

## EFFECTS OF CULTURE AND PROCESSING GOALS ON THE ACTIVATION AND BINDING OF TRAIT CONCEPTS

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Two studies compared spontaneous trait use by Latinos and Anglo-Americans, with trait-implying behaviors equated over cultures on their intentional trait implications. In Study 1, only Anglos showed activation of trait concepts on a lexical decision task. In Study 2, with the more complex stimuli set, Anglos showed greater binding (linkage) of trait concepts and/or behaviors to the actors performing the behaviors. Results were consistent with the more frequent use of trait terms by Euro-Americans than by those from collectivist cultures, especially in open-ended self-descriptions and causal explanations, and illustrate the value of investigating activation and binding as two separable stages of spontaneous trait inference. The results also show that spontaneous inferences can reveal cultural differences that intentional inferences do not.

One of us (JSU) recently introduced a classroom discussion of spontaneous trait inferences by asking students for their first thought in response to the sentence, "He wondered where the stars come from." Almost 95% of undergraduates at NYU said "curious" when asked for trait infer-

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ences (Uleman, Hon, Roman, & Moskowitz, 1996). Neha (a student from India) immediately said "child," providing an unexpected entree to the topic of cultural differences in social inferences. Neha was not the only one to see this sentence as implying "child" rather than "curious;" this paper's first author (MAZ) had the same impression. Those from collectivist cultures are more likely than individualistic Euro-Americans to see social role rather than trait implications, and to use them in descriptions and explanations, but the reasons for this finding are not clear.

In this paper we describe two studies that show cultural differences in the initial stages of spontaneous trait use: activation and binding. These studies not only add to the growing literature on cultural differences in trait use, but also demonstrate the value of researching spontaneous rather than intentional inferences.

## CULTURAL DIFFERENCES IN THE USE OF TRAITS

There is considerable evidence that cultures differ in how often they use personality traits to describe and explain human behavior. "Europeans and Americans often prefer to explain social behavior primarily in terms of personal attributes and dispositions, [whereas] for other populations . . . explanation of behavior seems to require an analysis of social roles, obligations, and situational factors" (Fiske, Kitayama, Markus, & Nisbett, 1998, p. 915). Among the best evidence for these differences is Miller's (1984) contrasting Euro-American and Indian explanations of successes and failures; Kashima, Siegal, Tanaka, and Kashima's (1992) contrasting Australians and Japanese on correspondent attitude attributions; Morris and Peng's (1994) contrasting Euro-American with Chinese perceptions of causality and dispositional explanations; and Menon, Morris, Chiu, and Hong's (1999) and Chiu, Morris, Hong, and Menon's (2000) demonstrations that Chinese attribute dispositions and agency to groups, whereas Americans make these attributions to individuals. Euro-Americans also use traits more than Indians do when describing others (Miller, 1987; Shweder and Bourne, 1984), and use traits more in self-descriptions than do Japanese (Cousins, 1989), Koreans (Rhee, Uleman, Lee, & Roman, 1995), or Puerto Rican children (Hart, Lucca-Irizarry, & Damon, 1986).

Cultural differences in the frequency of trait use have appeared to be so general and robust that they comprise defining features of some of the major global distinctions between cultures. Individualist cultures emphasize the private self, whereas collectivist cultures emphasize the collective self (Triandis, 1995). "The private self includes cognitions that involve traits, states, or behaviors (e.g., 'I am honest'). The collective self consists of cognitions about group membership (e.g., 'I am a son')" (Trafimow, Triandis, & Goto, 1991, p. 649). In contrast to people in inter-

dependent cultures, people in independent cultures view the self as "an independent, self-contained, autonomous entity who (a) comprises a unique configuration of internal attributes (e.g., traits, abilities, motives, and values) and (b) behaves primarily as a consequence of these internal attributes . . ." (Markus & Kitayama, 1991, p. 224).

However, recent research suggests that these cultural differences are less sweeping and more subtle than originally assumed. An early warning of complexity appeared in Cousins' (1989) study of self-descriptions. Although Euro-Americans used traits three times as often as Japanese did on a standard Twenty Statement Test (TST), Japanese used traits 60% more often than Euro-Americans when the TST was contextualized by asking for descriptions of the self when "at home," "at school," and "with close friends." More recently, Krull, Loy, Lin, Wang, Chen, & Zhao (1999) used Jones and Harris's (1967) attitude attribution paradigm and Ross, Amabile, and Steinmetz's (1977) quiz master paradigm to look for cultural differences in the correspondence bias (over-emphasizing dispositional causes relative to situational causes). They found a strong correspondence bias among both Euro-Americans and Chinese in both studies. More importantly, there was no evidence of any cultural difference in the correspondence bias. Choi and Nisbett (1998) did find subtle differences in the correspondence bias for attitude attribution with Korean and American participants. Both groups showed the usual bias, but when situational causes were made highly salient, Americans' bias was unaffected whereas Koreans' bias decreased.

This last result, several others reported by Choi and Nisbett (1998) and Norenzayan, Choi, and Nisbett (1999), and an extensive literature review led Choi, Nisbett, and Norenzayan (1999) to propose that East Asians are generally *not* any less likely than Americans to use traits in descriptions and explanations. Instead, East Asians show more sensitivity than Westerners to situational causes. For example, Koreans were more sensitive than Americans to facilitating and inhibiting situational information in predicting future behavior. However, there was no difference in Chinese and American willingness to infer dispositions and use them to predict consistent future behaviors, even when predicting to very different situations. Both groups greatly and equally overestimated the cross-situational stability of behavior (Norenzayan et al., 1999). Choi et al. (1999) concluded "that 'dispositionism' is a cross-culturally widespread mode of thinking . . . The East-West split in attribution thus originates primarily from a stronger 'situationism' or belief in the importance of the context of behavior in East Asia" (p. 47).

This conclusion may prematurely minimize cultural differences in dispositionism. It minimizes the frequently replicated differences in trait use for self-descriptions on the TST noted above (Cousins, 1989; Ip & Bond, 1995; Rhee et al., 1995; Trafimow et al., 1991, Study 1; and

Triandis, 1989), and in descriptions of others (Miller, 1987; Shweder & Bourne, 1984). It minimizes differences in the use of traits and other internal characteristics in causal explanations (e.g., Chiu, Morris, Hong, & Menon, 2000; Kashima et al., 1992, for attitudes; Lee, Hallahan, & Herzog, 1996, with newspaper accounts; Menon et al., 1999, including newspaper accounts in Study 1; Miller, 1984, with explaining vignettes; and Morris & Peng, 1994, including newspaper accounts in Study 2). Furthermore, the new evidence from Norenzayan et al. (1999) that there are cultural differences in "situation-based predictions" but not in "disposition-based predictions" is based on studies that only vary situational information, rather than on studies with comparable variation in situational and dispositional information.

It is suggestive that much of the evidence for cultural differences in trait use comes from relatively open-ended measures, such as the TST or open-ended explanations of events. Such open-ended measures reveal chronically accessible constructs and inference procedures because they typically do not involve questions that are explicitly about either traits or situations. More structured measures, which make traits or situational causes explicit, necessarily make them more salient. Once a trait explanation for behavior is salient, all people seem to find it difficult to discount them. East Asians show the correspondence bias just as much as Westerners, and when they do respond more to highly salient situational information, the bias is only reduced, not eliminated (Choi et al., 1999). This suggests that additional information might be gained from studying the earliest stages of trait inference and activation, in contexts where chronic accessibility and habitual inference processes rather than question-induced salience are decisive. Spontaneous trait inferences are not prompted by any questions at all, so they should be more sensitive to cultural differences in trait use than are more explicit measures.

## SPONTANEOUS TRAIT INFERENCES

Spontaneous trait inferences (STIs) are trait inferences that occur unintentionally, almost effortlessly, and usually without awareness. They occur with attention to trait-implying behavior for almost any purpose (Uleman & Moskowitz, 1994). If participants try to memorize sentences such as "The secretary solved the mystery half way through the book," they typically infer "clever" as a trait description of the secretary and are unaware of that inference. Making STIs involves two separable processes: activation of the trait concept through an inference procedure, and attaching or binding that concept to an actor or agent in long-term memory (LTM).

STIs can be detected in several ways including cued recall; recognition reaction times (RTs); word-stem completions; lexical decisions; and sav-

ings in relearning. These last two methods are used in Studies 1 and 2 below. STIs may provide the input for the initial stages of intentional inferences (Gilbert, 1998, p. 113) or act as primes that influence subsequent unrelated judgments (Moskowitz & Roman, 1992; Stapel, Koomen, & van der Pligt, 1996; see Uleman, 1999, and Uleman, Newman, & Moskowitz, 1996 for more details).

