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The Least Likely Act: Overweighting Atypical Past Behavior in Behavioral Predictions

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Abstract

When people predict the future behavior of a person, thinking of that target as an individual decreases the accuracy of their predictions. The present research examined one potential source of this bias, whether and why predictors overweight the atypical past behavior of individuals. The results suggest that predictors do indeed overweight the atypical past behavior of an individual. Atypical past behavior is more cognitively accessible than typical past behavior, which leads it to be overweighted in the impressions that serve as the basis for their predictions. Predictions for group members appear less susceptible to this bias, presumably because predictors are less likely to form a coherent impression of a group than an individual before making their predictions.

Keywords

judgment and decision making, memory, perspective taking, social cognition, social judgment

People are impressively accurate when predicting how the majority of people will behave under most circumstances (Nisbett & Kunda, 1985, p. 297), but display considerable inaccuracy when predicting the behavior of specific individuals. For both trained professionals and novices, thinking about a person as an individual diminishes the accuracy of their behavioral predictions (Davis, Hoch, & Ragsdale, 1986; Dawes, Faust, & Meehl, 1989; Epley & Dunning, 2000). We suggest this inaccuracy is exacerbated by the high accessibility of people's atypical past behavior, which is consequently overweighted when making behavioral predictions for individuals.

Broadly, differences in the accuracy of predictions for individuals and populations stem from a reliance on different information when making these two kinds of predictions (Kahneman & Tversky, 1973). When predicting the behavior of individuals, people imagine what they would do and correct for the peculiarities of that situation and individual (i.e., use case-based information). When predicting how a member of a population will behave, people base their predictions on the base-rates of behavior exhibited by other members of that population (i.e., use distributional information; Epley, Keysar, Van Boven, & Gilovich, 2004; Nickerson, 1999). Although both forms of information are likely to be useful, predictors who possess case-based information tend to ignore relevant distribution information when making predictions. For example, research participants given individuating information about a student and relevant base-rate information (i.e., contributions made by other students) were less accurate at predicting how much money the student would contribute to a charity than participants only given base-rate information, because participants given individuating information completely ignored the base-rate information (Epley & Dunning, 2000).

Even when predictors use both kinds of information, inaccuracies arise when nondiagnostic case-based information is included in judgment and when diagnostic case-based information is overweighted or underweighted in judgment (Hall, Ariss, & Todorov, 2007; Taylor, 1982; Tversky & Kahneman, 1973, 1974). We suggest that one such source of bias is the overweighting of highly accessible but unrepresentative cased-based information about the individual. Atypical traits and past experiences come first to mind and are consequently overweighted when forming impressions of people and making affective forecasts (Hastie & Kumar, 1979; Morewedge, Gilbert, & Wilson, 2005). If individuals' atypical past behavior is highly accessible, it is likely to exert undue influence on the impressions of individuals upon which people base behavioral predictions.

We report four experiments that tested this hypothesis. Experiment 1 examined whether predictors overweight the

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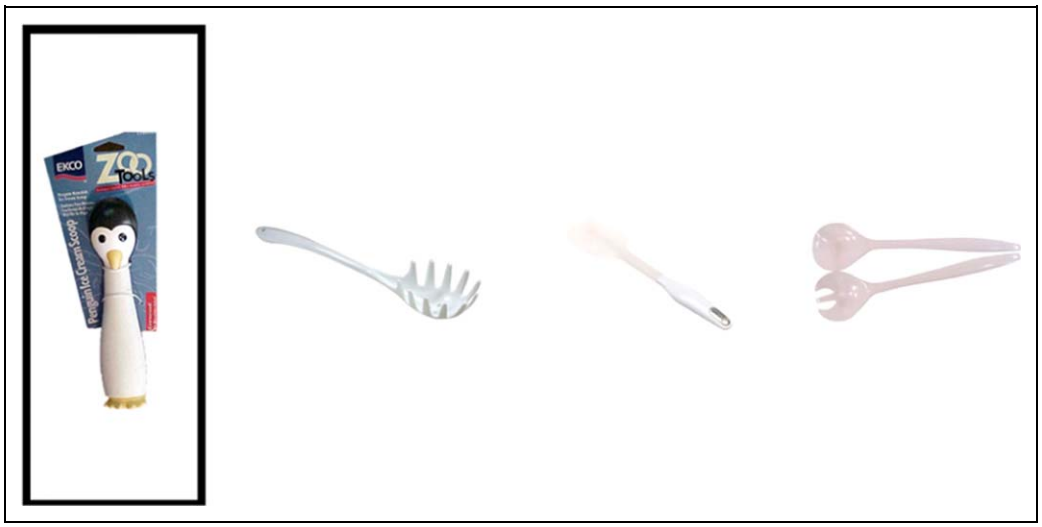

