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Optimism about future life events.

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OPTIMISM ABOUT FUTURE LIFE EVENTS

A Dissertation Presented

By

LINDA LANG-GUNN

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

February 1984

Psychology

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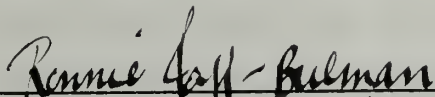
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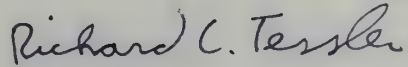
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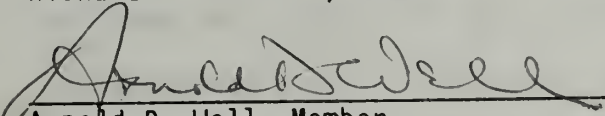
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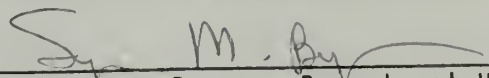
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ACKNOWLEDGMENT

This particular work has had a relatively short history, but as the culmination of my graduate career, the list of those who deserve my acknowledgment and gratitude is long.

I would like to express my appreciation to the members of my committee--Icek Ajzen, Rick Tessler, and Arnie Well--for their interest and encouragement. I would especially like to express my gratitude to the chairperson of my committee, Ronnie Janoff-Bulman, for her consistent encouragement and support.

I am indebted to former teachers, Drs. Stephen G. West and Steven Lang-Gunn, for introducing me to the field of social psychology, particularly cognitive social psychology, and to Ronnie Janoff-Bulman, for encouraging my interest in social-clinical issues.

I owe a special debt of gratitude to two faculty members who had a significant impact on my graduate career, and provided much needed support, Drs. Joseph Pleck and Rick Tessler. Two fellow students also made a special contribution to my tenure as a graduate student--Margaret Madden and David Wagstaff.

Finally, a very special thanks to two people who have given me unconditional support during my graduate career: Judith Smith, colleague and friend, for her unwavering confidence in me, and Steven Lang-Gunn, colleague, friend, and husband, for his advice and comfort, and most importantly, his patience, throughout my graduate studies.

ABSTRACT

Optimism About Future Life Events

(February 1984)

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Optimism is examined from a social psychological perspective, including the role of attribution processes, cognitive heuristics, and motivational biases. The present study investigated cognitive and motivational processes that may promote and sustain optimism about the future likelihood of experiencing negative life events. Specifically, this study examined the effects of event severity and base-rate information on judgments of the probability that oneself and others will experience specific negative life events.

It was hypothesized that event severity would have a stronger effect on judgments about oneself than on judgments about others, and that individuals would selectively use base-rate information in judging their own likelihood of experiencing negative life events. Judgments were made about four life events involving marriage, employment, crime, and health. As predicted, respondents judged severe events to be less probable than mild events, although they did not report that the severe events occurred less frequently in their own actual experience.

Both mild and severe negative life events were regarded as less likely to happen to oneself than to others, but the extended hypothesis that severity would have a greater impact on judgments regarding one's own future outcomes received only marginal support from the data.

The relatively high estimates of population base-rates given by respondents did not permit adequate analysis of the hypotheses regarding the selective use of base-rate information. Provision of base-rate information resulted in significantly lower judgments of event probability for both self and other in every condition. Judgments of event probability were also affected by sex of respondent and event. Compared to males, females consistently gave higher estimates of the probability of the negative events. Respondents attributed significantly greater control over the events to themselves than to others. A number of issues are discussed, including the asymmetries in self-other judgments, evidence of judgment bias, illusions of control and invulnerability, methodological considerations, and the possible consequences and adaptiveness of unwarranted optimism about one's own future prospects. ✓

TABLE OF CONTENTS

ACKNOWLEDGEMENT.	iv
ABSTRACT	v
Chapter	
✓ I. INTRODUCTION	1
Some Evidence of Optimism.	2
Recollection of the past	2
Evaluations of the present	6
General life happiness	8
Specific satisfaction: Marriages & jobs	9
Expectations for the future.	11
Social Psychological Perspectives.	19
Explanation & prediction	20
Attributions for positive and negative outcomes.	21
Expectations for positive and negative outcomes.	30
The illusion of contingency.	35
The illusion of control.	42
The illusion of invulnerability.	47
Cognitive heuristics	55
Availability	56
Representativeness	61
Causality heuristic.	65
Hindsight effect	71
Consequences of optimism	74
Optimism: Meaning and measurement	85
Summary.	91
II. METHOD	98
Overview	98
Respondents.	98
Design	99
Procedure.	100
Independent Variables.	100
Dependent Measures	102
Perceived population base-rate	102
Probability judgments: Self and other	103
Judgment certainty	103
Perceived characteristics of event	103
Perceived control: Self and other	104
Personal concern	104
Personal experience.	104
Self descriptions.	105

Chapter

III. RESULTS. 106

 Overview 106

 Manipulation Checks. 107

 Probability Judgments: Self and Other 108

 Effects of severity. 108

 Effects of base-rate information 111

 Selective use of base-rate information 115

 Other factors influencing probability judgments. 119

 Event Likelihood 123

 Judgment Certainty: Self and Other. 123

 Event Characteristics. 128

 Perceived Control: Self and Other 133

 Personal Concern 137

 Personal Experience. 138

 Self Descriptions. 140

 Correlational Analyses 142

 Summary. 148

IV. DISCUSSION 154

 Factors Affecting Probability Judgments. 154

 Illusions of Control and Invulnerability 157

 Evidence of Judgment Bias. 159

 Optimism and Realism 162

 Methodological Considerations. 163

 Future Directions. 166

.

FOOTNOTES. 171

REFERENCE NOTES. 172

REFERENCES 173

APPENDICES 187

 Appendix A: Base-rate Information 188

 Appendix B: Sample Questionnaire. 190

TABLES

Table

1. Experimental Design	99
2. Life Events and Base-rates Specified.	101
3. Mean Probability Estimates for Population, Self, and Other	109
4. Mean Probability Estimates for Population, Self, and Other as a Function of Severity and Event	110
5. Mean Difference between Probability Estimates and Base-rate Specified as a Function of Base-rate Information	113
6. Mean Difference between Probability Estimates and Base-rate Specified as a Function of Base-rate Information and Severity.	115
7. Mean Probability Estimates as a Function of Internal Classification, Base-rate, and Event	118
8. Mean Probability Estimates as a Function of Sex of Respondent	120
9. Mean Certainty Ratings for Self and Other as a Function of Event.	124
10. Mean Certainty Ratings as a Function of Event and Sex of Respondent	125
11. Mean Self Certainty Ratings as a Function of Severity, Sex, and Base-rate.	126
12. Mean Self Certainty Ratings as a Function of Base-rate, Severity, and Event.	127
13. Mean Event Ratings as a Function of Severity and Event. . .	130
14. Mean Ratings of Control as a Function of Sex of Respondent	134

15. Mean Ratings of Control as a Function of Event. 135

16. Mean Ratings of Control as a Function of Event
and Sex of Respondent 136

17. Mean Ratings of Concern as a Function of
Severity and Event. 138

18. Mean Personal Experience Ratings
as a Function of Severity and Event 139

19. Mean Self Description Ratings
as a Function of Severity 141

CHAPTER I

INTRODUCTION

Most people describe themselves as optimists, and there is considerable evidence that they are accurate in this description. People remember more pleasant than unpleasant events in their lives, they generally perceive most of their outcomes to be good, and they expect the future to be positive. Research indicates that reports of personal happiness and personal expectations are highly positive, and that positive outcomes are generally regarded as more likely. In short, people seem to structure their conceptual worlds as positive, and they are decidedly optimistic about the future.

In recent years, cognitive social psychologists have focused on people's explanations and reactions to uncontrollable, negative life events (e.g., Janoff-Bulman & Lang-Gunn, in press; Lerner & Miller, 1978; Wortman, 1976). It is the thesis of this paper that the perception of personal immunity to negative life events may represent only one aspect of a generally positive orientation toward the world. Specifically, people underestimate their vulnerability to negative life events, and they overestimate the likelihood of experiencing positive events. Before examining social psychological perspectives, some evidence of such a positive outlook on the future will be presented. The primary focus of this paper is on expectations for the

future, but evidence of a similar orientation toward the past and the present will also be reviewed.