STIs reflect chronic inference procedures (Duff & Newman, 1997, Study 2). They are "habits of the mind," developed for dealing with frequently occurring information patterns and associated chronic goals. The more someone intentionally infers particular traits, or traits in general, the more the procedures for doing so become automatic (Smith, 1994). The ease with which STIs occur should provide evidence of the importance of trait inferences for a particular population. Thus, if members of one culture make trait inferences more often than members of another, they should show more evidence of STIs.

The first evidence of cultural differences in STIs was reported by Newman (1991). In a developmental study of trait inferences, he found evidence for STIs among suburban fifth graders but no such evidence among fifth graders in an urban, largely Puerto Rican neighborhood. This unpredicted finding was explained in terms of Latino cultures being less individualist and more collectivist (e.g., Marin & Triandis, 1985), and traits being used less widely in collectivist cultures.

Because this cultural explanation was post hoc, follow-up studies were done to see whether individual differences in individualism were related to STIs. Using Euro-American participants, Newman (1993) found a positive relationship between STIs and individualism in two studies, one using cued-recall (for men only) and the other a recognition RT procedure (for men and women). Again using Euro-American participants and the same measure of individualism (i.e., ideocentrism; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988), Duff and Newman (1997, Study 1) found that individualism was negatively related to making spontaneous situational inferences, thereby ruling out the possibility that individualism correlates positively with making any sort of inference. These studies provided very suggestive evidence for cultural differences in STIs. However, no published studies to date have found predicted STI differences between cultures.

## SPONTANEOUS VERSUS INTENTIONAL TRAIT INFERENCES

There are at least two advantages to looking for cultural differences in trait use with STIs rather than with intentional inferences. First, responses are less structured by the STI "questions" than with the more traditional open-ended response formats; they are spontaneous. To the extent that cultural differences are more likely to occur when responses

are less restricted, STIs should reveal them. Of course, the methods for detecting STIs (and other spontaneous inferences) require that one knows what one is looking for. Thus spontaneous inferences are probed in highly structured ways in order to detect them, but the procedures place minimal restrictions on participants' responses, in part because they do not realize that they are making them.

Second, spontaneous inferences reveal more about individual differences in cognitive practice than intentional inferences do. Intentional inferences reveal competencies and are shaped by current motives and the demands of communication. Spontaneous inferences have no such functions. Zelli and colleagues (Zelli, Cervone, & Huesmann, 1996; Zelli, Huesmann, & Cervone, 1995) reported two cued-recall studies that empirically support this idea. Participants read trait-implicating sentences with a memory goal. Those in the "deliberate inference" condition also thought about why the actors did what they did. Participants in both studies were either high or low on actual behavioral aggression (e.g., having "threatened, or actually cut [someone] with a knife, or shot with a gun").

Some sentences were ambiguous, having hostile and non-hostile interpretations. "The electrician looks at his younger brother and starts laughing" could imply "ridicule" or "playful." "The man in the second row starts screaming when the athlete runs by" could imply "insulting" or "excited." Zelli et al. (1995, 1996) predicted that highly aggressive participants would spontaneously interpret these sentences in the hostile way but that differences between participants would not occur for deliberate inferences because everyone was capable of making both interpretations. That is, intentional inferences would produce multiple interpretations, not just the spontaneous inferences that occur on the basis of chronically accessible constructs or highly practiced procedures.

Both studies supported this prediction, suggesting that spontaneous impressions are more sensitive to the influence of chronically accessible constructs and highly proceduralized inference processes than the "traditional deliberate processing paradigms, which have yielded relatively small aggressive/nonaggressive differences" (Zelli et al., 1995, p. 415). For more on the differences between spontaneous and intentional inferences, see Uleman (1999).

## STAGES OF STIS

One of the central issues raised by STI research has been whether the inferred traits refer to the actors or merely to behaviors (e.g., Bassili, 1989). Current evidence supports thinking of STIs as occurring in two stages. The first stage involves inferring the trait concept from behavioral or other information; this results in activation of the trait concept. (For com-

prehensive reviews of concept activation, see Higgins, 1996; Smith, 1998.) The second stage involves "binding"<sup>1</sup> or linking the trait concept to the actor (or other object) in LTM. Under some conditions, both of these stages occur relatively automatically, so the trait refers to both behavior and actor. Under other conditions, only the first stage occurs; or binding occurs to a different actor in "spontaneous trait transference" (Skowronski, Carlston, Mae, & Crawford, 1998).

Van Overwalle, Drenth, and Marsman (1999) provided some of the best evidence to date that STIs refer to actors and not just the behaviors, but the evidence is mixed (Uleman et al., 1996). In fact, STIs can occur without any actor at all (Claeys, 1990).

Stapel et al. (1996) showed that under some conditions, STIs refer only to the behavior. The investigators asked participants to read trait-implying sentences under several conditions and then, in "an unrelated study," rate a different ambiguous target person. When participants read trait-implying sentences under the usual memory instructions, assimilation of the target person to STI traits occurred. However, when they read the sentences under impression formation instructions (ensuring a trait-actor link), contrast occurred. These findings replicate those of Moskowitz and Roman (1992). In addition, when the STI sentences included names rather than pronouns, and were accompanied by photos of the actors, contrast occurred regardless of instructions. Stapel et al. interpreted these findings as showing that when STIs refer only to the behavior, this abstract trait provides an "interpretation frame" for the subsequent ambiguous target and produces assimilation. But when STIs are linked to actors (because of the names and photos), providing specific and concrete scale anchors, contrast occurs. Consistent with this, when the original sentences were accompanied by additional information implying a person attribution, contrast occurred. When the accompanying information implied a situation attribution, assimilation occurred.

Stapel and Koomen (1996) confirmed their "trait-reference" hypothesis by simply telling participants that the STI sentences were either behavior or person descriptions. The former produced assimilation of a subsequent ambiguous target; the latter produced contrast. That is, ex-

1. "Binding" has previously been described as establishing an actor-trait link or association. We adopt the term "binding" here to suggest that there may be parallels with the "binding problem" in visual object recognition and attention (e.g., Treisman, 1995), memory (e.g., Eichenbaum and Bunsey, 1995), and consciousness (e.g., Revonsuo, 1999). All of these concern the mechanism(s) by which discrete features (e.g., color, shape, motion) or other mental units get bound to each other to form coherent, higher-order units. These may also be related to findings by Krull (1993), and Krull and Dill (1996), that inference goals (questions) can determine whether inferred properties are bound to the person or to the situation.

plicit instructions were used to control which processing stage(s) occurred, and these had the predicted effects on rating other targets.

Note that unlike participants in van Overwalle et al.'s (1999) study, where probe RTs were measured immediately after each sentence, participants in Stapel and Koomen's (1996) study had to store the trait-actor links in LTM where they could affect a subsequent judgment. But storage of everything—actor, trait, and the link between them—in LTM does not always occur. Subsequent assimilation or contrast depends on precisely what is stored.

Skowronski et al. (1998) also proposed that activation and binding (or association) of STIs are separate stages on the basis of an entirely different paradigm. Their spontaneous trait transference findings show that STIs can be easily linked not to the actors performing the trait-implicating behavior, but to others who describe (communicate) the actors' behaviors. In these studies, STIs are activated as usual but then are linked to someone else such as the communicator. These results, and those of Mae, Carlston, and Skowronski (1999), provide strong evidence for separating the activation stage from that of associating the STI with an actor.

## THE PRESENT STUDIES

We conducted two studies to see whether there are cultural differences in STIs. The first one, using lexical decision RTs, is particularly sensitive to STI activation. The second one, using Skowronski et al.'s (1998, Studies 2 and 3) trait-rating procedures, is particularly sensitive to detecting the binding of STIs to actors in LTM.

The data were collected at the University of Texas at El Paso (UTEP) because it offered a unique opportunity to study cultural differences among participants with the same residential and university affiliation, ensure uniform procedures, and eliminate the problems of translating materials. Most classes are taught in English. Mexican Americans make up approximately 63% of the student population, and that group is augmented by a sizable (10%) Mexican National student population. This 3:1 ratio of Latinos to Anglos was useful because it gave us more statistical power to detect the phenomena of interest among Latinos, where we predicted STI effects would be weaker or absent.

Trait-implicating sentences were pretested in this population and selected to ensure there were no cultural differences in intentional trait inferences. By eliminating cultural differences in explicit beliefs and knowledge structures about the trait implications of behaviors, any differences that did emerge between cultures could be confidently attributed to cognitive habits.

In Study 1, we predicted that Anglos would show clearer evidence of spontaneous trait activation than Latinos. This is consistent with

Newman's (1991) results showing no STIs among Puerto Rican fifth graders, as well as with the general expectation of less trait use in collectivist cultures. In Study 2, we predicted that Anglos would show clearer evidence of spontaneous trait binding than Latinos, for the same reasons.

