

# **To Follow Expert Advice When Making a Decision: An Examination of Reactive Versus Reflective Autonomy**

**Richard Koestner**

**Isabelle Gingras**

**Rania Abutaa**

McGill University

**Gaëtan F. Losier**

Université de Moncton

**Lina DiDio**

**Marylene Gagné**

University of Rochester

**ABSTRACT** The present study examined whether reactive and reflective autonomy moderated individuals' responses to expert influence. Participants were given the opportunity to win money at a racetrack betting task for which they were provided with objective information about horses' previous performances along with specific expert recommendations. The experts were made to look either credible or noncredible by manipulating information on the success rate of their previous predictions. The results showed that the two forms of

This research was funded by grants from the Social Sciences and Humanities Research Council (SSHRC) of Canada and the Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR-Quebec). Gaëtan F. Losier was funded by a grant from the Université de Moncton.

Correspondence regarding this article should be sent to Richard Koestner, Psychology Department, McGill University, Montreal, Quebec, Canada, H3A 1B1.

*Journal of Personality* 67:5, October 1999.

Copyright © 1999 by Blackwell Publishers, 350 Main Street, Malden, MA 02148, USA, and 108 Cowley Road, Oxford, OX4 1JF, UK.

autonomy led to exactly opposite behaviors in response to the advice of credible experts. Reflective autonomy was significantly positively associated with following the recommendations of credible experts whereas reactive autonomy was significantly negatively associated with following the recommendations. The results also showed that it was particularly after losing their first race that reactive autonomy was related to rejecting the advice of experts. These findings indicate that reactive and reflective forms of autonomy may yield opposite patterns of behavior in certain situations.

Many decisions, such as which graduate school to attend or how to invest for retirement, involve weighing such complex issues that it becomes advisable to consider input from experts. Yet, the extent to which people use input from experts when making decisions varies greatly. Some people resist experts' influence even if it is valuable, whereas others comply with experts' advice even if it is questionable. The present study considers the role of individual differences in the need for autonomy to account for the extent to which an individual follows the advice of experts. Two conceptions of autonomy are distinguished: reactive and reflective. The conditions under which each form of autonomy will impact on the way individuals use expert advice when making complex decisions are outlined.

The traditional conception of autonomy in personality psychology is based on Henry Murray's (1938) *Explorations in Personality*. Murray defined the need for autonomy as follows: "To resist influence or coercion; to defy an authority or to seek freedom in a new place. To strive for independence" (p. 82). Murray viewed autonomy as one of several psychological needs that concerned "how human power is exerted, resisted, or yielded to" (p. 82). He suggested that individuals are high in autonomy to the extent that they avoid influence from others. Such behavior was contrasted with copying and obeying others (need for deference) and with commanding, leading, and acting as an exemplar for others (need for dominance).

Murray (1938) further suggested that an autonomous individual's desire to resist influence would be manifest in a tendency to disregard conventions, avoid rigidly structured activities, and feel confined in monogamous relationships. He hypothesized that peers view highly autonomous individuals as "independent," "free," "willful," "defiant," "stubborn," and "resistant." In his only experimental study on the topic, Murray showed that men high in autonomy on a self-report questionnaire

were significantly more resistant to hypnotism than men low in autonomy.

Murray's (1938) conception of autonomy guided the selection of items for the autonomy scale on the Adjective Checklist (ACL; Gough & Heilbrun, 1983). Research with the ACL has shown that autonomy is associated with satisfaction with careers that emphasize self-direction (Arvey, Dewhirst, & Boling, 1976) and with a dislike of work environments that encourage teamwork (O'Reilly, Chatman, & Caldwell, 1991). Autonomy also has been associated with dropping out of counseling (Craig & Olson, 1988; Heilbrun, 1961) and with leaving college prematurely (Heilbrun, 1965). These findings confirm Murray's (1938) view that autonomous individuals "want to go their own way, uninfluenced and uncoerced by others" (p. 152).

### Deci and Ryan's Conception of Autonomy

Is resistance to outside influence the archetype of autonomous behavior, as Murray (1938) suggested? A different conception of autonomy has been presented by Deci and Ryan (1985, 1987, 1991) in their Self-Determination Theory. Their conception derived from the work of Richard deCharms (1968), who argued that an intentional action is not always freely chosen. He distinguished between actions for which the locus of causality is internal, resulting in the experience of oneself as an "origin" of action, and those for which the locus of causality is external, resulting in the experience of feeling like a "pawn" to social pressures and inducements. When people act as origins, they experience themselves as the cause of desired changes and take responsibility for their actions (deCharms, 1992).

Ryan (1993) noted that this conception of autonomy owes much to philosophical discussion in which a sense of ownership, authenticity, responsibility, and choice are all entailed in autonomy. He pointed out, however, that it is common to misconstrue the meaning of autonomy, defining it too narrowly in terms of resistance to outside influences. For Ryan (1993), autonomous behaviors result from a *reflective* evaluation of options and a consideration of one's interests and needs rather than from a *reflexive* opposition to any outside influence.

