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The Perils of Pondering: Intuition and Thin Slice Judgments

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Intuitive processing is critical for effective social and interpersonal interactions. Previous work has found that people are able to form accurate impressions that predict certain ecologically valid outcomes from brief observations or "thin slices" of behavior. This article discusses theoretical and empirical work showing that thin slice judgments are intuitive and efficient. Thin slice judgments can be made accurately even under conditions of distraction. Moreover, such judgments are impeded by tasks that interfere with the intuitive process. Thin slice judgments are impeded by tasks involving deliberation such as reasons analyses tasks. Thus, impressionistic, evaluative thin slice judgments seem to be intuitive.

Intuition is essential to optimal social and interpersonal functioning. Individuals have to both produce and enact behavior as well as process and perceive the behavior of others. These complex processes occur smoothly, for the most part, because they are intuitive. They are rapid, nonconscious, and automatic.

In this article, I focus on one particular type of social judgment: inference about others from brief glimpses or "thin slices" of behavior. Thin slices of expressive behavior are random samples of the behavioral stream, less than 5 min in length, that provide information regarding personality, affect, and interpersonal relations. Converging evidence from different areas of research indicates that thin slice judgments can sometimes be surprisingly accurate when accuracy is defined as convergence with independent real-world criteria. A meta-analysis conducted approximately two decades ago on the accuracy of predictions of various social and clinical outcomes based on thin slices of behavior revealed unexpectedly high rates of judgmental accuracy (Ambady, Bernieri, & Richeson, 2000; Ambady & Rosenthal, 1992). This meta-analysis included 39 studies. Since then more than 100 different studies have shown that a important information regarding social and interpersonal functioning can be picked up from thin slices of behavior, regardless of the channel of communication (visual, audio, verbal, or some combination of these). For instance, judgments based on carefully controlled and quite limited information, such as 20-s silent video slices of behavior, have been found to accurately predict outcome variables such as racial bias and certain personality disorders (Ambady & Weisbuch, 2010; Richeson & Shelton, 2005).

Work on nonverbal communication, evolutionary psychology, and social cognition all suggest that judgments based on thin slices of behavior are hardwired and occur relatively automatically (DePaulo & Friedman, 1998; Patterson, 1995, 1998, 1999; Tesser & Martin, 1996). But direct empirical evidence for the intuitiveness of thin slice judgments has been lacking. My goals here are to review the theoretical evidence and to present empirical evidence regarding the intuitiveness of thin slice judgments.

Are Thin Slice Judgments Intuitive?

Thin slice judgments are thought to be based on tacit, implicit knowledge that makes verbal explanations and reasoning unnecessary (Polanyi, 1966). Such judgments are ubiquitous and are communicated through nonverbal behavior that has been characterized as "an elaborate and secret code that is written nowhere, known by none, and understood by all" (Sapir, 1949, p. 556). The literature on nonverbal behavior suggests that evaluative judgments based solely on nonverbal cues are biologically based and occur automatically, outside awareness, without drawing on conscious, cognitive processing resources (Ambady & Weisbuch, 2010).

Social psychological processes that are considered to be intuitive and automatic generally possess an important characteristic: They are efficient. That is, such processes can occur in parallel and are not disrupted by the processing of other tasks and information (Bargh, 1996, 1997; Devine, 1989; Neuberg, 1988; Shiffrin & Schneider, 1977, Srull & Wyer, 1979).

One way to investigate the efficiency of a process is by examining whether the process remains unimpeded by conditions that tax cognitive and attentional processing such as attentional or cognitive overload or by imposing time constraints. An efficient, intuitive process should be relatively immune to conditions that normally tax cognitive and attentional resources. On