## STUDY 1

If Anglos use traits more often to describe and explain social events, their trait inference processes should be more practiced and proceduralized than those of Latinos. Even with behaviors that imply traits to the same degree for both cultures, spontaneous trait concept activation should be more evident among Anglos than Latinos. This was tested with a lexical decision task.

## METHOD

*Participants.* Eighty-six Latino, 28 Euro-American, and 9 students of other or unidentified ethnicity (46 men and 77 women) participated for partial course credit in an introductory psychology course. Our theoretical focus supported pooling these into two ethnic groups: Latinos and Anglos plus others (hereafter called Anglos). We over-sampled Latinos because we wanted more statistical power to detect effects in that group and because they were more numerous in the participant pool.

All participants were fluent in English, as evidenced by their being students at UTEP where most classes are taught in English, but some of the Latino participants were not using their first language.<sup>2</sup> Evidence that Latino and Anglo participants had comparable English fluency is presented below, from RTs for filler items. (This paper also ends with a more general discussion of the possible effects of using participants' first versus second languages in these studies).

*Materials.* We pretested 16 behaviors from Carlston and Skowronski (1994) and 16 from Uleman et al. (1996). For each behavior, 55 participants (47 Latinos) first described all the behaviors and then listed up to 3 trait terms that came to mind easily and described the behavior. The 32 items were presented in one of two random orders with no time limit. Behavior descriptions were coded (by CV and two others) both in terms

2. Participants classified themselves in terms of ethnicity. We know that many Latinos had had spoken English as long as they used Spanish, and that some Latinos knew little or no Spanish. Thus one cannot assume that all Latino participants were native Spanish speakers. Unfortunately, we did not collect systematic information on language history and usage.

of how much they emphasized traits and external contexts. Disagreements were resolved through discussion among all the article authors.

Trait emphases in the behavior descriptions of both the multi-sentence stimuli from Carlston and Skowronski (1994) and the single-sentence stimuli did not differ between Latinos ( $M_s = 19.38$  for multi-sentence and  $18.77$  for single-sentence stimuli) and Anglos ( $M_s = 17.13$  and  $17.13$ , respectively),  $t_s(53) < 1$ ,  $p_s > .20$ , although Latinos tended to be higher, contrary to the usual finding. In addition, the context emphases in descriptions of these stimuli did not differ between Latinos ( $M_s = 24.77$  and  $25.17$ , respectively) and Anglos ( $M_s = 27.75$  and  $23.25$ , respectively),  $t_s(53) < 1.1$ ,  $p_s > .20$ , although Latinos tended to be lower, again contrary to the usual finding. Thus, both multi- and single-sentence stimuli were well-matched in terms of their intentional trait and context implications for Latino and Anglo participants, and the small nonsignificant differences that did exist would work against our hypotheses.

Twelve sentences from Uleman et al. (1996) were chosen for this study, with trait implication percentages the highest and most comparable for Latino and Anglo participants. We also chose 12 behaviors from Carlston and Skowronski (1994) using the same criteria for use in Study 2. The behaviors and implied traits for the pretest and both studies, from both sources, are shown in Table 1.

For Study 1, two series (A or B) of 100 displays were created to present on a computer screen in a modified lexical decision task. Each series contained six trait-implying sentences followed by the implied trait word, and six control sentences (from Uleman et al., 1996) followed by an unrelated trait word (= 24 of the 100 events). The implied trait word probes for series A were the unrelated trait probes for series B, and vice versa. That is, the same 12 trait words appeared in both series in the same serial positions, but in series A, the 6 traits were preceded by sentences that implied these traits, whereas in series B, they were preceded by control sentences. Each series also contained 47 filler sentences, 5 words, and 24 non-words. These series included five filler sentences that did not imply traits, followed by trait words. A total of 59 sentences appeared, of which 24 were followed by a non-word probe, 17 by a word probe, and 18 by simply another sentence. Thus both series included the same words, non-words, and filler sentences in the same serial positions. They differed only in the 6 trait-implying and 6 control sentences.

*Procedure.* Participants completed the experiment individually and were told this was a study of the effects of people doing two things at once, "like studying while watching TV. For example, does turning your attention to the TV only when you hear a laugh from the audience lessen recall for the just-learned material?" They were asked to remember sentences that appeared on a computer screen and to make a series

of lexical decisions throughout the sentence presentation. Each sentence appeared for 3600 ms. When sentences were followed by a lexical decision rather than another sentence (so designed to be unpredictable), a letter string appeared 420 ms after the sentence disappeared and was displayed for 3600 ms. Participants indicated as quickly as possible whether the string was a word or not, via the keyboard with their dominant hand's index finger positioned on the YES key. RTs up to 2000 ms were recorded. Finally, memory for the sentences was tested for consistency with the cover story; these data were not analyzed. Neither trait inferences nor impression formation were ever mentioned or suggested, ensuring that any trait inferences that occurred were spontaneous.

*Design.* RTs (and log RTs) were averaged to produce three dependent variables for each participant: for traits implied by the preceding sentence, for traits preceded by control sentences, and for filler words. The resulting design is a 2 (Ethnicity: Latino or Anglo)  $\times$  2 (Series: A or B)  $\times$  3 (Match: probes are traits that do or do not match sentence trait implications, or are filler words) mixed factorial. Ethnicity and Series were between-Ss factors and Match was within-Ss.

## RESULTS

*Preliminary Analyses.* There were 17 lexical decision RTs of interest for each participant: 6 for traits preceded by sentences implying that trait, 6 for traits preceded by control sentences, and 5 for other words. Of all possible RTs, 5.45% were errors or missing data ( $> 2000$  ms). The modal number of missing data points per participant was 1, and 3 participants had 5 or 6. Dropping these 3 participants from further data analyses did not alter the results, so they were retained.

The distribution of each of these 17 RTs was positively and significantly ( $p < .01$ ) skewed. Log transformations reduced this skew more than square root transformations but hardly eliminated it. Therefore, the 0.96% of RTs that were more than 3 standard deviations greater or less than their log(RT) mean were dropped. As a result, only 13 of the 17 log(RT)s' skew were still at  $p < .01$ . All missing data points (6.41%) were replaced by the mean RT or log(RT) calculated from existing data for the corresponding combination of ethnicity (Latino, Anglo) and Series (A, B). Statistical analyses of RTs and log(RTs) yielded comparable results, so for clarity, we report results simply in terms of RTs.

*Comparisons of Latino and Anglo Participants.* The first question is whether Latino and Anglo lexical decision RTs differ on the 5 filler words. Because the study was conducted entirely in English, which was

TABLE 1. Implied traits and behaviors used in pretest; in Study 1 (from Uleman, marked series "A" or "B"); and in Study 2 (marked "2").

*From Carlston & Skowronski (1994)*

- Brave: I was walking down the street and I saw this guy running from the bank toward me. He had a mask on and was carrying a full bag of money. I heard the sirens, and without thinking, I jumped him and held him 'till the police got there a few seconds later.
- Cheap: I don't like to spend money. I never go to the mall. If I need something I go to Odd Lots or Value City. In the summer I go to yard sales.
- Clumsy (2): Yesterday in dance class I stubbed my toe on the piano. I bumped into the girl next to me and we both fell over. Later during class, we were turning circles and I went right into the mirrors in the front of the classroom.
- Conceited: I am the most beautiful girl in school. By the age of 13, I competed for my first national beauty title. In high school I was homecoming and prom queen. Everybody loves me.
- Confident (2): I am sure that I will get the promotion at work. I have worked hard and I have pressed all the right "social buttons." When I walk into work today, I am going to walk in there ready to assume command.
- Conformist: All of the other workers at the factory have voted to strike if they do not receive more benefits. I haven't been working here too long and feel pressured to make a choice. I am against the strike but don't want to offend anyone so I guess I'll go along with the others if they strike.
- Intelligent: I am 18 years old and a doctor. I received my medical degree from Harvard. In my spare time I enjoy doing research at the Mayo Clinic.
- Lazy: I usually crawl out of bed at noon and have some breakfast. I get dressed about two o'clock and go to work at three. I get off work at nine and by that time I am too tired to do anything else but go home and go to bed.
- Naive: A friend of mine just gave me a bag of flour to keep in my locker today at school. She told me that it was for a project in home economics. I really feel good about helping out my friend, but I wonder what that police officer was doing in my locker?
- Polite (2): I always try to say "thank you" when someone opens a door for me and I always say "excuse me" when walking down a crowded hall. Some of my friends say that my behavior is strange but I simply call it good manners.
- Religious: I attend my church twice a week and try to read the "good book" as often as I can. I stay involved with the activities of the church by attending a special prayer meeting every month. The church, for me, is a key place for personal growth.
- Romantic (2): Tonight is my anniversary. I have fixed a candlelight dinner for my husband. I'm going to serve dinner on a table that I have set up in our bedroom.
- Shy (2): I was walking along the street and I saw some girls from my psychology class coming toward me. They waved at me. I blushed and managed a small wave. I then ran across the street and into a bookstore and waited until they had walked out of sight.
- Sloppy: I enjoy having my own place. I can leave my clothes on the floor. I can leave my plate on the coffee table instead of taking it in the kitchen. I can leave my towels on the floor after taking a shower. And I do just that.
- Spontaneous: Today, I went out and bought a car. I don't need it, but it struck my fancy. I like doing things this way — I hate to spend too much time mulling over a decision.
- Superstitious (2): One morning I broke my favorite mirror and ran over my neighbor's black cat. I thought I was cursed! I couldn't figure out why I was having such a bad day until I realized what day it was: Friday the 13th.

