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Abstract

Psychological research has devoted much attention to how people judge and predict others. However, a full understanding of social perception necessitates incorporating the responses of the targets, who may have little interest in being predicted. The authors argue that whether people want to be predicted depends on the interpersonal context—in particular, competitive or cooperative ones. Study 1 used a unique behavioral measure and showed that competition participants, when asked to draw the flight path of a moth in a separate study, produced significantly more variable and significantly less predictable trajectories than did cooperation participants. Study 2 examined participants' self-assessments and showed that participants expecting a competitive interaction indicated that they were more difficult to predict, less willing to open up, and more willing to mislead. Together, the findings suggest that people are not always open to being predicted and that the form of these tendencies depends on features of the situation.

Keywords

Predicting Behavior, Judging Others, Unpredictability, Cooperation, Competitive Advantage

During the 2002 sniper shootings in Baltimore and Washington, DC, a woman described herself as zigzagging while walking, even though the probability of being shot was low. In her mind, she might have thought that she was competing for her life as she moved at random to minimize the chances of being a target, similar to a moth trying to evade a bat's sonar (Morris, 2002). In this research, we examine a similar issue: We focus on how competitive situations, compared to cooperative ones, lead people to be unwilling to be predicted. Specifically, we explore the hypothesis that people seek to avoid being predicted in competitive contexts relative to cooperative contexts.

Unless they suffer from certain brain impairments, people readily try to figure out others and infer their intentions and goals (cf. Heberlein & Adolphs, 2004). People even try to predict the "behavior" of moving geometric figures (Heider & Simmel, 1944), the weather, coin tosses, and crops (e.g., Barrett & Keil, 1996; Guthrie, 1993). Social prediction is so important for who we are that the mental architecture that supports it—theory of mind—appears early in children and is universally observed (e.g., Vinden, 1999; Wellman, Cross, & Watson, 2001; but see Lillard, 1998). Whereas work in person perception has had a long history in social psychology (for a review, see Fiske, 1992), comparatively less research has focused on the behavior and responses of targets (cf. Shelton, 2000). Of the available research, studies show that the perceiver's ability to come to some understanding of targets depends not only on one's own characteristics and

social cognitive tools but also on the target of prediction (e.g., Garcia, Hallahan, & Rosenthal, 2007; Hampson, 1997; Hancock & Ickes, 1996; Kenny, Mohr, & Levesque, 2001; Snodgrass, Hecht, & Ploutz-Snyder, 1998; Swann, 1984; Zaki, Bolger, & Ochsner, 2008). What is unclear about targets is how they might influence this process. Examining the perspective of the target may thus provide insights into the target's toolbox and insights into social perception in general that cannot be gleaned from an emphasis on perceivers. In the present research, we focus on the target's responses in competitive and cooperative contexts.

Being Predictable

Before discussing competitive and cooperative contexts, it is important to define what we mean by people being (not being)

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predictable. Effective and intelligent behavior depends on mental and behavioral responses that allow a person to adapt to or shape environmental contexts and respond flexibly to them (Sternberg, 1997). The general tendency toward being (not being) predictable facilitates flexible responding. For example, in cooperative contexts, being predictable can foster transparency and coordination, but in competitive contexts, not being predictable can aid in keeping others at bay, which may be instrumental for reducing interpersonal costs or even gaining competitive advantage.

With regard to the behavioral tendencies themselves (being predictable, not being predictable), we define them as being multifaceted, given that social situations are dynamic and have unique properties. For example, in not wanting to be predicted, people can limit disclosures about what they are like and what their goals are. They might also lie or misdirect. Still in other situations, when an act is in progress, people could attempt to be difficult to predict, like the woman zigzagging across a mall parking lot.

Whether these behaviors succeed in not allowing others to predict the self depends on various factors (e.g., features of the perceiver, the target, and the situation), but the responses have in common the goal (the not necessarily conscious goal) of not being predicted, which we define as not wanting to give others a sense of what one is like and what one intends to do and, ultimately, not having others forecast one's acts or moves.

