dimensions of the Big-Five personality theory, were selected from Kashiwagi et al. (1993) and Wada (1996). They were assigned to the three conditions, so that each condition involved one positive and one negative trait stimulus from each of the five dimensions. The assignment of words to conditions was counterbalanced across participants.

Prime stimulus. The prime stimulus was the sentence ''I am _,'' where the blank space contained one trait word (e.g., ''I am nervous''). In the related-trait condition, the trait words for this prime stimulus were semantically related to those for the autobiographical task. For example, when ''intellectual'' was used in the autobiographical task, the prime sentence was ''I am smart.'' The trait words for the prime stimuli in the related-trait condition were chosen from Isaka (1992), who examined the semantic similarity of Japanese trait adjectives.

In the unrelated-trait condition, the trait words for the prime stimuli described different dimensions of the Big-Five personality theory from the corresponding trait words used for the autobiographical task. In half of the trials for the unrelated-trait condition, trait words for the prime stimulus had a similar valence to those for the autobiographical task; in the other half, trait words for the prime stimulus differed in valence from those for the autobiographical task. The trait set for the prime stimulus of the unrelated condition included one positive and one negative trait word from each of the five dimensions of the Big-Five personality theory, and were chosen from Kashiwagi et al. (1993) and Wada (1996). In the control condition, four asterisks were used as a nonword prime.

Each of the trait words for the autobiographical task and the prime stimulus were used only once per participant. In addition, 24 trait adjectives were also used in the practice session. These 24 trait words did not involve any words that were semantically similar to those used in the experimental trials.

Procedure. The procedure used in Experiment 2 was similar to the one used in Experiment 1, except that the prime sentence was presented for 1500 ms in place of the descriptive initial task, and the stimulus trait words were changed. During the prime stimulus presentation, participants were asked to look at the prime sentence, and no response was requested. After participants completed all of the experimental trials, they were handed a questionnaire, which included trait words used in the experiments, and asked to rate each of them on a 5-point scale (1 = extremely unlike me, 2 = unlike me, 3 = slightly like me, 4 = like me, and 5 = extremely like me).

Results

Response latencies for the autobiographical task were subjected to a logarithmic transformation. Data from two participants who did not comply with the instructions were discarded. Trials producing outside values were excluded as outliers in the following analysis (Tukey, 1977; mean number of discarded trials = 0.03, $SD = 0.17$). Neither the gender of participants nor the valence of used personality traits qualified any of the findings (ps > .30).

A one-way within-participants ANOVA on the transformed latencies produced a significant main effect for the prime type (Figure 1): $F(2, 62) = 10.64$, $MSE = 0.01$, $R^2 = .89$, $p < .01$. Tukey's tests indicated that response latencies for the related-trait condition were significantly faster than for both the unrelated-trait ($p < .05$) and the control ($p < .05$) conditions.[3] These results clearly suggest that access to abstract trait representations facilitates recall of personal episodes, and that the activation of abstract trait representations extends to pertinent personal episodes. Thus, the results of Experiment 2 support the findings of Experiment 1, that abstract trait representations are associated with related personal episodes in long-term memory.

Effects of the self-descriptiveness of the prime stimulus trait word. To investigate the effects of the descriptiveness of the prime stimulus trait word, we sorted participants' response latencies into two levels of self-description (descriptive and non-descriptive).[4] Ratings by the participants of traits as 3 and higher were coded as descriptive, and ratings of 2 and lower were coded as non-descriptive. Because the prime stimulus in the control condition did not contain a trait word, trials of the control condition were excluded from the following analysis.