According to Deci and Flaste (1995), one can act autonomously while following the advice of others and one can fail to display autonomy even while rejecting such advice. Autonomy is not defined

in terms of *interpersonal* processes of resistance or compliance with social influence but rather in terms of the *intrapersonal* processes of personal choice. To the extent that one freely *chooses* to follow another's advice while considering one's needs, interests, and goals, one is fully autonomous. To the extent that one feels compelled to reject another's advice, regardless of whether it is consistent with one's interests and goals, one is failing to act autonomously.

The General Causality Orientations Scale (GCOS) was developed to measure individual differences in people's orientation toward autonomous functioning (Deci & Ryan, 1985). The autonomy scale of the GCOS has been shown to be positively associated with focusing on enjoyment and challenge at work (Amabile, Hill, Hennessey, & Tighe, 1994), rarely experiencing boredom (Farmer & Sundberg, 1986), and exploring within oneself when making a career choice (e.g., carefully weighing one's own interests and abilities; Blustein, 1988). It also has been associated with a high degree of integration in personality, a persistent approach toward one's goals, and experiencing greater intimacy and more positive emotions during everyday social interactions (Hodgins, Koestner, & Duncan, 1996; Koestner, Bernieri, & Zuckerman, 1992; Koestner & Zuckerman, 1994). These studies suggest that the GCOS measures a reflective form of autonomy that promotes adaptive functioning.

### Present Study

The work of Henry Murray (1938) and Deci and Ryan (1985) has led to two distinct conceptions of the need for autonomy. Murray's conception of autonomy is predicated on independence from and nonreliance upon others, whereas Ryan's (1993) and Deci and Flaste's (1995) definition of autonomy is predicated on the capacity to make informed choices based on an awareness of one's needs, interests, and values. Koestner and Losier (1996) proposed referring to Murray's conception of autonomy as "reactive" and Deci and Ryan's as "reflective." These authors suggested that the distinction between the two forms of autonomy will be most evident in people's response to social influence.

The present study tested whether reactively and reflectively autonomous individuals show divergent patterns of responses to experts of varying credibility. Participants were given the opportunity to win money at a racetrack betting task for which they were provided with objective

information about horses' previous performances along with specific expert recommendations. The experts were made to look either credible or noncredible by manipulating information on the success rate of their previous predictions. The dependent variable was the extent to which participants' selections conformed with those recommended by the experts.

We hypothesized that reflectively autonomous individuals would use expert input in a rational manner. It was expected that they would recognize the informational value of the recommendations made by credible experts and would take them into account when making their own selections. By contrast, it was expected that reflectively autonomous individuals would discount the value of the recommendations made by noncredible experts and instead try to master the task themselves. Stated differently, we expected that reflective autonomy would be positively related to relying on the recommendations of credible experts but unrelated to reliance on noncredible experts.

We hypothesized that reactively autonomous individuals would interpret any form of expert influence as a threat to their self-reliance. In *both* the credible and noncredible expert conditions we expected them to be significantly less likely to rely on the recommendations of experts. Stated differently, we expected a negative correlation between reactive autonomy and reliance on either credible or noncredible experts.<sup>1</sup>

The study included a control condition that did not provide participants with any information regarding experts' selections. If participants in this condition made selections that matched those of the experts it would be only because they used horses' past performance information in the same way as the experts. This, however, was unlikely, because the experts had access to more information. For example, the experts likely reviewed the last 10 races by each horse and considered the length of the races, the conditions of the track, the strength of the competition, and who were the horse's jockey and trainer. In the control condition, both reflective and

1. Although we discuss how "reactively autonomous" and "reflectively autonomous" individuals are likely to act, we do not want to imply that there is a dichotomy. Previous research by Koestner and Losier (1996) suggested that measures of the two constructs are uncorrelated. The present study measured both reactive and reflective autonomy as continuous individual differences and separately examined the relations of each form of autonomy with the dependent variable.

reactive autonomy were expected to be unrelated to whether participants' selections matched those recommended by the experts.

## METHOD

### Participants

The sample consisted of undergraduates who volunteered to participate in order to earn extra credits for a psychology course. The study was entitled "Decision-Making and Racetrack Betting" and was described as "examining personality factors that influence decision-making strategies using probability judgments, in the context of horse race betting." There were 112 women and 34 men whose age ranged from 17 to 49 ( $M = 20.5$ ). Forty-seven participants were randomly assigned to the control condition, 50 to the noncredible expert condition, and 49 to the credible expert condition. Experimental sessions were conducted with groups of four to seven participants. Eighty-four percent of participants had no previous experience with betting on horse races.

### Procedure

Upon arrival at the laboratory, participants signed a consent form, answered some demographic questions, and completed the GCOS (Deci & Ryan, 1985), which includes a scale assessing reflective autonomy, and the ACL (Gough & Heilbrun, 1983), which includes a scale assessing reactive autonomy. Previous racetrack betting experience also was assessed.

Participants were then provided with information about how to handicap horse races. This information explained the importance of past performances (how a horse had finished in recent races and what its speed ratings were). Participants were given \$6 and asked to bet \$2 on each of three races. They were allowed to place one of three types of bets: (1) Win Bet—participants win if their horse finishes first, (2) Place Bet—participants win if their horse finishes first or second; and (3) Show Bet—participants win if their horse finishes first, second, or third. Participants were told that a successful bet would pay \$8, \$6, or \$4, depending on whether they had chosen the Win, Place, or Show bet. The three betting options were provided to simulate conditions offered at real racetracks. Participants placed bets on the fourth through sixth races held at Gulfstream Park on January 18, 1995.

