Self-Schematic Representation of the Type A and B Behavior Patterns

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Past research has established clear behavioral differences between Type A and B individuals. The purpose of our research was to examine how these behavioral differences are represented in the self-definitions of Type A and Bs. We investigated the existence of Type A and B self-schemata by using two tasks designed to measure the influence of these hypothetical structures on speed of processing and memory interference. During an initial task, Type As and Bs made self-relevant decisions (like me, not like me) in response to trait adjectives previously scaled as Type A, Type B, or neutral in content. Reaction times for the decisions were measured, and results indicated that both Type As and Bs made faster decisions for schema-compatible responses than for schema-incompatible responses. On a second task, Type As and Bs were tested for recognition memory after they attempted to memorize half of the aforementioned trait list. Memory errors were examined and indicated that Type As and Bs made more errors that were compatible with their respective self-schemata. Taken together, these results indicate that a Type A and B distinction forms a reliable organizing framework for the self-definitions of Type A and Bs. The existence of stable cognitive structures that parallel the behavioral differences between Type A and Bs has important implications for both theory and application.

Past medical research has validated the important role of the Type A behavior pattern in the etiology of coronary heart disease (e.g., Cooper, Dette, & Weiss, 1981; Dembroski, Weiss, Shields, Haynes, & Feinleib, 1978; Haynes, Feinleib, & Kannel, 1980; Rosenman et al., 1975), and psychological research has verified its three major components: competitive achievement striving, time urgency, and hostility (for reviews, see Glass, 1977; Matthews, 1982). More recently, researchers have focused on how Type As and Bs attend to, process, and respond to environmental information. For example, it is now apparent that Type As and Bs differ in the attention they allocate to task-relevant and task-irrelevant stimuli (e.g., Carver, Coleman, & Glass, 1976; Matthews & Brunson, 1979; Strube & Lott, 1985; Strube, Turner, Patrick, & Perrillo, 1983; Weidner & Matthews, 1978; see also Humphries, Carver, & Neumann, 1983), their interpretations of the performance of others (e.g., Smith & Brehm, 1981; Strube & Werner, 1985), and their interpretations of their own performances (e.g., Brunson & Matthews, 1981; Rhodewalt, 1984; Strube, 1985). Consequently, emerging theoretical views on Type A and B behavior have a decidedly cognitive flavor and appear to share an emphasis on how Type As and Bs evaluate themselves and respond to self-relevant information (cf. Matthews, 1982, p. 312–313; Price, 1982; Strube, in press).

Crucial to such formulations is knowledge of how Type A and Bs organize information about their own behavior. Accordingly, our purpose in these two studies was to examine whether Type A and Bs have coherent cognitive representations, or self-schemata, of their behavioral styles.

Organization of Self-Knowledge

Social cognition research has firmly established the existence of cognitive structures, or schemata, that aid in the processing of information from the social world (e.g., see Cantor & Mitchell, 1979; Fiske & Taylor, 1984; Markus, 1980; Wyer & Carston, 1979). Schemata represent cognitive generalizations that are based on frequent past experience with objects, events, or people to which one is exposed. The presumed advantages of schemata are the provision of efficiency in information processing (not all information is or need be processed), the organization of a bewildering array of stimuli into coherent knowledge structures, and the enhanced future use of information. Given that much information processed by individuals is related to themselves, it is not surprising that researchers have identified cognitive structures that serve to organize self-knowledge. In fact, it has been suggested that these self-schemata are central to the processing of all social information, and that an adequate understanding of how individuals make sense of their social world is intimately tied to how they make sense of their own behavior (cf. Markus & Smith, 1981; see also Rogers, 1981).

Empirical research has demonstrated the existence of self-schemata in several domains (e.g., Crane & Markus, 1982; Ingram, Smith, & Brehm, 1983; Markus, 1977; Markus, Crane, Bernstein, & Siladi, 1982; Markus & Smith, 1981; Mills, 1983) and has indicated a number of reliable consequences of self-schemata on the processing of self-related information (Bargh, 1982; Cacioppo, Petty, & Sidera, 1982; Kernis, 1984; Kuiper,
1981; Kuiper & Rogers, 1979; Miller, 1984; Rogers, Kuiper, & Kirker, 1977; Rogers, Rogers, & Kuiper, 1979). For example, individuals who have a schema in a particular domain can process schema-compatible information more quickly, can readily retrieve schema-compatible information from memory, can confidently predict their future behavior in the relevant domain, and can resist schema-incompatible information (Kendzierski, 1980; Markus, 1977; Markus & Smith, 1981). In addition, self-schemata can produce reliable memory distortions (e.g., Rogers et al., 1979). Several of these characteristic features of self-schemata are used in this study as the basis for examining Type A/B differences in self-definition.

Type A/B Self-Schemata

As noted previously, much psychological research has been focused on the different ways in which Type As and Bs process and respond to self-relevant information. The verification of Type A/B content differences in the organization of self-knowledge would provide an important complement to this research and would establish the existence of a cognitive component that is critical to the development of a general cognitive–behavioral model of Type A and B patterns.