Some Evidence of Optimism

Recollection of the Past

There is abundant evidence that people believe that events in their past have been predominantly pleasant. Early research established that people report more pleasant than unpleasant events in recalling events during their lifespan, or more recent experiences (e.g., Henderson, 1911; Washburn, Giang, Ives, & Pollock, 1925). In an early summary of scientific thought and research on selective recall, Hollingworth (1910) described the effect of the passage of time on the perceived pleasantness of events:

The canonization of saints, the apotheosis of strenuous historical characters, the obituaries of our friends, the reminiscences of childhood, all testify in this natural and universal habit of forgetting the bad and exalting the good. (p. 710)

Studies by Meltzer (e.g., Meltzer & Ludwig, 1967, 1970), a pioneer in the field of selective recall, are representative of recent research on the recall of life experiences. For example, in an early experiment that became a prototype for research on the selective recall of experiences, Meltzer (1930) asked college students to record and rate experiences from their Christmas vacations. Six weeks later, the students were asked to recall their experiences, and Meltzer found that recall was significantly greater for pleasant than unpleasant

experiences. In another study, 69% of the life experiences listed by a group of small-town workers were pleasant experiences (Meltzer & Ludwig, 1967).

Studies of selective recall involving shorter time intervals, from one day to several weeks, have also demonstrated this overabundance of positive events. Generally, people were asked to construct lists of events in their immediate past, and in all of these studies, individuals listed a greater number of pleasant than unpleasant events (Cason, 1932; Flugel, 1925; Jackson, 1973; Jersild, 1931; Meltzer, 1930; Menzies, 1935; O'Kelly & Steckle, 1940; Steckle, 1945; Turner & Barlow, 1951; Wall, 1948; Waters & Leeper, 1936; Wolgemuth, 1923). These studies, using a number of different subject populations, have consistently demonstrated that when individuals are asked to recall life events, from the previous day or a lifetime, they report more pleasant than unpleasant experiences.

In addition, research suggests that the intensity of an event is sometimes an important factor in the selective recall of experiences. Menzies (1935), Turner and Barlow (1951), and Waters and Leeper (1936) all reported that recall of highly pleasant or unpleasant events was greater than recall of neutral events. More recently, Holmes (1970) reexamined the roles of affect and intensity in the recall of daily experiences. For a one-week period, the participants in Holmes' study recorded daily pleasant and unpleasant experiences, and rated the pleasantness and intensity of affect for each experience. One week later, participants were asked to recall the experiences, and rate their present affect toward the experiences originally listed. Holmes

(1970) found greater recall of experiences originally considered pleasant or intense.

In comparisons of the initial and final affect ratings of the events, Holmes found a greater proportion of experiences showing a decrease in affective intensity (i.e., neutralization) than experiences showing no change or an increase in intensity. Moreover, originally unpleasant experiences were more likely than pleasant or neutral experiences to become neutralized over time, and experiences that were affectively neutralized over time were most likely to be forgotten. In other words, unpleasant personal experiences were more likely to decrease in reported intensity and become neutral with the passage of time, and neutral experiences tended to be forgotten.

In addition to life events, other studies have demonstrated selective recall for pleasant stimuli using subject and experimenter-generated lists, and a variety of different stimuli (see Osgood, 1953, and Matlin & Stang, 1978, for reviews of the literature on selective recall and learning). In a review of evidence regarding language, word associations, and spew order, Matlin and Stang (1978) concluded that positive stimuli in general are represented more frequently and prior to negative stimuli.

Although people may not often be inspired to generate spontaneously lists of past events in their lives, people do engage in retrospection, in the form of reminiscence, for example. Havighurst and Glasser (1972) described reminiscence as

(looking) back over our lives, recalling people and events, thoughts and feelings. Sometimes such recall comes unbidden, as idle thoughts or daydreams. Sometimes we

purposely think back, trying to remember and reconstruct. Such retrospection, both purposive and spontaneous, may be called reminiscence. (p.245)

In this study, participants were not asked, specifically, to judge the pleasantness of their reminiscences. However, in their descriptions of the content of their reminiscences, many participants reported that reminiscence gave them a good feeling, whereas relatively few participants reported a bad feeling associated with reminiscence. Moreover, Havighurst and Glasser (1972) found that the frequency and the pleasantness of reminiscences were significantly correlated; participants who reported frequent reminiscence tended to describe their memories as pleasant. Similarly, in a study of reminiscence among the elderly, McMahon and Rhudick (1967) reported that reminiscence was associated with less depression among the aged, and suggested that reminiscence is an adaptive response.

Matlin and Stang (1978) proposed the concept of "selective rehearsal"--people are more likely to review and rehearse pleasant information--and presented evidence of selective rehearsal in a verbal learning study (Matlin & Underhill, 1978). Extension of this concept to reminiscence suggests that more frequent reminiscence about positive past events may account, at least in part, for the greater recall of positive life experiences.

With nostalgia, recollections of the past may be positively enhanced or romanticized. Stein (1974) suggested that nostalgia is a means of coping for a person who perceives the present and the immediate past to be unpleasant, and who has little hope for the future:

And so we re-invent the past, defending against it in the very act of identification. For nostalgia does not seek the way things were but the way one wishes they had been. As the past is thus idealized, interesting accommodations are made: punishments and the arbitrary authorities one suffered as a child, and escaped from as an adolescent, are fondly recalled as hardships gladly endured on the way to adulthood. (p. 20)

Matlin and Stang (1978) identified daydreaming as another way in which people may invent a "pleasant unreality" to compensate for an unpleasant reality.

Thus, there is considerable evidence that selective recall operates in people's recollections of the past: People report that events in their lives have been predominantly pleasant. Further, there is some evidence that reminiscence is generally pleasant, that people spend more time thinking about pleasant information, and that unpleasant events tend to become neutralized over time and ultimately forgotten.

Evaluations of the Present

In studies of the quality of life, as well as in many other social and psychological studies, people are asked to report on their general happiness, their mood, or their satisfaction with specific aspects of their lives. Even a brief excursion into the literature on happiness, or a review of studies that include measures of happiness, mood, or satisfaction suggests that most people describe their lives as happy.

For example, people are more likely to describe themselves as

"highly elated" rather than "highly gloomy" (Young, 1937), and as "steadily cheerful" rather than "steadily depressed" (Washburn, Harding, Simon, & Tomlinson, 1925). People report that they are above average on a scale to measure "how well you are feeling at the present time" (Bousfield, 1950), and that "life in general" is positive (Burgess & Sales, 1971). Moreover, in comparative evaluations, people describe themselves as "happier than most" (Goldings, 1954), and "happier than others" (Fellows, 1956). People are also likely to describe themselves as "optimists" (Laird, 1923; Watson, 1930). In a more recent study conducted by Matlin (cited in Matlin & Stang, 1978), 71% of the members of a class of almost 100 students described themselves as optimists. After reviewing the research evidence, Goldings (1954) concluded:

On direct inquiry, in the United States, happiness tends to be avowed and feelings of unhappiness to be disavowed with the result that, given a point of average happiness as a referent, most people will tend to rate their own happiness as greater than the average. (p. 46)

In studies asking individuals to make comparative evaluations of their happiness, the point of reference or comparison is often ambiguous, or very general, such as the average person in this country, or in the world. Since the respondents in research are often college students, they might reasonably judge that they are happier, or have a better quality of life, than the hypothetical "average person." However, when individuals are asked to compare their feelings with the "average feelings of the class" (Cason, 1932) or to make daily comparisons of their mood with their own typical mood (Johnson, 1937), they report, on average, feeling better than the

average feelings of the class, or better than they typically feel. Moreover, studies of people that might be expected to report less happiness, such as mentally or physically handicapped persons, indicate levels of life satisfaction that meet or exceed the levels reported by normal control subjects (e.g., Cameron, Titus, Kostin, & Kostin, 1973).