TABLE 1. (continued)

*From Uleman et al. (1996)*


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Cautious (B):	He checked everyone's seat belts before starting off.
Cautious:	She always drove a little slower than the speed limit.
Clumsy (B, 2):	He stepped on his girlfriend's feet during the two-step.
Concerned (B, 2):	She called her Representative about increasing aid for the homeless.
Curious (A):	He asked where the stars come from.
Funny (A, 2):	Her stories made people laugh so hard they held their sides.
Generous (A):	She left a 25% tip for the waitress.
Honest (A, 2):	He returned the lost wallet with all the money in it.
Honest:	He told the cashier that he got too much change.
Insecure (B):	He was afraid the new employees wouldn't like him.
Irresponsible:	The baby sitter lost track of the two year old.
Lazy (A):	She lay around the house all day, reading magazines.
Lazy:	She took the elevator up one flight.
Nosy (A, 2):	She watched her neighbor's house to see who came and went.
Selfish (B, 2):	She wouldn't loan her extra blanket to the other campers.
Smart (B):	He took his first calculus course when he was 12 years old.

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not the first language of some Latinos, it seemed possible that lexical decisions by Latinos would be slower than those of Anglos. On the other hand, all participants were university students and accustomed to instruction in English. A *t*-test on the mean RT on filler words for Latinos ( $M = 739$  ms) and Anglos ( $M = 746$  ms) showed no evidence of any difference,  $t(121) < 1, p > .80$ , suggesting that the samples did not differ in English fluency.

The second question is whether ethnicity affected the predicted facilitation of lexical decisions about trait words when they were implied by preceding sentences. A 2 (Ethnicity: Latino or Anglo)  $\times$  2 (Series: A or B)  $\times$  2 (Match: yes or no, with fillers omitted) ANOVA, with repeated measures on the last factor, produced a predicted main effect for Match,  $F(1,119) = 6.22, p < .014$ , with RTs faster when trait probes matched sentence implications ( $M = 835$  ms) than when they did not ( $M = 862$  ms); and an uninteresting Series  $\times$  Match interaction<sup>3</sup>,  $F(1,119) = 30.58, p < .001$ . Most interesting was a marginal Ethnicity  $\times$  Match interaction,  $F(1,119) = 2.33, p < .129$ . No other effects approached significance,  $F_s < 1, p_s > .50$ .

3. The difference between RTs in the match vs. mis-match conditions was greater for list A than list B.

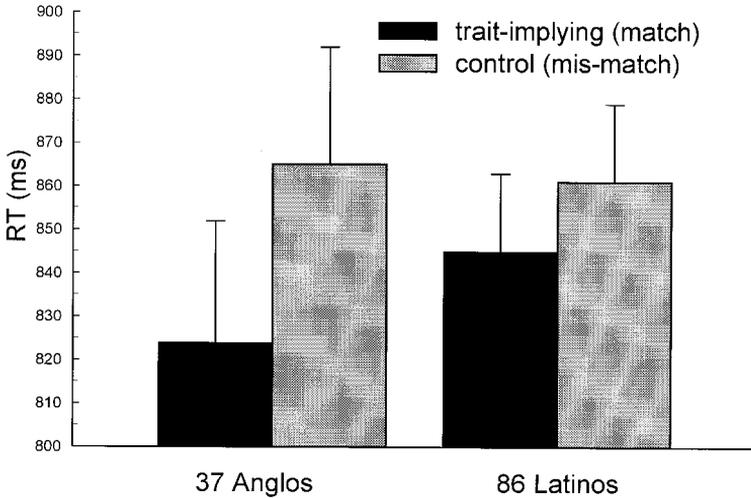


FIGURE 1. Mean lexical decision reaction times (RTs and standard errors) for Anglo and Hispanic Ps, to 6 trait words following trait-implying sentences (match) and control sentences that did not imply the traits (mis-match); Study 1.

Recall that the samples of Latinos and Anglos differed in size because we wanted to maximize our statistical power to detect STIs among Latinos (who should make them less). This size difference, and the marginal 2-way interaction, argue for separate analyses of each sample.

Anglo participants, in a  $2 \times 2$ , Series  $\times$  Match ANOVA, showed the predicted main effect for Match,  $F(1,35) = 6.87, p < .013$ . RTs were 41 ms faster when sentence implication and trait probe matched ( $M = 824$  ms) than when they mismatched ( $M = 865$  ms),  $t(36) = 2.11, p < .042$  (see the left side of Figure 1). This indicates that Anglos made spontaneous trait inferences when reading these sentences. There was also the same uninteresting Series  $\times$  Match interaction seen above,  $F(1,35) = 16.04, p < .001$ .

Latino participants, in the same  $2 \times 2$ , Series  $\times$  Match ANOVA, showed only the uninteresting Series  $\times$  Match interaction seen above,  $F(1,84) = 18.67, p < .001$ . The main effect for Match that would indicate the occurrence of STIs did not approach significance,  $F(1,84) < 1, p > .39$  (see the right side of Figure 1). Thus, there was no evidence of STIs for Latinos even though the Latino sample was much larger.

## DISCUSSION

Consistent with our prediction, Anglos but not Latinos showed trait concept activation (faster lexical decision RTs) immediately after reading trait-implying sentences. This occurred in spite of the facts that: (1)

the sentences were selected to have equally strong trait implications for Anglos and Latinos making intentional trait inferences; (2) Anglos and Latinos did not differ on lexical decision RTs to filler words; and (3) the Latino sample was over twice as large, providing greater statistical power for detecting an RT difference.

These results show a clear cultural difference in spontaneous trait activation, consistent with prior findings on cultural differences (Newman, 1991) and related variables (Newman, 1993; Duff & Newman, 1997) for STIs. They provide the first evidence of predicted differences between cultural groups. They suggest that at least part of the cultural difference in the use of traits lies in the likelihood of spontaneous trait activation by trait-implicating behaviors. Finally, they illustrate again that spontaneous inferences can reveal individual (and cultural) differences even when intentional inferences do not (Zelli et al., 1995, 1996).

## STUDY 2

Trait concepts can be spontaneously activated by an actor's behavior without being bound to the actor in LTM. Uleman et al. (1996) reviewed the evidence from cued recall studies for such binding, and offered the following summary.

So evidence of . . . direct links in explicit memory from traits to actors is mixed. The clearest evidence is from Moskowitz's (1993a) participants with high personal need for structure [PNS], and from participants memorizing several behaviors performed by each actor (Moskowitz, 1993b). Weaker evidence comes from Uleman and Moskowitz's (1994) participants who made self-relevant judgments about actors' behaviors, and from Newman and Uleman (1990), who looked at accuracy in recalling actors' gender. Other studies (Winter and Uleman, 1984; Uleman et al. [Moskowitz, Roman, and Rhee], 1993; and Uleman and Moskowitz, 1994, other conditions) have found no evidence." (p. 246)

That is, when single trait-implicating sentences are simply memorized, explicit memory tests usually provide no evidence of binding, but if participants are particularly interested in categorizing things (participants with high PNS), study several behaviors per actor, or have other processing goals, explicit memory tests do show binding. (Other evidence that binding varies with encoding conditions was reviewed at the beginning of this paper).

Perhaps the most convincing demonstrations of spontaneous binding come from work by Carlston and Skowronski and their students, using a savings in relearning paradigm to assess implicit memory. In five studies, Carlston and Skowronski (1994) asked participants to familiarize themselves with a series of color photos of people paired with trait-im-

plying behavior descriptions. Then, after an intervening task designed to confuse participants and impose a time delay, they were asked to learn pairs of photos and traits. Photo-trait pairs congruent with the previous photo-behavior pairings were learned more easily, thus showing a savings effect. This savings effect persisted over delays up to 7 days (Study 3) and was not mediated by recall of the behaviors (Studies 2-4). The effect was also just as large as when participants intentionally formed impressions of the people paired with behaviors. This savings effect could only occur if the trait inference is bound to the actor (photo); otherwise there would be no savings in subsequent learning.