By investigating the presence/absence of Type A/B self-schemata, we address an additional issue of importance within the Type A literature. Specifically, there has been an emphasis on the understanding of Type A behavior at the expense of understanding Type B behavior. Indeed, Type B behavior is often defined as the relative absence of Type A characteristics. In some respects, this biased emphasis is not surprising: It is the Type A individual who is more coronary prone. From a theoretical standpoint, however, a thorough understanding of Type B behavior is critical. A useful starting point is to determine whether the Type B pattern is a coherent, organized entity in the cognitive structure of Type Bs or simply a convenient catch-all label used by researchers to characterize individuals who do not exhibit Type A behavior. It is entirely possible that Type B behavior is not seen as an important invariance by individuals who are labeled as Type B. This would imply that the Type B label is more a theoretical and methodological convenience than a reflection of reality, with important implications for explanations of Type A/B differences. Thus one outcome of this research would be an indication of whether it is appropriate to consider both the Type A and B patterns as well-organized behavioral styles that are reflected in cohesive cognitive organizations of self-knowledge.

Self-Schema Detection

In this study, two tasks were used to provide converging evidence for the presence of Type A/B self-schemata. The first task was modeled after the trait endorsement procedure developed by Markus (1977; see also Markus et al., 1982). In this procedure subjects respond to a list of trait adjectives by pressing one of two buttons labeled Like Me and Not Like Me. The traits are selected for their relevance to the self-schema domain under study, and the reaction time for each endorsement is measured. As Markus (1977; Markus et al., 1982) demonstrated, decisions compatible with the underlying self-schema are made more rapidly than are schema-incompatible decisions. In this study, Type As and Bs (as defined by standard questionnaire assessment) responded to traits from three lists: Type A, Type B, and neutral. If Type As organize their self-knowledge along the Type A/B dimension, then their reaction times for schema-compatible responses (Type A word: like me; Type B word: not like me) should be faster than their reaction times for schema-incompatible responses (Type A word: not like me; Type B word: like me). Likewise, if Type Bs organize their self-knowledge along the Type A/B dimension, then their reaction times for schema-compatible responses (Type B word: like me; Type A word: not like me) should be faster than their reaction times for schema-incompatible responses (Type B word: not like me; Type A word: like me). Type As and Bs should not differ in their reaction times to neutral words (which are irrelevant to the Type A/B dimension).

The second task enabled us to examine the presence of self-schemata via their influence on recognition memory. Rogers et al. (1979) showed that the enhanced accessibility of schema-relevant information can lead to reliable interference on a schema-irrelevant memory task (i.e., the false alarms effect). In our study, subjects were asked to memorize half of the adjective list on which they had previously made their like me—not like me endorsements. Subsequently, the entire list was shown to the subjects who had to judge whether a given word was on the prior memory list. The false positive errors were classified according to whether they were consistent with a Type A self-schema or a Type B self-schema. For example, a Type A false positive error would occur if a Type A trait previously endorsed as like me (or a Type B trait previously endorsed as not like me) was incorrectly recognized as having been on the memory list. The assumption behind false positive errors is that their accessibility in memory (which is due to their presence in the self-schema) makes them more likely to intrude into the recognition task. If Type As organize self-knowledge along the Type A/B dimension, then they should make more Type A schema-compatible errors than Type B schema-compatible errors. Likewise, if Type Bs organize self-knowledge along the Type A/B dimension, then they should make more Type B schema-compatible errors than Type A schema-compatible errors. Although there is no precedent in past research, we also examined whether self-schemata influenced the proportion of false negative errors. For example, subjects may be less likely to recognize a word previously rated in a schema-incompatible manner.

Study 1

Method

Overview

Male and female undergraduate volunteers participated in what was described as a study of self-concept and its relation to task performance. During an initial phase of the study, subjects completed a 66-item trait-adjective rating scale and a questionnaire measure of the Type A and B behavior patterns. During a second phase (at least 2 weeks after the initial phase), subjects were tested individually on a series of cognitive and behavioral tasks designed to elicit Type A/B differences. The series included an adjective endorsement task in which reaction times were assessed, a task in which solution of simple math problems was examined, a time estimation task, and a recognition memory task.
Subjects

Forty-two undergraduate volunteers (17 male and 25 female) participated in the study. The average age of the subjects was 20.8 years.

Word Lists

We used lists of Type A, Type B, and neutral self-descriptive words that were generated during a pilot phase of the research. We generated an initial list of 335 adjectives by using previous compilations (e.g., Anderson, 1968), dictionaries, and our knowledge of Type A and Type B patterns. A panel of 5 judges, knowledgeable in the characteristics of Type As and Bs, independently rated each word according to whether it was clearly characteristic of Type As, Type Bs, or neither exclusively. Words on which there was complete agreement (100%) were retained; this resulted in a list of 25 Type A words (e.g., competitive, driven) and 23 Type B words (e.g., relaxed, patient). Removal of synonymous words resulted in two word lists, each composed of 22 self-descriptive adjectives. A list of neutral words was constructed from words that could not be classified as clearly Type A or Type B in content (e.g., creative, religious). The neutral list also contained 22 words. Next, a group of 20 undergraduates (from the same population as that used in our study) rated all 66 words (randomly ordered) on 5-point desirability and meaningfulness scales. The three lists were found to be comparable in their rated desirability (Type A list: $M = 3.47, SD = 0.91$; Type B list: $M = 3.70, SD = 0.73$; neutral list: $M = 3.50, SD = 1.10$), in their rated meaningfulness (Type A list: $M = 4.70, SD = 0.16$; Type B list: $M = 4.57, SD = 0.24$; neutral list: $M = 4.64, SD = 0.26$), and in their average word length (Type A list: $M = 8.77, SD = 2.21$; Type B list: $M = 7.91, SD = 1.76$; neutral list: $M = 8.13, SD = 2.40$). Thus interpretation of endorsement rates and processing speed are not hampered by response biases arising from list differences that were unrelated to content.