Figure 1. Indication of the good chosen by the target of prediction in Experiment 1.

atypical past behavior of an individual when making behavioral predictions. Experiment 2 tested whether atypical past behavior is weighted more heavily than typical past behavior in behavioral predictions. Experiments 3A and 3B examined whether atypical past behavior is heavily weighted because it is more cognitively accessible than typical past behavior. Experiment 4 tested whether atypical behavior is overweighted in behavioral predictions merely because it is more cognitively accessible, or because its accessibility leads it to exert greater influence on impressions of the target whose behavior one is predicting.

Experiment 1: Overweighting Atypical Behavior

Predictors were shown the preference of a person who preferred an atypical good to equally desirable more typical goods from one set of goods. Predictors then estimated the probability that the target person also preferred atypical goods to typical goods in four other sets of goods. In each set, the atypical good was less desirable than the more typical goods. We believed that predictors would overweight the diagnosticity of a prior, atypical but desirable choice when predicting the probability of a future atypical and undesirable choice.

Pretest

Seventy-nine participants in Boston, MA and Pittsburgh, PA (31 female; $M_{age} = 23.7$, $SD = 5.5$) identified the good they most preferred in five sets of household goods (on a computer) in a random order. Each set contained one atypical good that had an "animal" theme and three more typical goods that did not have that theme (e.g., Figure 1). Thirty-two percent of the participants preferred the atypical good in the set in which all four goods were equally desirable.

Participants

A new group of 22 predictors was recruited in Boston, MA (12 female; $M_{age} = 23.8$, $SD = 7.2$); each received \$5 for participating.

Procedure

Predictors were first shown the good a participant chose from the set of equally desirable goods. That (atypical) good was indicated by a rectangle surrounding it; predictors received no additional information (Figure 1). Next, predictors estimated the probability that the participant chose each of the four goods in the other four sets. In each of those sets, the atypical good was less desirable. These estimates were made by clicking a computer mouse on an analog scale with endpoints, *Definitely did not choose it* (0%) and *Definitely chose it* (100%). Finally, participants rated the atypicality and desirability of each good in the experiment on 5-point scales with endpoints, *Not at all* (1) and *Extremely* (5). Nested within randomly ordered sets of goods, the order in which items were judged was random.

Results

Manipulation Checks

Across all five sets of goods, predictors considered the atypical goods to be more unusual ($M = 3.71$, $SD = .87$) than the typical goods ($M = 1.39$, $SD = .38$), all $ts(21) \geq 5.64$, all $ps \leq .001$, all $rs \geq .78$. Each atypical good was considered more unusual than every other good in its set, all $ts(21) > 4.68$, all $ps < .001$, all $rs \geq .71$ (Table S1).

The atypical good ($M = 2.27$, $SD = 1.35$) and typical goods ($M = 2.56$, $SD = .89$) were considered equally desirable in the first set, $t(21) = 1.01$, $p > .33$, whereas atypical goods were considered less desirable ($M = 1.78$, $SD = .84$) than typical

goods in the other four (prediction) sets ($M = 3.45$, $SD = .61$), all ts(21) ≥ 3.65, all ps $\leq .002$, all rs $\geq .63$ (Table S1).

Accuracy of Likelihood Judgments

We assessed accuracy by comparing the difference (averaged across the four predictions sets) between the predicted probability that the target would pick an atypical good from those sets (55.8%, $SD = 20.25\%$) and the percentage of pretest participants who chose the atypical good from the first set that also chose atypical goods from the four prediction sets (17.3%). A one-sample t test revealed that predictors significantly overestimated (by 38.5%) the probability that those pretest participants would choose additional atypical goods, $t(21) = 8.92$, $p < .001$, $r = .89$.