In many studies, happiness is not the primary dependent measure, and researchers are concerned with identifying relationships between happiness and other variables, rather than assessing the absolute level of happiness in a population of interest. However, a number of large-scale demographic surveys of quality of life have been conducted during the past two decades. In this research, level and correlates of happiness have been of primary interest.

General life happiness. The results of the first national sample survey of the correlates of happiness were reported by Gurin, Veroff, and Feld (1960). The first survey administration of this on-going program of research on "How Americans View their Mental Health" included a sample of almost 2500 adults in the United States. More than a third of the sample of respondents (35%) reported being "very happy," 54% described themselves as "pretty happy," and 10% reported that they were "not too happy," the lowest category of happiness provided. Similar results were obtained in subsequent surveys (e.g., Bradburn & Caplovitz, 1965; Bradburn, 1969; Campbell, Converse, & Rodgers, 1976; Watts & Free, 1974). In terms of demographic correlates, these studies generally indicate that education and income are positively correlated with personal happiness, and that sex is not

a significant correlate; the findings regarding age are conflicting. However, Matlin and Stang (1978) noted that even among people who might be expected to report the least happiness, such as people with little education and a low income, the majority describe themselves as "pretty happy" or "very happy."

In an ambitious cross-cultural study of personal aspirations (Cantril, 1965), individuals were interviewed and asked to indicate on a ten-point "ladder" scale where they presently stood from the "worst possible life for you" to the "best possible life for you." The average ratings ranged from a high of 6.6 by Americans, to a low of 1.6 by people in the Dominican Republic.¹ However, with the exception of people in the Philippines and the Dominican Republic, nearly all people regarded their personal present as better than their personal past.

Specific satisfaction: Marriages and jobs. In addition to overall happiness, two major components of life satisfaction--marital and job satisfaction--have received considerable attention from researchers. The literature in each of these areas is extensive, and only some highlights will be presented.

In general, people report being happy with both their marriages and their jobs. The study of "How Americans View their Mental Health" by Gurin, Veroff, and Feld (1960), described earlier in this section, devoted a chapter to marital happiness. Among all married respondents, 47% reported being "very happy," 22% described their happiness as "above average," 29% as "average," and 3% reported being "not too happy." Similar findings were reported by Bradburn and

Caplovitz (1965) and Campbell, Converse, and Rodgers (1976).

In their analysis of job satisfaction, Gurin, Veroff, and Feld (1960) found that three-quarters of employed men reported satisfaction with their jobs: 28% indicated that they were "very satisfied," and 49% reported being "satisfied." Of the remainder of the respondents, only 8% expressed dissatisfaction; 5% were neutral, and 10% were ambivalent. Subsequent analyses with subsamples indicated that only 31% reported that they had problems at work. In the 1972-1976 General Social Surveys conducted by the National Opinion Research Center, 50% or more of the middle and working class women, irrespective of their labor force status (viz., housewife versus employed), reported being "very satisfied" with the work they do, with only one exception (Wright, 1978). Examples of similarly high levels of reported job satisfaction abound in the literature (e.g., Meltzer, 1965; Quinn & Shepard, 1974; Quinn & Staines, 1978; Staines & Quinn, 1979).

In summary, when asked, individuals generally report high levels of life, marital, and job happiness and satisfaction. This review, of necessity, has been brief, but it illustrates the consistency of results on reported happiness across a variety of research methods, subject populations, and measurement techniques. While reported happiness certainly varies among individuals and groups of people, it is evident that people typically report that they are happy with their lives in general, and with major aspects of their lives, such as their marriages and jobs. The next section will review evidence that such positive feelings are not restricted to individuals' assessments of their past and present conditions, but extend to their feelings about

the future.

Expectations for the Future

People report being quite happy with their present lives, but there is evidence that they expect to be even happier in the future. In Cantril's (1965) cross-cultural study of individuals' aspirations, respondents were asked not only to evaluate their lives at the time of the interview, but to assess their lives five years earlier and five years in the future. Recall that, with few exceptions, people described their personal present as better than their personal past. On the ten-point ladder scale from "worst possible life" to "best possible life for you," personal ratings for the future ranged from a high of 8.4 among Cubans, to a relative low of 5.1 among Indians. More importantly, in every country, the average personal rating for the future was more positive than ratings of the present: "All people without exception expect significant improvement in the future . . . Hope here seems universal" (Cantril, 1965, pp. 190-191).

These results were replicated by Watts and Free (1973) in large-scale national surveys conducted in 1971 and 1972. In both surveys, respondents rated their present lives as better than their pasts, and they expected their futures to be even better. In a related question, respondents were asked to compare directly their present lives with their lives the previous year: 46% described themselves as better off, 41% as about the same, and only 12% indicated that they were worse off than the previous year.

In addition to expressing positive expectations for the future in general, people seem to have positive expectations about specific outcomes. For example, each year since 1966, the Laboratory for Research on Higher Education at the University of California at Los Angeles, under the sponsorship of the American Council on Education, has conducted a large-scale survey of freshmen entering colleges and universities across the country. The questionnaire contains a series of items asking the freshmen to estimate the general likelihood that they will experience specific outcomes, such as graduation with honors or election to student office. A review of the responses for freshmen nationally reveals very positive expectations for the future. For example, among respondents to the 1977 survey, only 1.3% estimated that there was a "very good" chance that they would drop out of college temporarily, and only 0.7% expected to leave college permanently; actual attrition rates are considerably higher, estimated at between 30%-50% nationwide (Pantages & Creedon, 1978). Similarly, only 1.8% of the entering freshmen expected to fail one or more courses, and less than 5% expected to need extra time to complete their degree. However, the freshmen did judge that their chances were "very good" that they would achieve at least a "B" average (47.7%), earn their bachelor's degree (79.9%), and find a job after college in the field for which they were trained (69.9%).

It is interesting to note that there may be little or no correspondence between people's expectations for their personal futures, and their expectations for the country. Respondents in Cantrill's (1965) study were asked to make judgments about the past,

present, and future of the country, in addition to the evaluations of their own lives. Among Americans, there was no relationship between personal and national ratings for the past, present, or future.² Noting the pessimism and alienation revealed by public opinion polls, Watts and Free (1973) proposed that

In the United States, the country of individualism par excellence, there is a sharp distinction in people's minds between their own personal lives and national life. Believing that individuals not only should but can take care of themselves and stand on their own two feet, Americans appear not to make a direct connection between their individual situations and the conditions of the nation--except in the case of war or severe calamity. As a result, they find it possible to feel that they as individuals can fare well, even though they perceive the country to be faring poorly. (p. 21)

Thus, even if a feeling of general malaise about the country exists, people seem able to maintain an expectation of a positive, or at least improving, personal future.

People evidence similar beliefs about other, often uncontrollable, negative life events, such as disease, accidents, and natural disasters: "It won't happen to me" (e.g., Janoff-Bulman & Lang-Gunn, in press; Wolfenstein, 1957). In her classic psychological essay on disaster, Wolfenstein (1957) observed that most people have an attitude of denial toward remote threats, and a general feeling of personal immunity to negative life events. Even when people acknowledge a threat or danger, they often persist in the belief that it will not affect them personally.

Paradoxically, Wolfenstein (1957) noted that feelings of personal immunity may be especially strong when there is nothing a person can do to prevent or avoid an impending danger. If precautionary measures

are available, the threat may be acknowledged to the extent of exercising precautions. However, when a person does not have precautions at his or her disposal, the threat will continue to be denied (cf. Janis, 1951).

It is interesting to note that once a disaster or other negative event has occurred, victims may interpret the event in a relatively positive manner. Wolfenstein (1957) observed that a major theme of post-disaster reactions, particularly among Americans, is the belief that "we were lucky," in spite of what has happened: "One stresses what one has rather than what one lacks, and compares oneself with others who are worse off. . . . The basis for comparison is how much worse it might have been and how much worse off others are" (pp. 182-183). Post-disaster reactions also include an enhanced awareness of the good fortune a person has enjoyed in the past, and a confidence in the future and one's ability to overcome the misfortune. The feeling that "we were lucky" is usually accompanied by a feeling that one does not have "the right" to complain if others have suffered greater misfortune.