Procedure

Subjects participated in what they were told was a two-phase experiment on self-concept and its relation to task performance.

Phase 1. During the initial phase, subjects completed the student form (Form T) of the Jenkins Activity Survey (JAS; Krantz, Glass, & Snyder, 1974) in order to assess their Type A/B status. The student form of the JAS is modeled after the adult version with the exception that items regarding job involvement have been replaced with items involving academic activities. Although the JAS Form T has been the standard assessment procedure for college-aged populations, it must be recognized that the JAS has been found to correlate only modestly with the Structure Interview, an assessment procedure that bases Type A and B classification on verbal and nonverbal responses in addition to content of answers (see Matthews, 1982; Musante, MacDougall, Denbroski, & Van Horn, 1983). Accordingly, studies in which different assessment procedures were used may not be comparable. We return to this issue of assessment correspondence in the discussion. In addition, subjects were presented a list of the 66 self-descriptive adjectives (in random order) and were asked to rate themselves by using 9-point scales bounded by not at all like me (1) and very much like me (9). The self-descriptive ratings for the 66 adjectives provided one check on the adequacy of their classification as Type A relevant, Type B relevant, or neutral. Phase 1 measures were group administered.

Phase 2. Subjects participated individually in the second phase of the study a minimum of 2 weeks after the first phase. During the second phase, subjects were exposed to a series of tasks, two of which were designed to enable us to examine their self-schematic organization of Type A and B behavior. Presentation of all tasks and the recording of subjects' responses were automated via small computer. Different experimenters conducted Phases 1 and 2.

The first task was modeled after the trait endorsement procedure de-
random order, in order to test recognition memory. Subjects were shown two keys labeled new and old, respectively. Subjects were told to press the key labeled new if the word on the screen had not appeared on the previous memory list, and to press the key labeled old if the presented word had appeared on the memory list. During the recognition task, the computer presented words and recorded the subject’s recognition response. A word remained on the screen until either the new or old button was pressed. For exploratory purposes, the reaction times for each memory decision were recorded automatically by the computer.

After completion of the recognition test, the study was concluded, and the subjects were thoroughly debriefed. Probes for suspicion during debriefing indicated very little skepticism; no subjects reported knowledge of the study’s true purpose.

Results

For purposes of analysis, subjects were classified as Type A (JAS scores ≥ 9; n = 22) or Type B (JAS scores ≤ 8; n = 20) on the basis of a median split of scores on the JAS (Mdn = 8.6). This procedure produced groups that differed substantially in their average JAS scores (5.15 vs. 10.91), F(1, 40) = 81.58, p < .001, although one must recognize that such a procedure also provides a more conservative test of the hypotheses than an extreme-groups classification. Preliminary analyses indicated the absence of sex differences; thus results to be reported are collapsed across sex of subject. (There were similar proportions of male and female subjects among Type A and B groups.) Because some subjects failed to complete all materials, degrees of freedom vary slightly.

Adjective Ratings

Subjects’ initial self-descriptive ratings provided one means of verifying the intended content differences in the 66-word list. Ratings were averaged over the 22 adjectives that constituted the Type A, Type B, and neutral sublists; thus each subject contributed three average ratings to the analysis. We examined these ratings by using a 2 × 3 (Subject Type: Type A or B × Word Type: Type A, Type B, or Neutral) analysis of variance (ANOVA); the latter factor was treated as a repeated measure. Results indicated a significant Word Type × Subject Type interaction, F(2, 78) = 7.61, p < .001 (see Table 1). Additional analyses within word type indicated that Type As, in comparison with Type Bs, provided higher ratings in response to Type A adjectives, t(39) = 2.83, p < .01, but lower ratings in response to Type B adjectives, t(39) = 2.41, p < .025.1 Type As and Bs did not differ in their ratings for neutral words, t(39) = 0.74. Contrasts within subject type indicated that Type As rated the Type A words more self-descriptive than the Type B words, t(78) = 4.13, p < .001, rated the neutral words as more self-descriptive than the Type B words, t(78) = 2.50, p < .025, and tended to rate the Type A words as more self-descriptive than the neutral words, t(78) = 1.53, p < .10. Type Bs, on the other hand, tended to rate the Type B words as more self-descriptive than the Type A words, t(78) = 1.38, p < .10, but did not provide reliably different ratings for Type A and neutral words, t(78) = 0.67, or for Type B and neutral words, t(78) = 0.71. Taken together, these results provide evidence for the intended content differences between sublists (further evidence is provided as follows with respect to endorsement rates).

Table 1

<table>
<thead>
<tr>
<th>Subject Type</th>
<th>Type A</th>
<th>Type B</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>6.19</td>
<td>5.26</td>
<td>5.84</td>
</tr>
<tr>
<td>Type B</td>
<td>5.51</td>
<td>5.83</td>
<td>5.67</td>
</tr>
</tbody>
</table>

Note. Individual ratings could range from 1 (not at all like me) to 9 (very much like me).