one hand, perceptual and judgmental errors on a variety of social inferential tasks are more likely to occur when cognitive resources are taxed. On the other hand, when the tasks are best performed relative automatically, taxing cognitive resources does not interfere with performance. Thus, Patterson and Stockbridge (1998) examined accuracy of performance on the Interpersonal Perception Task (Costanzo & Archer, 1989), a measure designed to assess accuracy of judgments of interpersonal interactions on dimensions involving the identification of kinship, level of romantic involvement, status, winners and losers in sporting events, and deception on the basis of responses to brief audiovisual scenarios. They found that perceivers under cognitive load showed virtually no depletion in accuracy when asked to form intuitive initial impressions of scenarios on the Interpersonal Perception Task but did show depletion when asked to pay attention to specific details and cues involved in the scenarios. Thus, the efficacy of intuitive judgments was not impaired by distraction compared to the efficacy of analytical judgments, which was reduced by distraction. If thin slice judgments are intuitive and efficient, they should involve minimal attentional capacity so that they can occur in parallel with other processing.

Another way to investigate the efficiency of a process is to examine whether conditions that involve increased cognitive and attentional processing can disrupt the process. Increased attention and capacity devoted to an intuitive, automatic process is thought to reduce the efficiency of the process. The counterproductive effects of thinking, articulating, and deliberating on judgments and decisions have been shown in a number of different studies (Melcher & Schooler, 1996; Wilson & Schooler, 1991). For example, comparing the cognitive strategies of accurate with inaccurate eyewitnesses, Dunning and Stern (1994) found that accurate eyewitnesses were more likely to state that their judgments resulted from an automatic process of recognition, whereas inaccurate witnesses followed a more deliberative strategy. Similarly, Melcher and Schooler (1996) concluded that the very act of articulating a process that is associated with perceptual rather than verbal expertise and knowledge hinders the accuracy of the process. Along the same lines, focusing attention and cognitive resources on intuitive, automatic processes decreases the effectiveness of such processes (Vallacher & Wegner, 1987). Thus, if thin slice judgments are intuitive, it is likely that such judgments will be disrupted by the introduction of more controlled, deliberative processing such as verbalization.

We conducted an experiment to examine the accuracy of such judgments under a cognitive load as well as under conditions involving deliberative processing. Participants judged brief 10-s clips of teachers drawn from a previous study (Ambady & Rosenthal, 1993) under one of four conditions: (a) a distraction or cognitive load condition in which participants simultaneously performed a cognitive task while watching each clip; (b) a reasons analysis task, in which participants noted their reasons for making their judgments before they made their ratings of each clip; (c) a control condition, in which participants made their ratings after watching each clip; and, (d) a delayed rating control condition, in which participants waited for 1 min before making their ratings (to provide a time control for the reasoning task). Because it was hypothesized that introducing more controlled processing would interfere with the accuracy of intuitive, automatic judgments, it was predicted that participants in the reasons analysis condition would make significantly less accurate judgments than those in the control conditions. Because it was hypothesized that thin slice judgments are efficient and can be processed in parallel, it was predicted that participants in the cognitive load condition would show similar levels of accuracy to participants in the control condition.

Stimuli consisted of 10-s silent video clips of college teachers used in a previous study (see Ambady & Rosenthal, 1993). Participants rated the overall effectiveness of the teacher in each of 39 clips on a 7-point scale.

Participants were randomly assigned to one of four different conditions:

1. In the control condition, 30 participants watched each clip and then made their rating.
2. In the cognitive load condition, 30 participants were given a standard distraction task (Posner & Rothbart, 1989). Participants were asked to count backwards aloud from 1,000 by 9 s while watching each clip after which they made their rating.
3. In the reasons analysis condition, adapting the procedure used by Wilson and Schooler (1991), 30 participants were asked to watch each clip. Prior to rating the clips, however, participants were asked to take 1 min to generate and record all the possible reasons for making their judgments. At the end of each minute, the research assistant asked them to make their ratings.
4. To control for the time between watching clips and making ratings in the reasoning condition, the 30 participants in the delayed control condition waited 1 min and made their rating after being prompted by the research assistant.