The acute awareness of one's fortune compared with others is also evident in another paradox in post-disaster reactions--survivor guilt (Janoff-Bulman & Lang-Gunn, in press; Wolfenstein, 1957). Survivor guilt has been observed in victims of disasters, and in survivors of Hiroshima (Lifton, 1971; Nagai, 1951) and World War II concentration camps (Chodoff, 1970; Lifton, 1967). Wolfenstein (1957), in her discussion of the aftermath of disasters, reported that survivors often "blame themselves for not having done enough for those who

perished. . . the survivor feels guilty for not having died instead of his loved ones, or in an effort to save them" (p. 216). Thus, although most people may expect personal immunity to, or at least survival of negative events, the fulfillment of their expectations may produce feelings of guilt or self-blame.

Positive expectations for the future, including feelings of personal immunity to negative outcomes, are especially evident in health-related attitudes and behaviors. Parsons (1951) argued that people are "motivated to underestimate the chances of their falling ill, especially seriously ill" (p. 443). Further, if people do become ill, they are unrealistically biased toward confidence that "everything will be all right," and they overestimate the likelihood of a rapid and complete recovery.

In a study by Lang-Gunn (Note 1), respondents judged themselves to be far less likely than the "average person" to develop any of a number of diseases, including pneumonia, diabetes, and leukemia. Likewise, Kirscht, Haefner, Kegeles, and Rosenstock (1966) found that people regarded themselves as less susceptible than others to cancer, tuberculosis, and dental disease. Such feelings of relative invulnerability to serious health problems may have important implications, such as an increased likelihood of taking health-related risks.

When symptoms of illness do occur, a person may attempt to "normalize" the symptoms by interpreting them within a minimally threatening explanatory framework (Davis, 1963; Mechanic, 1972). Attempts at normalization may persist until the symptoms subside, or

until the symptoms can no longer be explained within a conventional framework, and the individual is forced to acknowledge the possibility of serious illness. Even after acknowledging the possibility of illness, a person may delay in seeking medical care (e.g., Antonovsky & Hartman, 1974; Clements & Wakefield, 1972), preferring uncertainty about the future to confirmation of serious illness.

Even after a serious illness has been confirmed, people may deny the diagnosis or prognosis of the illness. For example, research indicates that the parents of children who are disabled or dying have strong tendencies to deny the prognosis. In a study of the families of children with polio, Davis (1963) found that some parents refused to recognize their child's handicap. Similarly, observations of the parents of dying children suggest that it is not uncommon for parents to deny the prognosis, and to maintain hope and belief in discovery of a cure until the end (e.g., Friedman, Chodoff, Mason, & Hamburg, 1977).

In a correlational study designed to demonstrate "unrealistic optimism" about future life events, Weinstein (1980) asked students to estimate their chances of experiencing different events compared to the chances of their classmates. In general, the respondents judged their own chances to be above average for positive events, and below average for negative events. An examination of the effects of the perceived characteristics of the events indicated that respondents were more likely to express optimism about negative events when the events were perceived as controllable; for positive events, there was no correlation between perceived controllability and optimism. Degree of desirability and perceived probability were positively related to

optimism about positive events, but did not affect the degree of optimism about negative events. In addition to perceived controllability, optimism about negative events was related to personal experience and the salience of a "stereotype" or high chance group. Weinstein (1980) concluded that an optimistic bias will occur, for both positive and negative outcomes, when two conditions are met: The event is perceived to be controllable, and people have some degree of commitment or emotional investment in the outcome.

Weinstein (1980) argued that unrealistic optimism may be a result of incomplete or inaccurate information about others. In a second study, students made written lists of factors that increase or decrease the likelihood that specific events would happen to them, and some students were given copies of the lists constructed by other students. Optimism about negative events was reduced, but not eliminated, by providing information about the attributes and actions of other people. For positive events, relative optimism was reduced by the act of listing factors influencing one's own chances; knowledge about others did not further reduce optimism. Weinstein (1980) concluded that enhanced awareness by an individual about their own or others' circumstances can reduce the degree of unrealistic optimism, but that there are other, more persistent, sources of optimism that cannot be eliminated by simply encouraging people to carefully consider their comparative judgments, or by providing them with information about others.

In a recent follow-up study, Weinstein and Lachendro (1982) investigated egocentrism as a source of unrealistic optimism. This

study was designed to determine whether the reduction in optimism about negative events following exposure to lists of reasons generated by others was a result of new information about the risk status of others, or simply the act of adopting the perspective of others. The results again demonstrated an optimistic bias, and the degree of optimism was reduced slightly by reading the risk-factor lists of others or preparing a list from the perspective of a "typical student" at the college. However, there was no difference in the optimism expressed by students in the "information" and "perspective" conditions. Weinstein and Lachendro (1982) concluded that optimism about oneself relative to others does not result from a lack of information about the attributes and actions of others, but from egocentric tendencies--failure to think carefully about the circumstances of others.

In another study of optimistic biases, Ross (Note 2) asked respondents to make judgments about a list of illnesses and major life events. Group comparisons of the responses for self or other-likelihood of experiencing each event revealed that the ratings of the likelihood for oneself were lower than the ratings of the likelihood for another person for each of 20 illnesses. Ross (Note 2) also reported negative correlations between the perceived severity of illness or undesirability of life events and the likelihood ratings: As the severity of an illness or the undesirability of a life event increased, the perceived likelihood of it occurring to oneself or another person decreased. Using general estimates of the actual prevalence of the illnesses, positive correlations between actual

prevalence and self and other-likelihood ratings were observed.

In summary, people seem to expect that their personal futures will be positive, in general, and in terms of specific outcomes. People expect to achieve (or experience) positive outcomes, and consider themselves to be relatively invulnerable to negative life events, such as disasters and disease. Although people may not expect to be entirely happy in the future, almost everyone believes that their future will be better than their past and present. Moreover, people believe that they are more likely than others to experience positive events, and less likely to experience negative events. In the following sections, these phenomena will be examined in terms of social-psychological theory and research.

Social Psychological Perspectives

Social psychologists have long been interested in the efforts of individuals to make sense of the world, to interpret and assign meaning to events in everyday experience (e.g., Asch, 1952; Heider, 1944, 1958). From a social psychological perspective, individuals are assumed to be involved, more or less continuously, in attempts to understand the behavior and events they encounter daily, and social psychological theory and research have identified cognitive and motivational processes that affect the ways in which individuals perceive the world and explain events in their lives. The following sections will review theoretical formulations and empirical evidence that contribute to an understanding of personal expectations and

optimism about the future.

Explanation and Prediction

Of the many and varied judgment tasks confronting the individual, two tasks are especially relevant to the development of expectations about the future--causal judgment and the prediction of behavior and outcomes. In forming a causal judgment, the individual attempts to identify one or more causes to which a particular effect--an action or outcome--can be reasonably attributed. In addition to seeking causal explanations of events, the individual forms expectations and makes predictions in an effort to anticipate future outcomes and events. Clearly, these two tasks are related; explanations for an event provide an important basis for the prediction of unknown future events.

Until recently, the primary, and almost exclusive focus of theoretical and empirical inquiry has been causal judgment and other inferential tasks. The task of prediction, studied intensively by judgment researchers, has only recently begun to receive attention from cognitive social psychologists (e.g., Ross, 1977). Fischhoff (1976), in an early attempt to integrate the two areas of inquiry, noted the need for research aimed at specifying and clarifying the formal and psychological relationships between explanation and prediction. Generally, researchers in both areas acknowledge the interrelationship of explanation and prediction, perceive similarities in the processes underlying the two types of tasks, and regard each task as having important informational consequences for the other

(e.g., Kelley, 1972; Weiner, Freize, Kukla, Reed, Rest, & Rosenbaum, 1971). The following section will describe two areas of attribution research which emphasize the consequences of an explanation for the individual's beliefs and expectations for the future.

