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The Belief in Good Luck Scale

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The construction and properties of the Belief in Good Luck (BIGL) Scale are described. Three studies provide evidence that reliable individual differences exist with respect to beliefs about luck. Some individuals maintain an irrational view of luck as a somewhat stable force that tends to influence events in their own favor, while others seem to hold the more rational belief that luck is random and unreliable. Further, these beliefs showed a considerable amount of stability over time. The BIGL was significantly related to locus of control (primarily to a chance subscale), but other evidence suggested these constructs were distinct. Belief in good luck was not related to general optimism, academic pessimism, self-esteem, desire for control, or achievement motivation. There was also evidence that belief in good luck was distinct from feeling fortunate or generally satisfied with one's life. Ethnic group differences were observed for the BIGL scale, showing that Asian-Americans were more likely to endorse superstitious beliefs about luck than non-Asians. Finally, the BIGL scale was shown to predict positive expectations for the outcome of everyday situations that are typically associated with luck. This is generally in agreement with previous findings suggesting that people who believe in personal good luck react to lucky events by becoming more positive about the likelihood of future

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success (Darke & Freedman, 1997). In general, it is suggested that irrational beliefs about luck can serve as a source of positive expectations for the outcome of future events.

Perceptions of luck are an important part of traditional theories concerning the conditions typically associated with expectations for success and control (e.g., Kelley, 1967; Rotter, 1966; Weiner *et al.*, 1972). In general, these theories assume that luck is a random, uncontrollable factor which should have little effect on future expectations. Although this is certainly correct scientifically, many people seem to think of luck in a manner that is discrepant with this view. The purpose of the studies reported here was to develop a reliable measure of irrational beliefs about luck and then examine some of the implications these beliefs might have for expectations of success.

Rotter's social learning theory of personality (1955, 1966) was perhaps the first to identify factors that lead to perceptions of control. From this perspective, control should increase when events are thought to be determined primarily by an individual's own actions (internal locus of control), but decrease if events seem to be produced by luck or other people (external locus of control). Individuals may also develop generalized expectations of control on the basis of their reinforcement history in other contexts. Perceived control could therefore be derived either directly from past experience in the same context or from more general, dispositional perceptions of one's ability to control events. In either case, perceived control should be lower to the extent that luck was believed to be involved.

In another traditional model, Weiner *et al.* (1972) used an attributional approach (Jones & Davis, 1965; Kelley, 1967) to explain the origin of perceived control. As with social learning theory, future expectations were thought to be based on causal explanations made for past outcomes. This model specifies four primary causal factors to which success and failure are typically attributed—ability, effort, task difficulty, and luck. These were further categorized according to both their locus of causality (as defined by social learning theory) and their stability (i.e., the degree of consistency across situations and time); with luck considered to be both external and unstable. Whereas social learning theory focused on the locus of causality, the attributional model suggested that stability was the key factor in determining perceptions of control (Weiner, Nierenberg, & Goldstein, 1976). According to Weiner, control should be higher when stable attributes (such as ability) are thought to be involved in the outcome of events, but lower when unstable factors like luck seem to be responsible. Although there was some initial support for the idea that perceived control depended primarily on the stability of the underlying cause (Weiner *et al.*, 1976), there is good evidence that both increased stability and internality lead to perceptions of control (Anderson, 1983). In any case, since luck was specified as the unsta-

ble and external causal attribute, Weiner's model also predicted that any past success due to luck should be viewed as uncontrollable, with no implications for future success.

Thus, the traditional notion has been that events which are thought to be determined by luck should necessarily be perceived as uncontrollable. This is largely because these theories implicitly assume that most, if not all, people hold rational beliefs about the causal properties of luck. Chance events are independent of one another according to the rational view, which means that future events cannot be predicted on the basis of past luck and that one person is as likely to be lucky as another. However, it seemed to us that some people ''believe in luck,'' meaning that they think good luck consistently produces success in their daily lives. People sometimes say they have lucky days or that they think of themselves as lucky people in general. These kinds of statements seem to imply that luck is viewed as a personal quality that is at least somewhat stable over time. In other words, rather than maintaining the rational view that luck is external and unstable, at least some people talk about good luck as though it were just the opposite—personal and stable. In this sense, they seem to maintain irrational or superstitious beliefs about luck.

One possible implication of thinking about luck as personal and stable is that such beliefs might serve as a source of perceived control in certain situations. In fact, this idea follows readily from the general principles underlying the traditional view. Although we doubted that all people viewed luck as external/unstable, we did accept the more general notion that internal/stable factors tend to be perceived as controllable (as suggested by both theory and empirical evidence). If so, people who believe they are consistently lucky may also think that their luck provides some amount of control, in much the same way that other internal/stable attributes lead to perceptions of control.[1] Thus, from the perspective of someone who believes in luck, past luck might be expected to lead to positive expectations for success in the future. These individuals would presumably think their past luck should continue, just as people who view past success as due to their personal skill (an internal/stable causal factor) should anticipate future success.

Indeed, attempting to control luck is presumably the purpose of many common rituals and superstitions. Even those who consider themselves extremely rational and scientific may sometimes knock on wood to avoid bad luck or carry an object such as a rabbit's foot for good luck. The rituals exhibited by gamblers (e.g., blowing on dice before throwing them) seem indicative of similar beliefs (Henslin, 1967; Langer, 1977). Furthermore, ath-

[1] We use the terms perceived control, expectancy, predictability, and confidence interchangeably. This is in keeping with common usage in the previous literature (e.g., Langer, 1975; Rotter, 1955, 1966; Weiner, 1986).

letes often engage in superstitious behavior, such as wearing the same ''gameshirt'' during a winning streak to help ensure continued success. It is as though these rituals provide some means of exercising or activating personal luck in order to achieve success.

In fact, Langer (1975) found that individuals sometimes developed an illusion of control over outcomes that were determined entirely by chance. In a series of experiments, she showed that confidence increased when tasks included features that were likely to improve performance had there been skill involved. For instance, participants who were given the opportunity to practice a chance-determined task were more confident than those who received no practice at all. Practice might reasonably be expected to improve performance when skill is involved, but this expectation is obviously irrational when outcomes are determined entirely by chance. Although these studies did not directly examine irrational beliefs about luck, they do at least provide evidence that people sometimes act as if they can control chance (see Darke & Freedman, 1997, for further discussion).

