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Spontaneous versus Intentional Inferences in Impression Formation

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Psychology also attempts to conceptualize what it is doing... How do we do that? Mostly, so it seems to me, by the construction of oppositions—usually binary ones. We worry about nature versus nurture, about central versus peripheral, about serial versus parallel, and so on... far from providing the rungs of a ladder by which psychology gradually climbs to clarity, this form of conceptual structure leads rather to an ever increasing pile of issues, which we weary of or become diverted from, but never really settle.

—NEWELL (1973, pp. 287, 289)

This chapter takes a look at yet another binary opposition: how spontaneous inferences seem to differ from intentional ones when we form impressions of other people. The literature on intentional inferences in impression formation is huge (e.g., Gilbert, 1997; Kenny, 1994), and no attempt is made to summarize it here. But our picture of impression formation processes would be incomplete if it were restricted to intentional processes. Impressions are formed spontaneously (unintentionally) as well. So at the risk of adding yet another dichotomy to Newell’s pile of oppositions, and with a promissory note to move beyond mere dichotomies in future work, this chapter examines the newer and more limited spontaneous-inference literature for clues about how impressions formed spontaneously may differ from those formed intentionally. Spontaneous processes are engaged by mere attention to others, whereas intentional processes are engaged by intending to form an impression or make a decision about others. These two sets of processes may interact, but this possibility will not be developed here because there is no relevant research evidence.

I begin this chapter with a cautionary sketch of some properties of dualities, so that we do not assume that every duality is a good one, or mistake all dichotomies for latent dual-process theories. I then consider the criteria traditionally used to distinguish between strategic and automatic processes, and conclude that the distinction between intentional and unintentional (spontaneous) processes is the most defensible duality. A brief discussion of some complexities inherent in the notions of “intentional” and “unintentional” follows.

To illustrate the idea of unintentional (or spontaneous) inferences in general, three are described for which there is some research evidence: logical, predicting, and counterfactual. Then the major portion of the chapter
describes the ways in which spontaneous inferences seem to differ from intentional inferences in impression formation. These are summarized in a table. In addition, I offer a metaphor to capture these differences and perhaps to suggest others. Finally, the spontaneous-intentional duality is compared with some other prominent dual-process models. This produces several suggestions for future research that may help transform this “pile of issues” into the “rungs of a ladder” we can climb to gain a clearer view of their relations to one another.

FALSE AND TRUE DUALITIES

A duality may be false for many reasons. The underlying reality may actually be continuous (e.g., as posited in Kruglanski’s unimodel; see Kruglanski, Thompson, & Spiegel, Chapter 14, this volume). The duality may implicitly deny additional categories (e.g., “heterosexual men” and “women” as “natural” categories). It may imply mutually exclusive when that is inaccurate (e.g., the duality “straight” and “gay/lesbian” denies bisexuality). Or it may represent only one level of a hierarchical taxonomy (e.g., biological taxonomies).

Dual-process theories should be based on coherent dichotomies. One popular dichotomy in psychology has been that between automatic and controlled (or automatic and strategic) processes. But the current consensus is that automatic processes have several properties that do not always co-occur, and that some of these properties are continuous. Bargh (1994) has discussed four properties of automaticity: efficiency, lack of awareness, lack of control, and lack of intention. Three of these are arguably continuous. Smith’s (1994) work on the proceduralization of social judgments clearly demonstrates that the efficiency of cognitive processes varies continuously.

Awareness is also a matter of degree, but in several senses. First, people can be “aware” of varying amounts of any cognitive process and outcome. The literature is replete with discussions of what that amount may be in particular instances (e.g., Ericsson & Simon, 1993; Nisbett & Wilson, 1977; Smith & Miller, 1978), but there seems to be no dispute that a potentially continuous “amount” is involved. Second, because awareness of what happened is necessarily assessed after the fact, retrospective certainty of what one was aware of at the time (rather than what one surmised afterward) can vary continuously. So both the extent of what one is aware of, and one’s certainty that such awareness does not reflect retrospective reconstruction, can vary continuously.

Control is also a matter of degree in at least two senses. One concerns how closely the outcome can be made to match some standard or goal. One’s backhand in tennis may not perfectly match one’s ideal, but it may still evidence some degree of control. The second sense concerns the proportion of constituent subprocesses that are controlled or actively guided during their execution. When a skill is highly practiced, more of the subroutines are chained and executed automatically, so that conscious guidance serves only to disrupt the performance (e.g., “the Zen of” archery, typing, or tennis). However this proportion may be measured, it is clear that the acquisition of such expertise is a matter of degree.

Thus, among Bargh’s “four horses of automaticity,” intention may be the clearest candidate for a dichotomy on which to base a dual-process theory. Either you intend to do something, or you don’t. Intentions are a priori, so they don’t have the ambiguity of awareness assessed post hoc. (Note that post hoc reconstructions of intentions, which can vary in certainty and are subject to all kinds of self-justifying biases, are not included here.) Of course, intentions may have continuous features. The specificity of your plan for implementing your intention can vary. Your determination to carry out your intention may be strong or weak. Your success at doing so may also vary continuously. But the intention itself either exists or it does not. Some sort of mental Rubicon is crossed when you go from thinking about what to do to adopting a particular intention (see Gollwitzer, 1990). Operationally, participants in studies can be instructed to (have the intention to) form impressions of others, or to attend to information about them for some unrelated purpose.

This suggests that a dual-process theory may attempt to account for whatever differences occur when a cognitive process occurs intentionally versus unintentionally. The prerequisite for this is that the intentional pro-
cess also occurs, in some sense, unintentionally. Fortunately, many cognitive processes do. Evidence of their occurrence can be obtained from patterns of cued recall, recognition probe reaction times (RTs), lexical-decision RTs, word stem completions, and savings in relearning tasks. Some of these are considered in detail below.

This chapter describes emerging evidence on differences between intentional and unintentional inferences in impression formation. It focuses particularly on spontaneous trait inferences (STIs), because these have been defined from the outset (Winter & Uleman, 1984) as unintentional. STIs have typically been demonstrated by having participants read descriptions of trait-implying behaviors, in the absence of intentions to infer traits or form impressions, and then obtaining evidence that trait inferences occurred. For example, "The reporter steps on his girlfriend’s feet during the tango" implies "clumsy." "The secretary solved the mystery halfway through the book" implies "clever." The research evidence indicates that reading such sentences with a goal that does not involve impression formation—such as memorizing them, reading them as distractors, or familiarizing oneself with them—is enough to prompt trait inferences. Participants are not instructed to form trait inferences, and typically deny that they have done so. Yet evidence from a variety of paradigms provides evidence of STIs. (See Uleman, Newman, & Moskowitz, 1996, for a recent review of this evidence.)

There is also research suggesting that people make spontaneous emotion inferences. Gernsbacher, Goldsmith, and Robertson (1992, Study 3) had participants read stories, some of which implied emotions. For example:

Joe worked at the local 7-11, to get spending money while in school. One night, his best friend, Tom, came in to buy a soda. Joe needed to go back to the storage room for a second. While he was away, Tom noticed the cash register was open. From the open drawer, Tom quickly took a ten dollar bill. Later that week, Tom learned that Joe had been fired from the 7-11 because his cash had been low one night. (p. 105)

As noted above, intentions have properties more complex than their simple dichotomous presence or absence. A brief reminder of some of these may prevent conceptual confusion later on.