Participants in the control condition received only the past performance information. Participants in the two expert influence conditions were told that many people who bet on horses not only review past performance information, but also consider the recommendations of experts. Participants in these conditions

were then given the “Handicappers’ Page” for the races at Gulfstream Park that was published in the Daily Racing Form. The Handicappers’ Page provided the top three horses recommended in each race by each of four handicappers. It also included statistical information on how successful each of the handicappers had been with their predictions over the past month. This information was manipulated to give the impression that the handicappers were either successful or unsuccessful in their predictions.

Participants were allowed as long as they wanted to make their decisions prior to each race. The time ranged from 3 to 10 min. They then placed their bets and viewed the videotaped races. Successful participants were paid immediately after each race. The dependent variable was the extent to which participants’ horse selections matched those recommended by the handicappers. Participants were then debriefed about the purpose of the study.

### Measures of Autonomy

*General Causality Orientations Scale.* Reflective autonomy was assessed with the GCOS, which consists of 17 brief vignettes each presenting a situation (such as having just been turned down for a job) followed by three possible responses to that situation, including one that is autonomy oriented (Deci & Ryan, 1985; Hodgins et al., 1996; Ryan, 1989). Each response is followed by a 7-point scale on which respondents rate the extent to which that response—whether a behavior, thought, or feeling—would be characteristic of them in that situation. For example, participants are given the scenario:

Recently a position opened up at your place of work that could have meant a promotion for you. However, a person you work with was offered the job rather than you. In evaluating the situation you are likely to think . . .

An autonomy orientation is measured by the response, “You would probably take a look at factors in your own performance that led to your being passed over.”

The autonomy scale of the GCOS has demonstrated good internal and test-retest reliability (Blustein, 1988) and appears to be uninfluenced by socially desirable responding (Deci & Ryan, 1985).

*Adjective Checklist.* Reactive autonomy was assessed with the ACL which requires a person to circle any of 300 self-descriptive adjectives (Gough & Heilbrun, 1983). The ACL was shortened to 244 items by excluding all items that would be difficult for a student speaking English as a second language (e.g., rattle-brained, slipshod, stolid, zany). The Autonomy scale consists of 44 items. Twenty-nine of the items are scored positively (scored +1 if circled and 0 if not circled) and 15 are scored negatively (scored -1 if not circled and 0 if circled). Positive adjectives are adventurous, aggressive, aloof, argumentative, arrogant,

assertive, autocratic, confident, cynical, dissatisfied, egotistical, fault-finding, frank, hard-headed, headstrong, hostile, independent, indifferent, individualistic, irresponsible, opinionated, outspoken, rebellious, self-centered, self-confident, tactless, unconventional, undependable, and uninhibited; negative adjectives are cautious, conventional, cooperative, dependable, dependent, meek, moderate, obliging, self-denying, spineless, submissive, suggestible, tactful, timid, and tolerant. The sum of the +1s scored for the 44 autonomy adjectives was used as a measure of reactive autonomy. All 44 items for the Autonomy scale were included in the present study.

Gough and Heilbrun (1983) reported an internal reliability of .69 for the Autonomy scale and a test-retest reliability of .76 over 6 months. They also reported that autonomy scores were unrelated to scores on a scale of social desirability.

### Expert Influence

Participants were randomly assigned to one of three conditions. In all conditions, they were given a sheet which contained information on each horse's performance in its three previous races. An example of the information provided for two of the seven horses in the first race observed by participants is as follows:

#### 5. Runabout Bird

3 Dec 94	7th	behind by 7 lengths	41 speed rating
26 Nov 94	7th	behind by 18 lengths	43 speed rating
12 Nov 94	1st	winning by 7 lengths	81 speed rating

#### 7. Runaway Witness

21 Dec 94	3rd	behind by 3 lengths	84 speed rating
30 Nov 94	1st	winning by 1 length	77 speed rating
18 Oct 94	2nd	behind by 3 lengths	81 speed rating

Participants were told that most bettors select horses based on either recent history of winning or on speed ratings. It was explained that the speed rating represents an index of the horses' speed at a given distance relative to the track record at that distance. For the example provided, Runaway Witness would appear to be a better selection than Runabout Bird, based both on his average place of finish (2nd) and on his average speed rating (81). Participants in all three conditions received exactly the same past performance information and bet on the same three races in the same order.



Participants in the two expert influence conditions also received the “Handicappers’ Page,” which provided the top three horses recommended in each race by each of four handicappers. There also was a column titled “consensus,” which averaged across the recommendations of the four handicappers. The “Handicappers’ Page” also included statistical information on how successful each of the handicappers had been with their predictions over the past month. Thus, it was written that the “dollar figure after handicapper’s name represents Return On Investment (ROI), based on a flat \$2 win bet for each top selection. For example, \$2.11 means a profit of 11¢ for each \$2 wagered.” The veridical information provided by the Handicappers’ Page indicated that the handicappers at Gulfstream were, in fact, quite unsuccessful. The average return on a \$2 win bet for the experts ranged from \$0.45 to \$1.83 with a mean of \$1.12. This veridical information was used in the *noncredible expert* condition.