Generally speaking, irrational beliefs about luck may provide an important means of coping with the very real influence that chance sometimes has on everyday life. There are undoubtedly events such as accidents and natural disasters that are largely beyond any direct attempts to control. The uncertainty associated with the possibility that such events may occur can be quite disconcerting, especially when the consequences are substantial. Rothbaum, Weisz, and Snyder (1982) suggest that irrational beliefs about luck may allow individuals to remain optimistic even when it is objectively impossible to exercise direct control over one's circumstances. In their words, people ''. . . attempt to associate themselves with chance so as to share in the power of this larger force . . . seemingly regarding luck as a type of control'' (Rothbaum *et al.*, 1982, p. 11). In particular, they suggest that people are likely to rely on irrational beliefs about luck as a source of optimism when it is difficult or impossible to control events through direct action. People often do in fact become more superstitious when exposed to seemingly uncontrollable threats to their personal well-being. In a study conducted during the Gulf War, Israelis who lived in cities that were under missile attack were more likely to endorse magical or superstitious ideas than those who lived in cities that were not under attack (Keinan, 1994). Many of the superstitious thoughts examined in this study were related to the idea that luck could be controlled.

Thus, there is a considerable amount of anecdotal evidence, theoretical speculation, and even some indirect empirical support for the idea that at least some people hold irrational or superstitious beliefs about luck. However, little work has attempted to measure these beliefs directly or to investigate their role in determining perceptions of control. The present studies were designed to construct a reliable measure of individual differences in people's beliefs about luck. Three initial measurement studies were con-

ducted in the process of developing what we have called the Belief in Good Luck (BIGL) Scale. In Study 1, we began by defining what we thought were the important characteristics of beliefs about luck and then created an initial set of items to account for different aspects of this definition. Studies 2 and 3 further investigated the reliability and generalizability of the BIGL measure. This measure was also compared to other personality characteristics that seemed potentially related, in order to establish convergent and discriminant validity (see Study 1 for further discussion). Finally, a fourth set of studies investigated whether participants were able to make a distinction between beliefs in personal luck and the somewhat different view that one has had a fortunate or satisfying life.

Ethnic group differences in the BIGL were also examined. There have been numerous suggestions that members of Eastern cultures are more likely to think of personal luck as a source of security and optimism in their daily lives (e.g., Church, 1987; Weisz, Rothbaum, & Blackburn, 1984). With this in mind, we predicted that people with an Asian-American background might be more likely to endorse a belief in good luck than non-Asians. If so, this would provide some indication of the predictive validity of the BIGL scale.

Finally, the validity of the BIGL was considered more directly. Our strategy was to examine whether believing that luck was personal and stable (as measured by the BIGL scale) was associated with increased perceptions of control in some circumstances. This provided the clearest means of validating the BIGL, since it would help establish the crucial link between the belief that luck is internal and stable, and the theoretical prediction that such beliefs should lead to perceptions of control when luck is an important factor in determining events.

DERIVATION OF THE BELIEF IN GOOD LUCK SCALE (STUDIES 1, 2, AND 3)

Belief in good luck was defined as the view that luck is a somewhat stable characteristic that consistently favors some people but not others and is especially likely to favor oneself. In contrast, disbelief in luck was defined as the tendency to agree with the rational view of luck as random and unreliable. Studies by Wagenaar (Wagenaar & Keren, 1988; Wagenaar, Keren, & Pleit-Kuiper, 1984) support the idea that people make distinctions between luck and chance when describing gambling outcomes. For instance, gamblers use the word luck to refer to apparent ''streaks'' or ''runs'' in gambling outcomes, while chance is used to refer to the lack of any discernable pattern for random events. Our definition focused primarily on perceptions concerning the locus and stability of luck, since these dimensions were the most meaningful theoretically speaking. A number of initial items were constructed to account for various aspects of the belief in good luck in Study 1. Note that perceptions concerning the controllability of luck were not ex-

plicitly included as items in the BIGL scale itself. Instead, this was left to empirical verification in subsequent studies that examined the validity of the scale (as discussed above).

Although we suspected that not believing in good luck meant luck was thought to be random, an alternative possibility was that this might actually imply a belief in personal bad luck (i.e., one's luck is usually bad). Items designed to capture both meanings were therefore included in Study 1, so that we could examine each of these possibilities. Some items suggested that luck could not have any reliable effects (e.g., ''Luck is nothing more than random chance.''), while others dealt with the idea that people might think they were unlucky (e.g., ''I consider myself to be an unlucky person.''). In order to further distinguish the BIGL and beliefs in bad luck, comparisons were also made with other individual differences included in Study 1. Finally, in order to estimate the relative frequency of people who believed they were unlucky, we included a separate rating that allowed people to categorize themselves as either unlucky, lucky, or neither lucky nor unlucky. It was suspected that only a small minority of respondents would actually believe they were unlucky.

Individual difference measures that seemed potentially related to the BIGL scale were also included in Studies 1 and 2. Locus of control was used to examine the convergent validity of the scale. The BIGL was expected to be positively related to external perceptions of control, since thinking of luck as a prevalent influence in daily life is common to both constructs (see also Rotter, 1966). Measures of optimism and self-esteem were included to assess the discriminant validity of the BIGL scale. It seemed possible that the belief in good luck might simply be part of a more general optimistic outlook (i.e., the belief that things tend to work out well for oneself, for whatever reason). If so, people who say they are personally lucky might just think that everything tends to go their way, whether luck is involved or not. A slightly different possibility was that believing in personal good luck might be a specific form of a general tendency to think highly of oneself. That is, perhaps individuals who say they are lucky are high in self-esteem. Despite such possibilities, it was predicted that belief in good luck was distinct from these personality traits.

Measures of desire for control and achievement motivation were completed by subjects in Study 1 to examine whether irrational beliefs about luck might arise from these motivational concerns. A number of studies have shown that people with a strong desire to control important events sometimes act as if they can influence chance (Burger, 1986; Burger & Cooper, 1979). In addition, it seemed possible that beliefs in good luck might be motivated by a desire to achieve success. For instance, people who believe in good luck might think that this gives them the advantage they need to do well or get ahead in life. These ideas were also examined in Study 1.

METHODS

Participants

The participants in Study 1 were 231 visitors to the Ontario Science Centre in Toronto, Canada (114 men, 110 women, and 7 missing responses). Ages ranged from 16 to 69 years ($M = 34$ years). Participants in Studies 2 and 3 were Introductory Psychology students who had volunteered to complete a test battery at the beginning of the school year. Study 2 was conducted at the University of Toronto, Canada ($N = 1453$), while the third study was completed at New York University ($N = 494$). The ratio of females to males in the university samples was approximately 2 to 1.