An additional characteristic of self-schemata is that the content forms a coherent cluster of interrelated traits; that is, self-schemata are assumed to be internally consistent. If the Type A and B word lists provide adequate representations of Type A and B content, then they should exhibit internal consistency (as measured via coefficient alpha). The neutral list, on the other hand, should exhibit trivial internal consistency because it was not designed to represent a clear dimension. Among Type As, internal consistency estimates were high for the Type A list (r = .75) and Type B list (r = .84) but low for the neutral list (r = .29). Similarly, analyses for Type Bs indicated high internal consistency for the Type A list (r = .78) and Type B list (r = .89) but low internal consistency for the neutral list (r = .20).

Adjective Endorsement

Data collected during the adjective endorsement task yielded two distinct types of information: (a) number of adjectives endorsed as self-descriptive (i.e., like me) and (b) the amount of time to decide whether an adjective was self-descriptive or not. The number of adjectives endorsed as self-descriptive provides an additional and more critical check on the sublist content differences. We examined these frequency data by using a 2 × 3 (Subject Type: Type A or B × Word Type: Type A, Type B, or Neutral) ANOVA in which the latter factor was treated as a repeated measure. The only reliable effect to emerge from the analysis was the Subject Type × Word Type interaction, F(2, 80) = 11.90, p < .001. As the means in Table 2 indicate, the expected pattern of endorsements was obtained. Additional contrasts indicated that Type A subjects endorsed reliably more Type A words as being self-descriptive than did Type B subjects, t(40) = 4.09, p < .001. An opposite pattern emerged with respect to Type B words, t(40) = 3.31, p < .005, and no reliable differences were obtained with respect to endorsement of neutral words, t(40) = 0.30. Analyses within subject type indicated that Type As endorsed more Type A than Type B words as being self-descriptive, t(80) = 2.91, p < .005. The number of neutral words endorsed did not differ reliably from the number of Type A words endorsed, t(80) = 0.78, but was reliably larger than the number of Type B words endorsed, t(80) = 2.09, p < .05. Type B subjects endorsed reliably more Type B than Type A words,

1 Contrasts are based on an appropriate pooling of error terms (see Kirk, 1968). Of the error terms pooled, the more conservative (smaller) degrees of freedom is used to test for significance.


\( t(80) = 3.96, p < .01 \). The numbers of neutral words endorsed by Type Bs were not reliably different from the number of Type B words endorsed, \( t(80) = 1.29, \) but were reliably larger than the number of Type A words endorsed, \( t(80) = 2.67, p < .01 \). These results provide strong evidence for content differences in the adjective lists; both Type As and Bs responded to those differences.

An examination of internal consistency of endorsements was also undertaken. Paralleling the results for the rating data, Type As exhibited considerable internal consistency on the Type A list (\( r = .73 \)) and Type B list (\( r = .72 \)) but no internal consistency on the neutral list (\( r = 0 \)). Likewise, Type Bs exhibited considerable internal consistency on the Type A list (\( r = .76 \)) and Type B list (\( r = .80 \)) but little consistency on the neutral list (\( r = .37 \)).

Taken together, the adjective rating data and adjective endorsement data provide converging and compelling evidence for the intended list differences. However, the adjective endorsements and ratings do not themselves provide compelling evidence for the existence of self-schemata. Instead, they provide a self-report format that is amenable to investigation of processing speed and memory interference. An extensive description of list development has been provided because the validity of the subsequent hypothesis test rests on the adequacy of the constructed lists.²

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**Endorsement Decision Time**

The endorsement decision time data were examined with a \( 2 \times 3 \times 2 \) (Subject Type: Type A or B \( \times \) Word Type: Type A, Type B, or Neutral \( \times \) Endorsement Type: Like Me or Not Like Me) ANOVA.³ The latter two factors were treated as repeated measures. Results indicated a reliable main effect for word type, \( F(2, 80) = 13.78, p < .001 \), and a reliable main effect for endorsement type, \( F(1, 40) = 27.48, p < .001 \), both of which were qualified by a reliable Subject Type \( \times \) Word Type \( \times \) Endorsement Type interaction, \( F(2, 80) = 4.74, p < .025 \). The triple interaction was reflected in a pattern of means that supported the hypothesis that Type As and Bs would differ in their decision times for schema-compatible versus schema-incompatible decisions (see Table 3).

We conducted additional analyses to examine more specific aspects of this complex interaction. In particular, schematic representation should be indicated by faster like me than not like me reaction times in the compatible domain, but faster not like me than like me reaction times in the incompatible domain. Also, schematic representation should result in faster like me reaction times in the compatible domain than in the incompatible domain, but faster not like me reaction times in the incompatible domain than in the compatible domain. Contrasts computed within subject type and word type indicated that among Type A subjects, reliably faster decisions were made when Type A words were endorsed as being self-descriptive than when they were endorsed as not self-descriptive, \( t(40) = 4.29, p < .001 \). For Type B words, Type As provided faster decisions when claiming that an adjective was not self-descriptive than when claiming an adjective to be self-descriptive, but the difference was not reliable, \( t(40) = 0.42 \). Likewise, endorsements for neutral words did not differ reliably, \( t(40) = 0.97 \). Contrasts within endorsement type indicated that Type As were reliably faster when claiming a Type A word to be self-descriptive than when claiming a Type B word to be self-descriptive, \( t(40) = 2.62, p < .025 \). A nonsignificant difference in the opposite direction was obtained for Type A and B words endorsed as not like me, \( t(40) = 1.30 \). Although the reliability of specific contrasts varied, the overall pattern of means is consistent with the view that Type As have a stable self-schema in the Type A/B domain; this cognitive structure allowed them to make schema-compatible decisions (i.e., Type A word: like me and Type B word: not like me) faster (\( M = 2.54 \) s) than schema-incompatible decisions (i.e., Type B word: like me and Type A word: not like me; \( M = 3.06 \) s), \( t(40) = 2.81, p < .01 \).