In the *credible expert* condition the information was altered so that the average return on a \$2 win bet for the experts ranged from \$2.28 to \$2.63 with a mean of \$2.40. Handicappers were thus made to look credible by making their average rate of return on a \$2 bet greater than \$2. To make handicappers look noncredible it was only necessary to provide the veridical information regarding the success of their predictions as published in the Daily Racing Form. The experts’ recommended selections were identical in the noncredible and credible conditions. The only difference between the two expert conditions was the information regarding the average return on previous bets recommended by the experts.

Participants in the control condition did not receive any information regarding handicappers’ selections. It was assumed that control participants would wager based on an analysis of past performance information whereas participants in the two expert conditions would use some combination of the past performance information and the experts’ recommendations.<sup>2</sup>

### Reliance on Expert Influence

The dependent variable in the study was the extent to which participants’ selections conformed to those recommended by the experts. Each horse in a given race was coded for the extent to which it was recommended by the experts. There were four experts who each recommended three horses, ranked in order

2. The particular races were selected so that handicappers’ recommendations and past performance data would both be useful in making predictions. The experts’ predicted finishes for the 25 horses in the three races correlated  $r = .51$  with the horses’ actual performance. The experts’ predicted finishes also were positively related to the information on the past performance sheets:  $r = .51$  with the horses’ previous finishes and  $r = .37$  with the horses’ speed ratings. Previous finishes and speed ratings were both positively associated with actual results in the races observed by the participants,  $r_s = .21$  and  $.32$ .

of their probability of winning. If a horse was the highest rated by an expert, it was assigned a score of three. If it was the second highest rated, it scored two, and if it was the third highest rated it scored one. Each horse's scores were summed across the four experts; the higher the score, the more strongly the horse was recommended by the experts. A horse's expert-endorsement score could thus range from 0 (if no handicapper chose it as one of the three best) to 12 (if all four handicappers rated the horse highest).

The selection of each participant for each race was coded for the extent to which the horse had been recommended by the experts. A sum was then calculated for each participant across their three races. This summary score indicated the extent to which the choices of the participants conformed to the experts' recommended choices. For example, a hypothetical participant might make the following choices in the three races: (1st race) a horse rated by two experts as the best and unmentioned by the other two; (2nd race) a horse rated by one expert as the second best, by one as the third best, and unmentioned by two; (3rd race) a horse rated as best, second best, and third best by three experts, and unmentioned by the fourth expert. The reliance on experts score for this participant would be calculated as follows:

$$(3 + 3 + 0 + 0) + (2 + 1 + 0 + 0) + (3 + 2 + 1 + 0) = 15.$$

The reliance on expert score does not take into account whether participants made win, place, or show bets. The majority of bets placed were relatively conservative (55% Place bets, 36.3% Show bets, and 8.7% Win bets). There was no mention in the experimental instructions of any link between order of experts' picks and the type of bet one should make.<sup>3</sup>

We also calculated the correspondence with expert choices for participants in the control condition, although they were not given any expert information. It was important to show that participants would not make the same selections as experts simply by relying on past performance information. Recall that control participants received exactly the same past performance information as those in the expert conditions.

3. Correlational analyses revealed no distinct covariation between the extent to which horses were top-rated, second-rated, or third-rated by experts and whether participants selected the horse to win, place, or show. Stated differently, expert recommendations influenced whether participants placed a bet on a horse, but not whether they made a win, place, or show bet.

## RESULTS

### Means and Correlations for the Two Forms of Autonomy

Reactive autonomy scores from the ACL ranged from 7 to 29 ( $M = 17.4$  and  $SD = 4.6$ ). Reflective autonomy scores ranged from 74.0 to 115.9 ( $M = 94.7$  and  $SD = 8.8$ ). Reflective autonomy scores were moderately negatively correlated with reactive autonomy scores ( $r = -.21$ ,  $p < .01$ ). Therefore, as participants had higher scores on one kind of autonomy, there was a tendency for them to have lower scores on the other. Women scored significantly higher ( $M = 95.5$ ) than men ( $M = 91.0$ ) on reflective autonomy,  $t(144) = 2.81$ ,  $p < .01$ , whereas there was no sex difference approaching significance for reactive autonomy.

### Reliance on Experts as a Function of Condition

Reliance on experts scores ranged from 1 to 27. The scores were normally distributed with 6.9% of participants receiving a score between 1 and 10, 19.2% receiving a score between 11 and 15, 41.8% receiving a score between 16 and 20, 22.6% receiving a score between 21 and 25, and 9.6% receiving a score of 26 or 27.

A  $2 \times 3$  Analysis of Variance (ANOVA) was conducted on the measure of reliance on experts with Sex and Condition (Control/NonCredible/Credible) as between-subject factors. A highly significant main effect for Condition emerged,  $F(2,139) = 12.39$ ,  $p < .0001$ . No other effect approached significance ( $ps > .10$ ). Post-hoc Newman-Keuls tests showed that participants' mean reliance on experts was significantly lower in the Control condition ( $M = 5.06$ ) than the two Expert conditions (NonCredible  $M = 6.44$ ; Credible  $M = 6.60$ ). Reliance on experts did not differ between the NonCredible and Credible Expert conditions. Thus, it appears that participants showed a significant tendency to make their selections conform to those of experts, even when information discrediting the experts was provided. The results were unchanged when previous betting experience was included as a covariate.