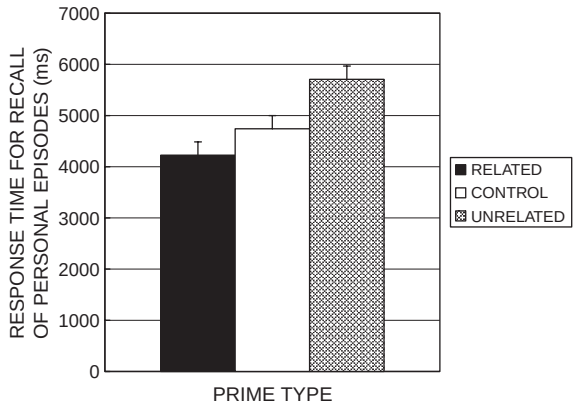

Figure 1. Mean response latencies for the recall of an autobiographical memory as a function of prime types (Experiment 2). Error bars represent the within-participants standard error (see Loftus & Masson, 1994).

A 2 (prime type: related, unrelated) × 2 (trait self-descriptiveness of the prime stimulus: descriptive, non-descriptive) within-participants ANOVA was conducted on the response latencies for the autobiographical task (see Table 1). As in the previous analysis, the main effect for prime type was significant: $F(1, 30) = 8.31$, $p < .01$. The main effect for self-descriptiveness was marginally significant: $F(1, 30) = 3.65$, $p < .07$. In addition, this ANOVA yielded a significant interaction between the prime type and the self-descriptiveness of the traits: $F(1, 30) = 5.25$, $p < .05$.

Simple main effect tests revealed the following differences: For self-descriptive trait words, participants recalled personal episodes significantly faster in the related-trait condition than in the unrelated-trait condition, $F(1, 30) = 21.48$, $p < .01$, while no significant effect was observed for non-descriptive trait words ($p > .15$). In addition, the related-trait condition produced faster re-

TABLE 1
Experiment 2

Trait descriptiveness	*Related*	*Unrelated*
Descriptive	3827	5662
Non-descriptive	4840	5763

Mean response time (ms) for the recall of personal episodes as a function of prime type and trait descriptiveness of the prime stimulus (Experiment 2).

[3] In the unrelated-trait condition, response latencies in the autobiographical task for trials in which the trait words for the prime stimulus and the autobiographical task had the same valence ($M = 5583$ ms) did not significantly differ from response latencies in trials where the valence of trait words for the prime stimulus differed from those for the autobiographical task ($M = 5976$ ms), $F(1, 31) = 0.06$.

[4] The distribution of trait descriptiveness was not skewed (skewedness = −0.10). A test for the curvilinear trend was performed to confirm that the relation between self-descriptiveness and response latency had no curvilinear component. To accomplish this, a multiple regression analysis was conducted on response latency for the autobiographical task, using ratings of self-descriptiveness and a quadratic term of self-descriptiveness as independent variables. This analysis revealed no significant trend for curvilinearity ($p > .55$).

sponse latencies when the prime stimulus contained self-descriptive traits as opposed to non-descriptive traits, $F(1, 30) = 8.44$, $p < .01$. On the other hand, in the unrelated-trait condition, response latencies for the autobiographical task were not differentially influenced by trait self-descriptiveness ($p > .70$).

Thus, self-descriptive personality traits facilitate recall of related behavioural episodes, while non-descriptive personality traits do not facilitate recall of personal episodes. These results suggest that abstract representations of traits, especially for self-descriptive traits, are linked to related personal episodes in representations of self-knowledge.[5]

Discussion

In summary, the results of Experiment 2 provide additional support for structural links between personal episodes and abstract representations of traits. However, participants did not verbalise the memories that were retrieved during the autobiographical task (following the methodology of Klein & Loftus, 1993). Therefore, it is possible that participants recalled general representations of experience (e.g., ''at times I've been shy''), instead of specific episodic experiences (i.e., memories pertaining to individual events such as ''one particular time I was shy''). If this were the case, the results of Experiment 2 would reveal links between abstract trait knowledge and general representations of experience, which would not refute the position of Klein, Loftus, and their colleagues (e.g., Klein, Chan, & Loftus, 1999).