Belief in Good Luck Items

We initially constructed 14 items that seemed to capture the essence of a belief in good luck according to our definition (see Table 1). The first study also included a bad luck item (labeled *m* in Table 1). In Studies 1 and 3, participants indicated the extent of their agreement using a Likert-type scale labeled: strongly disagree (1), somewhat disagree (2), slightly disagree (3), slightly agree (4), somewhat agree (5), and strongly agree (6). Study 2 used a similar four point agree–disagree scale. Only those items that had loaded substantially onto the BIGL dimension in the first study were included in Studies 2 and 3.

Additional Measures Included in Studies 1 and 2

Locus of control (LOC). Measured by Levenson's (1981) 24 item scale. This assesses the extent to which events are generally thought to be determined by factors such as luck and powerful others versus internal factors, such as skill and effort. This measure also provided separate subscale scores for internal, chance, and powerful other domains of control. The BIGL was most likely to be related to the chance domain of external control, while the belief that other people control events seemed only remotely related. It was less clear how the BIGL would be correlated with the internal subscale.

Optimism. The Life Orientation Test (LOT; Scheier & Carver, 1985) was used to measure optimism in Study 1. The LOT includes eight target items (e.g., ''I'm always optimistic about the future''), plus four fillers. In Study 2, the Defensive Pessimism Questionnaire (DPQ; Norem & Cantor, 1986; Norem & Illingworth, 1993) was used. This scale is composed of nine items concerned with whether people typically focus on the negative consequences of failure in academic situations (e.g., ''I often think about what it would be like if I do very poorly in an academic situation.'') versus positive consequences (e.g., ''I often try to figure out how likely it is that I will do very well in an academic situation.''). Each item was rated from 1 (not at all) to 5 (very much). Responses were scored and summed so that higher values would indicate greater defensive pessimism (i.e., less optimism).

Self-esteem (SE). Rosenberg's (1965) measure of global self-esteem was completed by subjects in Studies 1 and 2 in order to examine whether the BIGL was distinct from a general sense of positive self regard.

Desire for control (DC). Study 1 also included the desire for control scale (Burger & Cooper, 1979) to examine whether beliefs in personal good luck were motivated in part by a desire for control. An example item from this measure is, ''I enjoy having control over my own destiny.''

Achievement motivation (Ach). The 19 items of the Work and Family Orientation Scale (Spence & Helmreich, 1983) were used to assess achievement motives in Study 1, and examine whether such motives were related to beliefs in good luck.

Due to restrictions on the amount of time participants were available in Study 1, it was not possible to have everyone complete all of the additional individual difference measures. In-

stead, all participants completed the BIGL, LOC, and LOT scales, but were randomly assigned to complete only one of the SE ($n = 76$), DC ($n = 75$), or Ach ($n = 80$) measures. All subjects in Study 2 were asked to complete the BIGL, DPQ, and SE scales.

Overall personal luck. After completing the individual BIGL items, participants in the first study were also asked to summarize their perceptions of luck using an overall rating. Specifically, subjects indicated whether they considered themselves to be: (1) a very unlucky person, (2) a somewhat unlucky person, (3) neither a lucky nor unlucky person, (4) a somewhat lucky person, or (5) a very lucky person. The overall rating was used to determine the relative proportion of people who believed they were unlucky. It was also possible to examine which of these overall groups the BIGL scale was able to differentiate among. Since the scale was constructed to examine differences in the extent to which good luck was stable/personal versus random, it was predicted that people who categorize themselves as neither lucky nor unlucky would score lower on the BIGL than those who believe they are typically unlucky, who in turn should score lower than people who categorize themselves as typically lucky individuals.[2]

Test–Retest Reliability (Study 3)

The stability of responses on the BIGL measure was also examined as part of the third study. One-hundred-eleven of the students who had initially completed the BIGL items (59 women; 52 men) were asked to complete the scale a second time 1 to 2 months after the first assessment. This second administration was conducted following participation in an unrelated experiment.

RESULTS AND DISCUSSION

Factor Analysis of BIGL Items

The correlation matrix for the responses to the luck items in each of the studies was computed and submitted to a principle axes factor analysis to examine their dimensionality. Cattell's (1966) scree test suggested a single factor solution in each case.[3] The eigenvalues associated with the first factor in each sample were: $\lambda_1 = 5.03$, $\lambda_2 = 3.79$, and $\lambda_3 = 4.68$. Factor loadings are shown in Table 1 (along with item means and standard deviations). In

[2] It seemed to us that those who believed they were unlucky might actually agree with some of the more general BIGL items (e.g., Some people are consistently lucky, and others are unlucky) and only disagree with the items that specifically suggest their personal luck is good (e.g., I consistently have good luck). In comparison, those who suggest they are neither lucky nor unlucky would presumably disagree with both types of items, while those who think they are personally lucky should be more likely to agree with both personal and general beliefs in good luck.

[3] It is also possible to derive a multiple factor solution of the BIGL items using Kaiser's (1960) criterion. These analyses reliably indicate that the BIGL has three subscales that are significantly intercorrelated: Personal belief in luck (items *c*, *e*, *g*, and *j*), General belief in luck (items *a*, *b*, *d*, and *n*), and Chance/Distrust (items *i*, *k*, *l*, and *o*). The single bad luck item loaded (.69) onto a separate and uncorrelated factor in Study 1. See Darke (1993) for a full description.

Both the multiple and single factor solutions were considered when determining which items were retained for the BIGL scale. The single factor solution is presented here mainly for reasons of parsimony, and because the results of subsequent experiments employing the BIGL did not depend substantially on whether total scores or subscale scores were used.