Identical  $2 \times 3$  ANOVAs were conducted on the total amount of money won and type of bets made. Type of bet was coded 1 for Show, 2 for Place, and 3 for Win, and bets were aggregated across the three races. Thus, higher scores would indicate riskier bets. These ANOVAs revealed no effects approaching significance ( $ps > .20$ ).

**Table 1**  
Correlations of Autonomy With Reliance on Experts by Condition

	Reflective	Reactive
Control <i>n</i> = 47	.15	-.09
NonCredible <i>n</i> = 50	-.20	-.15
Credible <i>n</i> = 48	.30*	-.34*

\*  $p < .05$ .

### Predicting Reliance on Experts as a Function of Autonomy and Expert Condition

Table 1 displays the correlations of reflective and reactive autonomy to reliance on experts in each of the three conditions. It can be seen that reflective autonomy was unrelated to reliance in the control and noncredible conditions. In the credible condition, however, there was a significant positive relation between reflective autonomy and reliance on experts. It also can be seen that reactive autonomy was unassociated with reliance on experts in the control and the noncredible condition. In the credible condition, however, there was a significant negative relation between reactive autonomy and reliance on experts.

A *Z*-test of the difference between dependent correlations was performed in each of the conditions (Meng, Rosenthal, & Rubin, 1992). This test compares the correlations obtained for reflective and reactive autonomy with reliance on experts while controlling for the fact that the two

4. The difference between two correlated correlations can be calculated as follows (Meng, Rosenthal, & Rubin, 1992):

$$Z = (zr_1 - zr_2) * \text{sqrt} ((N - 3) \div (2 (1 - r_x) h'))$$

where:

$zr_1$  = the Fisher's *z* transformation of the correlation of predictor 1 with the outcome.

$zr_2$  = the Fisher's *z* transformation of the correlation of predictor 2 with the outcome.

$r_x$  = the correlation of the two predictors.

and where  $h' = \frac{1 - F\tilde{r}^2}{1 - \tilde{r}^2}$  and  $F = \frac{1 - r_x}{2(1 - \tilde{r}^2)}$ ; which must be  $\geq 1$ .

forms of autonomy are significantly correlated.<sup>4</sup> The only significant difference to emerge was in the credible expert condition,  $Z = 2.95$ ,  $p < .01$ , indicating that reflective and reactive autonomy lead people to respond in a significantly different way to credible experts. Individuals high in reflective autonomy displayed a significant tendency to follow the advice of credible experts whereas those high in reactive autonomy showed a significant tendency to reject such advice.

To test our specific predictions for the relations of each form of autonomy with reliance on experts across the three conditions, planned contrasts were performed. For reflective autonomy, we had hypothesized a positive relation with reliance on experts in the credible condition and no relation in the noncredible and control conditions. This pattern is captured with contrast weights of +2 for the credible condition, -1 for noncredible, and -1 for the control. The Z-test of this pattern of correlations was significant, Contrast  $Z = 1.85$ ,  $p < .05$ .<sup>5</sup>

For reactive autonomy, we had hypothesized negative relations with reliance on experts in both the credible and noncredible conditions, and no relation in the control condition. This pattern is captured with contrast weights of -1 for the credible and noncredible expert conditions, and +2 for the control. The Z-test of this pattern of correlations was not significant,  $Z = 1.09$ .

Correlations also were calculated between each form of autonomy and the type of bet and amount of money won in each of the three conditions. The only significant relation to emerge was between reactive autonomy and amount of money won in the noncredible expert condition,  $r = -.29$ ,  $p < .05$ , indicating that reactive autonomy was significantly associated with winning less money in this condition.

These correlations were then repeated after collapsing across the three experimental conditions. The only significant relation to emerge was between reactive autonomy and the likelihood of making win bets,  $r = .23$ ,  $p < .05$ . Thus, reactive autonomy was significantly positively related to making the riskiest type of bet.

5. Contrasts among correlations were calculated as follows (Rosenthal, 1984, p. 84):

$$z = \frac{\sum \lambda_j z_{rj}}{\text{Sqrt}(\sum (\lambda_j^2 / w_j))}, \text{ where } \lambda_j \text{ is the weight assigned to each of the correlations (sum}$$

of  $\lambda_j$ s must be zero),  $z_{rj}$  is the Fisher's  $z$  transformation of each correlation, and  $w_j$  is the inverse of the variance of the effect size of each case (for Fisher's  $z$  transformation the variance is  $1/(N_j - 3)$ , so  $w_j = N_j - 3$ ).

### Reliance on Experts as a Function of Autonomy and Losing/Winning the First Race

The results provide moderate confirmation of our hypotheses. Significant effects in the opposite directions were obtained for reflective and reactive autonomy in the credible expert condition, pointing to the different functions of these two forms of autonomy. Also, the pattern of correlations for reflective autonomy with relying on experts across the three conditions was in line with predictions. The predicted pattern of correlations for reactive autonomy with reliance on experts across conditions, however, although in the right direction, did not reach statistical significance.