To be sure, not wanting to be predicted can be distinguished from notions of the maladjustment of individuals who emit erratic behavior (e.g., Donahue, Robins, Roberts, & John, 1993; Laing, 1973); that is, we focus on nonclinical populations. Our construct is also distinct from general self-presentation (Goffman, 1959) in that people are not concealing any stigma or strategically enacting presentations to obtain explicit rewards. Indeed, as we show in the first study, people's responses are not tied to rewards; they can be triggered through priming with no real audience or interaction and with limited deliberation.

Competitive Versus Cooperative Environments

Competition is part of most social systems (Alexander, 1974; Humphrey, 1976), and competitive situations should incline people toward not wanting to be predicted (cf. Driver & Humphries, 1988; Miller, 1997), given the ambiguity of many competitive social encounters. Relative to cooperative encounters, competitive interactions are ambiguous because it is difficult to determine others' intentions, strengths, and competencies owing to reduced communication or increased dissimulation (e.g., Boles, Croson, & Murnighan, 2000). And even when the parties' strengths are "apparent," it is nevertheless difficult to determine the outcome of the interaction (cf. Bargh, 2006). Thus, an approach of not being predicted may provide a general and efficient way of managing the self and maintaining flexibility in competitive interactions. This is not to say that allowing others to predict the self may not occur at times in competitive contexts—for example, when a person can clearly

communicate his or her strengths or formidableness and when signaling truthfully can preclude future costs (e.g., "If you attack me, I will reciprocate"; cf. Grafen, 1990; Zahavi, 1975). In general, people should be inclined to not be predicted in competitive contexts, because they are likely to have little sense of which behaviors or portrayals will be effective.

In contrast to what is sensible when dealing with competitive others, cooperative social connections should shift one toward lessened discomfort at being predicted, given that it should allow both parties to coordinate in the pursuit of mutual goals. Such an interpersonal approach fosters acceptance, which is associated with a host of instrumental and emotional benefits (Baumeister & Leary, 1995; Cohen & Willis, 1985; Ybarra, 2002; Ybarra et al., 2008). Historically, the benefits have included, for example, self-protection and defense, food acquisition, the availability of mates, and the transmission of information and knowledge (e.g., Barash, 1977; Humphrey, 1976). Allowing the self to be predicted in cooperative encounters thus makes sense in that it engenders greater interpersonal transparency, which is necessary for social understanding and coordination.

Overview of Research

In two studies we tested the hypothesis that people will be less willing to be predicted in competitive than cooperative contexts. In Study 1, we tested whether tendencies toward being unpredictable could be influenced by simply imagining a competitive or cooperative scenario. Furthermore, we introduced a novel behavioral measure—people's rendition of a moth's flight pattern—and we used a relatively novel analysis in psychological research: ArcGIS (ESRI, Redlands, CA). In Study 2, participants were brought face-to-face with an "opponent" (competitive context) or a "partner" (cooperative context).

Study 1

We noted that people's tendencies to be (or not be) predicted can take different forms, but what these behaviors have in common is preventing others from not only having a sense of what one is like or intends to do but also predicting one's actions. In this first study, we assessed whether competitive contexts trigger behavior that is difficult to predict, compared to cooperative contexts. Specifically, we wanted to capture these processes unobtrusively, using a situational priming methodology and a novel, ostensibly unrelated measure. The situational prime exposed participants to an imagined competitive or cooperative scenario at Time 1. At Time 2, the novel measure was to draw a two-dimensional flight pattern of a moth. We expected participants in the competition condition to draw more variable and unpredictable flight patterns than those of participants in the cooperation condition.