TABLE 1
Descriptive Statistics and Factor Loadings for Belief in Good Luck Items in Studies 1, 2, and 3

Item	Study 1	Study 2	Study 3
a) Luck plays an important part in everyone's life.	**.67**	**.52**	**.66**
	4.13	*2.46*	*4.07*
	1.43	.97	1.36
b) Some people are consistently lucky, and others are unlucky.	**.61**	**.47**	**.53**
	3.89	*2.60*	*3.74*
	1.57	.88	1.38
c) I consider myself to be a lucky person.	**.69**	**.50**	**.60**
	3.89	*2.80*	*3.83*
	1.33	.85	1.33
d) I believe in luck.	**.73**	**.61**	**.70**
	4.01	*2.57*	*4.01*
	1.48	.92	1.46
e) I often feel like it's my lucky day.	**.62**	**.52**	**.62**
	3.52	*2.18*	*3.17*
	1.43	.86	1.42
f) Nobody can win at games of chance in the long-run.	**−.21**	na	na
	4.00	na	na
	1.72	na	na
g) I consistently have good luck.	**.61**	**.55**	**.69**
	3.13	*2.22*	*2.91*
	1.29	.84	1.27
h) I tend to win games of chance.	**.40**	na	na
	2.88	na	na
	1.37	na	na
i) It's a mistake to base any decisions on how lucky you feel.[a]	**−.25**	**−.20**	**−.28**
	4.34	*3.23*	*4.43*
	1.53	1.05	1.54
j) Luck works in my favor.	**.67**	**.65**	**.71**
	3.15	*2.36*	*3.19*
	1.29	.83	1.24
k) I don't mind leaving things to chance because I'm a lucky person.	**.49**	**.47**	**.50**
	2.39	*1.54*	*2.13*
	1.39	.74	1.16
l) Even the things in life I can't control tend to go my way because I'm lucky.	**.61**	**.65**	**.65**
	2.59	*1.90*	*2.48*
	1.34	.80	1.27

TABLE 1—*Continued*

Item	Study 1	Study 2	Study 3
m) I consider myself to be an unlucky person.	**.05**	na	na
	2.60	na	na
	1.38	na	na
n) There is such a thing as luck that favors some people, but not others.	**.58**	**.46**	**.50**
	3.23	*2.33*	*3.18*
	1.48	.97	1.51
o) Luck is nothing more than random chance.[a]	**−.38**	**−.30**	**−.42**
	4.27	*3.21*	*4.41*
	1.56	.99	1.44
Rating scale	1–6	1–4	1–6
Cronbach's alpha	.85	.78	.85
Eigenvalue	5.03	3.79	4.68
M(Total)	39.33	26.52	37.87
SD(Total)	10.63	5.86	10.05
N	231	1453	494

Note. Item factor loadings are shown in bold, item means are italicized, and item standard deviations appear in plain text. na, not available due to elimination of item after Study 1.

[a] Item reverse scored.

general, items that described luck as a personal or consistent quality loaded positively, whereas those items suggesting luck was unreliable and constituted nothing more than chance tended to load negatively onto the same dimension. Factor loadings were also very consistent for the three studies.

It is important to note that the item that was concerned with a belief in personal bad luck (item *m*) was unrelated to the BIGL factor in Study 1. This suggests that beliefs about personal good luck and bad luck are largely independent. Thus, people who tend to disagree with BIGL items do not seem to mean they think they are unlucky people. Rather, the BIGL items seem to distinguish between the belief that good luck is a personal and consistent factor versus the idea that luck is random.

The BIGL scale was created on the basis of the factor analysis in Study 1. Items that had a factor loading with an absolute value of .25 or greater were included in the measure (with the exception of item *h*, which was dropped despite meeting this criterion). Twelve of the original items were selected for inclusion into the scale on this basis (items *a, b, c, d, e, g, i, j, k, l, n,* and *o*). Total BIGL scores were computed by summing the selected items, after reverse scoring items *i* and *o*. Descriptive statistics for these totals are shown at the bottom of Table 1. The estimate of internal consistency was

similar for each of the samples: $\alpha = 0.85$ in Studies 1 and 3, and $\alpha = 0.78$ in Study 2.

Males and females were compared in terms of their total BIGL scores for each sample, but there were no significant sex differences. Total BIGL scores were also unrelated to participant age in Study 1.

Test–Retest Reliability (Study 3)

As mentioned, a subset of the respondents who had completed the original administration of the BIGL in Study 3 also completed the scale for a second time a number of weeks later. The correlation computed between total BIGL scores for the two administrations was $r(110) = .63$, $p < .001$, suggesting that beliefs in good luck are quite stable over time.

Convergent and Discriminant Validity: Additional Measures Included in Studies 1 and 2

Total scores of the BIGL were compared with the other individual difference measures included in Study 1. These are shown in Table 2. Looking at the first row, the predicted correlation between the BIGL and total locus control scores was significant. Correlations with the external subscales of the LOC measure showed that only the chance subscale was substantially correlated with BIGL total scores, while the magnitude of the correlation with the powerful others subscale was quite small. Finally, the internal subscale scores were not significantly related to beliefs in luck. Thus, the observed association between BIGL and LOC total scores seemed mainly attributable to the chance subscale. Overall, these findings imply that those who believed in good luck specifically thought that luck had an important impact on their lives, rather than having an external locus of control in general. At the same time, believers and nonbelievers seemed just as likely to think that skill and other personal qualities exert an important influence over everyday events.

It can also be seen that the BIGL did not correlate significantly with optimism (measured by the LOT scale) or self-esteem. The results of the second study confirmed there was no correlation between the BIGL measure and optimism (measured using the DPQ) or self-esteem; $r(1406) = -.04$ and $r(1312) = .02$.[4] Therefore, as predicted, beliefs in good luck seemed to be distinct from general optimism or simply having a positive view of oneself.

The BIGL was not significantly correlated with either the DC or Ach measures. Thus, there was little evidence that beliefs about luck were related to achievement motives or a desire for control. This seemed somewhat surprising, and we suggest that it might be worth examining this question further

[4] The DPQ can also be examined as separate optimism and pessimism subscales (Norem & Illingworth, 1993). The correlations of these subscales with the BIGL were similar to the overall DPQ measure; $r(1413) = .09$ and $r(1416) = .03$, for optimism and pessimism.

TABLE 2
Correlations of the BIGL, LOT, LOC, and Personal Bad Luck with the Other Individual Difference Measures Included in Study 1

	DC	SE	Ach	LOT	LOC	LOC_{Int}	LOC_{Ch}	LOC_{PO}
BIGL	−.12	−.20	.02	.01	−.34***	−.08	.43***	.18**
LOC	.08	.53***	.16	.45***	—	.58***	−.86***	−.85***
LOC_{Int}	.03	.50***	.20	.35***	—	—	—	—
LOC_{Ch}	−.09	−.33**	−.16	−.34***	—	—	—	—
LOC_{PO}	−.12	−.40***	−.08	−.38***	—	—	—	—
LOT	.24	.45***	.22	—	—	—	—	—
Unlucky	.01	−.29**	−.16	−.36***	−.29***	−.14*	.31***	.22**
N	57–62	66–73	59–67	191–210	194–202	202–216	202–214	202–211

Note. BIGL, total scores for belief in good luck scale; DC, desire for control; SE, self-esteem; Ach, achievement motivation; LOT, optimism (higher scores signify more of each attribute). LOC, LOC_{Int}, LOC_{Ch}, and LOC_{PO} are totals for the complete locus of control measure, internal, chance, and powerful others subscales. Higher scores indicate greater internality for the total scale and increased perceptions that control lies in the relevant domain for subscales. The unlucky row includes correlations for the single item that asked whether subjects typically thought of themselves as unlucky people. Dashes indicate either that the correlation was not of particular interest or that it is already reported elsewhere in the table.