First, a different dichotomy is possible. People may intend to do X, or intend to not do X. This is different from not intending to do X: The first involves an intention not to do something, whereas the second involves the absence of an intention. Processes occurring in the absence of an intention are what I have called "spontaneous." Intentions to not do something are central to Jacoby's (1991) process dissociation procedures. These contrast results obtained when participants are instructed to do X (the "inclusion" condition) versus instructed to not do X (the "exclusion" condition). Such a contrast makes it possible to assess how much cognitive control is possible (when various additional assumptions are met), but it is not the present contrast. I return to Jacoby's procedures at the end of this chapter. (See also Wegner & Wenzlaff, 1996, 150 milliseconds (ms) after the last sentence, which the participants were to pronounce as quickly as possible. When the emotion matched the one implied by the story, pronunciation times were reliably faster (by 50 ms), suggesting that the emotion concept had been activated by the story.

Neither this research nor most research on STIs has contrasted intentional and unintentional conditions directly. Instead, stimulus materials have been selected on the basis of their trait implications under impression formation instructions, and then used in unintentional (spontaneous) conditions to seek evidence of trait inferences. Recently, however, some research has emerged that directly compares intentional and unintentional conditions (e.g., Carlson & Skowronski, 1994; Stapel, Kooken, & van der Pligt, 1996; Zelli, Cervone, & Huesmann, 1996). This chapter focuses on this and related research as a source of suggestions and speculations about possible differences between intentional and unintentional inferences in impression formation. So the chapter is part review, part elaboration and speculation, and part program for future research.

SOME COMPLEXITIES OF INTENTIONS
for a different approach to the issue of control.

Second, "the absence of an intention to do X" is an ill-defined condition; it may include anything from intentions to do A through Z (except X) to being asleep. Clearly, this is too broad. So be more precise, the absence of the intention must occur within a task that requires attention to the stimulus information under some other intention, Y. Furthermore, intention Y must not necessarily entail intention X. Thus, people may be asked to memorize the information (Y) because this requires attention to the information without requiring that they infer traits (X). The complication here is that one does not always know what is entailed by a particular intention, because this requires detailed knowledge of the processes used to carry it out. Deciding whether a stimulus person resembles your mother may involve inferring traits ("Let's see, my mother is warm but demanding. Is this person warm but demanding?") but it may not ("My mother is female and 5'2". This guy is not"). So doing Y may turn out to entail X for some people and not others (because there are many ways to do Y), or may entail X for everyone (because that is the only way to do Y). At the very least, Y must not necessarily entail X. (See Uleman & Moskowitz, 1994, for more on the effects of other goals on STIs.) One cannot assume that people can accurately report on what processes, or intermediate outcomes, an intention entails. Nisbett and Wilson's (1977) classic demonstrations make this point, even with their limitations (Smith & Miller, 1978) and important exceptions (e.g., Ericsson & Simon, 1993). Research on the role of intuition in discovery (e.g., Bowers, Regehr, Balhazard, & Parker, 1990) also illustrates this point. Thus, although post hoc reports that Y was done without doing X may be desirable, they cannot be decisive for the issue of what an intentional process entails.

Third, the present discussion excludes unconscious goals and intentions. Global unconscious goals may be essential in the development of spontaneous processes (Uleman, Newman, & Moskowitz, 1996). But the current operation and psychological reality of unconscious goals are difficult to verify empirically (Uleman, 1996; cf. Bargh, Chen, & Burrows, 1996). In addition, unconscious intentions do not entail the kind of deliberate monitoring and corrective processes that characterize conscious intentions (see below). So in this chapter, "intention" means conscious intention.

EXAMPLES OF OTHER SPONTANEOUS INFERENCEs

Spontaneous inferences are not limited to the STI literature. A brief look at some other types of spontaneous inferences may sharpen the spontaneous-intentional distinction.

Spontaneous Logical Inferences

Many inferences are made in the course of text comprehension. For example, to understand "Linda finally decided to be daring and to get a dye job done on her hair," one must infer that "her" refers to Linda. On the other hand, not all possible inferences are made; one doesn't imagine all the colors that Linda could choose or everything that might have prompted her decision. Inferences that are necessarily entailed by comprehension are those required to maintain the coherence of what has been read, such as the anaphoric inference above and bridging inferences that link widely separated clauses (Grässer, Singer, & Trabasso, 1994; Kintsch, 1988; McKeon & Ratcliff, 1992). The number of potential inferences is infinite, and most are not necessary for comprehension and textual coherence.

Lea (1993b) has shown that some types of simple logical inferences, which are not required for text coherence, are nevertheless made during text comprehension. One series of studies permitted "or-elimination" inferences. For instance, the Linda story (see above) continued, "According to her hairdresser, Linda's complexion would look good with either a dark shade or a red shade. She let her hairdresser, Yvette, make the final decision. "Well," said Yvette, 'I'm sure you want to look different from everybody else this year, so we're not going to dye your hair red." Participants spontaneously inferred "dark" after reading this last sentence. In two studies, they were faster to make lexical decisions about associates of the inferences (e.g., "light") than
they were when the last sentence did not permit the inference (e.g., “Linda flipped through a few hairstyle magazines and saw a lot of people with red hair”). In another study, pronunciation times for the inferences themselves (e.g., “dark”) were faster.

Another pair of studies provides lexical-decision evidence for the spontaneous use of modus ponens (“If P, then Q; P; therefore Q”). In these, participants read stories such as, “Fred, the forest ranger, was trying to decide which National Park to work for. He knew that if he decided on the one in Alaska, then he would be working to protect the eagles. . . . After much consideration, Fred decided to work for the park in Alaska.” Reading about this decision facilitated a lexical decision about “bird,” but reading that “Fred wondered whether the park in Alaska would be too cold for his liking” did not. Note that comprehending neither text requires the activation of “eagles,” and that both texts mention Alaska toward the end. But only the first enables (but does not require) the spontaneous logical inference of “eagles.”

Spontaneous Predicting Inferences

Most inferences that are necessary to establish textual coherence are “backward” inferences, relating material currently in working memory to previous material. McKoon and Ratcliff (1986) showed that another kind of “forward” inference, not required for textual coherence, occurs spontaneously. “Predicting inferences” represent predictions about what will follow. For example, reading “After locating the cavity, the dentist told John to open his mouth” may prompt the prediction “drill,” but it does not require it. In three studies, McKoon and Ratcliff found that participants responded to recognition probes such as “drill” either more slowly, or with more errors, than after control stories that did not imply the predictions (e.g., “John opened his mouth for the dentist, but there were no cavities”). They interpreted this as evidence that “drill” was activated by the first but not by the second story, so that it was harder to say it had not appeared in the story. A fourth study showed that these predicting inferences were more effective recall cues for the predicting stories than for the control stories.

The emotions implied in the Gernsbacher et al. (1992) study described above could also be thought of as predicting inferences, in that they followed the events in the stories. However, to encourage comprehension, their participants expected to write continuations of some of the stories. So it might be argued that inferring the future implications of each story was entailed in their task, and therefore not spontaneous.

Thus, at least two kinds of forward inferences occur spontaneously during text comprehension: predicting and simple logical inferences. Neither is necessary for textual coherence. They may depend on intending to comprehend the text (the Y intention that doesn’t entail the X intention to infer, described above). In Lea’s (1995b) studies, participants answered a comprehension question after each story to ensure comprehension. McKoon and Ratcliff’s (1986) participants rated how interesting each sentence was before they got the unexpected cued-recall test. However, in their recognition probe RT studies, there was no instruction to ensure comprehension; in fact, comprehension worked against optimal performance, because predicting inferences that were implied but absent slowed responses and produced more errors. Nevertheless, participants seemed to employ their usual comprehension procedures anyway (at least on initial trials; see Uleman, Hon, Roman, & Moskowitz, 1996).