The criterion variable used to assess accuracy consisted of end of the semester student ratings of the teacher. Following Ambady and Rosenthal (1993), raters' judgments of teacher effectiveness were correlated with the criterion variable separately for each condition. Thus, aggregate ratings across judges were correlated with students' ratings of each teacher,

Table 1. *Teacher study: Correlation with the criterion.*

Condition	*r*
Reasoning	.27
Distraction	.65
Control	.71
Delayed control	.66

Table 2. *Couples study: Means (hits) and standard deviations.*

Condition	*M*	*SD*
Reasoning	24.19	2.86
Distraction (counting)	28.82	3.66
Distraction (rehearsal)	28.94	3.23
Control	29.25	2.59
Delayed control	26.50	2.63

separately for each condition, using the sample size of 13 teachers. These correlations are presented in Table 1.

To test the hypotheses that cognitive load would not impede judgments but that reasons analysis would impede judgment, we conducted pairwise comparisons of the correlation coefficients[1] from the relevant conditions (Rosenthal, 1991; Snedecor & Cochran, 1989). As can be seen in Table 1, the control participants performed the task the most accurately, supporting earlier evidence regarding the accuracy of thin slice judgments (Ambady & Rosenthal, 1993). As predicted, the process of reasoning diminished the accuracy of judgments relative to controls. Specifically, pairwise comparisons of the correlations revealed that participants in the reasoning condition performed significantly worse than those in the control condition (control and reasoning, $Z = -2.30$, $p < .01$) and significantly worse that participants in the delayed control condition (delayed control and reasoning, $Z = -1.93$, $p < .03$). In contrast, participants in the two control conditions did not differ significantly in their accuracy from participants in the distraction condition (control and distraction, $Z = -.41$, *ns*) or the delayed control condition (delayed control and distraction, $Z = -.04$, *ns*). Thus, distraction did not impede judgmental accuracy. Finally, participants in the reasoning condition also performed worse than those in the distraction condition ($Z = 1.89$, $p < .05$).

In sum, thin slice judgments were significantly impeded by the reasons analysis task. Taken in tandem with the finding that the accuracy of judgments was not impeded by a distracter task that diverts cognitive resources, this result suggests that thin slice judgments are efficient and involve a relatively intuitive and automatic process (Bargh, 1989, 1996; Logan, 1992; Posner & Snyder, 1975; Shiffrin & Schneider, 1977; Wegner & Bargh, 1998).

A second study was conducted to examine whether the previous results could be replicated in a different domain of judgment. This study examined the accuracy of judgments of interpersonal relationship status. Accordingly, participants had to judge the relationship between opposite sex dyads.

The stimuli consisted of 15-s audiovisual clips of 45 opposite sex dyads who were (a) involved in a relationship, (b) platonic friends, or (c) strangers. Fifteen dyads were videotaped in each category. For each dyad, 15-s clips were extracted after 1 min of interaction. The criterion variable was participants' accuracy in identifying the type of relationship between the members of the dyad from the silent videoclips—were they friends, lovers, or strangers?

Eighty participants were run in total: 16 in each of the five conditions. These conditions included the four described in the previous study as well as one additional distraction condition: (a) cognitive load, (b) control, (c) reasons analysis, and (d) delayed control. In the additional condition, (e) 16 participants were run on a digit rehearsal task (rehearsing a set of seven digits while watching the clips). This condition was introduced to rule out the possibility that the results of the previous study might have been due to the particular cognitive load task employed.

Participants were asked to judge the relationship status of each couple in a forced choice format with strangers being coded 1, friends 2, and lovers 3. As in the previous study, it was predicted that reasons analysis would diminish the accuracy of judgments compared to the control condition, but that cognitive load would not result in a decline in accuracy.