Method

Participants and procedure. Sixty-eight undergraduates participated in this study as part of a course requirement (48

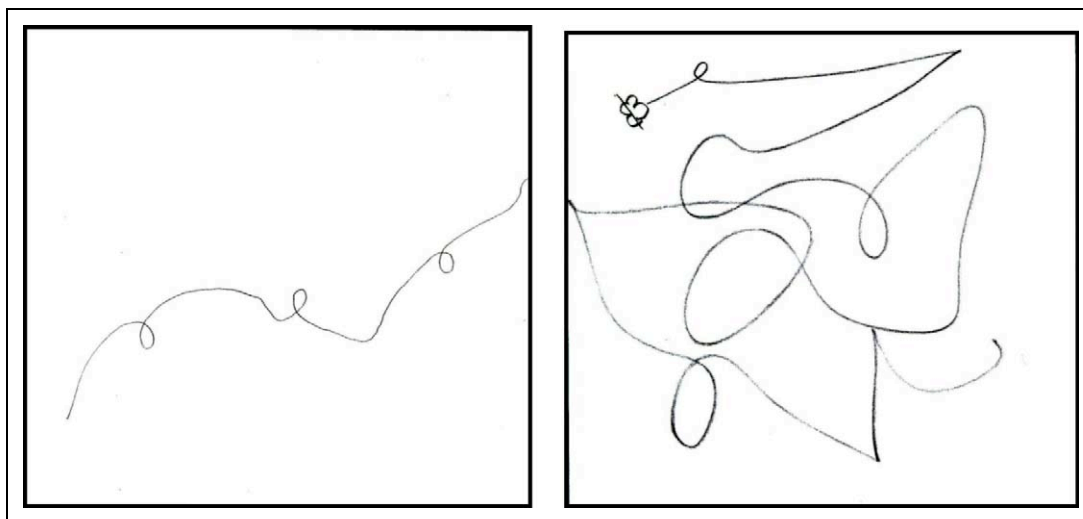


Figure 1. Sample moth trajectories.

females, 18 males, 2 unspecified; 18 to 23 years old, $M = 20.12$). Responses from 2 participants were unavailable because they did not provide a drawing, and responses from 11 participants were excluded because they failed to draw a two-dimensional moth trajectory. We also conducted a set of analyses with these excluded participants, and the results were similar to the findings we report below.¹

Each participant was randomly assigned to one of two conditions: competition (valid $n = 30$) or cooperation (valid $n = 25$). They read a description of the prisoner's dilemma game, as adapted from Kay, Wheeler, Bargh, and Ross (2004), and they were asked to imagine playing the game with another student. The key difference between conditions involved the labels and titles used to describe the game (i.e., "The Wall Street Game" versus "The Community Game") and the other participant (i.e., "opponent" versus "partner"; Liberman, Samuels, & Ross, 2004).

After reading the game description, participants completed a three-question manipulation check that used 7-point scales—namely, how adversarial it was, whether people were going to be on the same side, and whether the game was more cooperative or competitive (Kay et al., 2004). Participants' responses were averaged to form a composite ($\alpha = .68$), with higher scores indicating higher levels of perceived competition.

In an ostensibly unrelated questionnaire dealing with visual imagery, participants were asked to "draw the flight path of a moth" in a box (5×5 in. [13×13 cm]) presented on a sheet of paper. They were given no specific instructions or information about the moth. They were simply told to visualize and then draw a moth flying.

Results and Discussion

Manipulation check. The experimental manipulation had the intended effect (1 participant did not provide data): Competition participants perceived the game as being more competitive

($M = 4.65$, $SD = 0.98$) than did cooperation participants ($M = 4.01$, $SD = 1.16$), $t(52) = 2.18$, $p = .033$ ($d = .60$).

Moth trajectory. The moth trajectory drawings were scanned into digital images (1 cm = 100 units; see Figure 1 for representative images) and recorded in a spatial data file. Specifically, each drawn line was tagged with markers at every 100 "meters." At every marker, we measured its distance (displacement) from the point of origin. Each participant drew lines of different lengths and had multiple displacement scores (one for each marker, ranging from 17 to 270, $M = 64$). We calculated for each participant a measure of variability of displacement. The standard deviation for the displacement scores served as one index of how variable the trajectory was. We then used ArcGIS (geographic information system) to extract parameters from the traced lines (e.g., length of line, distance between point of origin and end point, angle between point of origin and end point).