Spontaneous Counterfactual Inferences

Counterfactual inferences may come to mind spontaneously under some circumstances. Roese and Olson (1997, pp. 21–23) report evidence that negative but not unexpected or novel events prompt counterfactual thinking. They measured RTs to counterfactual probes (e.g., “yes” or “no” to “My score could have been much different”) following feedback on an anagram task. RTs were shorter following failure, and negative affect (but neither unexpectedness nor controllability) significantly mediated this effect.

Roese and Olson obtained similar results from nondirective thought listings. Although such measures can be informative, and have been central in earlier research on “spontaneous” inferences (e.g., Weiner, 1985), there is always the danger that the instruction to list
thoughts prompts thinking that would not have otherwise occurred. The RT results are much more relevant and convincing.

**Spontaneous Inferences versus Simpler Unintended Processes**

As these examples illustrate, "inferring" refers to relatively complex symbolic processing of information in which several meanings are combined to produce an emergent meaning that is not present in any of the constituent meanings. Thus an inference (trait, logical, predicting, or counterfactual) goes well beyond the simple activation of concepts that is found in repetition or semantic priming. These simpler processes differ from spontaneous inferences in that priming activates concepts rather directly, whereas inferring invokes more extensive knowledge structures and more complex processes than simple associations and lexical access.

The trait, logical, predicting, and counterfactual inferences described above illustrate this difference. Well-designed studies always contain control stimuli, which may might activate the target concept can operate (e.g., "dentist" and "cavities" can activate "drill"), but these stimuli do not produce the target inference (e.g., "John opened his mouth for the dentist, but there were no cavities") to the same extent as the concept-implying stimulus. Although STIs themselves can act as primes once they occur (Moskowitz & Roman, 1992), they depend on more complex cognitive processes than semantic priming or association. Of course, priming and stereotype category activation play important roles in unintended-impression formation. But they are beyond the scope of this chapter.

**SPONTANEOUS VERSUS INTENTIONAL IMPRESSIONS**

Spontaneous impressions occur when one is attending to other people without an impression formation goal in mind. "Uneventful people watching" provides a prototypical case. "Uneventful" is important, because negative or surprising observations may initiate questions and epistemic goals: "What's going on? What caused that? What kind of person would do something like that?" When such questions occur, the inferred answers are not spontaneous. "Watching" is also important, because spontaneous inferences can only occur if the information is attended to. By contrast, intentional impressions occur when one is attending to, and even interacting with others with an impression formation goal in mind. Getting acquainted at a party and unstructured job interviews illustrate such situations, where the perceiver is actively engaged in information search and hypothesis testing in order to form an impression. Sometimes the impression formation goal is content-specific (e.g., "Is he a good candidate for the statistician job?" or "Does he have my sense of humor?"). Such content-specific goals activate relevant knowledge structures, which influence how any new information is encoded. Reflecting on these examples suggests several possible differences between spontaneous and intentional impressions, which are summarized in Table 7.1.

**TABLE 7.1. Differences in Impressions**

| 1. Spontaneous impressions are guided more by chronically accessible constructs, whereas intentional impressions are guided more by temporarily activated goal-relevant constructs and procedures, and by implicit theories (about the meanings of actions, relationships of traits to each other, the properties of an adequate impression, etc.). If you are engaging in uneventful people watching at the annual picnic, and are chronically concerned with other people's sense of humor or with how they treat children, your observations should be spontaneously encoded in terms of these particular concerns. On the other hand, if you have the goal of deciding who would work well in your lab, that should temporarily activate such constructs as intelligence and conscientiousness and your theories about good scientists, should prompt competing interpretations of whatever you observe, and should engage a host of hypothesis-testing processes. All of this may obscure individual differences in chronic accessibility.
| 2. Spontaneous impressions are less focused, more wide-ranging, and more promiscuous, whereas intentional impressions are focused; goal-irrelevant inferences are inhibited in the latter. A chronic concern with funniness, sexiness, a sense of social injustice, or the like should produce spontaneous inferences about any of these that are applicable. |
TABLE 7.1. Possible Differences between Spontaneous and Intentional Inferences in Impression Formation

<table>
<thead>
<tr>
<th>Spontaneous</th>
<th>Intentional</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inferences are guided by chronically accessible constructs and procedures.</td>
<td>1. Inferences are guided by temporary goal-relevant constructs and deliberative processes.</td>
</tr>
<tr>
<td>2. Multiple unrelated inferences occur and persist.</td>
<td>2. Goal- and context-irrelevant inferences are inhibited.</td>
</tr>
<tr>
<td>3. Prior construct activation affects impressions, but subsequent information is less likely to.</td>
<td>3. Both prior and subsequent information is integrated into coherent impressions.</td>
</tr>
<tr>
<td>4. Trait inferences are implicitly linked to actors by association, appropriately or not.</td>
<td>4. Trait inferences are explicitly linked to the actors about whom one intends to form impressions.</td>
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</table>

Multiple spontaneous inferences may occur in parallel. Intentional impressions are more focused and limited by serial processes that check for goal relevance, consistency, etc.

3. Spontaneous impressions arise in the course of comprehending events (or text). Rather than being revised when inconsistent or qualifying information is encountered, they are simply replaced by the new information's implications. This differs from intentional-impression formation in that the additional information is not used to revise and reinterpret prior information, which has to be retrieved from long-term memory. Instead, it simply forms an overlay and replaces prior impressions. Prior information may affect spontaneous impressions by priming relevant constructs. But little or no effort is made to revise prior inferences in light of subsequent information, partly because there is no awareness that they have been made.

4. Spontaneous impressions are linked to actors by mere association (if they are linked at all), whereas intentional impressions are correctly linked to the logically appropriate actor. Trait concepts activated spontaneously by one actor's behavior may become associated with another person in that setting, or may not even be associated with any particular person. Thus you may remember that someone (or something) was pretty funny at the annual picnic without remembering who it was, or you may even be mistaken about who it was. Such errors are less likely for intentional impressions, because one has the question in mind ("What's John really like when he lets his hair down?") before the answer is generated.

In short, relative to intentional impressions, spontaneous impressions reflect the perceiver more than the target (i.e., the perceiver's chronically activated constructs and a wider range of such constructs); are relatively unfocused; reflect little or no integration of inconsistent information; and may be associated with salient others who did not give rise to the impression, or may not be associated with anyone at all. This is a list of hypotheses, not a list of well-established research findings. Nevertheless, each was suggested by research evidence. I turn to that next, to describe the evidence, elaborate on these ideas, and examine the limits of the support that already exists for them.

Chronically Accessible Constructs versus Goal-Activated Constructs

Goals select and activate goal-relevant constructs and processes. For example, deciding whether someone is suitable for a particular job activates relevant constructs and hypothesis-testing processes (see Gollwitzer & Moskowitz, 1996; Trope & Liberman, 1996). Without such goals, the effects of chronic concerns and chronically accessible constructs should be more evident. In addition, the simple goal of being thorough in forming an impression may generate multiple inferences—
inferences that would not occur spontaneously, or with a specific but superficial processing goal in mind.