An additional experiment was conducted to address this issue. This experiment involved 15 undergraduate and graduate students (7 men and 8 women), who participated individually. The stimuli and the procedure were almost identical to those in Experiment 2, with three exceptions. First, participants pressed the space bar with the forefinger of their non-dominant hand and wrote recalled memories with their dominant hand. Second, participants were asked to read the prime stimulus aloud to ensure that they read it accurately. Third, the experimenter handed participants lined sheets of paper and asked them to write down a brief description of a retrieved memory after they recalled the memory and pressed the space bar.

Two judges, who were unaware of the experimental conditions, independently read each memory described by participants and marked whether the memories were specific or general. The judges agreed on more than 93% of the cases. Discrepancies were resolved through discussion. Only 12% of all retrieved memories were judged as general events, suggesting that participants seldom accessed general representations of experiences during the autobiographical task.

In addition, we examined whether the results of Experiment 2 would be replicated even when we excluded trials in which participants recalled general memories of experiences. For this purpose, we limited the following analysis to trials in which participants recalled specific experiences. Trials producing outside values were discarded as outliers (mean number of outliers = 1.2). Planned comparison revealed that participants recalled personal episodes faster in the related-trait condition ($M = 16{,}053$ ms) than in the control ($M = 16{,}963$ ms) and the unrelated-trait condition ($M = 21{,}377$ ms); $F(1, 26) = 5.59$, $MSE = 0.08$, $p < .05$.[6] These results provide support for structural links between personal episodes and abstract representations of traits.

However, it is possible that the presentation of the prime stimulus may activate not only abstract trait representations but also semantic knowledge. For example, participants might access their semantic knowledge to understand the meaning of the trait stimulus while reading the prime

[5] Because the Experiment 2 data can be also considered a special form of nested data, a simple ANOVA may not fully detect the effects of trait self-descriptiveness (Raudenbush & Bryk, 2002). Therefore, data were analysed using a Hierarchical Linear Model (HLM; i.e., Cross-Classified Random-Effects Model; Raudenbush & Bryk, 2002), in which the prime type and trait descriptiveness served as predictors. Trait descriptiveness was treated as a continuous variable. The HLM yielded a pattern of results similar to those obtained by the ANOVA.

[6] Because the response latencies for this additional experiment were longer than those in Experiment 2 under all conditions, it could be argued that participants in Experiment 2 recalled general representations of experiences rather than memories of specific experiences. In the additional experiment, however, the response time for the autobiographical task did not differ significantly regardless of whether participants recalled general or specific experiences ($p > .17$). In this additional experiment, participants were required to switch their attention between the colour monitor and the lined sheets of paper to write down memories. Also, they had to press the space bar with their non-dominant hand. These strong task demands are the probable causes of the longer response latencies in the additional experiment than in Experiment 2.

stimulus. Abstract trait knowledge might also be associated with semantic knowledge in memory, and access to abstract trait knowledge might increase the activation of semantic knowledge. Therefore, the results of Experiment 2 and the additional experiment may not sufficiently differentiate the priming effects of abstract trait representations for personal episodes from the priming effects of semantic knowledge for personal episodes. The results may reflect links between semantic knowledge and personal episodes, rather than between abstract representations of traits and personal episodes. Experiment 3 addressed this alternative explanation.

EXPERIMENT 3

Experiment 3, which aimed to exclude the alternative interpretations of the Experiment 2 results, employed essentially the same procedure as that of Experiment 2. There were four experimental conditions (self, semantic, mother, control). The self condition examined the priming effects of abstract representations of traits on subsequent recall of a personal episode, by using a prime stimulus that corresponded to abstract trait representations (e.g., I am gentle) of the participants. In the semantic condition, participants were simply presented with one personality trait before the autobiographical task (e.g., gentle), to investigate the priming effects of semantic knowledge on recall. In the mother condition, participants were presented with a prime stimulus that corresponded to their knowledge of their mother (e.g., My mother is gentle). The control condition used a nonword prime, and provided the baseline response time for the recall of a personal episode. If the priming effects of abstract trait representations on recall of personal episodes could not be entirely attributed to links between personal episodes and semantic knowledge, we expected the response latencies for the autobiographical task to be faster in the self condition than in the control and semantic conditions.