Discussion

Predictors overweighted the diagnosticity of the atypical past behavior of an individual when predicting her future behavior. They overestimated the probability that a person who preferred an atypical good to equally desirable typical alternatives would also prefer an inferior atypical good to superior typical alternatives. Given that predictors had no knowledge of the other behaviors of the individual, the atypical information that they overweighted was low-consensus information (Kelley, 1973).

Experiment 2: Weighting Atypical and Typical Behaviors

Whereas Experiment 1 examined whether predictors overweight the diagnosticity of a single atypical behavior, Experiment 2 compared the weight that predictors ascribe to atypical and more typical behaviors. Informed predictors first observed a woman's selection of four goods from four sets of consumer goods. One of her selections was atypical. Controls did not observe her choices. All participants then predicted which good she would select from a novel prediction set that included goods corresponding to each of her previous selections. We expected informed predictors to be both (a) more likely to predict that she would select the good corresponding to her atypical selection rather than her typical selections and to (b) be more likely than controls to predict that she would select the good corresponding to her atypical selection.

Method

Participants

One hundred and thirty-seven people in Boston, MA (72 female; $M_{age} = 23.3$, $SD = 4.9$) received $5 for participating.

Stimuli

A photograph of a target was selected from a bank of neutral female faces (Engell, Haxby, & Todorov, 2007). To determine which materials to use to represent her past and future behavior, we conducted two pretests to create five sets of pens, each containing four pens (see Online Supplemental Material at http://spps.sagepub.com/supplemental). One pen in each of the four past choice sets was selected to represent a past choice made by the target. Of these past choices, one (pink) pen was considered to be more atypical ($M = 3.57$, $SD = 1.06$) than the three other pens chosen (blue, black, and silver; $M = 1.97$, $SD = .77$), $t(64) = 12.89$, $p < .001$, $r = .85$. The pens in a fifth prediction set consisted of four typical pens. Each was the same color as one of the "chosen" pens and was considered to be more similar to that chosen pen than to all other pens in the prediction set, all ts(61) ≥ 8.17, all ps $< .001$, all rs $\geq .72$.

Procedure

Informed predictors saw the pens a woman selected from the four past choice sets. Each set was presented for 3 s and then a rectangular frame appeared around the pen she selected for another 3 s. Of her four selections, one pen was more atypical than the other three pens. Controls did not see her selections. All participants then saw the prediction set and indicated which pen she was most likely to choose from that set.

Finally, all participants rated the atypicality of every pen in the past choice and prediction sets on 5-point scales marked with endpoints, *Not at all Unusual* (1) and *Extremely Unusual* (5). The target's choices were not indicated while participants made these judgments. Predictions and typicality judgments were counterbalanced across participants in this experiment, but order did not influence any of the results. Within tasks, stimuli presentation and judgment order were random.

Results

Manipulation Checks

As in the pretest, the atypical pen selected by the target was considered more unusual by participants in both the informed and control conditions than the other pens she selected, all ts > 13.62, all ps $< .001$, all rs $\geq .76$. Importantly, the pen in the prediction set that corresponded to her atypical past choice was no more unusual than the other pens in the prediction set, all ts < 1.

Predictions

Nonparametric tests revealed differences in the pens that participants in the informed and control conditions thought the target would select, $\chi^2(3, n = 65) = 39.19$, $p < .001$ and $\chi^2(3, n = 72) = 14.78$, $p = .002$. A comparison of the two conditions revealed that a majority of participants in the informed condition predicted that the target would choose the pen corresponding to her atypical past selection (58.5%), whereas the majority of controls predicted that she would choose a pen corresponding to a more typical past selection (58.3%), $\chi^2(1, n = 137) = 3.85$, $p = .05$ (Table 1). Furthermore, informed participants were significantly more likely to predict that she would choose

Table 1. Predicted Choices and Atypicality of Previous Choices by Information About Previous Choices in Experiment 2 ($N = 137$)

	Informed		Controls	
Measure	Atypical Pen	Typical Pens	Atypical Pen	Typical Pens
Predicted choice	58.5% (38)	41.5% (27)	41.7% (30)	58.3% (42)
Atypicality of previous choices	4.00 $(1.08)_a$	1.65 $(.71)_b$	3.74 $(1.13)_a$	1.65 $(.71)_b$
Atypicality of corresponding potential choices	2.22 $(1.14)_a$	2.13 $(.81)_a$	2.12 $(1.12)_a$	2.11 $(.77)_a$

Note: If predictions were made randomly, 25% of participants should choose the pen corresponding to the target's most atypical previous choice and 75% of participants should choose one of the three pens corresponding to her more typical previous choices. Means within rows that do not share a common subscript differ significantly ($p \leq .05$) according to simple effects t tests. Frequencies and standard deviations appear in parentheses.

the pen corresponding to her atypical behavior than would be expected if they equally weighted her past behavior (i.e., $p_{\text{Atypical}} = .25$), $t(64) = 9.49$, $p < .001$.