Correct responses (hits) were tallied for each judge and were used as the measure of accuracy. A one-way analysis of variance, performed to examine the effect of condition on response accuracy (see Table 2), yielded a significant effect, $F(4, 75) = 8.24$, $p < .0001$. A series of planned contrasts were computed to test the specific hypotheses. A linear contrast tested the hypothesis that there would be no differences in the performance of participants in the distraction and control conditions, using weights of +1 (rehearsal), +1 (counting), –1 (control), –1 (delayed control). Results supported the hypothesis, $F(1, 75) = .22$, $p > 1$, $r = .05$. A second planned contrast tested the hypothesis that participants in the reasoning condition would perform significantly worse than those in the two control conditions using weights of +1 (control), +1 (delayed control), and –2 (reasoning), revealed a significant effect, $F(1, 75) = 15.89$, $p < .001$, $r = .42$. Finally, a third contrast

[1]The Fisher's *z*s associated with each *r* was obtained and the following formula was used to obtain Z: where N-3 corresponds to the *df* of each of the *z*s (Rosenthal, 1991; Snedecor & Cochran, 1989).

revealed that participants in the reasoning condition performed significantly worse than those in the two load conditions, $F(1, 75) = 25.67$, $p < .0001$, $r = .50$. Note that the two control conditions and the two load conditions did not differ significantly from each other, $F(1, 75) = .04$, $p > 1$, $r = .04$, for the load conditions; $F(1, 75) = 2.21$, $p > 1$, $r = .17$, for the control conditions.

The results of this study were consistent with those of the first study. Thus, both the distraction conditions did not impede the accuracy of judgments compared to a control condition, whereas the deliberation condition did impede the accuracy of judgments of thin slices compared both to control as well as to distraction conditions. One difference between this study and the previous one was in the inclusion of audio information. The consistency of the results from the two studies suggests that the type of channel being judged (silent video or the full audiovisual channel) does not affect the cognitive processing of thin slices. Taken together, these results support previous work indicating that controlled processing can adversely affect performance on tasks that are normally performed intuitively (Dunning & Stern, 1994; Melcher & Schooler, 1996; Wilson & Schooler, 1991).

The results of the two studies just presented suggest that brief, evaluative, thin slice judgments are made relatively intuitively. First, such judgments are efficient and can be processed in parallel with other cognitive tasks: Introducing a parallel distraction task demanding attentional resources did not dilute the accuracy of judgments. Second, such judgments are more accurate when they are made without deliberation. Moreover, the finding that deliberation reduced accuracy suggests that intuitive processing may be optimal for this type of social information. In another study from our laboratory using faces as stimuli, rather than dynamic thin slices, we found a similar pattern of results. Participants asked not to rely on their "gut instinct" but asked to deliberate and think carefully about their judgments were less accurate and slower at judging the sexual orientation of women from their facial appearance than were participants who made their judgments intuitively (Rule, Ambady, & Hallett, 2009). In a related vein, deception detection was impaired by deliberation but not by concurrent working memory task (Albrechtsen, Meissner, & Susa, 2009). Other studies have also attested to the benefits of intuitive thought, albeit in other judgment domains (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006).

One of the most provocative implications of these findings is that the mechanisms underlying intuitive judgments differ in important ways from those underlying deliberative judgments. Several dual-process theories of social cognition posit that person perception consists of two stages: first, a relatively automatic, evaluative stage, involving minimal cognitive processing, and second, a controlled, deliberative stage involving more effort and more elaborate cognitive processing (e.g., Gilbert & Krull, 1988; Trope, 1986). Although it is not clear whether these represent distinct or complementary stages (Cohen, Dunbar, & McClelland, 1990; Kunda & Thagard, 1996), it is clear, as summarized in a volume on dual-process theories in social psychology, that automaticity and control have distinct effects on social information processing (Chaiken & Trope, 1999). For example, previous research has shown that during the second deliberative or systematic stage of person perception, participants are usually able to make accurate judgments and attributions about behavior except when cognitive processing is impeded (Gilbert & Krull, 1988), the present work indicates that exactly the opposite process might be operative in the first relatively automatic, heuristic stage of person perception. The rapid, perhaps nonconscious, evaluative process that characterizes thin slice judgments resembles the evaluative, automatic process that, according to dual-process theories, occurs in the first stage of person perception. This initial evaluative stage of person perception reflected in thin slice judgments seems to be particularly important for the accurate processing of certain types of social information regarding affect, personality, and interpersonal functioning. In the early evaluative stage that draws more on perceptual processes in contrast to the later stage that draws more on cognitive processes, impeding cognitive processing by taxing cognitive resources does not seem noticeably to interfere with the quality of judgments. Facilitating cognitive processing by allocating increased cognitive resources to the task in this stage, however, substantially diminishes the quality of judgments. These results support recent work regarding the counterproductive effects of thinking, articulating, and deliberating on automatic behavior, judgments, and decisions (Baumeister, 1984; Dijksterhuis et al., 2006; Lewicki, 1986; Melcher & Schooler, 1996; Wilson & Schooler, 1991). Thin slice judgments thus seem to fall into the category of social judgments that rely on implicit, procedural rather than explicit, declarative knowledge.