Nevertheless, even if this prediction was supported, some alternative interpretations remain. Because the prime stimulus in the self condition (e.g., I am gentle) was more lengthy than that of the semantic condition (e.g., gentle), participants could take a longer time to read it, perhaps resulting in deeper semantic processing of the trait words in the self as opposed to the semantic condition. This deeper processing could shorten the response latencies of the autobiographical task in the self condition. To avoid this, Experiment 3 added the mother condition, in which the prime stimuli were longer than those of the self condition. If abstract trait representations distinctly facilitate the recall of personal experiences, we expected the response latencies for the autobiographical task to be faster in the self condition than in the control, semantic, or mother conditions.

In addition, Experiment 3 examined the influences of trait self-descriptiveness. As in Experiment 2, we expected that the self-descriptiveness of the prime stimulus traits would influence the priming effects of abstract trait representations on recall of personal episodes. Thus, in the self condition, a prime stimulus containing self-descriptive traits should facilitate recall of personal episodes more than one involving non-descriptive traits.

Method

Participants. Participants were 26 Japanese undergraduate and graduate students (13 men and 13 women; mean age = 23.8, $SD = 3.00$), who took part in individual experiments.

Design. The prime type (self, semantic, mother, control) was manipulated within participants. Each condition involved 10 trials (critical trials). In addition to the critical trials, the experiment included 45 filler trials. The presentation order of these 85 trials was randomised across the conditions and counterbalanced for each participant. The dependent variable was the response latency for the autobiographical task.

Stimuli: Autobiographical task (critical trials). As in Experiment 2, participants were shown a single personality trait word in the autobiographical task. A total of 40 trait words, which consisted of four positive and four negative trait words for each of the five dimensions of the Big-Five personality theory, were chosen from Kashiwagi et al. (1993) and Wada (1996). They were assigned to the four conditions (self, semantic, mother, control), so that each condition involved one positive and one negative trait word from each of the five dimensions of the Big-Five personality theory. The assignment of words to conditions was counterbalanced across participants. Each word was used only once per participant.

Stimuli: Prime stimulus (critical trials). The prime stimulus in the self condition was identical to that of Experiment 2 (''I am _''). The prime stimulus in the mother condition was ''My mother is _.'' In both conditions, the blank space of the prime stimulus contained a single trait word that was the same as that in the autobiographical task (e.g., I am gentle; My mother is gentle). In the semantic condition, the prime stimulus was a single trait word, which was identical to that of the autobiographical task. In the control condition, four asterisks were used as a nonword prime.

Stimuli: Filler trials. In the self, mother, and semantic conditions, the trait words for the prime stimulus were the same as those for the autobiographical task. Therefore, participants could prepare a personal episode during the prime stimulus presentation, which might distort the response latencies for the autobiographical task. To avoid this, 45 filler trials were also included, in which the trait word for the prime stimulus was semantically and perceptually irrelevant to that of the autobiographical task. Among these 45 filler trials, the prime stimulus was similar to that of the self condition for 15 trials, and to the mother condition for another 15 trials. For the remaining 15 trials the prime stimulus was a single trait word, as in the semantic condition.

For the filler trials, 90 additional trait words were selected from Kashiwagi et al. (1993), Tsuji (2001), and Wada (1996). In addition, 26 trait stimuli were used in the practice session. These additional 116 trait words did not involve any trait words that were semantically similar to those used in the critical trials. As in the critical trials, each word for the filler trials was also used once per participant.

Procedure. The procedure was essentially the same as that of Experiment 2. However, instead of reading the prime stimulus silently, participants were asked to read it aloud to ensure that they read it accurately. Participants were asked to press the keyboard space bar with the forefinger of their dominant hand immediately after verbalising the prime stimulus. After participants had completed all of the experimental trials, they were handed a questionnaire that contained 40 trait words for the critical trials. Participants were asked to rate the applicability of each word to themselves on a 5-point scale.