Skowronski et al. (1998) found similar effects after a 2-day delay using trait ratings of photos rather than savings as their dependent variable (Studies 2-4). This is particularly interesting because Carlston, Skowronski, and Sparks (1995, Study 5) found that participants' trait descriptions of the photos rarely matched the traits implied by the behaviors 2 days after they saw the photo-behavior pairs, suggesting again implicit memory.

We decided to adapt these materials and procedures for our purpose of seeing whether cultural differences exist in binding. For this study, we simplified Carlston and Skowronski's procedure considerably by omitting the confusion task and the multi-day delay. This simplification leaves our expected results open to an alternative explanation, namely that participants explicitly recalled the behaviors paired with each photo. That is, without confusion and delay, mere familiarization with photo-behavior pairs may affect subsequent trait ratings of the photos because (a) STIs occur at encoding and implicit memory of them affects ratings, or (b) behaviors are linked with photos in LTM and are then recalled and used to make trait ratings, or (c) both. Of course both processes require LTM binding between the photos and the behaviors or their trait implications, so cultural differences in ratings would implicate binding even though this study alone cannot tell us precisely what is bound to the actor photos in LTM.

In addition to behavior descriptions from Carlston and Skowronski (1994), we also used some behaviors from Uleman et al. (1996). These stimulus sets differ in two major ways. First, the Carlston and Skowronski stimuli are in the first person while Uleman et al.'s are in the third person, so all Uleman stimuli were changed to the first person for this study. Second, each Carlston and Skowronski behavior description contains multiple behaviors; several behaviors imply each trait (see Table 1). Such long stimuli would not work well in the lexical decision task of Study 1 because the time between the initial trait inference and the lexical decision probe would vary greatly; the relationship between stimuli and probes might be too obvious to participants; and individual differences in reading times would be magnified.

But there may be interesting differences between these stimulus sets when the issue is encoding into LTM, as in Study 2. First, the multi-sentence stimuli may imply traits more strongly because of the multiple trait-implying behaviors. Second, the multi-sentence stimuli may prompt spontaneous trait inferences more forcefully simply because they are longer, and therefore call more strongly for topical mental summaries (e.g., traits) in the course of text comprehension (e.g., Kintsch, 1988). Both of these considerations suggest that overall effects may be stronger with the multi-sentence stimuli. On the other hand, because these stimuli are longer, they also contain more contextual or situational information. Thus, if Latinos are more likely to use situational information, or to spontaneously summarize and encode situations in non-trait terms, they may show weaker effects than Anglos with the multi-sentence stimuli.

Finally, we decided to use trait ratings of the photos (as in Skowronski et al., 1998, Studies 2-4), rather than savings in relearning, as the dependent variable. Trait ratings provide an easier and a more ecologically interesting variable. We also included both familiarization and impression formation encoding conditions. All prior work by Carlston and Skowronski has shown no differences between familiarization and impression formation instructions in either savings or trait ratings when only one target is present, so we expected no effects for instructions. But this remarkable null result seemed worth exploring under conditions where ethnic differences might emerge.

In summary, we hypothesized (a) that multi-sentence stimuli would have a larger overall effect than single-sentence stimuli; (b) that Latinos' trait ratings would be affected less than Anglos' ratings by LTM effects of prior exposure to photo-behavior pairings; (c) that this cultural difference would be greater for multi-sentence than single-sentence stimuli; and (d) that encoding instructions would have no effect.

## METHOD

*Overview.* The study consisted of three phases modeled after Carlston and colleagues (Carlston & Skowronski, 1994; Carlston et al., 1995) and Skowronski et al. (1998). First, participants examined 22 photo-behavior pairings, either to form an impression of each of the 22 persons in the photos or to familiarize themselves with the materials. Then they performed a brief distracter task to clear short-term memory. Finally, they rated each of the 22 persons, along with a group of 22 new persons never seen before, on 3 traits. These traits differed for each person (photo), and for old photos they included the trait implied by the behavior previously paired with it. We were interested in whether the initial photo-behavior

pairings would differentially affect ratings by Latinos and Anglos, particularly under the familiarization instructions where trait inferences are spontaneous.

*Participants.* One hundred forty-three undergraduates enrolled in introductory psychology at UTEP participated in an experiment for partial course credit: 121 Latino, 20 Euro-American, and 2 African American participants. As in Study 1, preliminary analyses supported pooling these into two groups: Latinos, and Anglos (plus others). As in Study 1, we over-sampled Latinos because they were more available, and we expected the effects to be weaker among them.

*Materials.* Two sets of 22 photos (sets A and B) of young adults were developed, each with approximately equal numbers of men and women, Latinos and Anglos. The photos in each set were then paired with 22 pretested behaviors. These included 6 multi-sentence behaviors from Carlston and Skowronski (1994), 6 single-sentence behaviors from Uleman et al. (1996), and 10 filler behaviors. Genders of photos and behavior pronouns matched. Each photo was mounted on an 8.5" × 11" page, with a behavior description above it.

Although the multi- and single-sentence behaviors were matched on the likelihood of Latinos and Anglos describing them in terms of internal traits and external contexts (see pretest above), they were quite different. Single-sentence stimuli were 9 to 11 words long; multi-sentence stimuli varied from 2 to 4 sentences, and were 29 to 48 words long. Single-sentence stimuli had 1 to 3 verbs; multi-sentence stimuli had 4 to 9 verbs. Both stimulus sets included behaviors implying "clumsy," so comparing them illustrates these differences well; for example, from Uleman et al. (1996): "He stepped on his girlfriend's feet during the two-step." From Carlston and Skowronski (1994): "Yesterday in dance class I stubbed my toe on the piano. I bumped into the girl next to me and we both fell over. Later during class, we were turning circles and I went right into the mirrors in the front of the classroom."

*Procedure.* Participants were organized in groups of 1 to 6, and randomly assigned to instruction ("form an impression" or "familiarize yourself with the materials") and photo set (A or B) conditions. In phase 1, participants viewed 22 photo-behavior pairs, each presented for 20 seconds by a female experimenter. Then they spent 5 minutes on a filler task, listing as many of the fifty states and their capitals as they could, to clear behaviors from short-term memory. Finally, participants were presented with all 44 photos (sets A and B) in a random order. Each photo was accompanied by three traits, including the trait implied by the behavior presented in phase 1 and two unrelated filler traits. The order within each triad of traits was counterbalanced so that the target trait

was the first trait one-third of the time and last one-third of the time. Since both photo sets were shown in the final phase, each set of three traits appeared twice in the booklets. Participants rated all 44 photos on three traits, using a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*). Pairings of photos with traits-to-be-rated were the same for all participants. Participants were then thanked, debriefed, and dismissed.

*Design.* This procedure produced a 2 (Ethnicity, Latino or Anglo)  $\times$  2 (Instruction, impression or familiarize)  $\times$  2 (photo Training Set, A or B)  $\times$  2 (photo Target Set, old or new in terms of the training set)  $\times$  2 (trait Source: Carlston or Uleman) mixed design, with repeated measures on the last two factors. In addition to averaging the six focal trait ratings to produce each of the four measures for the 2  $\times$  2 within-subjects design, we also averaged the 12 filler trait ratings for each combination of within-subject factors.

## RESULTS

*Preliminary Analyses.* Mean ratings of filler traits were analyzed in a 2 (Ethnicity)  $\times$  2 (Instruction)  $\times$  2 (Training Set)  $\times$  2 (Target Set)  $\times$  2 (Source) design, with the last two factors within-subjects. We expected no effects, but wanted to check for the ethnic differences in response styles that sometimes occur in cross-cultural research (e.g., Hui and Triandis, 1989) and to be sure that neither photo set elicited more extreme ratings in general.

The ANOVA revealed no main effect for ethnicity,  $F(1,135) < 1.0, p > .60$ , but two interactions with it.<sup>4</sup> An Ethnicity  $\times$  Source interaction,  $F(1,135) = 4.31, p < .040$ , occurred because the difference between Uleman and Carlston fillers was larger for Latinos (4.13-3.90) than for Anglos (3.98-3.93). There was also an uninterpretable 4-way interaction,  $F(1,135) = 5.64, p < .019$ , involving every factor except Instruction. In order to control for these effects, mean filler ratings were subtracted from the corresponding mean target trait ratings. These difference scores were then used in subsequent analyses, run in parallel with analyses of the focal implied traits. These two sets of analyses produced essentially the same result, so for simplicity's only the analyses of focal traits are presented.