Zelli and his colleagues (Zelli et al., 1996; Zelli, Huesmann, & Cerverone, 1995) conducted two studies that contrasted spontaneous inferences with those made by participants who were asked to "think about the reasons why the persons described in the statement did what they did. Think about what caused the outcome described" (Zelli et al., 1996, p. 174). All participants read a group of sentences with the goal of memorizing them for a subsequent recall test; the "deliberate-inference" participants also thought about reasons for the actors' behaviors. Participants in each study were in the extreme quartiles on a self-report measure of the frequency of engaging in aggression (e.g., "threatened, or actually cut with a knife, or shot with a gun") in the past year. On this basis, they could be assumed to be high or low in the chronic activation of hostility-related constructs.

Some of the sentences participants read had both hostile and nonhostile interpretations. For example, "The electrician looks at his younger brother and starts laughing" can imply "ridicule" or "playful." "The man in the second row starts screaming when the athlete runs by" can imply "insulting" or "excited." The prediction was that more aggressive participants would spontaneously encode these sentences in hostile ways, but that this difference would disappear under deliberative conditions because all participants would generate both interpretations. That is, extensive deliberations should lead to multiple interpretations, not just to those occurring spontaneously on the basis of chronically accessible constructs.

This prediction was supported in both studies. Zelli et al. (1995) compared recall cued by hostile cues with that cued by semantic cues ("wires" and "audience," respectively, for the sentences above). Under spontaneous processing, hostile cues were relatively more effective for aggressive participants; under intentional processing, there were no differences. Zelli et al. (1996) compared the effectiveness of hostile and nonhostile trait cues, to control for the possibility that participants might differ in their tendency to make trait inferences of any kind. Under spontaneous processing, hostile cues were more effective for aggressive participants, but not for nonaggressive participants. Under deliberative processing, the pattern was reversed, but the difference was not significant.

These results suggest that spontaneous impressions are more sensitive to the influence of chronically accessible constructs than the "traditional deliberate processing" paradigms, which have yielded relatively small aggressive/nonaggressive differences [Dodge, 1993] (Zelli et al., 1995, p. 415). They are also consistent with findings on the assessment of social problem-solving skills. Rabiner, Lenhart, and Lockman (1990) examined such skills among three groups of fourth- and fifth-graders: nonrejected, rejected-aggressive, and rejected-nonaggressive. These children responded to six short conflict vignettes either (1) immediately, with the first thought that came to mind; or (2) after 20 seconds of reflection about alternative responses. In the immediate condition, both groups of rejected boys gave more "conflict escalation" and fewer nonaggressive "verbal assertion" solutions, consistent with their behavior in the rough-and-tumble round of daily social interactions. In the reflective condition, however, the only difference was that rejected-aggressive boys gave fewer verbal assertion solutions (suggesting that such solutions were not only inaccessible but unavailable to these boys). Although these immediate solutions were not "spontaneous" in precisely the unprompted sense used here, they were clearly less reflective and thus more revealing of differences in chronic accessibility.

There is a large body of evidence indicating that differences in the chronic accessibility of constructs do affect intentional-impression formation (see Higgins, 1996, pp. 139-141, for a recent review). Why, then, was this not the case in these studies? Note that these participants were asked to think about the reasons for and causes of the actions. Although this faithfully replicated traditional procedures in research on the cognitive mediators of aggressive behavior, it called for more extensive processing than the instruction to simply "form an impression." This more extensive thought may have activated most of the applicable available constructs in all the participants, swamping differences in chronic accessibility. That is, traditional impression for-
mation studies may have prompted less extensive processing than could easily have occurred, thereby allowing chronically accessible constructs to have a larger impact. The results of impression formation studies may not be particularly representative of the impression formation processes engaged in during social interaction, where more extensive thought may lead to multiple competing inferences (hypotheses to be examined), and where multiple goals may activate more goal-relevant constructs. Daily social interaction, especially where future interaction is anticipated, may engage more complex impression formation processes than those engaged by traditional "impression formation" instructions and settings. Research is needed to test this idea directly.

Although the studies by Zelli et al. (1995, 1996) are the only ones that directly compare spontaneous with intentional impressions, additional research also suggests the importance of chronic accessibility in STIs. My colleagues and I (Uleman, Winborne, Winter, & Shechter, 1986) examined whether a personality trait that predicts differences in impressions of others would also predict differences in STI. Our participants were high or low in authoritarianism. Sentence stimuli had clear intentional trait implications for one of these two groups but not the other. For example, "The architect loved the excitement of military parades" implied "patriotic" to those who were high on authoritarianism; among low-authoritarianism participants, there was much less consensus about its implications. On the other hand, when low-authoritarianism participants read "The reporter slapped his daughter several times whenever she left her clothes on the floor," they inferred that the reporter was "harsh" or "abusive," whereas high-authoritarianism participants did not. When these sentences were read "for a memory study," the most effective trait cues for participants low in authoritarianism (e.g., "harsh") were not effective for those high in authoritarianism. This was interpreted as support for the idea that differences in authoritarianism reflect (among other things) differences in chronically accessible constructs, which affect spontaneous impressions.

Newman (1993) reported two studies suggesting individual differences in the chronic accessibility of trait constructs in general. People in individualistic cultures use traits in their open-ended self-descriptions more than people from collectivist cultures do (e.g., Rhee, Uleman, Lee, & Roman, 1995). This suggests that individual differences in individualism (or, more accurately, idiocentrism; Triandis, Bontempo, Villareal, Asai, & Luca, 1988) may in part reflect differences in the chronic accessibility of trait constructs generally. In Study 1, participants read trait-implying sentences for a subsequent memory test. Analyses of cued-recall evidence for STIs revealed more STIs among idiocentric men (but not women). In Study 2, participants read trait-implying sentences and responded to trait and nontrait recognition probes. As predicted, there was more evidence of STI among participants (both men and women) who were higher in idiocentrism.

More recently, Duff and Newman (1997) found that idiocentric participants made more STIs and fewer spontaneous situational inferences. Participants read 12 sentences (e.g., "On her lunch break, the receptionist steps in front of another person in line," "The photographer complains about the service in the new restaurant") for a subsequent memory test. Each sentence had both a trait interpretation (e.g., "rude" and "picky," respectively) and a situational interpretation (e.g., "in a hurry" and "slow," respectively). Half the sentences were cued with trait cues, and half with situational cues. Idiocentrism correlated (1) positively with trait-cued sentence recall (but only among men, again), and (2) negatively with situation-cued recall.

An unpublished study supports the importance of individualism and collectivism in STIs. Zarate and Uleman (1994) found that on a lexical decision task, Anglo and Chicano students differed as predicted (Latino cultures are more collectivistic). Participants read sentences on a computer screen, and then their recall was tested, to simulate "an exam" taken after "study with distraction." During the sentences, the subjects were "distracted" unpredictably by lexical decisions. Among Anglos, RTs to trait words were shorter following trait-implying sentences than following control sentences, indicating STIs. But there was absolutely no evidence of STIs among Chicanos, even though there were almost two and a half times as many Chicanos
as Anglos, and the intentional inferences of Anglo and Chicano students did not differ.

Moskowitz (1993) reported an individual difference in STIs that reflected differences in chronic goals rather than in chronically accessible constructs. Using a cued-recall paradigm, he found that participants who were high in "personal need for structure" were more likely to engage in STIs. Personal need for structure is a desire for certainty and clarity, and a corresponding aversion to ambiguity. Those with the chronic goal of obtaining structure are thought to be more practiced at and more interested in inferring traits from behavior. They prefer not to suspend judgment, and tend to avoid more complex impressions that include situational contingencies. Therefore, they are more likely to interpret trait-implying sentences spontaneously in simple trait terms.