It is possible that a clearer set of findings would emerge if we took into account whether participants won or lost their first race. Losing the first race might impel participants to think seriously about relying on experts. It would be particularly interesting to observe how reflective and reactive autonomy influenced participants' willingness to follow experts for the second race after losing the first race. To examine this issue we present the correlations of each form of autonomy with relying on experts in the second race, separately both by condition and by whether participants lost or won the first race.

Fifty-eight percent of participants lost their bet on the first race; 42% won. For the first race, the correlations of reflective autonomy with relying on experts across the three conditions were as follows: Control,  $r = .19$ ; NonCredible,  $r = -.07$ ; Credible,  $r = .27$ . The correlations for reactive autonomy with relying on experts in the first race were as follows: Control,  $r = -.07$ ; NonCredible,  $r = -.15$ ; Credible,  $r = .03$ . Only the correlation for reflective autonomy in the Credible condition was significant.

Table 2 presents the correlations of reflective and reactive autonomy with relying on experts in the second race, separately by condition and whether participants lost or won the first race. The numbers in parentheses are the partial correlations of autonomy and reliance in race 2 controlling for the extent to which participants had relied on experts in the first race. It can be seen that there were no correlations approaching significance among participants who won their first race. A number of strong correlations, however, emerged for participants who lost their first race. Among losers, reflective autonomy was unrelated to reliance in the control condition, significantly negatively related in the noncredible

**Table 2**  
Correlations of Autonomy With Reliance on Experts in the Second Race by Condition and Lose/Win

	Lost 1st Race				Won 1st Race			
	Reflective		Reactive		Reflective		Reactive	
Control <i>ns</i> = 30,17	.04	(.05)	.20	(.18)	-.03	(-.07)	-.10	(-.12)
Noncredible <i>ns</i> = 26,24	-.47**	(-.49**)	-.31 <sup>▲</sup>	(-.31 <sup>▲</sup> )	-.07	(.00)	.00	(-.08)
Credible <i>ns</i> = 28,20	.44*	(.42*)	-.37 <sup>▲</sup>	(-.38*)	-.03	(.07)	.09	(.08)

*Note:* *ns* are reported first for those who lost and second for those who won in each condition. Numbers in parentheses are the partial correlations between autonomy and reliance on experts in the second race, controlling for the extent of reliance in the first race.

<sup>▲</sup>*p* < .10. \**p* < .05. \*\**p* < .01.

condition, and significantly positively related in the credible condition. It also can be seen that reactive autonomy was unassociated with reliance on experts in the control condition but marginally negatively related in the two expert conditions. Controlling for the extent to which participants had relied on experts in the first race yielded nearly identical results. We proceeded to compare the correlations across conditions for participants who had lost, using the same approaches as had been employed with overall reliance on experts index.

A *Z*-test of the difference between dependent correlations was performed in each of the lost race conditions (Meng, Rosenthal, & Rubin, 1992). This test compares the correlations obtained for reflective and reactive autonomy with reliance on experts while controlling for the fact that the two forms of autonomy are significantly correlated. The only significant difference to emerge was in the credible expert condition,  $Z = 2.69, p < .01$ . This indicates that reflective and reactive autonomy led to significantly different responses to credible experts. Individuals high in reflective autonomy displayed a significant tendency to follow the advice of credible experts after losing their first race whereas those high in reactive autonomy showed a significant tendency to reject such advice.

To test our specific predictions for the relations of autonomy with reliance on experts across the three conditions, planned contrasts were performed. Reflective autonomy was expected to be positively related to reliance on experts in the credible condition and unrelated in the non-credible and control conditions. The *Z*-test of this pattern of correlations was significant for participants who had lost their first race, Contrast  $Z = 2.89, p < .001$ . Reactive autonomy was expected to be negatively related to reliance on experts in both the credible and noncredible conditions, and unrelated in the control condition. The *Z*-test of this pattern was also significant, Contrast  $Z = 2.27, p < .05$ .

## DISCUSSION

The present study was designed to test whether reactively and reflectively autonomous individuals differ in their responses to expert influence. Participants were given the opportunity to win money at a racetrack betting task for which they were provided with objective information about horses' previous performances along with specific experts' recommendations (in the two experimental conditions). They thus had the option of relying entirely on their own judgment or also taking account



of the experts' recommendations. The experts were made to look either credible or noncredible by providing information on the success of their predictions over the previous month. The dependent variable was the extent to which participants' selections conformed with those recommended by the experts.

The results showed that participants generally tended to use the experts' recommendations when selecting their horses. Thus, the mean score for reliance on experts was significantly higher in the two expert conditions than the control condition. The participants, however, did not rely more on the advice of credible than noncredible experts. A previous study by Crano (1970) had shown that people were more influenced by a competent than an incompetent partner when performing a perceptual decision-making task. Other studies, however, failed to demonstrate the influence of source expertise on behavioral compliance (Sterthal, Phillips, & Dhokalia, 1978). Perhaps the mere title of "expert" was sufficient to induce people to follow their advice in the present study because racetrack betting was such a novel activity for most participants. It is noteworthy that people at racetracks seem to rely on noncredible experts as mindlessly as the participants in the study because the Handicappers' Page that was used for the "noncredible" condition was the one actually published in the Daily Racing Form. (The success rate of the handicappers had to be inflated to create the "credible" condition.) Of course, it would have been useful to include postexperimental questions that tapped whether participants' viewed the two expert conditions differently.