4. There were three other effects that did not involve ethnicity. There was a main effect for Source,  $F(1,135) = 10.42, p < .002$ , with Uleman fillers rated higher ( $M = 4.06$ ) than Carlston fillers ( $M = 3.92$ ). There was a Training Set  $\times$  Target Set interaction,  $F(1,135) = 11.21, p < .001$ , with fillers for B photos rated higher ( $M = 4.07$ ) than A photos ( $M = 3.91$ ). Finally, there was an uninterpretable 4-way interaction involving every factor except ethnicity,  $F(1,135) = 4.86, p < .029$ .

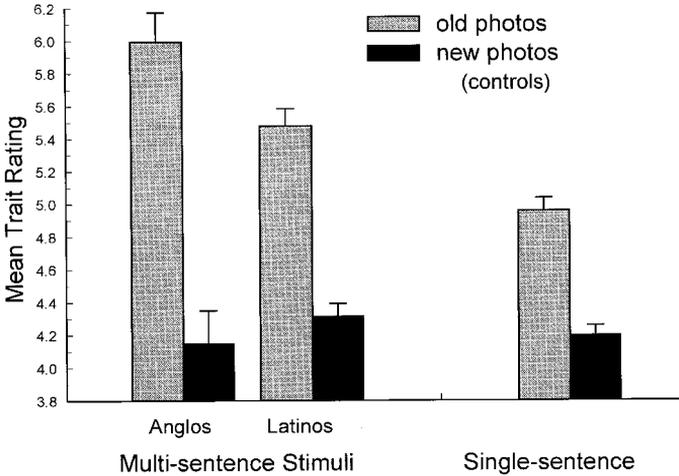


FIGURE 2. Mean trait ratings of old (previously paired with trait-implying behaviors) and new (control) photos, for multi- and single-sentence trait-implying stimuli; Study 2.

*Main analyses.* The mean focal trait ratings were analyzed in a  $2 \times 2 \times 2 \times 2 \times 2$  (Ethnicity  $\times$  Instruction  $\times$  Training Set  $\times$  Target Set  $\times$  Source) mixed ANOVA, with the last two factors within-subjects. There were three main effects. As predicted from prior research, there was a main effect for Target Set,  $F(1,135) = 99.10, p < .001$ . When the target set was old (i.e., when participants rated photos they had seen before, paired with trait-implying behaviors), ratings were higher ( $M = 5.40$ ) than when they were new ( $M = 4.25$ ).<sup>5</sup> Also as predicted, ratings of traits from multi-sentence stimuli were higher ( $M = 4.98$ ) than those from single-sentence stimuli ( $M = 4.67$ ),  $F(1,135) = 14.68, p < .001$ . Uninterestingly, ratings by those trained on photo set A were higher ( $M = 5.04$ ) than those trained on B ( $M = 4.62$ ),  $F(1,135) = 7.94, p < .006$ . Instruction had no effects, just as in prior research with this paradigm.

Most important was a 3-way Ethnicity  $\times$  Target Set  $\times$  Source interaction,  $F(1,135) = 11.01, p < .001$ , qualified by a 4-way interaction with Training Set,  $F(1,135) = 4.55, p < .035$ . In order to understand this better, we conducted separate Ethnicity  $\times$  Instruction  $\times$  Training Set  $\times$  Target Set ANOVAs for each stimulus source. Both Carlston's multi-sentence and Uleman's single-sentence stimuli showed the main effects of Training

5. This was qualified by a 2-way interaction with source,  $F(1,135) = 41.23, p < .001$ . Traits from both sources showed the same interaction. But the difference between old and new photos was greater with Carlston's traits (5.76-4.20) than Uleman's (5.04-4.31).

Set,  $F(1,135) > 4.80, p < .030$ , and of Target Set,  $F(1,135) > 35.45, p < .001$ , seen above. But these were the only effects for the single-sentence stimuli. None of the interactions with ethnicity approached significance,  $ps > .20$ . The unqualified effect of Target Set is shown on the right in Figure 2.

The multi-sentence stimuli, on the other hand, showed an Ethnicity  $\times$  Target Set interaction,  $F(1,135) = 6.86, p < .010$ . The difference between ratings of old and new photos was less for Latinos ( $M = 1.16$ ) than for Anglos ( $M = 1.84$ ),  $t(141) = 2.44, p < .036$ . This interaction with Target Set is shown on the left in Figure 2. None of the other interactions with Ethnicity approached significance,  $ps > .14$ .

## DISCUSSION

Our central question was whether Latinos and Anglos differ in spontaneously binding trait and/or behavioral information to actors in LTM, thereby affecting subsequent trait ratings of them. The results provide a qualified "Yes." The predicted cultural difference occurred, but only with multi-sentence stimuli. Both multi- and single-sentence stimuli showed an effect of prior information on trait ratings, producing higher ratings of old photos, but the difference between ratings of old and new photos was larger for Anglos than Latinos only with multi-sentence stimuli (see Figure 2).

The explanation of this cultural difference is not clear from this initial study. One possibility is that the multi-sentence stimuli are less likely to spontaneously activate trait implications among Latinos than Anglos, perhaps because they contain more situational information. This seems unlikely to us, given that (a) there were no cultural differences in intentional inferences in the pretest; (b) the single-sentence stimuli, which did show cultural differences in immediate trait activation in Study 1, showed no cultural differences in this study; and (c) trait ratings were higher for multi-sentence stimuli among both Anglos and Latinos. That is, if a cultural difference in trait activation were at issue, then this difference should have occurred for the single-sentence stimuli as well.

The other possibility is that implied traits, the behaviors on which they are based, or both, were less likely to bind with the actors among Latinos. Additional research is needed to examine this, but the present results strongly suggest cultural differences in binding when the trait implying information is complex.

The failure to find a cultural difference with the single-sentence stimuli is unexpected, especially given the cultural difference in immediate activation shown in Study 1. There were several differences between these studies. One is encoding instructions. Participants in Study 1 were under memory instructions, while those in Study 2 were under either familiarization or impression formation instructions. However, it seems

unlikely that instructions account for the difference because instructions made no difference within Study 2 with either stimulus set, and Carlston and Skowronski (1994, Study 4) found no difference in savings among memory, familiarization, and impression formation instructions.

Another difference is that participants in Study 2 had much longer exposure to the trait-implying behaviors than in Study 1: 20 s rather than 3.6 s. Longer exposure was necessary to provide enough time for reading the multi-sentence stimuli, but it also meant that participants had over five times as long to read and think about the single-sentence stimuli as they did in Study 1. This may have given Latinos enough time with each single-sentence stimulus to overcome cultural differences in initial trait activation levels, and also to bind trait implications and/or behaviors to actors. Under most conditions for text comprehension or observing others' behaviors, such long exposure times would be unusual, so cultural differences with even simple stimuli might well occur.

The finding that binding was greater for multi-sentence than single-sentence stimuli, overall, indicates that multiple behaviors by the same actor have greater spontaneous inference effects than single behaviors. Moskowitz (1993b) had already shown this with a very different procedure, in which behaviors by the same actor were not presented together. Our multi-sentence behaviors were blocked (grouped) by actor, which should further strengthen binding.<sup>6</sup>

## GENERAL DISCUSSION

These two studies showed cultural differences in spontaneous trait inferences with stimuli equated for cultural differences in intentional inferences. In both studies, when differences occurred they were smaller for Latinos than Anglos in spite of the facts that (a) stimulus materials implied traits as strongly to Latinos as Anglos when they made intentional inferences in our pretest; and (b) both studies included over twice as many Latino as Anglo participants, giving us more statistical power to detect effects among Latinos. In addition, these two studies seemed to implicate cultural differences at two distinct stages of STIs: activation in Study 1, and binding and judgment in Study 2.

6. As behavior descriptions increase in length and concern the same actor, one might wonder whether the inferences necessary for text comprehension and periodic mental summaries (e.g., Kintsch, 1988) are truly "spontaneous." That is, comprehending more than a few clauses requires extracting summary inferences and gists and storing them in LTM. If traits provide natural gist summaries, then longer texts should prompt more trait inferences even in the absence of explicit impression formation goals. Such inferences would still be spontaneous, but nevertheless entailed by a comprehension goal.

Study 1 used lexical decisions with single-sentence stimuli and showed trait activation among Anglos but not Latinos (see Figure 1). Study 2 used Skowronski et al.'s (1998) familiarization and trait-rating procedure with multi-sentence stimuli and showed larger effects of prior exposure to actor-behavior pairs on subsequent ratings of photos among Anglos than among Latinos. Unexpectedly, no such difference occurred with single-sentence stimuli in Study 2 (see Figure 2).

### SPONTANEOUS INFERENCES AS INDICATORS OF CULTURAL COGNITIVE PRACTICE

Spontaneous inference processes are best understood as relatively automatic, highly practiced cognitive procedures (Smith, 1994) that produce trait (and other) inferences whenever they encounter information that led to trait inferences in the past. The more common and highly practiced the inference procedure, the more likely it is to occur spontaneously. Because spontaneous inferences occur without intentions, and usually without awareness, their occurrence need not depend on conscious beliefs, goals, or ideologies; and once they occur, they need not be shaped by such conscious concerns. Thus, their nature and strength can provide an indicator of cultural cognitive practices—the kinds of things that people actually think and talk about in their cultural communities.