Thus there is considerable evidence consistent with the hypothesis that differences in chronically accessible constructs and goals are reflected in spontaneous impressions, and some evidence that extensive intentional thought about the same information obscures these effects (Zelli et al., 1995, 1996; Zárate & Uleman, 1994). But two kinds of studies are needed to provide clearer support for this hypothesis. The first kind of studies include more direct measures of chronic construct accessibility, and that distinguish this from construct availability. The second is studies that compare the results of spontaneous, "traditional intentional" (the usual impression formation condition), and "deliberative" (Zelli et al., 1996) processes of impression formation. If my speculation is correct, spontaneous impressions should be most affected by chronically accessible constructs, and deliberate impressions should be least affected. Traditional intentional impressions should fall somewhere in between.

Multiple Unrelated Inferences versus Goal-Relevant Inferences

Goals not only activate constructs, but also inhibit them. In negative priming, stimuli that are to be ignored on one trial take longer to respond to on the next trial than when they had not been ignored. Such inhibition does not simply reduce overall attention to a stimulus; it selects which of several aspects of a stimulus to ignore. "The behavioral goals of the task, whether semantic identification or manual reaching, determine what representations of a stimulus will be accessed and inhibited by attention" (Tipper, 1992, p. 108).

Inhibition is important in comprehension. The classic demonstrations have been carried out with ambiguous words (see Simpson, 1994, for a recent review). If participants read, "The man was not surprised when he found several spiders, roaches, and other bugs," and then immediately make a lexical decision about "ant" or "spy" or "sew", both "ant" and "spy" are facilitated because they are related to the meanings of "bug". If the lexical decision is delayed by just four more syllables (200 ms), decisions for "ant" are still facilitated, but those for "spy" are not. That is, all of the meanings of homonyms are initially activated in parallel, but the context-irrelevant ones are quickly inhibited (Swinney, 1979).

Gernsbacher (1991) gives a prominent role to suppression processes in her "structure-building framework" of comprehension. Suppression dampens activation through inhibitory signals transmitted to context-irrelevant cognitive nodes. It plays an important role in lexical access (as in Swinney, 1979), in anaphoric inference, in cataphoric access (maintaining greater activation for marked referents), and in the loss of surface information while retaining the meaning of text. Relative to good comprehenders, poor comprehenders are less efficient suppressors when understanding stories in written, in spoken, and even in pictorial form (Gernsbacher & Faust, 1991a). Thus the inhibition of context-irrelevant meanings is an important general mechanism in comprehending events.

What happens when comprehension goals or context do not require the inhibition of multiple meanings? For example, "Pam was annoyed by a quack" does not provide any basis for deciding whether the "quack" was a doctor or a sound from a duck, whereas "Pam was diagnosed by a quack" and "Pam heard a sound like a quack" do. Gernsbacher and Faust (1991b) used a lexical decision task with probes such as "doctor" and "duck" to show that both concepts were active immediately after unambiguous sentences, but that the context-irrelevant meanings were suppressed 500 ms later. For example, both concepts were activated when the delay between the sentence and the probes were after several context-irrelevant inferences in the texts.

Spontaneous inferences are more likely than context-irrelevant ones. Not only do they take a goal of forming an impression that takes into account what the other person might select, but they also represent several more recent inferences, per-
later. Following ambiguous sentences, however, both concepts remained just as active in the delay condition as appropriate concepts were after unambiguous sentences. Thus multiple contradictory meanings can remain active in the absence of disambiguating contexts.

Spontaneous inferences about others are more likely to resemble the associates of ambiguous sentences than those of unambiguous ones. No content-specific goals are operating to inhibit irrelevant meanings. No general goal of forming a coherent impression—one that takes other information about the person into account—is operating. So factors that might select the most relevant from among several meanings and suppress the rest are absent, permitting the persistence of multiple inferences.

Unfortunately, there is no direct research evidence on this possibility. But we (Uleman & Moskowitz, 1994) used a cue-reel paradigm to examine the co-occurrence of trait inferences and inferences of “behavioral gists.” Behavioral gists describe behavior in ways that are not directly relevant to traits. “The child tells his mother that he ate the chocolate” implies “honest,” but the behavior can also be characterized as “confessing.” We expected STIs and spontaneous gist inferences to compete for limited processing capacity or procedures, and therefore to be mutually exclusive. But instead of finding that traits’ and gists’ effectiveness as cues were negatively correlated, we found that they were positively correlated. These correlations reached significance in some conditions but not others (with Ns about 35); however, they were always positive. Thus, STIs and spontaneous gist inferences tend to co-occur rather than to be mutually exclusive. Whether or not multiple and even mutually inconsistent trait inferences co-occur in spontaneous impressions remains to be examined in future research.

**Forward versus Backward Information Integration**

Because spontaneous impressions are unintended and often unnoticed (unconscious), inconsistencies with subsequent information are unnoticed too. The usual processes of resolving inconsistencies when forming impressions of others are thus neglected. This does not mean that some sort of information integration doesn’t occur. But, at least for STIs, it is more likely for information that precedes rather than follows the trait-implying information. Three studies have demonstrated the effect of preceding information on STIs, and others have demonstrated the failure of subsequent information to affect STIs.

We (Newman & Uleman, 1990) primed trait concepts in an “unrelated-study” paradigm, before trait-implying sentences were read for a subsequent memory test. Either the positive or the negative pole of four trait constructs was primed. The trait-implying sentences were ambiguous, in the sense that they could imply either the positive or negative pole of one of the traits (e.g., “Molly would not take no for an answer” could imply that she was “determined” or “pushy.”) Trait-cued recall of the sentences was followed by an unexpected recall test for the primes from the “first study.”

Previous research had found that when primes were recalled, contrast effects occurred on a subsequent intentional-impression formation task, whereas assimilation occurred when they were not recalled. Apparently primes that could be remembered served as standards against which to compare subsequent information, resulting in a contrast or overcorrection effect. If they could not be recalled, subsequent information was simply assimilated to the primed construct. We obtained parallel findings for STIs. When participants recalled the prime (e.g., “persistent” or “stubborn”), the cue with the opposite valence (“pushy” and “determined,” respectively) was most effective—a contrast effect. When participants did not recall the prime, the cue synonymous with the prime was most effective—an assimilation effect. Thus the activation of relevant trait concepts prior to forming spontaneous impressions affects the inferences from ambiguous behaviors.

In view of the earlier discussion of inhibition above, it is interesting to note that we found that, relative to a no-prime condition, the primes inhibited the effectiveness of the other cue (whether contrasting or synonymous) rather than enhancing the effectiveness of the target cue. “This pattern of results thus seems to indicate that, without priming, more than one interpretation of an observed ambig-
uous behavior is encoded spontaneously... and the primed construct predominates only by inhibiting alternative ones" (Newman & Uleman, 1990, p. 237).

Lupfer, Clark, and Hutcherson (1990) examined whether the preceding narrative context would affect STIs. Instead of reading paragraphs of context and trait-implying behavior for a subsequent memory test, participants read them as distractors from what they believed was their focal task, memorizing digits. One example of such a distractor, “The businessman steps on his girlfriend’s feet during the foxtrot” (which implies “clumsy”) was preceded by either “The businessman and his girlfriend plan a ‘night on the town.’ He spills a drink on her dress,” or “The businessman and his girlfriend are trying to dance on a very crowded dance floor. Everyone is bumping into others.” The first context supports a trait inference, whereas the second does not. On each trial, participants read a string of digits to remember, then read the distractor information, then repeated the final trait-implying sentence aloud from memory, and finally recalled the digits. Relative to reading only the trait-implying sentence as a distractor, STIs were more likely with a preceding context that supported a trait inference.