Results

The response time for the autobiographical task was subjected to the logarithmic transformation. Trials producing outside values (Tukey, 1977) were excluded as outliers from the following analysis (mean number of discarded trials = 1.04, $SD = 2.07$). Neither the gender of participants nor the valence of the personality traits used qualified any of the findings (ps $> .15$). Data from one participant included seven outside values and were excluded.

A one-way within-participants ANOVA on the transformed latencies produced a significant main effect for the prime type (Figure 2): $F(3, 72) = 10.16$, $MSE = 0.01$, $R^2 = .79$, $p < .001$. Tukey's test showed that response latencies were significantly faster in the semantic condition than in the control condition ($p < .05$). Response latencies were also significantly faster in the self condition than in the control ($p < .01$), semantic ($p < .05$), or mother ($p < .01$) conditions.

These results complement and extend the findings of Experiments 1 and 2 in several ways. First, consistent with previous research (e.g., Conway & Bekerian, 1987; Reiser et al., 1985), the results suggest that semantic knowledge is linked to personal episodes in memory, and that access to semantic knowledge extends activation to nodes for personal episodes along the links between them. In addition, although access to semantic knowledge of personality traits facilitates the recall of personal episodes, access to abstract trait knowledge facilitates this recall better. Thus, thinking or saying ''I am'' strongly

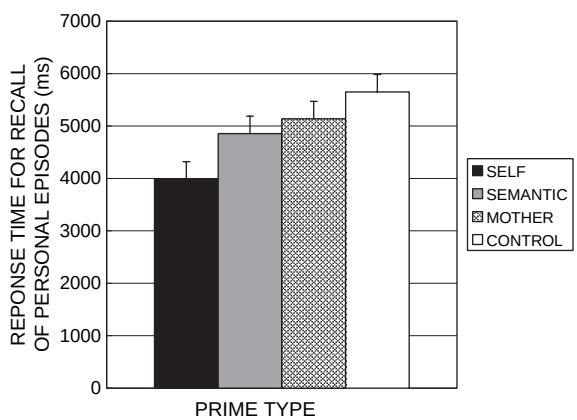

Figure 2. Mean response latencies for the recall of autobiographical memory as a function of prime types (Experiment 3). Error bars represent the within-participants standard error (see Loftus & Masson, 1994).

activates the abstract trait representations of participants, enhancing the recall of personal episodes more in the self condition than in the semantic condition. Finally, the finding that response latencies were shorter in the self condition than in the mother condition suggests that the advantage in the self condition over the semantic condition cannot be attributed to the length of the prime stimulus. These results provide evidence for associations between abstract trait representations and personal episodes in long-term memory.[7]

Effects of the self-descriptiveness of the prime stimulus trait words. To examine the influence of the self-descriptiveness of the prime stimulus traits, the trait words used in the self, semantic, and mother conditions were sorted into two levels of self-descriptiveness (descriptive and non-descriptive).[8] As in Experiment 2, because the prime stimulus of the control condition did not contain a trait word, control condition trials were excluded from the following analysis.

A 3 (prime type: self, semantic, mother) $\times$ 2 (trait self-descriptiveness: descriptive, non-descriptive) within-participants ANOVA was conducted on the response latencies for the autobiographical task (see Table 2). This analysis revealed significant main effects for the prime type: $F(2, 46) = 4.91$, $p < .05$; and trait descriptiveness: $F(1, 23) = 13.23$, $p < .01$. The interaction between the prime type and trait descriptiveness was not significant. However, post hoc comparisons within each level of trait descriptiveness revealed the following differences. For self-descriptive traits, the response latencies for the autobiographical task were significantly faster in the self condition than in the semantic and the mother condition (ps $< .05$). In contrast, for non-descriptive traits, the response latencies were faster in the self condition than in the mother condition ($p < .05$), but differences between the self condition and the semantic condition dropped to only marginal significance.[9] In addition, analysis of simple effects found that prime stimuli containing self-descriptive traits facilitated faster recall of personal episodes than stimuli containing non-descriptive traits in the self condition, $F(1, 68) = 4.67$, $p < .05$. These results are consistent with our predictions, revealing that in the self condition, the prime stimuli containing self-descriptive traits facilitated the recall of personal episodes more strongly than did prime stimuli containing non-descriptive traits.