Attributions for positive and negative outcomes. Social psychological research on lay explanation and attribution has revealed a positive orientation in the perception and explanation of personal outcomes and events. Although the roles of cognitive and motivational factors in attribution continues to be a major source of debate (e.g., Gunn, Note 3; Miller & Ross, 1975; Ross, 1977), research has demonstrated numerous instances of a positive "bias" in the explanation of events--attributions that appear to maintain or enhance a positive view of oneself or the world. Two areas of inquiry, in particular, have consistently shown an asymmetry in attribution for positive and negative outcomes--explanations for achievement outcomes, and attributions of responsibility for misfortune.

Research on attributions for success or failure has revealed a general tendency of individuals to attribute success at a task to their own personal characteristics, and to attribute failure to an external situational or environmental factor (e.g., Feather, 1969; Streufert & Streufert, 1969; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971; Wortman, Costanzo, & Witt, 1973). In general, people tend to perceive success as internal and stable and, thus, as an outcome likely to be repeated in the future. Failure, in contrast, is perceived as external and unstable, and therefore as an outcome not likely to recur. In addition to the positive affective consequences

(e.g., pride) of this general pattern of attribution for achievement outcomes, such attributions have the consequence of promoting expectations for future success.

Research on reactions to victimization also suggests that attributions are influenced by an individual's need to maintain fundamental beliefs about the world and positive expectations for his or her personal future. Knowledge of suffering, especially undeserved suffering, poses a potential threat to the perception of the world as safe and predictable. The interpretations and attributions people make about another's misfortune will be influenced by their beliefs about the world, and by the implications for their own future of their explanations of others' misfortune.

The "just world hypothesis" posited by Lerner and his colleagues (Lerner, 1965, 1970, 1971; Lerner & Matthews, 1967; Lerner & Miller, 1978; Lerner & Simmons, 1966) proposes that individuals have a fundamental need or desire to believe in a "just" world--a relatively stable and predictable world where people "get what they deserve and deserve what they get." According to the just world hypothesis, the interpretations people make of events in their lives serve, at least in part, to maintain this fundamental belief in the world as an orderly, stable, and predictable place. By believing that those who suffer somehow deserve their fates, the world seems more predictable and just, and people can maintain a feeling of relative invulnerability to undeserved suffering themselves (cf. Walster, 1966; Wortman, 1976). Victims are judged to deserve their fate as a consequence of their actions or their character. That is, the suffering is not unjust if

the victim is regarded as behaviorally responsible for his or her own suffering (e.g., having engaged in a careless act) or, if innocent by deed, because the victim has undesirable personal attributes. Research evidence generally supports the just world hypothesis and its limiting conditions (e.g., Landy & Aronson, 1969; Lerner & Matthews, 1967; Lerner & Simmons, 1966; Rubin & Peplau, 1973; Shaw & Skolnick, 1971; see Lerner & Miller, 1978, for a review).

A similar hypothesis regarding observers' perceptions and attributions about victims was advanced by Walster (1966), who emphasized a desire for perceived control, rather than justice, as the motivation for blaming people who experience misfortune. Walster (1966) proposed that people do not want to believe that severe negative events can happen at random, since this belief implies that they could become victims of similar, unavoidable misfortunes. Rather than acknowledging their own vulnerability by conceding that a similar negative event could happen to them, observers will tend to blame a person involved in the event:

As the magnitude of the misfortune increases . . . it becomes more and more unpleasant to acknowledge that "this is the kind of a thing that could happen to anyone." . . . If a serious accident is seen as the consequence of an unpredictable set of circumstances, beyond anyone's control or anticipation, a person is forced to concede the catastrophe could happen to him. If, however, he decides that the event was a predictable, controllable one, if he decides that someone was responsible for the unpleasant event, he should feel somewhat more able to avert such a disaster. (Walster, 1966, p. 74)

Thus, according to Walster (1966), reactions to misfortune are influenced by observers' desire to view the negative event as a result of controllable, or at least avoidable factors, so that they can avert

the recurrence of a similar misfortune to themselves. By attributing responsibility for a negative outcome to a person, observers can reassure themselves that their futures will not include similar misfortune.

In some cases, victims may join observers in blaming their own behavior for the misfortune, in an effort to make sense of the event, and maintain a belief in a just or controllable world. Like observers, victims of misfortune may prefer to believe that they were somehow responsible for the misfortune, than to believe that they were singled out for misfortune in a random, arbitrary fashion (e.g., Bulman & Wortman, 1977). Self-blame by victims has been observed in studies of accident, disease, and disaster victims, and is documented in the clinical literature (Janoff-Bulman & Lang-Gunn, in press). In extending the just world hypothesis to include the reactions of victims as well as observers, Lerner and Miller (1978) concluded that "people will alter their conceptual system, in this case their perception of their own worth, to impose order and justice on random events in their lives" (p. 1044).

An alternative motivation which may influence observers' reactions to victims has been proposed by Shaver (1970, 1975). Shaver's "defensive attribution" hypothesis proposes that people are also strongly motivated to protect their self-esteem. To maintain a belief in a relatively safe and predictable world, people may often blame the victim rather than attribute the misfortune to chance. However, if observers acknowledge the possibility of being in the same situation as the victim, blaming or derogating the victim might imply

that they would also be held responsible if they were to experience a similar misfortune. Thus, according to the defensive attribution hypothesis, the more observers believe that they could experience a fate similar to the victim's, the greater their motivation to attribute the event to chance, rather than the victim, in an effort to protect themselves from possible future blame. Shaver (1970, 1975) suggested that when outcomes are severe, observers will prefer to believe in an arbitrary and capricious world than to believe that they might be blamed for a similar outcome in the future.

Identification with the victim, in terms of a perceived common fate (Lerner & Miller, 1978) or situational similarity (Shaver, 1970), is believed to heighten observers' feelings of vulnerability, and to increase the likelihood of the reactions hypothesized by the just world, control, and defensive attribution formulations. The more likely observers perceive their own victimization to be, the more threatening the negative event, and the greater the motivation to preserve a belief in justice (Lerner & Miller, 1978) or controllability (Walster, 1966), or to protect oneself from possible future blame (Shaver, 1970). As Shaver (1975) noted, there is "a desire on the part of the perceiver to make whatever attributions best reduce the threat posed by the situation" (p. 110). Although the three formulations posit different motivations that may influence an individual's attributions about an outcome or event, they agree that self-protective motivations may affect attributions of responsibility for an outcome, and that the future implications of a judgment about an outcome are important to the individual.

Other theoretical orientations also emphasize the individual's need or desire to predict and control the future. The notion that people strive for mastery or control of their environments has been the cornerstone of many psychological theories (e.g., de Charms, 1968; Heider, 1958; Kelly, 1955; White, 1959), and has played a central role in theories of attribution processes. Indeed, Kelley (1971) has argued that the purpose of attribution, the reason people seek to explain events, is to understand and effectively control their environments. Further, Kelley (1971) proposed that causal judgments will tend to be biased toward controllable factors--factors that offer the individual the possibility of future control.

The role of a need or desire for personal control in attribution processes was extensively considered by Wortman (1976). In her review of relevant theory and research, Wortman (1976) found a substantial amount of evidence consistent with the view that people make attributions in order to enhance their feelings of control over the environment. However, she noted that much of the evidence supporting a "need for control" is also consistent with other theoretical frameworks, such as a need for justice or a desire for meaning and rationality.

The research on attributions for achievement outcomes and misfortune suggests that individuals may generally interpret important positive or negative outcomes in a manner that systematically promotes positive expectations for the future. This may be a relatively accurate reflection of the individual's past experience and learning, and an unintended product of the attribution process. That is,

positive outcomes are generally intended, and may actually occur more frequently than negative outcomes (Kanouse & Hanson, 1971). Thus, attributions that imply positive future outcomes may simply reflect the individual's intentions and prior experience (cf. Ickes & Layden, 1978; Miller & Ross, 1975).

Alternatively, attributions may be influenced by individuals' needs or desires (Heider, 1944, 1958). Individuals may be motivated to explain outcomes with reasons that are congruent with their views of themselves and the world, and their wishes and expectations for the future. Heider asserted that an attribution that "makes sense" to an individual must satisfy two criteria--the plausibility or rationality of the explanation, and the "personal acceptability" of the explanation, in terms of the individual's needs, wishes, and values: "From (the) possible underlying causes the one will be selected that best fits the ideas and wishes the person has about himself and others" (p. 172).