We first tested our hypothesis by examining the spatial relationship between the start and end points. The angular position of the end point, in relation to the start point, was extracted in ArcGIS. The angle ranged from 0° to 359° ($0^\circ =$ end point straight north of [above] start point, $90^\circ =$ end point straight east of [to the right of] start point, $180^\circ =$ end point straight south of [below] the start point). We expected the start–end angular relationship in the moth trajectories to be more variable (i.e., less predictable) for competition participants than for cooperation participants (see Figure 2). A Levene test confirmed the hypothesis, $F(1, 53) = 6.80$, $p = .012$, indicating higher variance in the competition group ($SD = 83.80$) than the cooperation group ($SD = 39.59$). Thus, the moths' flights ended in more varied directions in the competition condition than in the cooperation condition.

We also tested if the start and end points from the competition group were more random than those of the cooperation

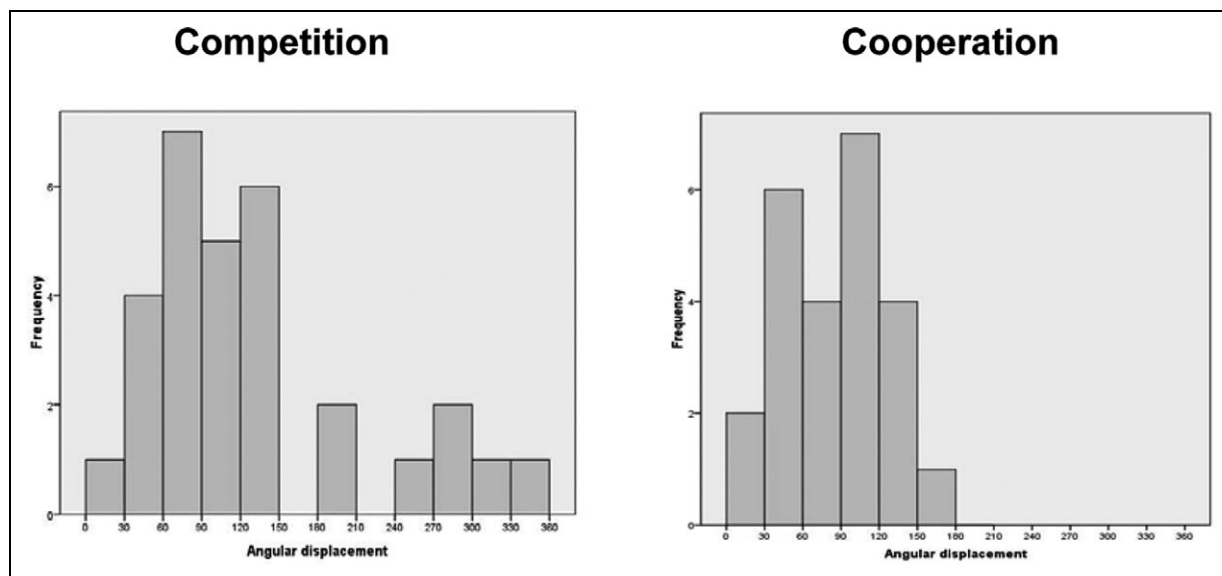


Figure 2. Histogram of the angular position of the end point in relation to the starting point.

group. We did so by adapting the frequency analysis method used to analyze if a set of numbers is random, by comparing the distribution of a set of numbers against a uniform distribution. If participants were randomly placing the start and end points, then the points should occur with equal probability near the top, middle, and bottom of the page. In this analysis, we divided the page into 10 equal-sized bins from the top to the bottom of the drawing frame and examined if the moths were equally likely to be present in any of the bins. We used ArcGIS to extract the y -coordinates of the start and end points of each trajectory. We determined the range of the starting y -coordinate values across participants and created 10 bins of equal distance on the vertical axis (1 = closest bin to the bottom of the page, 10 = closest bin to the top of the page). We then identified participants' start bin (1–10) based on their starting y -coordinate. The same was done with participants' ending y -coordinate value. This coding process yielded two distinct y -coordinate bin values for each participant. We then tallied the frequency in each bin and compared the frequencies across the 10 bins.