The pattern of means for Type Bs was also consistent with the possession of a self-schema in the Type A/B domain. Although endorsement decision times were not reliably different for Type A words, \( t(40) = 1.14 \), Type Bs responded significantly faster when endorsing a Type B word as being self-descriptive than when claiming it to be non-self-descriptive, \( t(40) = 3.58, p < .001 \). Unexpectedly, Type Bs responded reliably faster when claiming neutral words to be self-descriptive than when claiming them to be non-self-descriptive, \( t(40) = 1.75, p < .05 \). Within endorsement type, self-descriptive endorsements for

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**Table 3**

**Endorsement Decision Time as a Function of Subject Type, Word Type, and Endorsement Type**

<table>
<thead>
<tr>
<th>Subject type/endorsement type</th>
<th>Type A</th>
<th>Type B</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>Like me</td>
<td>2.29</td>
<td>2.88</td>
</tr>
<tr>
<td></td>
<td>Not like me</td>
<td>3.25</td>
<td>2.79</td>
</tr>
<tr>
<td>Type B</td>
<td>Like me</td>
<td>2.85</td>
<td>2.97</td>
</tr>
<tr>
<td></td>
<td>Not like me</td>
<td>3.06</td>
<td>3.96</td>
</tr>
</tbody>
</table>

*Note. Reaction times are displayed in original metric (seconds).*

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**Table 2**

**Number of Words Endorsed as Self-Descriptive as a Function of Subject Type and Word Type**

<table>
<thead>
<tr>
<th>Subject type</th>
<th>Word type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A</td>
</tr>
<tr>
<td>Type As</td>
<td>15.27</td>
</tr>
<tr>
<td>Type Bs</td>
<td>10.95</td>
</tr>
</tbody>
</table>

*Note. Individual endorsements could range from 0 to 22.*

² A copy of the adjective lists and the computer program for their presentation is available on request.

³ The reaction times were log transformed before analyses in order to reduce heterogeneity of variances and to remove the influence of extremely slow reaction times (i.e., remove positive skew in the distributions of reaction times). Nontransformed data produced the same pattern of means and reliable contrasts.
Table 4
Proportion of Recognition Errors as a Function of Subject Type, Schema-Type, and Error Type

<table>
<thead>
<tr>
<th>Subject type</th>
<th>Type A schema-compatible errors</th>
<th>Type B schema-compatible errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>False positive</td>
<td>False negative</td>
</tr>
<tr>
<td>Type As</td>
<td>.182</td>
<td>.264</td>
</tr>
<tr>
<td>Type Bs</td>
<td>.128</td>
<td>.255</td>
</tr>
</tbody>
</table>

Note: Type A schema-compatible false positive errors represented false claims that a word was on the memory list when that word had previously been rated in a Type A schema-compatible fashion (Type A word: like me; Type B word: not like me). Type A schema-compatible false negative errors represented false claims that a word was not on the memory list and that word had previously been rated in a Type B schema-compatible fashion (Type A word: not like me; Type B word: like me). Type B schema-compatible errors derived in an analogous manner.

Type A and B words were not reliably different, $t(40) = 0.34$, but non-self-descriptive endorsements for Type B words were reliably slower than for Type A words, $t(40) = 2.81, p < .01$. Paralleling the results for Type As, Type Bs made schema-compatible decisions more rapidly ($M = 3.02$ s) than schema-incompatible decisions ($M = 3.40$ s), $t(40) = 1.77, p < .05$.

Overall, both Type As and Type Bs made self-relevant decisions that were compatible with their presumed self-schemata faster than they made incompatible decisions. The means in Table 3 indicate that this effect was due primarily to differences in decisions made within the content domain that paralleled the behavior type; that is, for Type As the greatest difference in endorsement times occurred within the Type A list, whereas the greatest difference for Type Bs occurred within the Type B list.

Recognition Memory

We hypothesized that if Type As and Bs possess self-schemata in the Type A/B domain, then those cognitive structures should exert reliable distortions on a schema-irrelevant memory task (cf. Rogers et al., 1979). Words that are compatible with an individual's self-schema should be quite salient in memory and more likely than incompatible words to intrude into responses on a schema-irrelevant memory task. Subjects' errors during the memory task were transformed into proportions in order to equate for differing numbers of adjective-type-endorsement-type test items. These proportions were then analyzed in a $2 \times 3 \times 2 \times 2$ (Subject Type: Type A, Type B × Word Type: Type A, Type B, Neutral × Endorsement: Like Me, Not Like Me × Error Type: False Positive, False Negative) ANOVA in which the latter three factors were treated as repeated measures. Because of the highly specific nature of the hypotheses, a priori contrasts were used. Two such contrasts were computed, one each for false positive and false negative errors. In the contrast for false positive errors, we examined the hypothesis that Type As would make more Type A schema-compatible errors than Type B schema-compatible errors, and that the reverse pattern would be true for Type Bs. As expected, this pattern emerged (see Table 4) and was reliable, $t(40) = 1.82, p < .05$. In the second contrast, we tested a parallel prediction for false negative errors. Although Type As made a proportionally greater number of Type A schema-compatible false negative errors than Type B schema-compatible false negative errors, and Type Bs exhibited the opposite trend (see Table 4), the contrast was not reliable, $t(40) = 0.66$. Thus false negative errors do not appear to provide a sensitive index of self-schema influence.