Implicit in these various theoretical statements is the fundamental assumption that people desire positive outcomes. Belief in a just or controllable world is important because it reassures the individual that he or she can avoid negative outcomes and obtain positive outcomes, as a result of deservingness or mastery over the environment, for example. Thus, when confronted with knowledge of an outcome that is important to the individual, the person will be motivated to understand, through a process of attribution, how or why the particular outcome occurred. Moreover, the understanding the individual achieves, and the specific attributions made, may be

influenced by the individual's desire for positive outcomes in the future. Attribution to factors that can be avoided or controlled offers the individual the possibility of future control and, thus, determination of his or her own future outcomes.

In short, what these various theoretical orientations share is the often unstated assumption that people desire positive outcomes, and that this desire may influence the understandings and attributions people make about events in their lives. People do not engage in causal analysis, or make particular attributions, simply for the sake of maintaining a belief in a just or controllable world. Ultimately, all of these various motivations serve the same end: They maintain or enhance the belief that one will obtain the outcomes he or she desires. To individuals, the significance of perceived justice in the world, or the effective exercise of control over the environment, is the implication that they will avoid negative outcomes and obtain the outcomes they desire. In this manner, causal attributions can promote positive expectations for the future.

The desire for positive outcomes can be viewed as simply a restatement of the pleasure principle, or as the result of general cognitive tendencies, such as cognitive balance. Heider's (1958) general principle of cognitive balance involves three main concepts--unit formation, sentiments, and balanced state. Briefly, separate entities (e.g., people, objects, outcomes) comprise a unit, according to Heider, when they are perceived as associated or "belonging together." Sentiments refer to a positive or negative valuation attached to entities. A balanced state denotes "a situation

in which the perceived units and experienced sentiments co-exist without stress" (p. 176), and is obtained, for example, when the unit and sentiment relationships between two entities are both positive or both negative. Balance theory states that unit and sentiment relationships will tend toward a balanced state.

Given that people, by definition, like positive outcomes and dislike negative outcomes, balance theory suggests that "one will tend to perceive positive outcomes as belonging to self but not negative ones" (Snyder, Stephan, & Rosenfield, 1978, pp. 109-110). In addition, the principle of cognitive balance can provide a parsimonious account of several of the phenomena described earlier, including the tendency to take credit for good outcomes and deny blame for bad ones (i.e., a change in unit relationship), and the tendency to reinterpret negative outcomes in a positive light (i.e., a change in sentiment). Moreover, this principle might be extended to account in part for the selective recall of positive life experiences, and the expectation of positive outcomes in the future. Similar interpretations can be derived from cognitive dissonance theory (Festinger, 1957).

It is important to note that the balance that exists when a person desires and obtains a positive outcome presupposes a positive attitude toward oneself (Heider, 1958). If a person has a negative self-image, then the attainment of a positive outcome creates an "imbalanced" (or "unjust") state. By extension, the person with a negative attitude toward him or herself may not have positive expectations for the future. This important exception will be considered

in a later discussion of the consequences of optimism.

In summary, the attributions people make about their own or others' outcomes often appear to systematically promote positive expectations for the future. This asymmetry in explanations for positive and negative outcomes may result from the direct influence of a person's wishes for the future on their explanations of past or present events, or indirectly, as the ultimate goal of various motivations (e.g., control) that may influence the attribution process. Alternatively, the reinforcement of positive expectations may be an unintended product of attributions which reflect an individual's intentions and prior experience, including perceived associations between behaviors and outcomes.

Expectations for positive and negative outcomes. Some research also suggests that individuals' expectations are influenced directly by their wishes and desires. "Wishful thinking" occurs when the judged likelihood of an event increases with the perceived desirability of the event (McGuire, 1960). In Heider's words, "in wishful thinking, reality, as we see it, is assimilated to our wants" (1958, p. 235). Studies indicate that people tend to believe that favorable events are more likely to occur than unfavorable events (e.g., Irwin, 1953; Marks, 1951), and their predictions about events often appear to coincide with their personal preferences (e.g., Cantril, 1938; Lund, 1925; McGregor, 1938; McGuire, 1960).

Studies by Marks (1951) and Irwin (1953) indicated that people's stated expectations are significantly affected by the desirability, as well as the actual probability, of an outcome. In the first study,

Marks (1951) asked children to state whether they expected to draw a picture card from a deck of ten cards containing blank and picture cards. The actual probability was manipulated by varying the number of picture cards in each deck. Prior to each "game," the probability was specified, and a picture card was defined as desirable or undesirable, in terms of game points. The results revealed that stated expectations generally increased with actual probability, and that desirability of the outcome had a strong effect on expectations. Subjects tended to expect the desirable outcome, even when the actual probability was low.

The results of the effect of outcome desirability on stated expectations were extended to adults by Irwin (1953). In addition, Irwin (1953) examined individual's confidence in their stated expectations. Again, the results revealed that the probability of the outcome influenced expectations, although "irrational" responses were observed (e.g., expecting an outcome with a probability less than .5). The effect of outcome desirability on expectations was replicated, although the strength of the effect was weaker among these adult subjects. A desirable outcome (i.e., card) was expected more frequently than an undesirable outcome, and this effect was most pronounced when the actual probability was .5. However, contrary to the hypothesis, the expectation of desirable outcomes was not associated with a decrease in subjects' confidence in their expectations. In fact, Irwin (1953) reported some evidence of increased confidence in expectations for desirable outcomes.

In a study of the relationship between belief and desire, Lund

(1925) asked respondents to rate their belief strength, certainty, and the desirability of thirty propositions (e.g., "Do only the good die young?"; "Will our Republic continue to exist 100 years from now?"). The results yielded large and consistent positive correlations between belief and desire. Lund (1925) concluded that there is a strong emotional component to belief, and suggested that beliefs are often "wish-realizations--we believe what we want to believe" (p. 80).

A study of the relationship between desire and predictions was conducted by Cantril (1938). In this study, respondents were asked to make predictive judgments about fifteen social and political events (e.g., the likelihood of a major economic depression in the U. S.; the outcome of the Spanish Civil War). In addition to the predictive judgments, attitude measures were included to investigate the role of "wish fulfillment." The results indicated that people tended to forecast outcomes that they desired. In his interpretation of the results, Cantril (1938) suggested that

If no external structuration is given to provide a frame of reference for prediction, then a relevant internal frame of reference will give structure to the social stimuli and determine the prediction. Where no external structuration is apparent, uniformity of predictive judgments is proportional to the similarity of the internal structurations of the individuals involved. . . . Whenever the prediction of a social event is based wholly or in part upon an internal frame of reference, objectivity is rare, if not impossible, because of ego-involvement. (pp. 387-388)

This analysis suggests that individuals will rely on their attitudes or desires in predicting an outcome to the extent that the relevant, objective, external factors are unknown, ambiguous, or complex. Moreover, individuals will make similar predictions or

develop similar expectations when their attitudes, values, or desires are shared. Thus, if greater consensus exists in the evaluation of negative outcomes, for example, there may be greater uniformity in individuals' expectations about negative outcomes, especially when the causes of those outcomes are relatively ambiguous.

The significance of ambiguity and uncertainty in the prediction of future outcomes was also emphasized by McGregor (1938). Respondents were asked to make predictions about nine events (e.g., whether Roosevelt would be re-elected; whether there would be a major European war within a year), and to report their attitudes and desires concerning the events. The results indicated that individuals' desires strongly influenced their predictions only when the outcome was very uncertain or ambiguous. McGregor (1938) suggested that reduced ambiguity about a situation also reduced individuals' opportunities to select from among the available "facts" those facts consistent with their desires.

McGregor (1938) argued that previous studies which reported a significant relationship between beliefs and desires involved ambiguous events, and thus greatly underestimated the constraint imposed on individuals' beliefs by external reality: "Subjective factors do not operate with complete freedom. They are subject to external constraint. The individual lives not in a vacuum, but in a world of real events. . . . Regardless of our desires, we do 'face reality' to some extent" (p. 182). However, when the stimulus situation is completely uncertain or unambiguous, McGregor (1938) argued, the influence of subjective factors will be almost

unrestricted.