To examine whether the imagined competition and cooperation scenarios influenced the moth's trajectory, we used a chi-square to determine if there was an equal probability that the moth would start or end in any bin. To conform to the recommended minimum expected value of the chi-square test, the starting and ending observations were pooled so that there would be sufficient numbers of observations for the analysis. Confirming our hypothesis, the frequencies in the 10 bins did not differ from one another for the competition participants, $\chi^2(9, N = 6.0) = 9.33, p = .41$ (Figure 3). Participants in the cooperation condition, however, did not show the same random distribution: They were not equally distributed across the 10 bins, $\chi^2(9, N = 4.8) = 18.67, p < .03$ (Figure 3).

Study 1 is unique given the behavioral measure used. The results indicate that competition participants' renditions of a moth's path, as compared to those of cooperation participants,

produced not only more variable angular relationships between the start and end points in their trajectories but also more random distributions of the start and end points. Thus, even after simply imagining a competitive scenario in a separate part of the experiment, people's behavior, as reflected in the moth tracks, was more difficult to predict. Variability is likely to be only one element determining whether a person can or cannot be predicted. However, when dealing with competitive social situations, people may have little sense of what behavior will be effective. Thus, variability in behavior may serve as an important element in this process.

Study 2

In this next study, we expanded on the idea of people not wanting to be predicted. In addition to people being difficult to predict, we examined people's unwillingness to open up and their willingness to mislead. For this study, each participant sat face-to-face with his or her assigned "opponent" (competition condition) or "partner" (cooperation condition). Not only did we make the social situation more palpable, but we also expanded our assessments to capture more of the person's "psychology" in response to the situation. In particular, we examined whether participants' self-judgments gravitated toward lesser or greater willingness to be predicted as a function of condition. Compared to cooperation, competition should trigger expectations of behaviors with potential social costs and thus be more ambiguous in terms of what behaviors are effective in such contexts; therefore, we expected competition participants to indicate greater unwillingness to be predicted than cooperation participants.

Method

Participants and procedure. In sum, 131 undergraduate students (72 males, 59 females) participated for course credit