TABLE 2
Experiment 3

Trait descriptiveness	*Self*	*Semantic*	*Mother*
Descriptive	3755	4285	4459
Non-descriptive	4233	6105	6439

Mean response time (ms) for the recall of personal episodes as a function of prime type and trait descriptiveness (Experiment 3).

However, we unexpectedly found that response latencies were significantly faster for self-descriptive traits than for non-descriptive traits in the semantic condition, $F(1, 68) = 5.52$, $p < .05$, and the mother condition, $F(1, 68) = 10.96$, $p < .01$. As previous research has shown (e.g., Markus, 1977), highly self-descriptive traits are more accessible than non-descriptive traits. Therefore, even in the mother and semantic conditions, a prime stimulus containing self-descriptive traits might increase the accessibility of corresponding abstract trait knowledge, and activating abstract trait knowledge might spread to personal episodes, resulting in a heightened accessibility of personal episodes related to self-descriptive traits. Thus, although the trait descriptiveness results were somewhat unexpected, they are compatible with our other results demonstrating that abstract representations of traits are associated with related personal episodes in long-term memory.[10]

[7] When participants were presented with "My mother is gentle," they might have recalled personal episodes consistent with that sentence (e.g., "She treated me with care when I fell off my bike"). Hence, it could be argued that response latencies for the autobiographical task should be reduced even in the mother condition. However, in the autobiographical task of the mother condition, participants were asked to recall personal episodes in which they themselves manifested the stimulus trait (e.g., "I listened to my friend when he was distressed"), rather than personal episodes in which their mother manifested the stimulus trait.

[8] The distribution of trait descriptiveness was not skewed (skewedness $= -0.18$). As in Experiment 2, the relation between self-descriptiveness and response latencies had no significant trend for curvilinearity ($p > .13$).

[9] The means presented in Table 2 seem to imply an opposite pattern: The effects of prime type were stronger for non-descriptive traits than for self-descriptive traits. However, response latencies for non-descriptive traits ($SD = 3869$) had a larger variance than those for self-descriptive traits ($SD = 2151$), which would result in a significant effect of the prime type in self-descriptive traits, but not in non-descriptive traits.

[10] When data were analysed using a HLM, similar results were obtained.

Discussion

In summary, the results of Experiment 3 provide further evidence for links between personal episodes and abstract trait knowledge. However, these findings might appear inconsistent with results of previous research. As in our Experiment 3 semantic condition, Klein et al. (1997) asked participants to carry out an autobiographical task after a read-only task, in which participants simply read a single trait word. In contrast to the results of Experiment 3, Klein et al. found that response latencies for the autobiographical task did not differ for either the descriptive or read-only initial task, suggesting that access to abstract trait knowledge does not facilitate the autobiographical task more than the read-only task. The disparity in results between the two studies may reflect methodological differences. To activate participants' abstract trait representations, we simply presented the prime stimulus, while Klein et al. used the descriptive task. It is possible that presentation of the prime stimulus distorted the results of Experiment 3. However, the preliminary experiment (which used the simple prime stimulus) replicated the results of Experiment 1 (which used the descriptive task; see Footnote 2).