Lea (1995a) asked participants to read brief stories and make lexical decisions after each one. The critical stories ended with trait-implying sentences. Some stories supported the trait implication and some did not. For example, “The minister gets his poem published in The New Yorker” (which implies “talented”) was the last sentence in either the story “An Unusual Hobby” or “The Printing Errors.” The first story included the following: “Last year a published book of his poems won a prize. This year he has written, he thinks, his best poem.” The second story began, “The minister writes a poem for the church newsletter. A couple of printing errors occur. His poem becomes something so hilarious that the national press is alerted.” Lexical decisions were faster to trait words (e.g., “talented”) when the context supported the trait implication than when it did not, replicating the findings of Lupfer et al. (1990).

Note that both of these studies used narrative contexts that also implied the relevant traits. The clumsy businessman with big feet also spills a drink on his companion; the talented minister has already won a prize. So these studies may simply show that two trait activations are better than one, or that the preceding context is integrated in more complex ways. In either case, it makes STIs more likely.

What happens when trait-relevant information clearly follows the trait-implying sentences? Lupfer, Clark, Church, DePaola, and McDonald (1995) examined effects of covariation information. They developed local sentences that were either (1) trait-implying; (2) ambiguous, with traits and situations equally likely explanations; or (3) situation-implying. For some participants, these were followed by covariation information supporting trait inferences; for others, information supporting situational inferences. In both Studies 2 and 3, the resulting three-sentence paragraphs were presented as distractors from a focal task of digit memory (as in Lupfer et al., 1990). In Study 2, STIs were detected with a recognition probe task, with four probes following each paragraph: the trait implication, the situation implication, and two words that actually were presented. Error rates for trait probes showed that STIs were most likely following trait-implying focal sentences, as expected, but were unaffected by the covariation information. In Study 3, STIs were detected with a lexical-decision task. Error rates and latencies for traits again showed that STIs were more likely following trait-implying focal sentences, as expected, but were again unaffected by the covariation information. Thus both studies found that covariation information did not affect spontaneous impressions when it followed the trait-implying information, even though it did have the predicted effects on intentional impressions that were generated in Study 1.

On the basis of work by Moskowitz and Roman (1992), Stapel et al. (1996) used spontaneous- and intentional-impression formation tasks as primes in two studies of assimilation and contrast effects. In Study 1, participants in an “impersonal” condition read simple trait-implying sentences (e.g., “He knew he could handle most problems that would come up”), for the purpose of either forming an impression of the actor (intentional inference) or preparing for a subse-quent memory task (spontaneous impression). They also spelled a drink on his companion; the talented minister has already won a prize. So these studies may simply show that two trait activations are better than one, or that the preceding context is integrated in more complex ways. In either case, it makes STIs more likely.

Then in the second condition, participants read covariation information after the first paragraph and before the second paragraph. In the second condition, participants read covariation information after the first paragraph and before the second paragraph. In the second condition, participants read covariation information after the first paragraph and before the second paragraph.

Higgins et al. (1987) found that the second paragraph primed consistent views of the stimulus person and lead to more abstract and less specific conclusions. Participants were instructed to encode the stimulus person as a trait concept (consistent view) or a contextual concept (consistent view). Higgins et al. (1987) found that the second paragraph primed consistent views of the stimulus person and lead to more abstract and less specific conclusions. Participants were instructed to encode the stimulus person as a trait concept (consistent view) or a contextual concept (consistent view).

Moore (1982) found that participants were less likely to make trait inferences when the second paragraph primed consistent views of the stimulus person and lead to more abstract and less specific conclusions. Participants were instructed to encode the stimulus person as a trait concept (consistent view) or a contextual concept (consistent view).

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quent memory test (STI). The sentences’ trait implications were either positive (“confident” and “persistent”), negative (“conceited” and “stubborn”), or irrelevant to the second task. Then in a subsequent “unrelated” task, participants formed an impression of “Erik,” modeled after the ambiguous “Donald” in Higgins, Rholes, and Jones (1977). STIs on the first task produced assimilation effects on the second task, whereas intentional impressions produced contrast effects. This was consistent with their theory that activated “abstract” trait concepts (“in the background,” not linked to particular actors) would produce assimilation, whereas “concrete” concepts (linked to an actor) would produce contrast.

More to the present point, in Study 2 participants read these same trait-implying sentences under memory (STI) or impression formation instructions, and the sentences were followed by covariation information implying either situational or personal causality. Then participants formed impressions of Erik. Stapel et al. predicted that the situational information would make the activated trait concepts abstract, that the personal information would render them concrete; and that subsequent impressions of Erik would show assimilation or contrast effects, respectively. This was what occurred, regardless of whether the sentences were read under memory or impression instructions.

In other words (and contrary to Lupfer et al., 1995), the covariation information did have reliable effects in the STI condition, even though it followed the trait-implying sentences. Why this discrepancy? Although comparisons across studies are hazardous when there are so many differences between them (number and nature of sentences, dependent variables, etc.), recall that Lupfer et al.’s participants read the sentences as distractors rather than for a memory test, giving them less opportunity or incentive for the kind of elaborative processing that could alter inferences from the initial focal behaviors. Although both studies presented covariation information after the trait-implying information, the task demands in Stapel et al. (1996) called for more thorough processing than did those in Lupfer et al. (1995). Thus, whether subsequent information that could modify an intentional impression is processed for a spontaneous impression depends on the processing demands of the other task (the “Y” task discussed earlier in this chapter). Reading information as a momentary distractor requires less processing than reading for a subsequent memory test, which apparently calls for the construction of a more coherent “text base” (Kintsch, 1988) or “structure” (Gernsbacher, 1991) when several related sentences are involved.

This evidence is consistent with the hypothesis that, like intentional impressions, STIs are affected by preceding information that activates relevant constructs. But STIs are less likely to be revised by subsequent information than intentional impressions are. If new information suggests a new spontaneous impression, it is more likely to replace a prior impression than to be integrated with it. In short, forward integration (based on simple construct activation) occurs for both kinds of impressions, but backward integration is less likely with spontaneous impressions.

### Spontaneous versus Intentional Associations with Actors

When you ask yourself (or are asked) a question (e.g., “What kind of a person is Rashid?”), and then an answer to that question occurs to you, you know what question is being answered. Unlike Carnac the Magnificent on the old The Tonight Show with Johnny Carson (who would guess at the question when given an answer), you don’t have to guess at the question. So if the trait concept “clever” occurs to you as you’re wondering about Rashid, your initial inference will be that Rashid is clever.

Krugl (1993) demonstrated as much when he showed that the stages in forming impressions of a situation parallel those of forming impressions of a person. His participants were asked to watch a silent videotape of a woman responding nervously to unknown interview questions, and to form an impression of either the person or the situation. Half of each group was under cognitive load, which interferes with the “correction” stage of Gilbert’s well-known model of intentional person inferences (in which categorization and “correction” are more efficient than the final correction stage; Gilbert, Pelham, & Krull, 1988; see also Gilbert, 1997).
Consistent with the model, participants under cognitive load who were asked to form an impression of the woman saw her as more anxious than those under no load did. More interestingly, those under load who were asked to form an impression of the situation saw it as more anxiety-provoking than those under no load did. That is, without the more deliberative correction stage, participants attributed more anxiety to whatever they had a question about: either the person or the situation.

What happens when you don’t have a question in mind—when your inference is spontaneous? The answer seems to be that if you attach the inferred concept to anything, it will be linked to the most salient feature(s) in the situation.