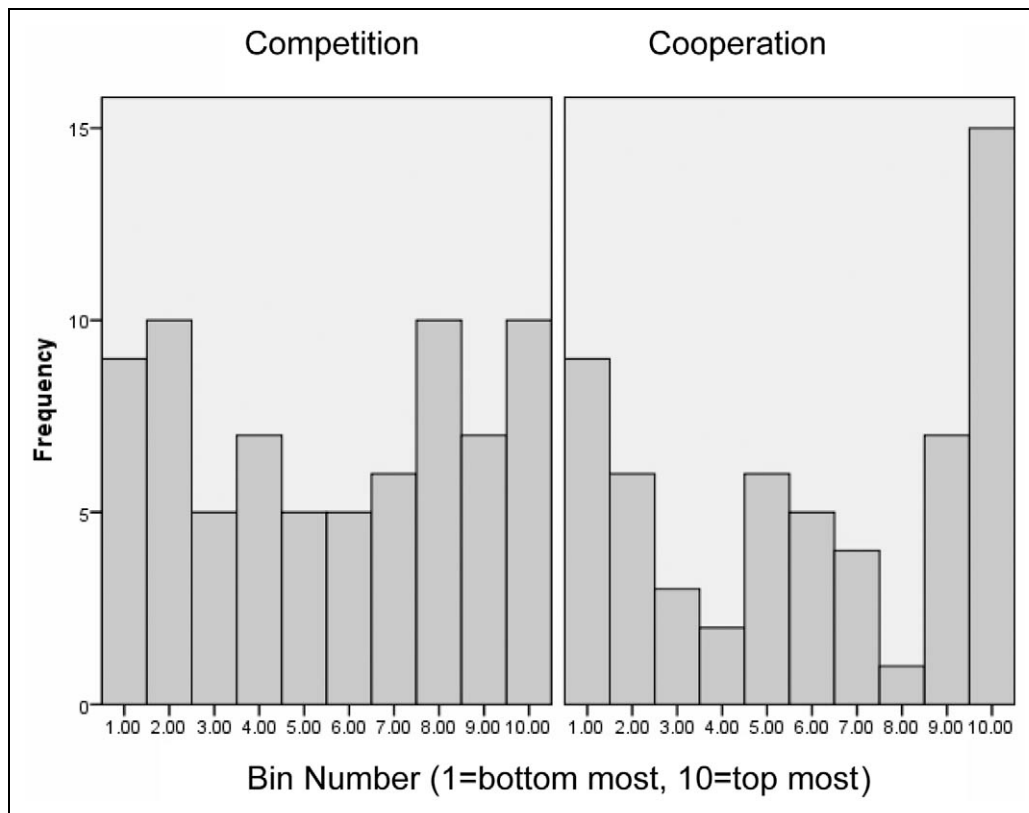


Figure 3. Frequency distribution of the start and end points of the moth trajectory.

Table 1. Items Composing the *Unwillingness to Be Predicted* Measure

I prefer to be direct and forthright when dealing with people I've just met.
I generally feel open to talking about myself with people.
If asked to do so, I would find it easy to describe myself to someone else.
Every now and then, I enjoy misleading people about who I really am.
I am a thoroughly honest and forthright person.
It's not hard to understand what really is important to me.
I am consistent from situation to situation in the way I react to things.
When people meet me, if they look hard enough they can find one basic characteristic through which to understand me.

and were randomly assigned to a competition condition ($n = 62$) or a cooperation condition ($n = 69$). Participants were run in groups of four, and the cooperation and competition conditions were run in separate sessions. Participants first blindly selected colored badges from a bag and pinned them on their shirts; they were then asked to find their opponents (competition condition) or partners (cooperation condition) with the same badge colors and to sit across the table from them. All participants were told that, for reasons of economy, the present experiment would be “piggybacked” with another study. The first study merely involved filling out a number of “personality inventories.” Participants were told the second study would take place 20 minutes later.

Before completing the personality inventories in which the items from our outcome measure were distributed, participants were given information about the second part of the study (which never occurred). They were told they would go to

another room to play a game. Depending on condition, we described the game as involving competition (matching wits to earn as many points for themselves) or cooperation (matching wits to earn as many points for the team; Chan & Ybarra, 2002).

Measures. For this study, we focused on three aspects of people's unwillingness to be predicted, namely judging the self as *difficult to predict*, *unwillingness to open up*, and *willingness to mislead*. The items for the measure came from Singelis (1994), and others were adapted from a sample of Wrightsman's items (1964) dealing with philosophies of human nature. The research team created other items.

The eight items composing the measure² (see Table 1) were interspersed with numerous filler items randomly drawn from personality scales. To further mask the nature of the questions, we used different response scales for the items to match the

questionnaire context in which they were embedded. Three items assessed being difficult to predict, which measured the degree to which participants felt they were complex and difficult to understand (e.g., “I am consistent from situation to situation in the way I react to things” (reverse scored). Unwillingness to open up (3 items) measured reticence in being open with others (e.g., “I generally feel open to talking about myself with people” (reverse scored). Willingness to mislead (2 items) reflected a readiness to use deception in dealing with people (e.g., “Every now and then, I enjoy misleading people about who I really am”). The responses were then reverse coded where necessary and standardized such that higher scores indicate greater unwillingness to be predicted (overall $\alpha = .64$).

On a following questionnaire that included various filler items, we included the manipulation check, which consisted of likelihood estimates for hostile and friendly behaviors (1 = *extremely unlikely*, 7 = *extremely likely*). We reversed scored the prediction for friendly behavior and averaged the two likelihood estimates ($r = .25$).

Any differences in people’s behavioral tendencies could arguably be a function of experienced affect and arousal. For example, anticipated competition could induce more negative affect and arousal in people, which could influence tendencies to not disclose self to others and to be antisocial in general (e.g., Cunningham, 1988; Rule & Nesdale, 1976). To account for these alternatives, we assessed participant affect and arousal using an affect grid (Russell, Weiss, & Mendelsohn, 1989). The perimeter was labeled with affect terms that varied in arousal (low to high on vertical axis, 1–9) and hedonic tone (negative to positive on x -axis, 1–9). Participants were each assigned an arousal score and a hedonic tone score based on which point on the grid they chose.