Discussion

Informed participants more heavily weighted the atypical past behavior of a target than her typical behavior. Informed participants predicted that the target's future behavior would correspond more closely to her atypical rather than typical past behavior, despite explicitly recognizing its atypicality. Considered together with the results of Experiment 1, the results suggest that people both overweight the diagnosticity of an individual's atypical behavior and ascribe it more weight than her typical past behavior. Experiments 3A and 3B examined whether this bias in judgment occurs because the atypical past behaviors of an individual are more cognitively accessible than her typical past behaviors.

Experiments 3A and 3B: Encoded and Recalled Behavior

We suggest that predictors overweight a person's atypical past behavior because, like other unusual stimuli and experiences (Hastie & Kumar, 1979; Morewedge et al., 2005; Wolfe & Horowitz, 2004), atypical past behaviors are more likely to be encoded and recalled at the time of judgment than typical past behaviors. We tested these two assumptions in Experiment 3A by manipulating the format in which a target's behavior was presented. If atypical behaviors are more likely to be encoded than typical behaviors, people should be more likely to recall atypical behaviors when these behaviors are presented simultaneously (when predictors can divide their attention as they desire) than when these behaviors are presented serially (when predictors must devote equal attention to each behavior). If atypical behaviors are more likely to be recalled at the time of judgment than typical behaviors, participants should better recall atypical behaviors than typical behaviors across both presentation formats.

In Experiment 3B, we used this format manipulation to examine whether preferential encoding and recollection of atypical behavior is responsible for its overweighting in behavioral predictions. If so, participants should be more likely to predict that the target would choose the pen corresponding to her atypical past behavior in both format conditions, but this bias should be more pronounced in the simultaneous than the serial presentation format condition.

Experiment 3A

Method

Participants

Fifty-two people in Boston, MA (34 females; $M_{\text{age}} = 24.3$, $SD = 4.6$) received $5 for participating.

Procedure

Participants saw a target's previous selections of pens from the four sets in the serial presentation format described in Experiment 2 or in a simultaneous presentation format: Each of the four sets was first displayed for 3 s in a random order, without any indication of a selection. Then, the four pens she selected were simultaneously displayed for 12 s. After a delay consisting of unrelated tasks ($M = 25.72$ min, $SD = 5.93$), all participants made 16 judgments in which they identified whether or not the target had selected each pen in the four choice sets by responding *yes* (1) or *no* (0) for each pen.

Results

Recall Accuracy

We averaged recall accuracy for the three typical chosen pens within each participant and then compared it to recall accuracy for the atypical selection in a 2(Presentation Format: Serial, Simultaneous) × 2(Selection: Atypical, Typical) mixed analysis of variance with repeated measures on the last factor. The analysis revealed a main effect of selection, such that participants were more likely to correctly recall the target's selection of the atypical pen than the typical pens, $F(1, 50) = 32.17$, $p < .001$, $\eta_p^2 = .39$. This was true for both the simultaneous and serial-format conditions, $t(23) = 5.57$, $p < .001$ and $t(27) = 2.26$, $p < .03$. More important, a significant Format × Selection interaction, $F(1, 50) = 7.01$, $p = .01$, $\eta_p^2 = .12$, revealed that participants accurately recalled her atypical selection in both formats (Serial = 89.3%; Simultaneous = 87.5%), $F < 1$, but were less accurate in their recollection of her typical selections in the simultaneous than in the serial presentation format

condition (Serial = 72.6%; Simultaneous = 41.7%), $F(1, 50) = 7.49$, $p = .01$.[1]

Experiment 3B

Method

Participants

Ninety-three people in Boston, MA (44 females; $M_{age} = 22.5$, $SD = 4.0$) received $5 for participating.