Memory Task Decision Time

We conducted an exploratory analysis of memory task decision times to examine whether additional effects of self-schema influence could be uncovered. Decision times were log transformed and examined via $2 \times 3 \times 2 \times 2$ (Subject Type: Type A, Type B × Word Type: Type A, Type B, Neutral × Prior Endorsement: Like Me, Not Like Me × Memory List Status: Old, New × Reported Status: Old, New) factorial ANOVA in which the latter four factors were treated as repeated measures. This analysis indicated that Type As made their memory decisions faster ($M = 1.61$ s) than did Type Bs ($M = 1.96$ s), $F(1, 40) = 4.54, p < .05$. All subjects also tended to make correct decisions faster ($M = 1.64$ s) than incorrect decisions ($M = 1.93$ s), as indicated by a Memory List Status × Reported Status interaction, $F(1, 40) = 40.41, p < .001$. This tendency was further qualified by subject type and word type, $F(2, 80) = 4.36, p < .025$. The relevant means are displayed in Table 5. Additional analyses were conducted within subject type and word type. Among Type As, correct memory decisions were made faster than incorrect decisions for Type A words, $t(80) = 2.60, p < .01$, and neutral words, $t(80) = 4.72, p < .001$, but not for Type B words, $t(80) = 1.34$. Among Type Bs, correct decisions were made faster than incorrect decisions for Type B words, $t(80) = 4.60, p < .001$, and neutral words, $t(80) = 3.73, p < .001$, but not for Type A words, $t(80) = 0.61$. In other words, both Type As and Bs made correct decisions faster than incorrect decisions except with word lists containing counterschematic information. Possible explanations for this pattern are deferred until the general discussion.

Math Problems and Time Estimation

Subjects participated in two tasks intervening between the endorsement procedure and the memory test. Although the ma-
The purpose of these tasks was to provide an interference experience before the memory task, they also were designed to elicit Type A/B differences. The first task involved the solution of simple math problems, first without a deadline, then with an explicit deadline. A 2 × 2 (Subject Type: Type A or B × Deadline Condition) ANOVA indicated no reliable differences between Type As and Bs; all subjects attempted more problems under the deadline condition (M = 94.9) than under the no-deadline condition (M = 76.8), F(1, 39) = 112.49, p < .001. Analysis of errors, however, indicated that Type As made a greater proportion of errors during both phases (M = .026) than did Type Bs (M = .013), F(1, 39) = 9.10, p < .005. The second task required subjects to estimate the passage of a minute. Type As and Bs did not differ reliably in these estimates, F(1, 38) = 0.71; all subjects tended to provide overestimates (M = 79.7 s).

Discussion

Overall, the results of this investigation provide convergent evidence for schematic organization of self-knowledge among Type As and Bs. An additional study was conducted, however, in order to clarify one pattern of obtained results. In particular, the endorsement decision time data (Table 3) suggest that the processing efficiency afforded by self-schemata is domain specific, operating for Type As within the Type A word list and for Type Bs within the Type B word list. Decision times did not differ for Type As and Bs for the Type B and A lists, respectively. We thought it desirable to replicate this finding. We also wanted to determine whether the significant difference between endorsement times on neutral words for Type Bs would replicate.

Study 2

Method

Twenty-six undergraduate volunteers (15 male, 11 female) participated in this study. The procedure represented a replication of the endorsement decision task from Study 1. As in Study 1, subjects completed the JAS in order to assess their Type A/B status. In this study, however, we administered the JAS after the endorsement task to determine whether it might have sensitized subjects in Study 1. Furthermore, subjects did not provide adjective ratings before the endorsement task in order to eliminate another possible sensitization effect.

Results and Discussion

Subjects were classified as Type As (JAS score ≥ 9) or Type Bs (JAS score ≤ 8) on the basis of a median split of their scores on the JAS (Mdn = 8.75). The endorsement decision times are displayed in Table 6 and indicate a pattern of means that closely resembles that obtained in Study 1. The only reliable differences to emerge were the domain-specific decisions for Type As and Bs; Type As provided reliably faster decisions when claiming a Type A word as self-descriptive than when claiming a Type A word to not be self-descriptive, t(48) = 3.54, p < .001; Type Bs provided faster decisions when claiming a Type B word to be self-descriptive than when claiming a Type B word to not be self-descriptive, t(48) = 1.78, p < .05. No other contrasts were reliable.

By combining the reaction time data from both studies, it is possible to obtain a more fine-grained examination of schematic representation among levels of JAS-defined Type A behavior. In Figure 1 we illustrate the degree of schematic representation (not like me reaction times minus like me reaction times) in the Type A and B domains for subjects who scored in the upper, middle, and lower thirds of the JAS distribution. There is a nearly linear relation between level of Type A or B behavior and its schematic representation. As JAS scores increase, subjects indicated greater degrees of schematic representation in the Type A domain and lesser degrees of schematic representation in the Type B domain.