* $p < .05$, ** $p < .01$, and *** $p < .001$; two tailed.

before drawing any firm conclusions concerning the role of motivation.

In spite of the observed similarity between luck beliefs and locus of control, Table 2 also shows evidence that these are distinct constructs. In particular, LOC total scores and each of the subscales were significantly correlated with both optimism and self-esteem, but (as noted) BIGL was not associated with either of these other measures. In general, it seems that the BIGL and LOC are somewhat related, but separate constructs.

Distinctions between the BIGL and Bad Luck (Study 1)

As mentioned, the initial factor analysis suggested that believing in personal bad luck was unrelated to the belief in good luck construct. In keeping with the results of that analysis, the correlation between total BIGL scores and the unlucky item was nonsignificant, $r(214) = .05$. To examine these distinctions further, the item that assessed bad luck was correlated with the other individual differences included in Study 1 (see bottom row in Table 2). As with the BIGL scale, beliefs in bad luck were related to LOC total scores. However, unlike total BIGL scores, personal bad luck was associated with lower optimism and self-esteem.[5] These findings further establish that the BIGL scale is distinct from beliefs about personal bad luck.

Subjects in Study 1 were also classified into one of three groups on the basis of the final overall personal luck categorization they made: unlucky, neither, or lucky. Of the subjects who completed this measure ($N = 215$), the proportion of those who considered themselves lucky (51.63%) was similar to the proportion who thought they were neither lucky nor unlucky (43.72%), while very few subjects said they were unlucky (4.65%). Next, these three groups were examined in terms of their BIGL scores by computing a one-way analysis of variance. Not surprisingly, there was a significant overall effect, $F(2, 212) = 23.93$, $p < .0001$. However, more importantly, posthoc tests (Fisher, 1949) showed that the good-luck group was higher on the BIGL scale than the groups who said they were neither lucky nor unlucky ($Ms = 43.78$ vs 34.49, $p < .0001$), while those who said they were unlucky fell in-between and did not differ significantly from either of the other groups ($M = 37.60$). These findings are useful primarily in showing that beliefs in consistent bad luck are relatively uncommon and that the BIGL scale does not seem particularly good at distinguishing between people who said they were typically lucky from those who said they were typically unlucky.

Overall, these findings suggest that a lower score on the BIGL scale implies that the individual thinks luck is just random chance. Very few people

[5] We should remind readers that single items often prove to be less reliable. Since unreliable measures tend to attenuate the estimated degree of association, it is possible that the correlations reported here underestimate the actual relationship between belief in personal bad luck and the other measures. However, it seems that even this single item was adequate to allow the majority of the correlations computed for this measure to reach standard levels of significance.

seemed to mean that they were unlucky people. Instead, bad luck beliefs seemed to be part of a very different set of personality characteristics which generally suggested a negative view of oneself and one's life (i.e., lower self-esteem and greater pessimism).

Studies 4a and 4b: Beliefs in Good Luck, Personal Good Fortune, and Life Satisfaction

The initial studies suggest the BIGL scale is distinct from a number of potentially related constructs; however, a remaining issue was whether belief in good luck was distinguishable from a belief in what might be called good fortune. Many people will say that life has been good to them—they have better-than-average families, health, economic situations, personal characteristics, talents, and so on. This is sometimes called being fortunate or having good fortune, but is also often called being lucky.

Although this good fortune might be thought to represent good luck, we thought that the concepts were at least to some extent distinct. Perhaps the main difference is that beliefs in luck should have implications for future expectations rather than simply serving as a description of past events. It is perfectly reasonable to say that some people have been luckier or more fortunate than others in the past. What is irrational about the belief in luck is the implication that future events should be related to personal good luck. (This idea was explicitly tested in examining the validity of the BIGL scale, described later.) Thus, these constructs seemed at least somewhat distinct conceptually.

A separate set of studies was conducted to examine any similarities between beliefs in good luck and the belief that one is simply fortunate. This was done in two somewhat different ways. Study 4a included a wide range of questions that seemed related to everyday conceptions of what people might mean when they say they have had a fortunate life. These questions were mostly derived on an intuitive basis. In addition, Study 4b used a standard measure of global life satisfaction called the Satisfaction With Life Scale (Diener, Emmons, Larson, & Griffin, 1985).

Study 4a. Participants were 116 visitors (57 men, 55 women, 4 missing responses) at the Ontario Science Centre in Toronto, Canada. The mean age of the sample was 32.33 years, and ranged between 18 and 71 years.

Each subject completed a questionnaire designed to assess the extent to which they felt they were fortunate or generally satisfied with their lives. For the first five items, subjects rated their responses using a seven point rating scale. These included: their finances compared to other families, from below average (1) to above average (7); their overall health and that of their immediate family, from poor (1) to excellent (7); the perceived security of their job, from not at all (1) to extremely secure (7); and whether they felt they were really getting the things they desired most out of life, from not at all (1) to always (7). Subjects also reported the number of years of formal

education they had received. Finally, participants indicated whether they had ever experienced any of 9 different life events or circumstances that seemed related to having a fortunate life or not. These included: a serious accident involving personal injury, or injury of a close family member; a serious illness, or the illness of a close family member; a serious medical operation for themselves or a close family member; and whether they were married, had children, or owned a home (we assumed these last three life events would be considered positive by the majority of individuals in our sample). Responses were scored by assigning a value of 1 to answers that suggested positive life events (e.g., never having a serious injury, being married, having children, etc. . . .) and 0 for negative or less positive responses. These scores were then totalled to form an overall incidence measure. Finally, participants completed the BIGL scale, using the same format described in Study 1.

Correlations were computed between total BIGL scores and each of the good fortune measures included in the survey. These ranged between −.14 and .03 and were all nonsignificant, implying that beliefs in luck are in fact unrelated to whether people believed they were fortunate or unfortunate in the past, and their general level of life-satisfaction. An item-by-item analysis of the questions pertaining to good fortune and life satisfaction revealed no significant BIGL effects either.