Procedure

The procedure followed that of Experiment 3A, except that immediately after seeing all of the woman's choice of pens, participants predicted which pen she would choose from the prediction set (described in Experiment 2).

Results

Nonparametric tests revealed differences in the pens that participants in the simultaneous format and serial format conditions thought the target would select, $\chi^2(3, n = 46) = 69.83$, $p < .001$ and $\chi^2(3, n = 47) = 31.55$, $p < .001$. Participants in both conditions were more likely than chance to believe the target would choose the pen corresponding to her atypical past selection, all ts ≥ 4.45, ps $< .001$. A comparison of the presentation formats, however, revealed that participants in the simultaneous format condition were more likely to predict that she would choose the pen corresponding to her atypical past selection (78.3%) than participants in the serial format condition (57.4%), $\chi^2(1, n = 93) = 4.61$, $p = .03$.

Discussion

Participants were more likely to encode and recall a person's atypical behavior than her more typical behaviors in Experiment 3A. As this bias was more exaggerated when her behaviors were presented simultaneously (so participants could divide their attention as they desired) than when her behaviors were presented serially (so that participants had to equally allocate their attention to each behavior), the results suggest that people both preferentially encode and recall atypical behaviors. Moreover, the preferential encoding and recall of atypical behaviors influenced behavioral predictions in Experiment 3B. Participants given both presentation formats overweighted the target's atypical behavior, but this bias was less pronounced when the target's behaviors were presented serially than simultaneously.

Experiment 4: Individuals and Populations

Experiment 4 examined whether atypical past behavior is overweighted in behavioral predictions merely because of its greater cognitive accessibility at the time of judgment or because its greater cognitive accessibility leads it to be overweighted in impressions of the target. We manipulated whether past behaviors were presented as the past actions of an individual woman or the past actions of a group of women, because people more rapidly organize information about individuals into coherent impressions than information about groups and populations (Hamilton & Sherman, 1996). If behavioral predictions are biased only by the cognitive accessibility of atypical past behavior, then the overweighting of atypical past behavior in behavioral predictions should be similar for the individual and the group. If behavioral predictions for individuals are biased by atypical past behavior because it is overweighted in the formation of impressions used to make behavioral predictions, however, the overweighting of atypical behavior should be greater for the individual than for the group.

Method

Participants

Seventy people in Boston, MA (35 females; $M_{age} = 31.5$, $SD = 12.6$) received $5 for participating.

Procedure

Participants in an individual condition saw the selection of pens made by the target, exactly as in the informed condition of Experiment 2. Participants in a group condition saw the selection of the same pens, but presented as if the selections were made by a series of four different women described as a "group of women." Each woman made one selection from one of the four set of pens. The four women in the group were of the same age and race as the target, exhibited similar facial expressions, and were dressed similarly. All participants were then shown a photograph of the target and the prediction set, and indicated which of the four pens in that set she would choose, as described in Experiment 2. Finally, participants rated the atypicality of every pen in the experiment on 5-point scales marked with endpoints, *Not at all Unusual* (1) and *Extremely Unusual* (5).

Results

Manipulation Check

Across both conditions, the selection of the atypical pen was considered more unusual by participants than the other pens selected, all ts > 5.73, all ps $< .001$, all rs $\geq .75$. As in previous experiments, the pen in the prediction set corresponding to the atypical past choice was considered no more unusual than the other pens in the prediction set, $t < 1$.

Predictions

Nonparametric tests revealed asymmetries in the pens that participants in the individual condition predicted that the woman would choose, $\chi^2(3, n = 42) = 35.33$, $p < .001$, but did not reveal asymmetries in the pens that participants in the group condition predicted that the woman would choose, $\chi^2(3, n = 28) = 2.00$, $p = .57$. A comparison across conditions revealed that more participants predicted that the target would choose

the pen corresponding to the atypical past selection when predicting for an individual (64.3%) than when predicting for a group member (25.0%), $\chi^2(1, n = 73) = 8.87$, $p = .003$. Put differently, participants were more likely than chance to predict that an individual would behave in accordance with her single atypical behavior (25%), one-sample $t(41) = 5.25$, $p < .001$. In contrast, participants were no more likely than chance to predict that a group member would behave in accordance with her group's single atypical behavior (25%), one-sample $t < 1$.