Perhaps under deliberative conditions, people attend to the wrong or irrelevant information. Murphy and Balzer (1986) found evidence suggesting that this might be the case. College students made judgments of teachers on a number of dimensions such as organization and clarity from videotapes either immediately after viewing them or on the next day. When their judgments were compared with those of "expert" rater graduate students, participants who made judgments after the delay were more accurate than those who made judgments immediately after viewing the clips. Judgments made on the next day were less hampered by irrelevant or misleading detail and were likely driven by larger global gestalt impressions. Indeed, further analysis indicated that with the delay, ratings converged

with the criterion on relatively important dimensions but not on unimportant dimensions. The results are reminiscent in some respects to the findings by Meehl (1954), who suggested that people have a tendency to "overfit the model" in their clinical assessments of others in their zeal for accuracy. We can easily imagine, too, that thin slice observers might overestimate the importance of an idiosyncratic and vivid cue (e.g., a cough, a scratch, a certain gesture or utterance, etc.).

Thus, tasks that tax cognitive resources, such as rehearsing a series of numbers, do not seem to impede the accuracy of thin slice judgments. In contrast, thin slice judgments suffer when information is processed more deliberately, such as under conditions when people have to come up with reasons and justifications for their judgments.

Why should reasoning and thinking inhibit the accuracy of thin slice judgments? Most theories regarding rational judgment and decision making argue that careful deliberation, consideration, and weighing of arguments and positions is associated with higher quality decisions (Dawes, 1998). Previous work suggests that the most negative impact of reasoning occurs when the issues being reasoned about have a large affective component. This impact is attributed to the fact that affect-based attitudes are less well known to people and analyzing reasons is likely to emphasize cognitive aspects at the expense of the affective basis of the attitudes (Millar & Tesser, 1986; Wilson & Schooler, 1991). Thus, one explanation for the poorer judgments associated with reasoning might be the tendency of individuals to focus on the wrong reasons for their preferences and choices (Nisbett & Wilson, 1977). People thus focus on the wrong factors, concentrate on irrelevant information, and ignore relevant information pertaining to their attitudes (Wilson, Dunn, Kraft, & Lisle, 1989). Similarly, the negative effects of deliberation on thin slice judgments might be due to focusing on the wrong factors and ignoring instinctive, affective reactions. Another possibility is that reasoning and thinking can lead to greater polarization of judgments, and thus, perhaps, greater inaccuracy (Tesser, 1978). Thus, breaking down and articulating reasons might reduce the accuracy of molar, gestalt impressions forming the basis for initial evaluations.

The evidence that thin slice intuitive judgments can sometimes be more accurate than deliberative judgments might, when taken at surface value, seem somewhat disturbing. Of some comfort is the realization that spontaneous evaluations and thin slice judgments should be accurate only when the behavioral evidence on which these judgments are based is valid, meaningful, veridical, and relevant to the category being judged (Heider, 1958; McArthur & Baron, 1983). Thus, categories irrelevant to the situation and wrongfully applied should be associated with inaccurate judgments. Appropriate implicit knowledge that is correctly applied, however, will be associated with accurate judgments. Consider, for example, the judgment of an individual's potential to be a good teacher. The use of tacit knowledge about the behaviors and skills associated with good teaching ("She is enthusiastic and clear") should be associated with more accurate judgments of teaching potential rather than the use of implicit race or gender stereotypes ("She is Asian and likely to be shy"; see also Kunda & Thagard, 1996). The encouraging implication of the present findings is that individuals are generally able to efficiently extract, distill, and apply information that is relevant to the criterion being judged. Moreover, if left to do so, individuals tend to use effective strategies in making such judgments.