In addition to the ambiguity of the situation, McGregor (1938) suggested that the influence of "wishful thinking" and subjective factors will also depend upon the intensity of the individual's wishes or desires:

If his own welfare, or pride, or ethical ideals are involved, we may expect the intensity of his wishes concerning the outcome of the situation to be greater than when the situation and its outcome are relatively remote from his personal life. Importance is a subjective factor--the degree to which the individual is personally concerned over the outcome of the situation; the extent to which his ego is involved. (pp. 189-190)

Thus, McGregor (1938) proposed that the two factors determining the relative influence of the stimulus situation and subjective factors are the degree of ambiguity of the stimulus situation, and the importance of the outcome to the individual. Of these two factors, McGregor (1938) argued that importance will have a greater impact on predictions:

The influence of importance in the determination of prediction should not be underestimated. When the outcome of the situation is of vital concern to the predictor, even a slight degree of ambiguity of the stimulus situation provides opportunity for wishes to operate. The factor of importance, therefore, is probably the more heavily weighted of these two determining factors. (p. 192)

In the present context, this analysis suggests that subjective factors, such as wishes and desires, are likely to influence individuals' predictions about the likelihood of experiencing specific positive and negative outcomes. Compared to predictions of social events or the outcomes of others, importance, or ego-involvement, should be greatest when individuals consider their own future

outcomes. Moreover, many outcomes and life events experienced by individuals are highly unpredictable and uncertain.

In summary, these studies indicate that the asymmetry in individuals' explanations of positive and negative outcomes extends to their expectations about future events. People appear to judge positive events as more likely than negative events, and their predictions about events often correspond to their wishes or desires. However, like their explanations, people's expectations about their own future outcomes may be influenced by cognitive as well as motivational factors. The anticipation of future outcomes, like the interpretation of past outcomes, may reflect individuals' intentions and prior experience, and an actual or perceived contingency between their intentions and actions and their outcomes.

The Illusion of Contingency

Research on judgments about the relationship between events indicates that people have difficulty assessing correlation or covariation. People generally do not recognize randomness (Kahneman & Tversky, 1972), and events or outcomes that occur together by chance are often inaccurately judged to be related. In addition, an individual's a priori beliefs about the relationship between events may have a significant influence on judgments of the actual relationship between events, even when no relationship, or a negative relationship, exists.

Evidence that people may perceive an illusory correlation between

two events was reported by Chapman (1967) and Chapman and Chapman (1967, 1969). In an initial study using word associations, Chapman (1967) found that subjects overestimated the frequency of association of pairs of related words (e.g., lion-tiger), compared to pairs of unrelated words (e.g., lion-eggs) that occurred with the same frequency. Chapman and Chapman (1967, 1969) extended this finding to the task of clinical diagnosis and judgment. In an effort to understand the persistent use of diagnostic tests that lack validity, these investigators conducted an interesting set of experiments in which clinically naive subjects were presented with randomly paired clinical test responses and diagnoses for hypothetical patients. In evaluations of the frequency with which various responses and diagnoses were associated, subjects markedly overestimated the co-occurrence of response-diagnosis pairs that were independently judged to be related.

Chapman and Chapman (1967, 1969) suggested that these results occurred because clinicians and laypersons have implicit, a priori beliefs or hypotheses about the relationship between particular test responses (e.g., a particular type of drawing on the Draw-A-Person test) and specific psychological problems. Prior beliefs about the relationship between responses and diagnoses influenced subjects' judgments even with repeated exposure to the materials, and with monetary inducements for making accurate judgments. Moreover, the illusory correlation effect occurred when the actual correlation was negative, and subjects failed to detect correlations that were in fact present in the test materials. The illusory correlation effect has

been replicated using different clinical test materials (Starr & Katkin, 1969), and with judgments of the relationships among different personality traits (Berman & Kenny, 1976).

Other failures of people to judge the actual degree of relationship between two outcomes or events have been reported by Smedslund (1963) and by Ward and Jenkins (1965). For example, Smedslund (1963) presented nurses with symptoms and diagnoses paired on cards, and instructed them to determine whether a particular symptom and diagnosis were associated. The results revealed that the nurses' judgments were not related to the actual relationship between the symptom and diagnosis. However, there was a substantial correlation between the frequency with which the symptom and diagnosis appeared together, and the number of subjects who judged that the symptom and diagnosis were related. Apparently, in their judgments of the relationship between symptom and diagnosis, the nurses were influenced only by those instances in which the relationship was confirmed by the presence of both the symptom and the diagnosis.

Research by Jenkins and Ward (1965) suggests that people are also inaccurate in judging the contingency between their own behavioral responses and subsequent outcomes. In a series of experiments, Jenkins and Ward (1965) investigated subjects' judgments of contingency between two possible responses and two outcomes. Hypothesizing that subjects would perceive a contingency between their responses and outcomes if one of the outcomes was more desirable and appeared with greater frequency, the investigators varied the relative desirability of the outcomes ("score" or "no score" versus two neutral

symbols), and the actual relationship between responses and outcomes (a range from no control to perfect control). For each of the problem sets, subjects pressed one of two response buttons for 60 trials, and judged the degree of control they had over the outcomes. The results revealed that the judged degree of contingency between responses and outcomes was unrelated to the actual degree of contingency, regardless of the relative desirability of the outcomes or the role of the subject (actor or observer). However, subjects' judgments of contingency, as predicted, were positively correlated with the frequency of the desired outcome. Even when subjects had no control and the desired outcomes occurred very infrequently, almost half of the subjects judged that they had some control over the outcome.

These studies indicate that people make inaccurate judgments about the relationship between events and, more importantly, about the contingency between their actions and subsequent outcomes. People may perceive a relationship where no relationship exists, and when events (or behaviors and outcomes) do covary, people seem to disregard the possibility that the association occurred by chance. Moreover, the beliefs people develop about the relationship between events or behaviors and outcomes appear to be persistent and relatively impervious to contradictory information, including evidence of a negative relationship, or the absence of any relationship. In short, the co-occurrence of events, albeit by chance, is regarded as evidence of a relationship, whereas the absence of covariation between events does not appear to influence people's judgments about the actual relationship (cf. Kelley, 1967, 1971; Ross, 1977).

Thus, if people sometimes obtain the outcomes they desire, they are likely to perceive a contingency between their intentions or actions and the outcomes they receive, and to regard the occurrence of the outcome as evidence of their ability to produce desired outcomes (cf. Heider, 1958; Wortman, 1976). Moreover, instances in which people fail to achieve a desired outcome are not likely to influence an individual's illusion of contingency between intentions and outcomes, since people tend to neglect the informational value of non-occurrences. As a result, even the occasional attainment of desired outcomes may promote the conviction that a person can generally produce the outcomes he or she desires.

As noted previously, an illusion of correlation or contingency between a person's intentions or actions and their outcomes provides an alternative to motivational interpretations for asymmetries in the explanation of positive and negative outcomes, including success and failure (Miller & Ross, 1975; Ross, 1977). Success, and positive outcomes in general, are likely to be anticipated and consistent with an individual's past experience (or recollection of the past). In addition, positive outcomes are generally intended, and are the object of a person's plans and efforts, whereas negative outcomes are usually unanticipated and unintended events that occur despite a person's intentions or actions. Based on a judged relationship between intentions and outcomes, and prior experience, people are likely to attribute positive outcomes to themselves, and to explain unintended negative outcomes in terms of situational or environmental factors.

Similar effects of individuals' judgments of contingency between

their responses and their outcomes have been proposed by Kelley (1967, 1971). Kelley's "covariation principle" states that individuals will attribute an effect (e.g., an event, outcome, behavior) to a factor with which it covaries. This suggests that people rely on evidence of covariation between their behavior and their outcomes to make judgments of causality. If people change their behavior and observe a change in the environment, they will likely attribute causality to themselves. This analysis applies to both intended and unintended outcomes, although people may be less aware of changes in their behavior that produce unintended outcomes.