There are several ways to define and assess links between actors and trait inferences, and not all of them produce the same results. Explicit memory links between trait inferences and actors seem to be relatively rare and to require particular conditions (see Uleman, Newman, & Moskowitz, 1996, on “manifest reference”). However, a rehearsing paradigm provides strong evidence of implicit memory links between actors and STTs. In relearning, participants memorize stimuli on one occasion and then memorize them again later. It takes less time or fewer trials to reach the same performance criterion on the second occasion, or the old material is learned more thoroughly in the same amount of time than new material on the second occasion. This savings is usually unrelated to whether participants recognize the old material on the second session. Thus savings in relearning provides a measure of implicit memory.

Carlston and Skowronski (1994; Carlston, Skowronski, & Sparks, 1995) have studied STT with a relearning paradigm. In a typical study, participants viewed a series of photos of people paired with self-descriptive statements that implied traits. (For example, “I hate animals. Today I was walking to the pool hall and I saw this puppy. So I kicked it out of my way” implies “cruel.”) They were asked either to form impressions of the people or simply to “familiarize [yourself] with materials to be used later in the experiment.” Then they attempted to learn photo-trait pairs on a later occasion. Some photos were paired with traits implied by the previous self-descriptive behaviors, and some were not. The difference in memory for “old” and “new” pairs provided a measure of savings. Large savings effects were found in nine studies, and, remarkably, they did not differ by condition. Thus, mere familiarity led to (spontaneous) trait inferences as much as intentional-impression formation did.

In Study 4, Carlston et al. (1995) told participants that the descriptions were given by the people in the photos, but that they were about other people. To emphasize that these were not self-descriptions, the photos and descriptions had different genders. Some participants familiarized themselves with the materials (as in previous studies), whereas others formed intentional impressions of either the person in the photo or the person being described. Savings occurred under familiarization (where it revealed an erroneous implicit association between photo and trait), but not reliably under either impression formation condition. That is, the trait inference was reliably associated with the (salient) photo only in spontaneous impressions. This suggests that when people intentionally form impressions, potentially misleading associative links can be prevented or inhibited.

Skowronski, Carlson, Mae, and Crawford (1998) have dubbed this effect “spontaneous trait transference” (STT). In a series of four studies, they documented how robust it is. Study 1 used the relearning paradigm to show that it persists over a 2-day delay. (It also found some evidence of STT in the intentional-impression condition with no delay, but this disappeared after the 2-day delay.) Studies 2–4 used an explicit trait-rating task instead of relearning, after initial familiarization. In Study 2, 2 days after participants had simply familiarized themselves with the communicators’ (in photos) descriptions of cross-gender acquaintances, they erroneously attributed the traits implied by those descriptions to the communicators. Study 3 showed that even when participants were explicitly told that the photos of the “communicators” and “their descriptions” were randomly paired, and that they should simply study them for a subsequent test of their memory for the pairings, their trait ratings of the photos 2 days later reflected traits implied by the descriptions. Study 4 demonstrated STT with videotaped interviews rather than printed stimuli. It is possible that spontaneous associations are more robust than intentional associations; on filler questions, people are sometimes asked to consider the interview itself, and are later shown filler questions, ensuring that the interview itself is not mediated by STT.

These studies, on simple and sophisticated concepts alike, suggest the salience of the phenomenon. And it provides a window into the intentional-impression formation process, which is responsible for the intentional impressions people develop. Skowronski described the presence of STT as a reminder of the impression formation process.

A METAPHORICAL SUMMARY

Table 7.1 summarized above is presented in a metaphorical summary, suggesting the salience of the phenomenon. This summary is presented here to make some suggestions for future research. Many of the results described above are more formal and more detailed than the summary presented here, but the summary is meant to be a convenient way of relating the findings to one another.

Spontaneous associations are present in the unconscious mind, and they establish shortcuts in learning and thinking. They are often present in multiple, parallel processing streams, but not always. People are sometimes asked to consider the interview itself, and are later shown filler questions, ensuring that the interview itself is not mediated by STT. Skowronski described the presence of STT as a reminder of the impression formation process.
stimuli. Interviewees described either themselves or others. Some participants intentionally formed trait impressions of those described; others familiarized themselves with the interview format; and still others judged whether the taped vignettes were staged or authentic. Trait ratings of interviewees 2 days later showed STT of equal magnitude for all goal conditions. And, replicating a finding from Study 2, explicit memory for whether the interview had been about self or other did not mediate STT.

These results suggest that STT is based on simple associations between activated trait concepts and communicators. It is reminiscent of the “innuendo” effect reported by Wegner, Wenzlaff, Kerkert, and Beattie (1981). And it provides a sharp contrast with intentional-impression formation processes, in which intentions link trait concepts firmly to the intentional object of inquiry. Spontaneous impressions are implicitly associated with salient people, even if they are not the people the impression should be about.

A METAPHOR, NOT A MODEL

Table 7.1 summarizes the four differences described above, but omits the reasons for suggesting them and the reliability of that evidence. This evidence may suggest other differences to the reader (or may suggest that some suggestions should not be taken very seriously without further research). Because many of these ideas are speculative, a metaphorical summary is more appropriate than a more formal model. Here’s mine.

Spontaneous-impression formation processes are part of an underground stream of unconscious thought—guided by long-established constructs and procedures, flowing in multiple unrelated directions, carrying prior inferences forward to color the current stream, but never circling back or flowing uphill to change the source. (New inferences supplant old ones, but are not integrated with them in complex ways.) They attach themselves promiscuously to any plausible target in their path. Intentional-impression formation processes are an above-ground aqueduct system—flexibly channeled to destinations consistent with current needs, protected from leaks and contaminants by inhibitory processes, integrated with other complex processing systems, and accompanied by a record-keeping and control system for self-corrective feedback. The underground stream and the aqueduct system may interact, but in ways as yet unfathomed.

SOME RELATIONSHIPS WITH OTHER DUAL-PROCESS THEORIES

Dual-process theories often identify distinct kinds of processing, and then describe the unique instigators and consequences of each. Thus one often starts with a clear conception of the processes’ characteristics and then investigates the conditions that give rise to them, as well as their unique consequences (e.g., Sloman, 1996). My approach has been different. I have begun with a dichotomous instigating condition—the presence or absence of intentions to form an impression—and asked whether there is any empirical evidence that different processes flow from each. Recent evidence suggests that they do. These differences, summarized in Table 7.1, have some interesting similarities to and differences from other dual-process formulations.

Greenwald and Banaji’s (1995) distinction between implicit and explicit social cognitions rests on whether the person is aware of them and their influence on behavior. (This is a feature of the outcome, rather than an instigating condition or a feature of the process.) They make a strong case for using measures of attitudes, self-esteem, and stereotypes that do not depend on accurate introspective self-reports, because these often fail to reflect the effects of past experience that mediate valenced responses toward others (attitudes), toward the self (self-esteem), and toward members of social categories (stereotypes). By their broad criterion, a spontaneous inference is an implicit social cognition—that is, “the introspectively unidentified (or inaccurately identified) trace of past experience that mediates” responses (p. 5). As noted above, these responses include explicit recall of behaviors, lexical decisions, recognition RTSs, savings in relearning, and explicit impressions (see Uleman, Newman, & Moskowitz, 1996, for more details). All of these are implicit measures, in that none requires awareness either of making an infer-
ence or of its effect on the response. In fact, participants usually deny that they have inferred anything, and these inferences interfere with some response tasks. So spontaneous impressions are usually implicit social cognitions. Thus the research on STIs extends the domain of responses that depend on implicit cognition beyond the highly valenced ones considered by Greenwald and Banaji, to include the more specific effects of activating particular constructs.