Study 4b. One hundred nine participants (83 females and 26 males) from the introductory psychology class at the University of Toronto were asked to complete the Satisfaction with Life Scale (SWLS; Diener *et al.*, 1985) and the BIGL measure. The SWLS is a five item measure, rated from 1 (strongly disagree) to 7 (strongly agree). Studies using college samples suggest this is both a reliable and valid measure of life satisfaction (Pavot & Diener, 1993; Pavot, Diener, Colvin, & Sandvik, 1991). These scales were included as part of a larger questionnaire completed by participants in groups of 2 to 10 people. Total scores for each scale were computed for all subjects, with the exception of four people who failed to fully complete the BIGL measure. The observed correlation between BIGL and the SWLS proved to be nonsignificant, $r(104) = .12$. Thus, belief in good luck also seemed to be unrelated to this standardized measure of life satisfaction. Overall, there was good evidence that participants were able to distinguish between beliefs in good luck and perceptions of good fortune or feelings of general satisfaction with their lives.

Summary

The data described thus far provide evidence that the BIGL is a reliable measure of differences in beliefs about the causal properties of luck. Some people maintained the rational view of luck as random and unreliable, while others felt they are lucky people who are favored by consistent good luck. Furthermore, these beliefs were shown to be highly stable over time.

Correlations between the BIGL and locus of control provided evidence of convergent validity. In fact, the BIGL was specifically related to the chance subscale and not to the domains that were less clearly relevant to beliefs about luck (i.e., powerful others and internality). Correlations with other individual difference measures included in Study 1 suggested that the BIGL was by no means redundant with the locus of control construct. There was also good evidence that the BIGL was distinct from other potentially related constructs, such as self-esteem and general optimism (Studies 1 and 2) as well as good fortune and general life satisfaction (Studies 4a and 4b). These findings provide evidence for the discriminant validity of the derived scale. Perceptions of good and bad luck were also shown to be quite different. Personal good and bad luck did not appear to be opposite ends of the same continuum. Rather, low scores on the BIGL measure seemed to indicate that luck was viewed as random and unreliable (Study 1).

ASSESSING THE VALIDITY OF THE BELIEF IN GOOD LUCK SCALE

We next addressed questions concerning the external validity of the BIGL scale. Some of the initial studies included additional measures that were useful for this purpose. For instance, Study 3 included measures of participants' ethnic background. Since it was possible to predict ethnic group differences on the BIGL based on previous theories about perceptions of luck in Eastern and Western cultures, these data served as an initial indication of the external validity of the scale.

However, the most important source of evidence for the external validity of the BIGL measure involved establishing whether beliefs in personal/stable good luck would serve as a source of perceived control. As mentioned, this assumption was based initially on the most basic assertion of the traditional theories (i.e., that internal/stable factors are perceived as controllable). We left open the question of whether the BIGL scale was related to perceived control when constructing the items for the measure. This was largely because it seemed less interesting (theoretically speaking) to specifically assess beliefs about the controllability of luck, and then simply observe whether behavior was consistent with such perceptions. Rather, this initial assumption was empirically tested to establish the validity of the scale.

Two sources of data were available for this purpose. In Study 1, we examined expectations concerning situations in which the outcome seemed highly dependent on luck (e.g., finding money on the street, avoiding injury in an accident, etc.). In addition, we briefly describe a series of experiments (published elsewhere; see Darke & Freedman, 1997) which examined the effect of a lucky event on subsequent expectations for success using the Belief in Good Luck Scale.

Ethnic Group Differences in Beliefs About Good Luck (Study 3, Revisited)

There have been numerous suggestions that members of Eastern cultures think luck plays a more important, and perhaps slightly different, role in everyday life than do Westerners (Church, 1987; Weisz *et al.*, 1984). For instance, many studies have shown Easterners tend to be more external in terms of locus of control (Bond & Tornatzky, 1973; Evans, 1981; Mahler, 1974; McGinnies, Nordholm, Ward, & Bhanthumnavin, 1974; Parsons & Schneider, 1974). In a recent review of the literature examining social attribution in Eastern cultures (based primarily on studies from Hong Kong and Singapore), Crittenden (1996) concluded that luck was not clearly viewed as either external or variable. Further, Church (1987) reports that personal luck is commonly viewed as an important source of hope for future success among people in the Philippines. Such beliefs seem to act as an important source of perceived control over important life events in Eastern cultures (see Weisz *et al.*, 1984).

Of course, Eastern superstitions concerning luck are well known. An interesting example is provided by the process involved in deciding on a name for a prominent Japanese motor company. Rather than adopting the family name Toyo*da*, as originally intended, this company was eventually called Toyo*ta* based on the advice of a numerologist. The reason? The name Toyo*da* takes 10 strokes of a pen to write in Japanese, while Toyo*ta* takes only 8. Toyo*ta* was chosen because the number 8 is thought to be luckier than the number 10 in Japan (Ashley, 1984).

Given the cultural differences suggested by the existing literature, it was predicted that individuals with an Eastern background would be more likely to believe in good luck than those with a non-Eastern background. In order to examine this hypothesis, participants in Study 3 were asked to indicate their ethnicity. Respondents could identify themselves as either: Asian-American ($n = 144$), African-American ($n = 40$), Latino ($n = 39$), White ($n = 208$), or Other ($n = 19$). The BIGL scores of participants who had identified themselves as Asian-American were compared to those who said they were members of the remaining ethnic groups.[6] As expected, Asian-Americans scored significantly higher on the BIGL scale ($M = 39.69$) than non-Asians ($M = 36.92$), $t(448) = 2.73$, $p < .05$.

Thus it seemed that the predicted cultural variation existed in people's beliefs about the causal properties of luck. These differences may reflect broader distinctions in the general world views observed in Eastern and

[6] A one-way ANOVA for the BIGL scores that compared each of the ethnic groups was also significant, $F(4, 445) = 5.03$, $p < .001$. Simple contrasts revealed that Asian-Americans were significantly higher on the BIGL ($M = 39.69$) than African-Americans ($M = 33.16$, $p < .05$), Latinos ($M = 34.33$, $p < .05$), and Whites ($M = 37.82$, $p < .10$).

Western cultures. In particular, it has been suggested that Eastern cultures are more open to mystical or transcendental views of the world relative to Western views (Church, 1987). Most importantly, these findings provide initial evidence that the BIGL is a valid measure of superstitious beliefs about luck.