General Discussion

The results of these two studies provide evidence for self-schematic representation of the Type A and B behavior patterns. Both Type As and Type Bs processed self-relevant information more efficiently when that information was compatible with the presumed underlying self-schemata. Furthermore, recognition errors on a schema-irrelevant memory task were more prevalent when the test word was a component of the presumed underlying self-schema; this demonstrated the "false alarms effect" that is indicative of schema interference (Rogers et al., 1979). Thus it appears that Type A and B behavior represents an important invariance in the social experiences of Type As and Bs, respectively.

The pattern of endorsement decision times suggests, in addition, that the Type A and B domains may represent distinctly organized content clusters that can be represented independently as self-schemata. In other words, it appears that it may be inappropriate to consider Type A and Type B as mutually exclusive categories or as polar opposites along a single dimension.

Table 6

<table>
<thead>
<tr>
<th>Subject type/endorsement type</th>
<th>Word type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A</td>
</tr>
<tr>
<td>Type A</td>
<td></td>
</tr>
<tr>
<td>Like Me</td>
<td>2.23</td>
</tr>
<tr>
<td>Not Like Me</td>
<td>3.69</td>
</tr>
<tr>
<td>Type B</td>
<td></td>
</tr>
<tr>
<td>Like Me</td>
<td>3.03</td>
</tr>
<tr>
<td>Not Like Me</td>
<td>3.22</td>
</tr>
</tbody>
</table>

Note: Reaction times are displayed in original metric (seconds).
sion. Instead, it may be more appropriate to consider the Type A and B domains as distinct independent entities. If true, this would have both theoretical and empirical implications. Theoretically, it suggests that individuals could conceivably fall into one of four different classifications: schematic in the Type A domain but not the Type B domain, schematic in the Type B domain but not the Type A domain, schematic in both domains (dual schematics), or aschematic in both domains. The first two classifications would represent Type As and Bs as typically defined. The third group, schematic in both Type A and B domains, would appear to be similar to individuals classified as Type X according to the Structured Interview assessment procedure (Rosenman, 1978), who have clear characteristics of both Type As and Type Bs. The last classification, aschematic in both Type A and B domains, would appear to represent individuals for whom Type A and B behavior is not an important behavioral invariance, and for whom the Type A/B distinction is not relevant to the organization of self-knowledge. These distinctions would be crucial to theoretical accounts of Type A/B behavior. The aschematics would be outside the bounds of theoretical explanation because Type A/B is an irrelevant distinction for them. Those individuals who are schematic in one domain but not the other would presumably behave as classic Type As and Bs. Individuals schematic in both domains present a special challenge because in theoretical formulations, one would need to specify when Type A or Type B behavior would predominate. Methodologically, the existence of four distinct subgroups would indicate the need for possible revisions in the way Type A and B behavior is assessed, and could contribute to the only moderate agreement between the JAS (a unidimensional measure) and the Structured Interview (which in principle allows multiple dimensions to emerge; see Matthews, 1982).

The presence of two distinct domains has some empirical justification in our research. If the formulation just presented is correct; then schematic representation in the Type A domain should not be dependent on schematic representation in the Type B domain, and four distinct groups should be identifiable. Furthermore, dual schematics and aschematics should have moderate scores on the JAS, whereas individuals who are schematic in one domain but not the other should have extreme

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5 This distinction between Type A and B behavior as endpoints of one dimension, or independent entities, parallels a similar discussion by Bem (1981, 1982) and Markus (Crane & Markus, 1982; Markus, Crane, Bernstein, & Silash, 1982) regarding the femininity–masculinity distinction.
scores. Subjects (from both studies; $n = 68$) were classified as schematic or aschematic in the Type A and B domains on the basis of a median split of the differences between *not like me* and *like me* reaction times for Type A and B words, respectively (a large positive difference in reaction times would be indicative of schematic representation in that domain). As expected, four distinct and relatively independent groups emerged, and both dual schematics ($M = 8.37; n = 16$) and aschematics ($M = 7.86; n = 14$) scored near the mean of JAS scores, whereas Type A schematics obtained higher JAS scores ($M = 10.15; n = 20$) and Type B schematics obtained lower JAS scores ($M = 7.06; n = 18$).

The ability to distinguish two separate domains also provides a possible resolution of the failure to find strong behavioral differences on the filler tasks. It is possible that the two domains exert their influence on different aspects of behavior. The correlations between schematic representation and task characteristics provided support for this notion. Subjects with greater degrees of schematic representation in the Type B domain made fewer errors on the math tests than did subjects with less schematic representation, $r(40) = - .41, p < .01$. Schematic representation in the Type A domain was unrelated to number of errors, $r(40) = .01$. On the other hand, schematic representation in both domains was related to total number of problems attempted, but in opposite directions: for the Type B domain, $r(40) = -.32, p < .05$; for the Type A domain, $r(40) = .24, p < .06$. Thus the Type B domain was associated with both slow and careful responding, whereas the Type A domain was associated simply with faster responding. This more fine-grained analysis does not shed any additional light on the failure to find time estimation differences. In light of the strength of the other results, it seems best to consider the lack of time estimation differences as being due to some variability in the procedures used in this study and by Glass (1977). We did not, for example, pose the task to subjects as a challenge. Perhaps this would have produced the intended differences.