Affect and Thin Slice Judgments

More evidence for the intuitiveness of thin slice judgments comes from work examining the role of affect and mood on such judgments. Affect influences the way in which information is processed. In general, happy people process information in a more heuristic and less systematic manner, relying more on cognitive shortcuts and general knowledge structures and less on careful, logical thought (Andrews, Bless, Bohner, Schwarz, & Strack, 1990; Forgas, 1998; Mackie & Worth, 1989; Schwarz & Bless, 1991; Sinclair, 1988). This leads to greater efficiency in their judgments (Forgas, 1991; Niedenthal & Setterlund, 1994). In contrast, sad people tend to use systematic and detailed information-processing styles (Chaiken, Liberman, & Eagly, 1989; Forgas & Bower, 1987; Schwarz & Bless, 1991). Individuals in a sad mood are more likely to spontaneously engage in detail-oriented, cognitively taxing, highly analytical processing (Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989). Evidence discussed in the previous section showing that the quality of thin slice judgments is hampered by deliberative thought suggests that sadness, by inducing deliberative, systematic thinking, might be associated with less accurate thin slice judgments.

The effects of sad and happy moods on thin slice judgments were examined in a series of four studies by Ambady and Gray (2002). Experimentally induced sadness was found to diminish the accuracy of thin slice judgments in the first two studies. Moreover, sad participants were less efficient in their judgments—they were less accurate and took more time to make the judgments as compared to control and happy participants. These results suggest that sad participants were making their judgments more deliberatively and less intuitively and that this process affected the quality of the judgments. In the third study, chronically sad participants showed the same pattern of results as those in whom a sad mood was experimentally induced. Finally, in the fourth study, half the sad participants were distracted by having to perform mental calculations while

completing the thin slice judgment task. Of interest, distraction corrected for the effects of sadness. Participants in the sad mood condition who were exposed to the cognitive load manipulation performed at a level equal to that of control participants. By contrast, participants in a sad mood condition who did not receive the cognitive load performed significantly worse than the two other groups. This pattern of results also suggests that thin slice judgments are most accurate when they are made intuitively rather than deliberatively.

Conclusion

Many evaluations, judgments, and inferences regarding traits, attitudes, and personalities of others are often made spontaneously, nonconsciously, online from limited behavioral information (Uleman, Newman, & Moskowitz, 1996; Weiner, 1985). To paraphrase William James (1890/1983), "effortless attention is the rule" (p. 427). For the most part, this process appears to be adaptive and efficient, and initial impressions and judgments remain uncorrected except when "a log-jam occurs" in the initial intuitive stage of perception (James, 1890/1983, p. 427), and we need to expend effort: when we are motivated to obtain diagnostic information or when we are confronted with unexpected, novel, or inconsistent events or behaviors (Clary & Tessar, 1983; Fiske & Neuberg, 1990; Hastie, 1984; Kanazawa, 1992; Weiner, 1985).

The evidence presented in this article suggests that thin slice judgments are intuitive. These judgments are efficient: They do not seem to drain cognitive resources and can be accurate even when processed in parallel with other tasks. Summarizing the proceedings of the same conference, Renato Tagiuri (1958) commented that

> evaluation of other persons, important as it is to our existence, is largely automatic, one of the things we do without knowing very much about the "principles" in terms of which we operate. Regardless of the degree of skill which an adult may have in appraising others, he engages in the process most of the time without paying much attention to how he does it. (p. ix)

This lack of attention to an intuitive process might be beneficial. These results bring to mind Caesar's reflection about Cassius in Shakespeare's (1974) play *Julius Caesar*: "He thinks too much; such men are dangerous" (p. 1108). Although, as academics and researchers, we might be skeptical of the claim that people who think too much are dangerous, the present work does suggest that sometimes it is dangerous to think too much—at least while evaluating others in a familiar domain, and when the evaluations have a substantial affective component.

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