These cultural cognitive practices may differ from what people believe they should think or talk about, and/or what they are able to think or talk about when requested or required. Just as behavioral norms, prescriptions, and competencies can differ from behavioral practices, so too can cognitive norms and competencies differ from cognitive practices.

In these studies, social norms were irrelevant because none of the behaviors implicated strong values or norms. Cognitive capabilities were equated by our pretest, which showed that Latinos and Anglos were equally able to intentionally infer the same traits from our behaviors. Nevertheless, cultural differences in spontaneous inference processes emerged. This suggests that Anglos have a stronger cultural practice of thinking and talking about traits, and using them to describe and explain actors, than Latinos do.

These results also suggest that cognitive beliefs, abilities, and practices should be distinguished more carefully in future cultural research. Differences in spontaneous cognitions can occur where differences in intentional inferences do not (see also Zelli et al., 1995, 1996), and presumably intentional differences can occur where spontaneous ones do not. We see no reason to identify one or the other as more central to any definition of "culture," but do see good reason to distinguish between them

and include both (along with other elements of culture such as artifacts, social institutions, behavioral practices, etc.).

The present studies demonstrate cultural differences in spontaneous "dispositionism." These studies did not examine situational inferences, so cultural differences in spontaneous "situationism" went unmeasured and cannot be compared with dispositionism. That remains for future research. But the results of these two studies provide clear evidence (in addition to that cited in the paper) that it is premature to conclude there are few cultural differences in trait use.

### ACTIVATION AND BINDING AS STAGES IN INFERENCES ABOUT OTHERS

These studies provide further evidence that spontaneous trait activation is distinct from spontaneous binding and judgment. They add to the assimilation-contrast evidence obtained by Stapel et al. (1996), and to the spontaneous trait transference evidence by Skowronski et al. (1998) and Mae et al. (1999). In addition, they show that culture can affect each stage under particular conditions. The emergence of cultural differences in binding and judgment seems to depend on stimulus complexity (e.g., single or multiple behaviors) and processing conditions (e.g., available time).

### DIRECTIONS FOR FUTURE RESEARCH

These studies raise almost as many questions as they answer. One concerns the relative importance in Study 2 of storing implied traits with actors in LTM, versus storing behaviors from which traits can be judged. It is likely that both occurred, but it would be interesting to see whether the effect still occurs with an intervening confusion task and/or a time delay designed to eliminate behavior recall. Was the cultural difference in Study 2 primarily due to binding implied traits to actors, or due to binding behaviors that could be explicitly recalled and then used in trait judgments?

Another question concerns the relative impact of culture on dispositional versus situational (or contextual) causes in spontaneous inferences. The two present studies focused only on dispositional inferences. But spontaneous situation inferences do occur (Duff & Newman, 1997; Lupfer, Clark, & Hutcherson, 1990; Newman, 1993). Future research should examine culture's impact on both types of inference, using paradigms that are sensitive to the stages of spontaneous social inferences.

A more complex set of questions concerns the effects of conducting these studies in English rather than Spanish, with many Latino partici-

pants who are bilingual. We sought to minimize the effects of language (rather than culture, to the extent these are separable), and the attendant difficulties of establishing translation equivalences, by using university students at the same university who presumably have equivalent levels of English fluency (as evidenced by comparable RTs for filler words in Study 1) and who use English frequently every day. However, one could argue that conducting the studies in English “primes” Anglo culture, in the same ways that a picture of the Statue of Liberty primes Anglo culture, or The Great Wall of China primes Chinese culture (Hong, Morris, Chiu, & Benet-Martinez, 2000). Priming our Latino participants with Anglo culture by using English may have led them to respond more like Anglos, reducing differences between ethnic groups. Thus our studies may underestimate ethnic differences in STIs.

On the other hand, the Latino participants’ failure to show as much activation (Study 1) or binding (Study 2 with multi-sentence stimuli) might be an artifact of forcing some of them to use their nonpreferred language. Several recent studies argue against this possibility. Studies of semantic priming among bilinguals seem to show that when priming and target languages differ, priming occurs as strongly between languages as within, even under speeded conditions, as long as the target language is predictable (Hernandez, Bates, & Avila, 1996). In the present studies, the target language was predictably English, so even if some Latino participants were “thinking in Spanish,” basic linguistic processes such as semantic priming would have been unaffected.

More cautionary evidence comes from recent work on differences between skilled and less skilled readers (Long, Oppy, & Seely, 1994), distinguished on the basis of verbal SAT scores (top and bottom thirds of their sample,  $M_s = 570$  and  $395$ ). Lexical decision RTs showed that although both types of reader were equally fast at disambiguating homographs, only skilled readers generated topic-related words in the course of reading. If one assumes that our Latino participants are much less skilled English readers than our Anglo participants, and if one assumes that topic-word inferences involve most of the same processes as STIs, then these results offer some support for interpreting our results as artifacts of ethnic differences in English reading skills. We have doubts about both assumptions (but no data). Clearly future research should control for language history and use, and assess reading skill.

One method for avoiding many of these issues in future research would be to compare trait inferences with other inference types that are not expected to differ across cultures (e.g., McKoon and Ratcliff’s (1986) predicting inferences). Although extensive pilot testing would be necessary to develop culturally neutral control materials, the benefits would be considerable.

## REFERENCES

- Bassili, J. N. (1989). Traits as action categories versus traits as person attributes in social cognition. In J. N. Bassili (Ed.), *On-line cognition in person perception* (pp. 61-89). Hillsdale, NJ: Erlbaum.
- Carlston, D. E., & Skowronski, J. J. (1994). Savings in the relearning of trait information as evidence for spontaneous inference generation. *Journal of Personality and Social Psychology, 66*, 840-856.
- Carlston, D. E., Skowronski, J. J., & Sparks, C. (1995). Savings in relearning II: On the formation of behavior-based trait associations and inferences. *Journal of Personality and Social Psychology, 69*, 420-436.
- Chiu, C-Y., Morris, M. W., Hong, Y-Y., & Menon, T. (2000). Motivated cultural cognition: The impact of implicit cultural theories on dispositional attribution varies as a function of need for closure. *Journal of Personality and Social Psychology, 78*, 247-259.
- Choi, I., & Nisbett, R. E. (1998). Situational salience and cultural differences in the correspondence bias and actor-observer bias. *Personality and Social Psychology Bulletin, 24*, 949-960.
- Choi, I., Nisbett, R. E., & Norenzayan, A. (1999). Causal attribution across cultures: Variation and universality. *Psychological Bulletin, 125*, 47-63.
- Claeys, W. (1990). On the spontaneity of behavior categorization and its implications for personality measurement. *European Journal of Social Psychology, 4*, 173-186.
- Cousins, S. D. (1989). Culture and selfhood in Japan and the US. *Journal of Personality and Social Psychology, 56*, 124-131.
- Duff, K. J., & Newman, L. S. (1997). Individual differences in the spontaneous construal of behavior: Idiocentrism and the automatization of the trait inference process. *Social Cognition, 15*, 217-241.
- Eichenbaum, H., & Bunsey, M. (1995). On the binding of associations in memory: Clues from studies on the role of the hippocampal region in paired-associate learning. *Current Directions in Psychological Science, 4*, 19-23.
- Fiske, A. P., Kitayama, S., Markus, H. R., & Nisbett, R. E. (1998). The cultural matrix of social psychology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology: Vol. 2* (4th ed., pp. 915-981). Boston: McGraw-Hill.
- Gilbert, D. T. (1998). Ordinary personology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology: Vol. 2* (4th ed., pp. 89-150). New York: McGraw Hill
- Hart, D., Lucca-Irizarry, N., & Damon, W. (1986). The development of self-understanding in Puerto Rico and the United States. *Journal of Early Adolescence, 6*, 293-304.
- Hernandez, A. E., Bates, E. A., & Avila, L. X. (1996). Processing across the language boundary: A cross-modal priming study of Spanish-English bilinguals. *Journal of Experimental Psychology: Learning, Memory and Cognition, 22*, 846-864.
- Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133-168). New York: Guilford.
- Hong, Y-Y., Morris, M. W., Chiu, C-Y., & Benet-Martinez, V. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist, 55*, 709-720.
- Hui, C. H., & Triandis, H. C. (1989). Effects of culture and response format on extreme response style. *Journal of Cross-Cultural Psychology, 20*, 296-309.
- Ip, G. W. M., & Bond, M. H. (1995). Culture, values, and the spontaneous self-concept. *Asian Journal of Psychology, 1*, 29-35.