Luck Scenarios (Study 1, Revisited)

Study 1 also included measures to help establish the external validity of the BIGL scale, particularly the link with perceived control. Participants in that study were asked to indicate their expectations for the outcome of five hypothetical scenarios that described everyday situations in which good luck might be of importance. Some of these involved the possibility that negative events might befall participants (e.g., personal injury in a traffic accident), while others involved more positive events (e.g., finding $20 in a crowd). Each person indicated their expectations on appropriately worded seven-point scales (see Appendix). Responses were scored such that low values meant the worst outcome was expected and high scores indicated more positive expectations. A total score was calculated by summing the ratings of the five scenarios for each person.

On the basis of our original assumptions concerning the relation between luck and perceived control, it was predicted that beliefs in personal good luck would be associated with positive expectations on the luck scenarios. For comparative purposes, the relationship between the luck scenarios and the other individual difference measures included in Study 1 were also examined.

Correlations computed for the BIGL scores suggested that believing in personal good luck did indeed predict positive expectations for the luck scenarios (see Table 3). Those who believed in personal/stable good luck thought they were more likely to find money, and win a coin flip, and less likely to be injured in a traffic accident, $r(211) = .35$, $p < .001$. Optimism and self-esteem were also significant predictors of positive expectations for the scenarios, $r(208) = .32$, $p < .001$ and $r(73) = .24$, $p < .05$, respectively. A multiple regression using these three variables as simultaneous predictors for the expected outcomes found that only beliefs in good luck ($B = .23$; $t = 2.04$, $p < .05$) and optimism ($B = .36$; $t = 2.92$, $p < .005$) accounted for unique components of the variance. There were no unique effects of self-esteem ($t < 1$). None of the other individual differences were significantly related to expectations on the luck scenarios.

Overall, these findings provide tentative evidence for the idea that irrational beliefs concerning the locus and stability of luck (as measured by the BIGL scale) provided at least some sense of control over everyday events. People who tended to believe they were personally lucky had more positive expectations for the outcome of events that seemed to involve luck.

TABLE 3
First-Order Correlations between Individual Difference Measures and Positive Expectations for Luck Scenarios in Study 1

	Predictor variables								
	BIGL	DC	SE	Ach	LOT	LOC	LOC_{Int}	LOC_{Ch}	LOC_{PO}
r	.35**	.11	.24*	.19	.32**	.04	.05	.03	−.09
N	212	61	74	65	209	201	215	214	209

Note. Responses to the luck scenarios were coded so that higher scores indicated more positive expectations.
* $p < .01$ and ** $p < .001$, two tailed.

Effects of Initial Luck on Future Expectations for Success

As mentioned, the BIGL was originally constructed for use in a related series of studies that examined the reactions people had to experiencing a lucky event (Darke & Freedman, 1997). These studies provide the clearest test of the external validity of the BIGL measure, and therefore the main findings are briefly described here.

The rationale for using initial luck to examine the implications of the BIGL scale for future success was based on the approach taken in past research concerning achievement attributions and locus of control. Many of the classic studies first exposed participants to initial success or failure, then assessed perceptions of what factors had produced the outcome (e.g., Was the outcome produced by skill, effort, task difficulty, or luck?), and finally examined the consequences of these causal perceptions for future success (see Weiner, 1986, for a review). The idea was that thinking internal/stable factors were responsible for past outcomes should have implications for the likelihood of future success. In the present context, we reasoned that exposing participants to a lucky event before beginning an objectively unrelated achievement task should cause believers in personal/stable luck to become more confident about their subsequent performance. If so, this would verify our initial assumption that believing in good luck should cause people to act as though their future luck was controllable.

The general procedure used in Darke and Freedman's studies (1997) was to have some people experience a lucky event (winning $5 against the odds in a lottery) just before beginning a subsequent decision task, while those in a control condition experienced no lucky event (they were simply given the same amount of money, without having to win it). All participants then completed a decision task (e.g., concerning their perceptions of visual stimuli that were briefly flashed on a computer screen) which included measures of confidence and risk-taking (i.e., betting real money). Participants were divided into groups using a median split of their BIGL scores, measured several weeks before the experimental session was conducted.

Since the lucky event that was experienced before beginning the task seemed to be determined entirely by chance, rationally speaking, it should have had no implications for performance on the subsequent decision task. However, given the proposed link between the BIGL and perceived control, it was predicted that experiencing initial good luck would cause the high-BIGL group to become more confident and bet more money relative to participants with similar beliefs who were in the control condition. In contrast, the original prediction for the low-BIGL group (those who thought of luck as random) was that performance expectations should be relatively unaffected by initial luck. This behavior would be consistent with their belief that luck is random.

The results of two experiments that employed the BIGL scale confirmed the main prediction of increased confidence for high-BIGL participants who experienced initial luck (relative to controls). Further analyses suggested these findings were not related to locus of control or self-esteem scores (Darke, 1993). This pattern was labeled the lucky streak effect because high-BIGL individuals acted as though their initial good luck implied more good luck would follow. In contrast, initial luck had an unexpected effect on the low-BIGL group. Instead of simply ignoring the lucky event, these individuals were actually less confident on the task they completed afterward (relative to controls). This was tentatively labeled an instance of the gamblers' fallacy, since it seemed to imply that initial good luck was likely to be offset by future bad luck. More generally, it can be said that although low-BIGL individuals seem to agree that luck is random and unreliable, their behavior suggests they do not fully understand the properties of randomness. Rather than acting as though their initial good luck was irrelevant to future outcomes, low-BIGL individuals behaved as though they thought chance was hydraulic or self-correcting (i.e., as if bad luck should offset their initial good luck). Clearly, additional work is needed to fully understand the behavior and perceptions of low-BIGL individuals.

Although these results were somewhat more complicated than had been anticipated, they do provide some indication that belief in good luck can serve as a source of confidence for the outcome of future, objectively unrelated events. Initial luck seemed to act as a signal that more good luck was about to follow for those who believed luck was a stable, personal factor. Thus, these findings supported the main prediction concerning the association between the BIGL scale and future expectations.