Also, our target task in Experiment 3 was always the autobiographical task. In contrast, Klein et al. (1997) used a 3 (initial task: descriptive, autobiographical, read-only) $\times$ 2 (target task: descriptive, autobiographical) within-participants design to create six initial target–task pairings. Thus, it is possible that participants in Experiment 3 were more able to prepare memories before the autobiographical task than participants in the experiment by Klein et al. However, the preparation idea does not explain the results of Experiment 3. In Experiment 3, participants were presented with the same trait word twice in the self and the semantic and mother conditions. Thus, participants could prepare a personal episode equally in these three conditions. However, we found that response latencies for recalling personal episodes were faster in the self condition than in the mother and semantic conditions. Thus, participant preparation cannot fully explain the priming effects that abstract representations of traits have on personal episodes. Our conclusion, that access to abstract representations of traits facilitates recall of personal episodes better than access to semantic knowledge, cannot be attributed to methodological differences between our experiments and those of Klein et al.

GENERAL DISCUSSION

Much research on self-knowledge has described the various forms of interaction between semantic self-knowledge and episodic self-knowledge (e.g., Blagov & Singer, 2004; Brewer, 1986; Conway et al., 2004; Robinson, 1986; Ross, 1989; Woike et al., 1999). On the other hand, research concerning the mental representations of personal trait knowledge has suggested that abstract trait knowledge is represented independently of personal episodes (e.g., Klein et al., 1997; Klein & Loftus, 1993; Tulving, 1993). However, our study showed that accessing similar abstract trait representations facilitated a faster recall of personal episodes than accessing irrelevant abstract trait representations (Experiments 1 and 2), a nonword prime (Experiments 2 and 3), knowledge of one's mother (Experiment 3), or semantic knowledge (Experiment 3). We also observed stronger facilitative effects of abstract trait representations on recall of personal episodes for self-descriptive traits than for traits that were not self-descriptive. These results clearly suggest that abstract trait knowledge is linked with personal episodes in long-term self-knowledge.

Our results also indicate that the assumptions underlying the interpretation of some previous research are inadequate. The conclusion that abstract trait knowledge is represented independently of personal episodes assumed that defining a trait word did not facilitate the recall of a personal episode (Klein & Loftus, 1993), or that reading a trait word did not promote the autobiographical task (Klein et al., 1997). Contrary to these assumptions, our results from Experiment 3 indicate that reading a trait word also facilitates the recall of personal episodes, suggesting that personal episodes are linked to related semantic knowledge in long-term memory. Therefore, defining or reading a trait word can also facilitate the recall of personal episodes. Thus, the results of Klein, Loftus, and their colleagues could indicate that access to abstract trait representations facilitates recall of autobiographical episodes to the same extent as the define or read-only tasks do. If so, this would not imply the independence of abstract trait knowledge and personal episodes. In summary, our study

provides evidence that abstract trait representations are associated or linked with related personal episodes in long-term self-knowledge.

However, some questions remain. First, are the facilitation effects of the prime stimulus, corresponding to abstract trait knowledge on recall of personal episodes, compatible with views that abstract trait knowledge is represented independently of personal episodes? Previous research has suggested that abstract representations of traits do not exist when there are few trait-related experiences (Klein et al., 1992b; Klein, Sherman, & Loftus, 1996b). Therefore, prime stimuli containing trait words, which are not self-descriptive words, might not be able to activate abstract trait knowledge. Instead, they might activate personal episodes related to those traits, which could facilitate the recall of related personal episodes. Thus, even if abstract representations of traits and personal episodes were not associated in memory, the prime stimulus might facilitate the recall of personal episodes, although these facilitation effects would be limited to trials containing non-descriptive traits. However, in Experiments 2 and 3 we found that prime stimuli containing self-descriptive traits facilitate the recall of personal episodes far more than do prime stimuli containing non-descriptive traits. These results clearly suggest that abstract trait knowledge is associated with personal episodes.