Results and Discussion

Manipulation check. The experimental manipulation had the intended effect. Participants in the competition condition predicted a greater likelihood that they would engage in hostile behaviors ($M = 2.52$, $SD = 1.04$) than did participants in the cooperation condition ($M = 2.18$, $SD = .94$), $F(1, 129) = 3.91$, $p = .05$, $d = .34$.

Unwillingness to be predicted. We used a one-way analysis of variance, with condition as the between-participants factor (cooperation, competition) and *unwillingness to be predicted* as the dependent variable. Participants in the competition condition were more unwilling to be predicted ($M = .19$, $SD = .51$) than participants in the cooperation condition ($M = -.13$, $SD = .52$), $F(1, 129) = 12.86$, $p < .0001$ ($d = .62$). The univariate contrasts conducted separately on each subscale were significant for *difficult to predict* (competition, $M = .22$, $SD = .71$; cooperation, $M = -.15$, $SD = .72$), $F(1, 129) = 8.37$, $p < .004$, $d = .52$, and *unwillingness to open up* (competition, $M = .18$, $SD = .70$; cooperation, $M = -.14$, $SD = .72$), $F(1, 129) = 6.71$, $p < .01$, $d = .45$. The contrast for *willingness to*

mislead was marginally significant (competition, $M = .15$, $SD = .83$; cooperation, $M = -.10$, $SD = .78$), $F(1, 129) = 3.29$, $p = .07$, $d = .31$. Participant affect and arousal did not vary by condition. Furthermore, controlling for both variables did not alter the nature of the results.

Overall the findings indicate that participants’ orientations were modified depending on whether they expected to compete or cooperate. Even without knowing or interacting with the other person, competition participants expressed greater tendencies associated with not wanting to be predicted, compared to participants in the cooperation condition. This was the case even though the items for the dependent measure were phrased in trait terms. To us, this suggests that these behavioral tendencies became incorporated, at least temporarily, into people’s self-concepts as a function of the social context.

General Discussion

We have argued that the possibility for competitive interaction should incline people to not want to be predicted, to avoid potential social costs and to avoid having limits placed on their behavior. In contrast, cooperative social connections should be associated with a greater willingness to be predicted because this facilitates interpersonal transparency and coordination, which are crucial for pursuing common goals. The results show that when participants were asked to draw a moth flying on a sheet of paper, the paths of the competitive participants were more variable, random, and difficult to predict than were the paths drawn by cooperation participants (Study 1). Furthermore, Study 2 participants in competition mode indicated a greater unwillingness to be predicted than did cooperation participants. Thus, people under certain social circumstances do not want to be predicted, and they can actually produce random behavior that is not readily predictable.

Theoretical and Practical Significance

Much research in social perception has focused on the perceivers and their attempts to predict others, whereas less attention has been given to the targets of these prediction attempts. Our focus on the targets’ willingness to be predicted may help serve as a counterweight to this emphasis in the literature. Whether or not perceivers succeed in predicting others should also depend on the target and the possibility for cooperation. Our perspective thus leaves a good amount of the outcome to social perception in the hands of the targets of prediction, even when they have no clear sense of how they are perceived by the other person. Moreover, in this research we focused on the interaction goals of competition and cooperation. These two interaction goals are important because they represent a central lever in the shape that interactions and relationships take across culture (Brown, 1991) and, as some argue, across evolutionary time (e.g., Alexander, 1974; Barash, 1977). Nonetheless, it is useful to consider other circumstances that might incline people to not be predicted.