Discussion

Participants given the same information about the previous behavior of an individual or a group member differently weighted atypical past behavior in their behavioral predictions. Participants predicted that the individual was most likely to behave in accordance with her most atypical past behavior, whereas participants did not predict that a group member was more likely to behave in accordance with the most atypical past behavior of other group members than their more typical past behaviors. These results suggest that cognitive accessibility alone does not explain the overweighting of atypical past behaviors in behavioral predictions. Rather, the greater cognitive accessibility of atypical behavior leads it to be overweighted in impressions formed of the individual that bias behavioral predictions.

General Discussion

It may be easiest to remember and describe a person using the traits and behaviors they do not share with other people, but their unusual traits and behaviors may not be the best information to use when predicting their future behavior. A presidential candidate who seems overcome by emotion in a single speech is unlikely to be emotionally unstable. Yet, the ease with which such instances are encoded and retrieved from memory may lead them to be overweighted when judging the capability of an experienced leader. Atypical behaviors may serve a good index of what behavior a person is capable of and may contain other diagnostic information (Ajzen & Fishbein, 1975; Jones & Davis, 1965; Reeder & Brewer, 1979; Skowronski & Carlston, 1992), but are by definition unrepresentative of how people typically behave. Despite explicitly identifying an individual's past behavior as the most atypical behavior the individual had performed, participants believed the atypical (i.e., low consensus) past behavior of an individual to be most diagnostic of her future behavior.

The greater cognitive accessibility of that atypical information appeared to be the reason why it was overweighted in the impressions of the individual that served as the basis of behavioral predictions. This contributes to the psychology of prediction by illustrating why base-rate information is more often ignored when making predictions for individuals than group members. It appears that behavioral predictions are based on coherent impressions that are formed of an individual while considering her past behavior rather than by consideration of the frequency of her behaviors at the time of judgment.

Predictions for group members appear less susceptible to this particular bias because the judge is less likely to spontaneously form a coherent impression of the group (Hamilton & Sherman, 1996). We did not directly compare the accuracy of predictions for individuals and group members, but the results of Experiment 4 suggest that people should be more accurate when making predictions for group members. A greater reliance on distributional information is likely to engender greater accuracy than a reliance on impressions that overweight atypical behaviors (Kahneman & Tversky, 1973; Nisbett & Borgida, 1975).

Of course, we do not intend to suggest that groups are never characterized or perceived in terms of their distinctive or atypical traits and behaviors (e.g., Hamilton & Gifford, 1976; McGuire, McGuire, Child, & Fujioka, 1979; Reeder & Brewer, 1979; Risen, Gilovich, & Dunning, 2007; Skowronski & Carlston, 1992). Rather, the present research suggests that what is true of the inferences drawn of rare groups—that their unusual behaviors are more readily remembered and heavily weighted than similarly unusual behaviors of larger groups (Hamilton & Gifford, 1976; Risen et al., 2007)—may apply to inferences made about individuals. It is likely that the reliance on impressions as opposed to distributional information when predicting the behavior of group members is moderated by the perceived entitativity of the group (McConnell, Sherman, & Hamilton, 1997). The atypical past behavior of highly entitative groups is likely to be overweighted when predicting the behavior of their members.

The present research also contributes to our understanding of why atypical behavior is overweighted in person perception (Kelley, 1973; Reeder & Brewer, 1979). Atypical behavior is often accorded greater weight than typical behavior because it is considered to be more diagnostic (Skowronski & Carlson, 1989). The results demonstrate that independent of its diagnosticity, atypical behavior is also accorded greater weight when forming impressions simply because it is more cognitively accessible (Hamilton & Fallot, 1974).

Predictors overweighted the atypical behavior of an individual when predicting her future behavior, but appeared less likely to overweight atypical behavior when predicting the future behavior of a group member. Perhaps, the notorious inaccuracy of the behavioral predictions made by clinicians, admissions committees, and spouses (Davis et al., 1986; Dawes et al., 1989) might be improved by having them think less of their targets as individuals and consider what any large group of clients, students, or partners would do under those circumstances before making their predictions.

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Note

1. Simple effects tests revealed that participants in both the serial and simultaneous format conditions were more likely to recall the atypical than typical selections, $t_{paired}(27) = 2.26$, $p = .03$, $r = .40$ and $t_{paired}(23) = 5.57$, $p < .001$, $r = .76$, respectively.

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