- Jones, E. E., & Harris, V. A. (1967). The attribution of attitudes. *Journal of Experimental Social Psychology*, 3, 1-24.
- Kashima, Y., Siegal, M., Tanaka, K., & Kashima, E. S. (1992). Do people believe behaviours are consistent with attitudes? Towards a cultural psychology of attribution processes. *British Journal of Social Psychology*, 31, 111-124.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, 95, 163-182.
- Krull, D. S. (1993). Does the grist change the mill? The effect of perceiver's goal on the process of social inference. *Personality and Social Psychology Bulletin*, 19, 340-348.
- Krull, D. S., & Dill, J. C. (1996). On thinking first and responding fast: Flexibility in social inference processes. *Personality and Social Psychology Bulletin*, 22, 949-959.
- Krull, D. S., Loy, M. H.-M., Lin, J., Wang, C.-F., Chen, S., & Zhao, X. (1999). The fundamental attribution error: Correspondence bias in individualist and collectivist cultures. *Personality and Social Psychology Bulletin*, 25, 1208-1219.
- Lee, F., Hallahan, M., & Herzog, T. (1996). Explaining real life events: How culture and domain shape attributions. *Personality and Social Psychology Bulletin*, 22, 732-741.
- Long, D. L., Oppy, B. J., & Seely, M. R. (1994). Individual differences in the time course of inferential processing. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 20, 1456-1470.
- Lupfer, M. B., Clark, L. F., & Hutcherson, H. W. (1990). Impact of context on spontaneous trait and situational attributions. *Journal of Personality and Social Psychology*, 58, 239-249.
- Mae, L., Carlston, D. E., & Skowronski, J. J. (1999). Spontaneous trait transference to familiar communicators: Is a little knowledge a dangerous thing? *Journal of Personality and Social Psychology*, 77, 233-246.
- Marin, G., & Triandis, H. C. (1985). Allocentrism as an important characteristic of the behavior of Latin Americans and Hispanics. In R. Diaz-Guerrero (Ed.), *Cross cultural and national studies in social psychology* (pp. 85-104). Amsterdam: North Holland.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224-253.
- McKoon, G., & Ratcliff, R. (1986). Inferences about predictable events. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 15, 326-338.
- Menon, T., Morris, M. S., Chiu, C.-Y., & Hong, Y.-Y. (1999). Culture and the construal of agency: Attribution to individual versus group dispositions. *Journal of Personality and Social Psychology*, 76, 701-717.
- Miller, J. G. (1984). Culture and the development of everyday social explanation. *Journal of Personality and Social Psychology*, 46, 961-978.
- Miller, J. G. (1987). Cultural influences on the development of conceptual differentiation in person description. *British Journal of Developmental Psychology*, 5, 309-319.
- Morris, M. W., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology*, 67, 949-971.
- Moskowitz, G. B. (1993a). Individual differences in social categorization: The effects of personal need for structure on spontaneous trait inferences. *Journal of Personality and Social Psychology*, 65, 132-142.
- Moskowitz, G. B. (1993b). Person organization with a memory set: Are spontaneous trait inferences personality characterizations or behavior labels? *European Journal of Personality*, 7, 195-208.
- Moskowitz, G. B., & Roman, R. J. (1992). Spontaneous trait inferences as self-generated primes: Implications for conscious social judgment. *Journal of Personality and Social Psychology*, 62, 728-738.

- Newman, L. S. (1991). Why are traits inferred spontaneously? A developmental approach. *Social Cognition*, 9, 221-253.
- Newman, L. S. (1993). How individualists interpret behavior: Idiocentrism and spontaneous trait inference. *Social Cognition*, 11, 249-269.
- Newman, L. S., & Uleman, J. S. (1990). Assimilation and contrast effects in spontaneous trait inferences. *Personality and Social Psychology Bulletin*, 16, 224-240.
- Norenzayan, A., Choi, I., & Nisbett, R. E. (1999). Eastern and Western perceptions of causality for social behavior: Lay theories about personalities and situations. In D. Miller & D. Prentice (Eds.), *Culture divides* (pp. 239-272). New York: Russell Sage Foundation.
- Peng, K., Nisbett, R. E., & Wong, N. Y. C. (1997). Validity problems comparing values across cultures and possible solutions. *Psychological Methods*, 2, 329-344.
- Revonsuo, A. (1999). Binding and the phenomenal unity of consciousness. *Consciousness and Cognition: An International Journal*, 8, 173-185.
- Rhee, E., Uleman, J. S., Lee, H. K., & Roman, R. J. (1995). Spontaneous self-descriptions and ethnic identities in individualistic and collectivistic cultures. *Journal of Personality and Social Psychology*, 69, 142-152.
- Ross, L., Amabile, T. M., & Steinmetz, J. L. (1977). Social roles, social control, and biases in social-perception processes. *Journal of Personality and Social Psychology*, 35, 485-494.
- Shweder, R. A., & Bourne, E. J. (1984). Does the concept of the person vary cross-culturally? In R. A. Shweder & R. A. LeVine (Eds.), *Culture theory: Essays on mind, self, and emotion* (pp. 158-199). Cambridge, UK: Cambridge Univ. Press.
- Skowronski, J. J., Carlston, D. E., Mae, L., & Crawford, M. T. (1998). Spontaneous trait transference: Communicators take on the qualities they describe in others. *Journal of Personality and Social Psychology*, 74, 837-848.
- Smith, E. R. (1994). Procedural knowledge and processing strategies in social cognition. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition: Vol. 1, Basic processes* (pp. 99-152). Hillsdale, NJ: Erlbaum.
- Smith, E. R. (1998). Mental representation and memory. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology: Vol. 1* (4th ed., pp. 391-445). New York: McGraw Hill.
- Stapel, D. A., & Koomen, W. (1996). Differential consequences of trait inferences: A direct test of the trait-reference hypothesis. *European Journal of Social Psychology*, 26, 827-837.
- Stapel, D. A., Koomen, W., & van der Pligt, J. (1996). The referents of trait inferences: Impact of trait concepts versus actor-trait links on subsequent judgments. *Journal of Personality and Social Psychology*, 70, 437-450.
- Trafimow, D., Triandis, H. C., & Goto, S. G. (1991). Some tests of the distinction between the private self and the collective self. *Journal of Personality and Social Psychology*, 60, 649-655.
- Treisman, A. (1995). Modularity and attention: Is the binding problem real? In C. Bundesen, & H. Shibuya (Eds.), *Visual selective attention: Visual cognition, Vol. 2* (Nos. 2 & 3; pp. 303-311). Mahwah, NJ: Erlbaum.
- Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 96, 269-289.
- Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.
- Triandis, H. C., Bontempo, R., Villareal, M. J., Asai, M., & Lucca, N. (1988). Individualism and collectivism: Cross-cultural perspectives on self-ingroup relationships. *Journal of Personality and Social Psychology*, 54, 323-338.
- Uleman, J. S. (1999). Spontaneous versus intentional inferences in impression formation. In

- S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 141-160). New York: Guilford.
- Uleman, J. S., Hon, A., Roman, R., & Moskowitz, G. B. (1996). On-line evidence for spontaneous trait inferences at encoding. *Personality and Social Psychology Bulletin, 22*, 377-394.
- Uleman, J. S., & Moskowitz, G. B. (1994). Unintended effects of goals on unintended inferences. *Journal of Personality and Social Psychology, 66*, 490-501.
- Uleman, J. S., Moskowitz, G. B., Roman, R. J., & Rhee, E. (1993). Tacit, manifest, and intentional reference: How spontaneous trait inferences refer to persons. *Social Cognition, 11*, 321-351.
- Uleman, J. S., Newman, L. S., & Moskowitz, G. B. (1996). People as flexible interpreters: Evidence and issues from spontaneous trait inference. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 28, pp. 211-279). San Diego, CA: Academic Press.
- Van Overwalle, F., Drenth, T., & Marsman, G. (1999). Spontaneous trait inferences: Are they linked to the actor or to the action? *Personality and Social Psychology Bulletin, 25*, 450-462.
- Winter, L., & Uleman, J. S. (1984). When are social judgments made? Evidence for the spontaneousness of trait inferences. *Journal of Personality and Social Psychology, 47*, 237-252. (Also see correction in *Journal of Personality and Social Psychology* (1986), 50, 355.)
- Zelli, A., Cervone, D., & Huesmann, R. L. (1996). Behavioral experience and social inference: Individual differences in aggressive experience and spontaneous versus deliberate trait inference. *Social Cognition, 14*, 165-190.
- Zelli, A., Huesmann, L. R., & Cervone, D. (1995). Social inference and individual differences in aggression: Evidence for spontaneous judgments of hostility. *Aggressive Behavior, 21*, 405-417.