Epstein's experiential system (see Epstein & Pacini, Chapter 23, this volume) has some suggestive similarities to spontaneous inference processes, although it is described as noncognitive, and it attempts to account for a different and broader range of phenomena. Perhaps spontaneous inferences are one kind of input that goes primarily to the experiential system.

Trobe's dual-process model of impression formation distinguishes between identification and inference processes (see Trope & Gaunt, Chapter 8, this volume). All of the relevant research has been done under intentional impression formation instructions, so possible roles for spontaneous inferences are as yet unexamined. However, two lines of evidence suggest that identification (at least) may occur spontaneously as well as intentionally. First, some kinds of prior information can affect STIs (point 3, Table 7.1). Thus, prior situational information that could disambiguate the identification of behavior may facilitate STIs, as it does intentional identification. Second, identification and STIs are relatively unaffected by concurrent cognitive load. The possibility of spontaneous identification remains to be tested directly. Spontaneous "inferences" (in Trope's more specific sense) are probably less likely than spontaneous identifications because intentional "inferences" require substantial cognitive capacity, and the discounting of trait causes may involve a more complex, coherent cognitive sequence than spontaneous processing can sustain. In addition, Trope's trait "inference" process produces a clear causal attribution to the actor, whereas STIs are merely associated with the actor. Their status as "real explanations" or "causes" is unclear, and they are probably best regarded as potential hypotheses, at least until a question is posed and an answer is sought intentionally.

Neither the heuristic-systematic distinction (Chen & Chaiken, Chapter 4, this volume) nor the central–peripheral distinction (Petty & Wegener, Chapter 3, this volume) seems to map very well onto the spontaneous–intentional dichotomy, because both describe intentional processes of attitude change. That is, both distinguish between ways of intentionally processing persuasive messages. And both have been studied almost exclusively within situations of intentional attitude change. Heuristic and peripheral processing seem to have more in common with spontaneous processing, because neither produces complex integration of all the relevant message content (point 3, Table 7.1). And systematic and central processing are clearly intentional. However, heuristic and peripheral processing can also be intentional, whereas spontaneous processing cannot, by definition.

It may be interesting to see whether spontaneous processing of persuasive messages, accompanied by heuristic cues, will favor the use of heuristic cues when heuristic cues (e.g., source expertise and systematic cues (e.g., argument strength) are equated for ease of encoding. It seems more likely that attitudes will be determined by other features of the presentation. One possibility, given the associationistic nature of spontaneous processes (point 4, Table 7.1), is that attitudes will be determined by the relative frequency of positive and negative associations with the attitude object, regardless of whether the associations have heuristic or systematic value. Another possibility, given spontaneous inferences' failure to integrate into the presentation (point 3, Table 7.1) and the idea that new associations simply supplant old ones, is that attitudes will be determined by the last information presented (a recency effect), regardless of its heuristic or systematic relevance. Neither possibility accords heuristic cues any special role in spontaneously processing persuasive messages.

Mapping Sloman's (1996) "two systems of reasoning" onto the spontaneous–intentional dichotomy is also difficult, because Sloman's work is exclusively based on studies where reasoning, whether associative or rule-based, was intentional. People tried to solve problems, apply theories, or arrive at conclusions intentionally. Although his "associative system" seems to share some features with spontaneous inferences (e.g., both are more associative, and both may contribute more to
intuition, fantasy, and creativity), his associative reasoning is intentional. Just because spontaneous inferences are associative, and associative reasoning can occur intentionally, spontaneous inferences need not be the same as intentional associative reasoning. For example, people are aware "of the result of the computation" (p. 6) in associative reasoning (although not of the process). This is usually not true of spontaneous inferences. Finally, unlike the case of spontaneously processing persuasive messages, it is difficult to imagine what it could mean to spontaneously reason or attempt to solve problems.

Jacoby, Kelley, and McElree (Chapter 19, this volume) argue persuasively that there are no "process-pure" tasks, and that all cognitive tasks are performed through some combination of controllable and uncontrollable processes. Their process dissociation procedures and models yield estimates of the relative effect of each in any task where these two operate independently. How can these models be applied to STIs? It is useful to distinguish between (1) making STIs in the first place, or encoding; and (2) STIs' effects on subsequent impression formation or other processes (i.e., those involving retrieval). Speed-accuracy tradeoff procedures should be useful for tracking the time courses and relative importance of controllable and uncontrollable processes in producing STIs under a variety of encoding conditions, such as variations in goals (Uleman & Moskowitz, 1994), in concurrent cognitive load (Uleman, Newman, & Winter, 1992), in prior trait priming (Newman & Uleman, 1990), and in the linguistic structure of the stimulus materials (the focus of most of the literature on text comprehension). There is evidence that people can gain control of STI encoding processes over the course of many trials with feedback, when STI interferes with the primary task (Uleman, Hon, et al., 1996). Encoding processes that are initially uncontrollable seem to come under control. Speed-accuracy tradeoff analyses over the course of multiple trials may provide insight into how this occurs.

The process dissociation procedures familiar to most social psychologists through Jacoby's false-fame effect (e.g., Jacoby, Kelley, Brown, & Jasehko, 1989) can be used to estimate the relative contribution of controllable and uncontrollable processes to STIs' effects on retrieval tasks, such as savings in relearning (e.g., Carlson et al., 1995), word stem completion (e.g., Whitney, Waring, & Zingmark, 1992), or any other task where both controlled retrieval strategies and automatic "habits" or familiarity may play a role (e.g., Moskowitz & Roman, 1992; Stapel et al., 1996).

For example, Skowronski et al. (1998) have shown that when participants "familiarize" themselves with pairs of photos and trait-implying descriptions, the resulting STIs affect subsequent trait ratings of the people in the photos 2 days later. This effect occurs even when it is clear to participants that those in the photos were describing someone else, and it does not depend on subsequent confusion about this issue. Thus one might set up "inclusion" versus "exclusion" trait-rating conditions, in which participants are invited to "use whatever comes to mind for your trait ratings, including the material you familiarized yourself with earlier" or "be sure to avoid being influenced by the erroneous material you familiarized yourself with earlier," respectively. The relative effect of controlled retrieval processes could be varied by varying the delay between familiarization and ratings. The automatic effects of familiarity might be varied by manipulating relevant encoding conditions. Such a program of research could determine the relative importance of controllable and uncontrollable processes in both the encoding of STIs and their subsequent effects on a variety of impression formation tasks.

As I hope this section begins to indicate, one way to avoid the "pile of issues" Newell (1973) decried in the quotation that opens this chapter is to look for ways in which these dichotomies may duplicate, extend, cross-cut, or complement one another. The fact that these comparisons generate several clear suggestions for future research supports the heuristic value of "dual-process theories" after all.

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NOTES

1. The clarity of this intuitive distinction between complex inferences and simple semantic priming and associations depends upon what models of inference processes, priming, and associations are adopted. Explicating and defending a model for inferences are well beyond the scope of this chapter, although I suspect it would resemble the recent proposals by Kunda and Thagard (1996), modified perhaps to handle the telling criticisms of Bodenhausen, Macrae, and Sherman (Chapter 13, this volume). Their models are clearly symbolic, in that the nodes symbolize something. If one adopts a mixed symbolic-connectionist model of information processing—a course supported by several compelling arguments (e.g., Marcus, 1997; Smolensky, 1988)—this distinction may become less clear. Nevertheless, it seems useful for present purposes.

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Spontaneous versus Intentional Inferences