Although the data support the existence of self-schemata for both Type As and Type Bs, the evidence was somewhat weaker for Type Bs. For example, in Study 1, although Type Bs exhibited reliably faster *Type B like me* than *Type B not like me* decisions, they also exhibited reliably faster *like me* than *not like me* decisions for the neutral words. In the second study, the differences in decision times for Type Bs within the neutral list were not reliable, but the differences within the Type B list were weaker than the differences obtained for Type As within the Type A list. There are several possible explanations that deserve mention. First, it could be that the Type B list did not capture the core components of Type B behavior, or that it contained multiple domains that obscured detection of the Type B domain. These explanations seem unlikely: (a) Very stringent criteria were used to select words for the lists; (b) patterns of endorsements by Type As and Bs were virtually mirror images (see Table 2); and (c) internal consistency of items within the Type B list was so large as to make it unlikely that multiple domains were being assessed.

A second possibility is that Type As are more self-focused than Type Bs (e.g., Rhodewalt, 1984; Scherwitz, Berton, & Leventhal, 1978) and as a consequence have more fully developed, more elaborated, or more accessible self-structures. Our data cannot address the plausibility of this explanation. It is, however, amenable to future test. For example, if Type As are more self-focused in general than Type Bs, then all of their self-structures should be more fully developed, not just those within the Type A domain. Furthermore, Type As should be more able than Type Bs to provide elaborate and detailed descriptions of past instances of schema-compatible behaviors. Finally, Type As should be more able than Type Bs to provide confident predictions about future schema-compatible behaviors. Even if this additional research did not demonstrate greater schema articulation for Type As than Bs, it would provide additional evidence for schema existence among Type As and Bs. The desirability of this future research should not, however, obscure the fact that convergent evidence from the endorsement and memory tasks in our two studies indicates that both Type As and Bs appear to organize self-knowledge consistent with their behavioral styles.

We previously noted that much research on Type As and Bs has been focused on responses to self-relevant information and that a full understanding of such processes would benefit from consideration of self-schemata. One influence of self-schemata is the rejection of counterschematic information (Markus, 1977). Failure information should constitute a greater threat to Type As than Type Bs because it counters their self-declarations more. Accordingly, Type As should exert greater effort to invalidate or explain the counterschematic evidence (via increased efforts at control or success; see also Clary & Tesser, 1983) and give up only after prolonged exposure to failure (which convinces them of the partial validity of the evidence). In several studies, researchers have in fact demonstrated that Type As, in relation to Type Bs, respond to initial, brief exposure to uncontrollable failure with exaggerated attempts to regain control (e.g., Glass, 1977; Krantz et al., 1974; Matthews, 1979) but respond to extensive exposure to uncontrollable failure with greater passivity.

A second example stems from results reported by Strube (1985) regarding the attribution styles of Type As and Bs. Strube found that when asked to make causal attributions for hypothetical positive and negative outcomes, Type As were more self-serving, assuming greater causal responsibility for positive than negative events. One explanation for these results rests on the effects that self-schemata have on the recall of personal information. Schema-consistent information is more easily remembered and elaborated (Markus, 1977), and it seems plausible that the ease with which past instances of success and failure can be recalled should influence attributions. The greater number of past instances of success, and their ease of recall, may imply dispositional influences that operate across diverse situations. Infrequent and difficult-to-recall failure episodes imply extinguishing circumstances. Thus Type As may be more self-serving in their attribution style because of the greater ease with which they can recall past success as a function of their self-schemata. The greater availability of past success may also underlie the “I can do it better” attitude that characterizes...
the Type As' reluctance to relinquish control to others (e.g., Strube, Berry, & Moergen, 1985; Strube & Werner, 1985).

In addition to enhancing our understanding of self-relevant information processing by Type As and Bs, a consideration of self-schemata suggests important issues regarding the evaluation of others. For example, it has been demonstrated that self-schemata form an important basis for the evaluation of others (Fong & Markus, 1982; Markus & Smith, 1981); individuals are biased toward seeking and evaluating information about others that is consistent with their self-deﬁnitions (see also Lewicki, 1983). The similarity between judgments made about others and judgments made about the self may be due to the generally greater accessibility of self-related constructs (Higgins, King, & Mavin, 1982) or to the greater confidence with which people make judgments in domains in which they are expert (Fong & Markus, 1982). One implication is that the same person could be judged differently by individuals with different self-schemata. Given the importance of the Type A/B distinction in the achievement and performance domains, it seems particularly important to examine how Type A and B self-schemata influence judgments of others. Also, given our previous comments about the potentially greater accessibility of self-structures for Type As, it could be that Type As are more prone than Type Bs to judge others according to some self-standard.

Finally, some comment regarding the inﬂuence of self-schemata on the time taken to make recognition memory decisions is necessary. Recall that in the first study we explored this variable as a potential measure of self-schemata impact. Results indicated that the tendency to make correct decisions more rapidly than incorrect decisions did not hold when subjects were considering test words from the domain that countered the presumed self-schema. One possible explanation is that counterschematic words were particularly difﬁcult to integrate into memory (no available structure) and thus could not be recognized as efﬁciently on the recognition test. Thus the typical ease with which correct decisions were made did not emerge for counterschematic words. This conclusion is only tentative. Given the exploratory nature of this analysis, it is best to await the outcome of more research as to the viability of recognition memory decision time as a useful measure of self-schema inﬂuence.

In summary, these two studies verify the presence of self-schemata in the Type A and B domains. These cognitive structures should prove useful in the development of more complete models for describing and predicting how Type As and Bs attend to, process, and respond to information in their social worlds.

References


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