GENERAL DISCUSSION

The past literature includes numerous suggestions that people maintain irrational beliefs about luck (e.g., Wagenaar, 1988) and that such beliefs may provide an important source of control that falls outside the domain typically examined by social and personality psychologists (Rothbaum *et al.,* 1982). However, the present studies were the first systematic attempt to directly measure such beliefs and determine their implications for perceptions of control. We began by assuming that differences in the perceived locus and stability of luck were key in determining whether this factor would serve as a source of control or confidence in people's daily lives. The evidence reported here generally supports our initial hypotheses. There were indeed reliable differences in beliefs about the causal properties of luck. Some people believe in luck, meaning they tend to view good luck as a stable, internal attribute which they possess. Others do not believe in luck and instead maintain the rational view that it is external and unreliable. Beliefs in good luck were also shown to be distinct from potentially related constructs such as opti-

mism, self-esteem, and being fortunate or general life satisfaction. The predicted ethnic group differences between individuals with Eastern versus Western cultural backgrounds were also observed.

Further, people who believed they were personally lucky tended to act as though good luck would help assure success in the future and in everyday situations that seemed highly associated with luck. These findings were particularly important because they provided support for our initial assumption that thinking of luck as internal and stable should lead to expectations of control. As mentioned, the BIGL scale does not directly assess perceptions of control. Instead, the scale measures beliefs about luck's causal features (i.e., locus and stability). The question of whether these beliefs were related to perceived control was left to empirical verification in the validity studies. Although we could have included items that specifically assessed the controllability of luck in the BIGL scale itself, we believe that the approach we used is more meaningful conceptually speaking. In particular, these findings provide evidence for our initial suggestion that it was the stability and internality of irrational beliefs about luck which were most important in understanding why people sometimes act as if luck is controllable or predictable.

The present findings, along with those of the Darke and Freedman (1997) experiments, have a number of implications for traditional theories of perceived control. First, our findings clearly qualify these theories in some respects. Both locus of control and attributional models of perceived control describe luck as an external, unstable, and therefore uncontrollable causal factor. The consequence being that any events thought to be determined by luck should have no implications for future outcomes. However, this perspective assumes that most, if not all, individuals maintain a rational view of luck's causal properties. The present studies show that there are in fact important and reliable individual differences in terms people's views of luck. While some individuals agree with the rational view assumed by the traditional models, others think that luck is just the opposite—personal and stable. Further, good luck served as a source of positive expectations for believers, rather than being considered irrelevant. These findings suggest that people's reactions to lucky events depend substantially on their beliefs about luck.

Although our findings qualify the specific idea that lucky events should have no implications for the perception of future events, interestingly there was in fact some support for the more general aspects of the traditional models. Perhaps the most basic tenet of these models is that external/unstable attributes should be perceived as uncontrollable, while internal/stable attributes should be controllable (Anderson, 1983). As mentioned, this principle actually provided the basis for the prediction that believers would have more positive expectations when luck was involved in the situation. The fact that this prediction was confirmed suggests that even irrational beliefs about luck roughly conform to the more general principles of the traditional view. Fur-

thermore, our findings imply that it is the perceived internality and stability of events which are most important in determining perceptions of control, rather than the particular attributions made (e.g., skill, luck, effort, or difficulty).

It is interesting to note that irrational beliefs about luck are somewhat self-serving. Beliefs in luck are unrealistically positive self-evaluations, since they are specific to luck that acts in one's favor but do not seem to include the possibility that personal luck could be consistently unfavorable. In addition, a large proportion of people seemed to think of themselves as personally lucky, while only a small percentage thought they were personally unlucky. Further, beliefs in good luck seemed to provide individuals with a feeling of confidence or certainty when luck was associated with the situation in some way. Although some might be inclined to view such distortions as a liability, we advise some caution in this respect. Social and personality psychologists have begun to reconsider whether similar biases and illusions are necessarily maladaptive (Greenwald, 1980; Taylor, 1989; Taylor & Brown, 1988, 1994). In particular, Taylor and Brown (1988) have argued that people are prone to a number of positive illusions that lead to unrealistically positive self-evaluations, overestimates of control, and greater optimism than is warranted by objective circumstances. It seems that beliefs in good luck have very similar qualities. What remains to be determined is whether such beliefs can be useful or adaptive in at least some circumstances or whether they are simply liabilities. Our guess is that such beliefs are advantageous in some situations, but potentially disastrous in others. This question promises to be an interesting one for future research to examine.

The Belief in Luck Scale has already proven to be useful in understanding irrational behavior concerning luck in the experiments by Darke and Freedman (1997). This scale may also be of use in understanding other instances of irrational behavior. For example, irrational beliefs about luck may be involved in the well known illusion of control effect (Langer, 1975). Perhaps those individuals who believe in luck are more likely to develop an illusion of control over events that are objectively chance determined. The BIGL scale also seems potentially helpful in understanding some of the puzzling behavior exhibited by gamblers (e.g., Wagenaar, 1988), as well as other forms of risk-taking observed in everyday life. In general, examining irrational beliefs about luck using the BIGL scale seems potentially useful in understanding a variety of irrational behaviors concerning luck or chance events.

APPENDIX: LUCK SCENARIOS AND RATING SCALES

1. If you were walking down a street that was full of people and someone dropped a $20 bill in the middle of the crowd, do you feel that you would: most certainly find it; probably find it; have a slightly better than even chance of finding it; have no feeling one way or the other; have a slightly better

than even chance of not finding it; probably not find it; most certainly not find it.

2. If you were on a bus that crashed on the roadway and half the people were injured while the other half were safe, do you feel that you would: most certainly be safe; probably be safe; have a slightly better then even chance of being safe; have no feeling one way or the other; have a slightly better than even chance of being injured; probably be injured; most certainly be injured.

3. If you had to flip a coin to see whether you would get a set of extra tickets to a show or someone else would get them, do you feel like you would: most certainly lose; probably lose; have a slightly better than even chance of losing; have no feeling one way or the other; have a slightly better than even chance of winning; probably win; most certainly win.

4. Imagine that you're driving a car when you notice that you're low on gas. You also know that you don't have any money or credit cards to buy more gas because you left them at home. There may be just enough fuel left to get you home and then to a gas station, but you can't tell for sure. Do you feel that you would: most certainly make it; probably make it; have a slightly better than even chance of making it; have no feeling one way or the other; have a slightly better than even chance of running out of gas; probably run out of gas; most certainly run out of gas.

5. Imagine that you are coming home on the subway late one night. You notice that there may be just enough time to get to your station before the last connecting bus leaves—but it'll be close. Do you feel like you would: most certainly miss the bus; probably miss the bus; have a slightly better than even chance of missing the bus; have no feeling one way or the other; have a slightly better than even chance of catching the bus; probably catch the bus; most certainly catch the bus.

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