The results for reflective autonomy supported our predictions. The pattern of correlations with relying on experts across the three races suggested that reflective autonomy was unrelated to relying on experts in the control and noncredible expert conditions and positively related in the credible condition, where it was explicit that the experts had a winning track record. Thus, individuals high in reflective autonomy followed the advice of experts when it was clear that it would improve their success. We suggest that individuals high in reflective autonomy display an adaptive behavior pattern of evaluating expert input to determine whether it provides information that promotes their competent functioning.

The results for reactive autonomy only partially confirmed our predictions. The pattern of correlations with relying on experts across the three races indicated that reactive autonomy was unrelated to relying on experts in the control and noncredible conditions. In the credible condition, however, reactive autonomy was significantly negatively related to

making selections recommended by the experts. That is, reactive autonomy was associated with rejecting the advice of credible experts. We had expected reactive autonomy to be related to rejecting the advice of *both* credible and noncredible experts. Interestingly, these results suggest that individuals high in reactive autonomy were motivated to reject expert recommendations *especially* when it was clear that the advice would help them succeed. It is possible that reactively autonomous individuals interpreted the advice differently in the two expert conditions. They probably evaluated the advice for whether it posed a threat for their self-reliance. In the credible condition, the advice may have signalled a clear threat to feeling self-reliant. If reactively autonomous individuals chose to rely on the experts in this condition and subsequently won, they would not have felt that they had won on their own merits. By contrast, winning while rejecting credible expert advice would demonstrate that the individual could be successful while actively avoiding input from the experts. (Such a success also would reinforce the behavior of acting independently of others.)

Supplemental analyses were performed to examine how reflective and reactive autonomy specifically influenced reliance on experts in the second race, as a function of whether participants had lost or won the first race. It was thought that losing the first race might make people think more seriously about considering experts' advice. These analyses revealed distinctive patterns of relations for reflective and reactive autonomy with relying on experts. After losing the first race, reflective autonomy was associated with following the advice of credible experts but rejecting the advice of noncredible experts, whereas reactive autonomy was associated with rejecting the advice of both credible and noncredible experts. These patterns suggest that losing led reflective individuals to be highly alert to the credibility of experts whereas it led reactive individuals to disregard whether experts were credible or not. It should be noted that rejecting the advice of noncredible experts (rather than just ignoring it) may represent a rational action given their losing track records. That is, if experts consistently make wrong selections they may inadvertently provide information about which horse *not* to choose.

Neither form of autonomy was related to reliance on experts after participants won the first race. This suggests that uncertainty about one's ability to perform well may be a critical moderating factor in the relation between autonomy and reliance on experts. It is unfortunate that the present study was not specifically designed to examine this issue. A future

study should experimentally manipulate success/failure at a first race and also assess participants' feelings of confidence or self-efficacy. It would seem natural for people to be especially oriented toward relying on expert input after a failure which causes them to doubt their competence. However, our results suggest that such a "natural" pattern will only be apparent for reflective autonomous individuals. Reactive individuals are likely to display the paradoxical behavior of being especially likely to reject expert advice when they doubt their competence (likely because they are so intent on proving their competence to themselves).

Some discussion of the terminology used in this paper to describe the relations of autonomy to relying on experts is called for. A significant positive relation with the selections recommended by experts was interpreted as "following the advice of experts." Although this phrase suggests conformity we imagine the decision-making process for reflective autonomous individuals to have been more active and integrative rather than passive. A significant negative relation with the selections recommended by experts was interpreted as "rejecting the advice of experts." A significant negative correlation between reactive autonomy and reliance on experts, however, does not necessarily imply that reactive individuals systematically avoided selecting horses that had been recommended, only that such individuals were significantly less likely to rely on experts than their nonreactive counterparts. Nonsignificant relations between autonomy and reliance on experts were not interpreted.

The oppositional behavior of individuals high in reactive autonomy can be explained by Brehm and Brehm's (1981) theory of psychological reactance. The theory holds that individuals experience psychological reactance when their belief that they can freely engage in a particular behavior is threatened by social pressures. Reactance leads people to view the threatened behavior as more attractive and to act to restore their freedom. Perhaps individuals high in reactive autonomy are vulnerable to interpreting the recommendations of experts as social pressure that threatens their behavioral options. Ironically, in resisting being a "pawn" to expert influence, reactive individuals fail to act as "origins." Indeed, systematic rejection of experts' selections may actually serve to severely limit the behavioral options of reactively autonomous individuals.

Are individuals high in reactive autonomy behaving maladaptively by rejecting the advice of credible experts? In the present study, opposing the experts did not have any consequences on how much money was won. In most life contexts, however, rejecting the advice of credible experts

leads to damaging effects on performance. The cost of this oppositional style may be particularly high because in the present study reactive autonomy was associated with making risky bets. Thus, reactive autonomy was positively associated with preferring to bet that one's horse would win first place rather than finish among the top two or three horses. The "win" bets offered the highest payoff but the least chance of winning. When making more important decisions, the combination of rejecting experts and setting excessively high goals represents a recipe for disaster (Baumeister, Heatherton, & Tice, 1993).