Perhaps competitive interactions are part of a broader theme dealing with novel or ambiguous contexts that are difficult to anticipate, which may promote in people an unwillingness to be predicted. As noted earlier, this should be the case because people may be unable to determine which behaviors will be conducive to the situation at hand; or, even if such a determination is made, they may feel incapable of enacting them for various reasons. Finally, given the time that it takes to develop trust (e.g., Ybarra, 2002), encountering strangers is likely to make people uneasy about whether these others will cooperate or not. Thus, social situations that are likely surrounded by unclear norms and roles—such as those dealing with intergroup encounters, moving to a new culture, or entering novel environments (e.g., a new job)—may foster an unwillingness to be predicted. In such circumstances, people cannot rely on past routines or procedures to make sense of social events and interactions. For this reason, the culture shock of entering new environments or relationships manifests itself as cognitive fatigue (Richeson & Shelton, 2003; Winkelman, 1994). These cognitive outcomes may in turn disable certain strategic efforts, given that in unpracticed domains, self-presentation relies on cognitive resources (Pontari & Schlenker, 2000; Vohs, Baumeister, & Ciarocco, 2005).

The present findings may also inform work on pluralistic ignorance, in which people misperceive a norm (e.g., level of drinking on a college campus) and so make behavioral decisions based on that misperception (Prentice & Miller, 1993). The findings suggest one reason why pluralistic ignorance may be so pervasive. If people in novel or ambiguous situations keep from being predicted, it should make it difficult for others to have a sense of relevant behavioral norms, which may then feed into their misperceptions. Related processes might be expected in other social situations or in cultures and cities marked by greater ambiguity or more competitive values. People living in such environs may tend to not want to be predicted, opting for the stoic, cold-shouldered default in day-to-day life and interactions with passers-by.

Notes

1. These participants did not draw two-dimensional diagrams (lines were not straight) but three-dimensional images. The spatial information from these images (e.g., an image of a moth flying in a room with furniture toward a light bulb on the ceiling) cannot be adequately captured by the ArcGIS software without relying on certain assumptions. But even when we disregard the third dimension and measure the parameters as if they were two-dimensional, we get the same results when we include these participants as when we do not.
2. Before conducting the experiment, we validated the *unwillingness to be predicted* measure (see Table 1 for items) by correlating it with a version of Rosenberg's Faith in People Scale (1957), which captures the general belief that others are competitive and looking out for themselves. We obtained data from two pretest samples. The first sample ($n = 147$; 35 males, 112 females; age range = 18 to 77, $M = 25.3$, $SD = 9.8$) completed the survey on a psychological studies website. The second sample ($n = 219$; 84 males, 135

females; age range = 18 to 22, $M = 18.5$, $SD = 0.9$) completed the survey as part of a course requirement.

We used exploratory factor analysis (principal axis factoring and principal components analysis; oblique and orthogonal rotations) on the eight questions considered a priori to measure people's unwillingness to be predicted. As based on common criteria for determining numbers of factors (scree plots and the eigenvalue rule), three factors that conformed to three behavior classes were consistently found in both samples. We summed the items loading highest on each factor to create three subscales: Difficult to Predict (3 items) assessed the degree to which participants felt as though they were complex and difficult to understand. Unwillingness to Open Up (3 items) measured reticence in being open with others. Willingness to Mislead (2 items) reflected a readiness to use deception in dealing with people. The items were answered on 6-point scales ($-3 = \textit{strongly disagree}$, $3 = \textit{strongly agree}$). Across the two samples, an overall measure was sufficiently reliable, Cronbach's $\alpha = .66$. The items were reverse coded where necessary such that higher scores indicate greater unwillingness to be predicted.

Five questions composed the Faith in People Scale. Sample items included "People are very competitive" and "People always just look out for themselves." Factor analysis confirmed the need for one latent variable. After reverse coding where necessary, we summed the answers to the five items, with larger numbers reflecting a greater belief that others are competitive, Cronbach's $\alpha = .55$. The regression analysis indicated that people who tended to see others as being competitive also tended to score higher on the measure of unwillingness to be predicted: Sample 1, Wilk's $F(3, 143) = 10.43$, $p < .001$, $R^2 = .18$; Sample 2, Wilk's $F(3, 215) = 6.27$, $p < .001$, $R^2 = .08$. This is most evident for Sample 1, but the basic relationship between the measures was present in both samples. These pretests indicate that people who tend to see others as being generally selfish and competitive are more likely to report an elevated unwillingness to be predicted.

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