Second, it might be argued that the results of the present study could be attributable to the familiarity of trait words. For example, self-descriptive traits could be considered more familiar than non-descriptive traits, or the familiarity of trait words could be considered a factor in the differences in findings between the present study and those of Klein and his colleagues. To address these issues, we obtained word frequency data from Tsuji (2001). However, trait descriptiveness was not significantly correlated with word frequency in Experiments 2 and 3 (ps $> .18$). In addition, we submitted response latencies to general linear models (GLM), using the prime type, word frequency, and an interaction between the prime type and word frequency as predictors. These GLMs did not find significant interactions between the prime type and word frequency in any of the three experiments (ps $> .19$). These results suggest that familiarity of trait words did not distort the results of trait descriptiveness and can not explain differences in results between the present study and those of Klein and his colleagues. Further research is needed to examine other factors, such as age of acquisition of trait words (e.g., Ellis & Lambon Ralph, 2000).

In conclusion, this study provides substantial evidence that abstract trait knowledge is linked to related personal episodes in mental representations of self-knowledge, suggesting that episodic self-knowledge is associated with related semantic self-knowledge in long-term memory. These results provide support for the SMS model of autobiographical memory, which assumes that the conceptual self (i.e., abstract trait knowledge) interacts with specific personal episodes and an autobiographical knowledge base (Conway et al., 2004).

Episodic and semantic memory

It could be argued that the results of the present study are inconsistent with research on episodic and semantic memory, which has demonstrated that these two types of memory can be dissociated from one another in patients with brain damage (see Wheeler & McMillan, 2001, for reviews). However, this study does not refute research about episodic and semantic memory for two reasons. First, recent research has indicated that episodic and semantic memories have not only independent aspects, but also interrelated aspects (e.g., Westmacott et al., 2003; Westmacott & Moscovitch, 2003).

Second, it is reasonable to assume that semantic self-knowledge has some aspects of episodic memory, which could result in links between abstract trait knowledge and personal episodes. Previous research has shown that semantic memory is associated with noetic (knowing) awareness (e.g., Wheeler, Stuss, & Tulving, 1997). In contrast, semantic *self*-knowledge can involve self-knowing (autonoetic) awareness, which research has shown to be associated with episodic memory (Wheeler et al., 1997). This suggests that semantic self-knowledge intersects somehow with episodic memory, in which personal episodes are represented, and therefore that semantic self-knowledge cannot be completely independent of episodic self-knowledge.

Implications for self-knowledge

The present study has several implications for the self-knowledge field. First, our findings may help to resolve an apparent inconsistency in the

self-knowledge literature. Many researchers have pointed out that episodic self-knowledge and semantic self-knowledge interact closely with each other (Blagov & Singer, 2004; Kunda & Sanitioso, 1989; Markus & Kunda, 1986; Sanitioso et al., 1990; Woike et al., 1999; for reviews, see Brewer, 1986; Conway & Pleydell-Pearce, 2000; Kunda, 1990; Ross, 1989). However, research focused on the mental representations of personal trait knowledge has suggested that abstract trait knowledge is represented independently of related personal episodes in long-term memory (e.g., Klein & Loftus, 1993; Tulving, 1993). Our study has pointed out that the interpretations of the results of these studies are based on questionable assumptions. We have provided substantial evidence that abstract trait knowledge is represented with related personal episodes in long-term self-knowledge. This suggests that semantic self-knowledge is associated with episodic self-knowledge in long-term mental representations, which serve as the underlying mechanism for the dynamic interactions between these two kinds of self-knowledge. Thus, the current study may help to resolve this inconsistency.

Second, this study suggests an explanation for the underlying cognitive mechanism governing the effects of self-concept on the recall of personal episodes. Previous research has indicated that personal episodes that were compatible with an individual's self-concept were more accessible (e.g., Markus & Ruvolo, 1989; Woike et al., 1999). Our results suggest that the effects of self-concept on the recall of personal episodes might depend on the structural relationships between semantic and episodic self-knowledge in memory. Since an individual's self-concept is a primary representation, it should be highly accessible in long-term memory (e.g., Markus, 1977). As a result, the activation of nodes for self-concept would activate nodes for related personal episodes along the structural links between them, resulting in high accessibility for personal episodes that are consistent with the individual's self-concept. Thus, the structural links between self-concept and personal episodes may explain the cognitive mechanism by which self-concept influences the recall of personal episodes.

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