An easy criticism of the present study is that the decisions required of participants were trivial. Betting \$6 on three horse races does not seem relevant to the kind of decisions that people make in their everyday lives. Would reactive and reflective autonomy lead individuals to use different decision-making strategies when choosing where to go to college, or how to invest their money? Such questions could have been assessed with interviews or by presenting hypothetical scenarios to participants. Interview and scenario approaches would not have allowed, however, for experimental control of experts' credibility and standardization of conditions across participants. They also would not have yielded a clear behavioral measure of the extent to which participants use expert advice.

The results of the present study confirm the importance of distinguishing between reactive and reflective autonomy. The two forms of autonomy were significantly negatively correlated with one another and led to exactly opposite behaviors in response to the advice of credible experts. Highly *reactive* individuals rejected the recommendations of credible experts whereas highly *reflective* individuals followed the recommendations. These findings build on the studies by Koestner and Losier (1996) and indicate that measures of "autonomy" derived from Murray's (1938) versus Deci and Ryan's (1985) conceptions do not assess the same construct; indeed, they may be assessing constructs associated with opposite behaviors in certain situations. Future studies should examine the cognitive and emotional processes underlying the distinct reactions of people high in reactive and reflective autonomy to credible experts. It also would be interesting to examine how the two forms of autonomy moderate the impact of other forms of social influence, such as advice from a friend.

## REFERENCES

- Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, **66**, 950–967.
- Arvey, R. D., Dewhirst, H. D., & Boling, J. C. (1976). Relationships between goal clarity, participation in goal setting, and personality characteristics on job satisfaction in a scientific organization. *Journal of Applied Psychology*, **61**, 103–105.
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1993). When ego threats lead to self-regulation failure: Negative consequences of high self esteem. *Journal of Personality and Social Psychology*, **64**, 141–156.
- Blustein, D. L. (1988). The relation between motivational processes and career exploration. *Journal of Vocational Behavior*, **32**, 345–357.
- Brehm, S. S., & Brehm, J. W. (1981). *Psychological reactance: A theory of freedom and control*. New York: Academic Press.
- Craig, R. J., & Olson, R. E. (1988). Differences in psychological need hierarchy between program completers and dropouts from a drug abuse treatment program. *American Journal of Drug and Alcohol Abuse*, **14**, 89–96.
- Crano, W. D. (1970). Effects of sex, response order, and expertise in conformity: A dispositional approach. *Sociometry*, **33**, 239–252.
- deCharms, R. (1968). *Personal causation*. New York: Academic Press.
- deCharms, R. (1992). Personal causation and the origin concept. In C. P. Smith (Ed.), *Motivation and personality: Handbook of thematic content analysis* (pp. 325–333). Cambridge, MA: Cambridge University Press.
- Deci, E. L., & Flaste, R. (1995). *Why we do what we do: The dynamics of personal autonomy*. New York: Grosset/Putnam.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1987). Support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, **53**, 1024–1037.
- Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. A. Dienstbar (Ed.), *Nebraska symposium on motivation* (pp. 237–288). Lincoln: University of Nebraska Press.
- Edwards, A. L. (1954). *Edwards Personal Preference Schedule manual*. New York: Psychological Corporation.
- Farmer, R., & Sundberg, N. D. (1986). Boredom proneness: The development and correlates of a new scale. *Journal of Personality Assessment*, **50**, 4–17.
- Gough, H., & Heilbrun, A. L. (1983). *The Revised Adjective Checklist manual*. Palo Alto, CA: Consulting Psychologists Press.
- Heilbrun, A. B. (1961). Male and female personality correlates of early termination in counselling. *Journal of Counselling Psychology*, **8**, 31–36.
- Heilbrun, A. B. (1965). Personality factors in college dropout. *Journal of Applied Psychology*, **49**, 1–7.
- Hodgins, H., Koestner, R., & Duncan, N. (1996). On the compatibility of autonomy and relatedness. *Personality and Social Psychology Bulletin*, **22**, 227–237.

- Koestner, R., Bernieri, F., & Zuckerman, M. (1992). Self-determination and consistency between attitudes, traits and behaviors. *Personality and Social Psychology Bulletin*, **18**, 52–59.
- Koestner, R., & Losier, G. F. (1996). Distinguishing reactive versus reflective autonomy. *Journal of Personality*, **64**, 465–494.
- Koestner, R., & Zuckerman, M. (1994). Causality orientations, failure and achievement. *Journal of Personality*, **62**, 321–346.
- Meng, X. L., Rosenthal, R., & Rubin, D. B. (1992). Comparing correlated correlation coefficients. *Psychological Bulletin*, **111**, 172–175.
- Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.
- O'Reilly, C. A., Chatman, J., & Caldwell, D. F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, **34**, 487–516.
- Rosenthal, R. (1984). *Meta-analytic procedures for social research*. Beverly Hills: Sage.
- Ryan, R. M. (1989). The revised General Causality Orientations Scale. Unpublished manuscript, University of Rochester.
- Ryan, R. M. (1993). Agency and organization: Intrinsic motivation, autonomy and the self in psychological development. In J. E. Jacobs (Ed.), *Nebraska symposium on motivation* (Vol. 40, pp. 1–56). Lincoln: University of Nebraska Press.
- Sternthal, B., Phillips, L.W., & Dhokalia, R. (1978). The persuasive effect of source credibility: A situational analysis. *Public Opinion Quarterly*, **42**(3), 285–314.