Clearly, an illusion of contingency between one's intentions or behaviors and one's outcomes is likely to promote positive expectations for the future. To the extent that people believe that their outcomes are determined by their intentions and actions, they should expect to achieve the outcomes they desire. Failure to produce desired outcomes in the past and present is not likely to be regarded as evidence of the weakness or absence of a relationship between intentions and outcomes, but rather as not informative or as evidence that one simply did not try hard enough to produce the desired outcome(s). Thus, an illusion of contingency between one's intentions and outcomes would appear to give people substantial basis for optimism about the future.

Belief in a just world also denies the operation of chance and reflects a failure to judge a lack of contingency between behavior and outcomes. Justice may specify a contingency between a particular action and outcome, as well as a more general contingency between

one's character and actions and one's outcomes (Heider, 1958). Even if people acknowledge that many negative life events are beyond an individual's direct control to prevent or avoid, they may, as the just world hypothesis suggests, perceive a more general contingency between an individual's conduct and his or her outcomes. If most people perceive their past outcomes as generally positive, and believe that they deserved such outcomes because they have been (or have tried to be) a "good" person, then they likely expect future outcomes will also depend on their general character and conduct.

Indeed, there is some evidence to indicate that people may attempt to control future outcomes by engaging in "good" acts (e.g., Janis, 1951; Kubler-Ross, 1969). Janis (1951), for example, has suggested that "people who are facing the prospect of illness, unemployment, or any extreme form of deprivation, will often attempt to ward off the danger by making sure that they do not deserve to be punished" (p. 169). Thus, a more general illusion of contingency, such as the relationships specified by the concept of justice, also offers the individual some measure of perceived control over future outcomes, both positive and negative (cf. Kushner, 1981), and reduces the need for concern or worry about negative events that might occur at any time by chance.

In summary, research evidence suggests that people generally do not recognize randomness, and that they perceive contingencies between random events. People perceive relationships among unrelated events, including their intentions and desired outcomes that occur by chance. Moreover, people do not generally regard failures to obtain

desired outcomes as evidence disconfirming a relationship between their intention or action and their outcomes. These inaccuracies in judgment are likely to promote a conviction that one can determine his or her own outcomes, and this belief provides a substantial basis for optimism about the future.

The Illusion of Control

Individuals' judgments not only reveal an "illusion of contingency" about events that occur together by chance, they also evidence a belief in the ability to control, or at least influence, chance events. Sociological studies have provided some observational evidence that people regard chance events as controllable. Henslin (1967), for example, conducted a participant-observer study of crapshooters, and noted that crapshooters believe that concentration, effort, and confidence enhance a shooter's control over the outcome of a dice toss. Other beliefs about throwing techniques (e.g., a hard throw will produce high numbers) and betting strategies also revealed a perception of control over the outcome. Similarly, Goffman (1967) studied gambling practices and observed that Las Vegas dealers were at risk of losing their jobs during runs of bad luck.

Experimental evidence of an "illusion of control" was provided in an interesting set of studies by Langer (1975). An illusion of control was defined by Langer as "an expectancy of a personal success probability inappropriately higher than the objective probability would warrant" (p. 313). Langer surmised that an illusion of control

over chance events could be induced by introducing characteristics of a skill situation, such as choice, familiarity, involvement, and competition. A series of experiments concerning behavior in chance situations provided support for the hypotheses. For example, in one study, participants in a lottery who were allowed to choose their ticket regarded the ticket as more valuable than participants who were given tickets. Langer (1975) concluded that aspects of skill situations produce an inappropriate increase in individuals' confidence about chance outcomes. Indeed, in some studies, participants declined the opportunity to actually improve their objective chances of winning by entering a different lottery.

The determinants of perceived control were also investigated experimentally by Wortman (1975). In two studies, Wortman (1975) varied whether subjects actually initiated the outcome, and whether they had foreknowledge of what they hoped to attain. The results provided strong support for the hypotheses: Subjects who "caused" their own outcome (i.e., selected a marble representing their prize) and knew what they hoped to attain, perceived themselves to have greater control, choice, and responsibility for their outcome. Wortman (1975) suggested that people can attempt to exert control only if they know what they hope to attain (e.g., a number on dice, a particular prize).

There is also some evidence that an illusion of control, like an illusion of contingency (or correlation), is not likely to be eliminated or diminished by failure to influence the outcome. The participants in Wortman's (1975) study reported their perceptions of

control after the outcome was known. Even when participants were unsuccessful in selecting the marble that represented the preferred prize, attempting to select a particular marble resulted in feelings of control. Similarly, in his study of crapsshooters, Henslin (1967) observed that "failure does not represent the 'absence of control' but, rather, that someone's or something's control over the dice was greater than that of the shooter's. It is never that it was merely by chance" (p. 325).

An illusion of control over chance events is evident in individuals' explanations of past outcomes, as well as in their expectations for future outcomes. Attributions for positive and negative outcomes, as noted earlier, often appear to minimize the role of chance, and to exaggerate the role of the individual in producing an outcome. By eschewing chance in attributions of causality or responsibility, misfortunes are rendered more meaningful and avoidable, rather than arbitrary and capricious (cf. Bucher, 1957; Drabek & Quarantelli, 1967). In hindsight, even the victims of misfortune may blame themselves, and exaggerate their ability to have produced or avoided the misfortune (Janoff-Bulman & Lang-Gunn, in press; Wortman, 1976). Although there are few systematic studies in which victims of misfortune have been queried directly about their attributions of causality or responsibility for the misfortune, many investigators have observed self-blame by the apparently innocent victims of disease, crime, and disaster.

In a systematic study of accident victims, Bulman and Wortman (1977) conducted intensive interviews of 29 individuals who were

paralyzed as a result of seemingly "freak" accidents. Despite the apparently random nature of the accidents, a third of the respondents blamed themselves for the accident more than any other factor (viz., other people, the environment, and chance), and almost two-thirds blamed themselves at least in part for the accident that resulted in their paralysis.

Disease victims may spontaneously express beliefs about the relationship of their illness to their past behavior. Bard and Dyk (1956) observed that the unsolicited beliefs expressed by seriously ill individuals were "cast in terms of assigning culpability or responsibility for the illness" (p. 153), and concluded that individuals must establish a belief that explains their illness. Often, the illness was identified as the result of generalized or specific wrong-doing in the past. Similarly, Abrams and Finesinger (1953) reported a marked tendency of cancer patients to explain the cause or responsibility for the disease in terms of their own past actions, and to express guilt. The belief that one's own actions had a direct or indirect influence on the occurrence of illness has been observed by many researchers (e.g., Chodoff, Friedman, & Hamburg, 1964; Davis, 1963; Friedman, Chodoff, Mason, & Hamburg, 1977; Kubler-Ross, 1969; Taylor & Levin, 1976).

Specific acts of commission or omission are also identified by the victims of crime. Bard and Sangrey (1979) observed that victims of crime often seem eager to accept responsibility for their own victimization. In hindsight, the victim may note a failure to have exercised certain precautions, or to have responded to specific

features of the situation. Self-blame by the victims of rape, in particular, has been widely observed and documented (e.g., Bryant & Cirel, 1977; Burgess & Holmstrom, 1974; Medea & Thompson, 1974).

These observations about the victims of misfortune suggest that individuals may emphasize the role of their own action (or inaction) in producing a negative outcome, and may exaggerate, in retrospect, their ability to have avoided the outcome. The unknown causes or the complex series of circumstances that lead to many uncontrollable life events such as disease and accidents would seem to afford the individual considerable latitude in identifying the significant factors involved in the occurrence of a particular outcome. In instances in which the specific outcome will not recur (e.g., paralysis or terminal illness), the exaggeration of one's ability to have prevented the misfortune may serve simply to deny the "intolerable conclusion that no one was responsible" and that the event "has come about impersonally and meaninglessly" (Chodoff et al., 1964, p. 747). However, it may also promote a more general belief in one's ability to influence future outcomes, such as recovery. In instances in which the individual is vulnerable to a recurrence of the misfortune (e.g., natural disasters, crime), such attributions imply an ability to avoid future occurrences, and may be instrumental in establishing positive expectations for the future.

Thus, in addition to failures to recognize randomness in the relationships between events, people often fail to acknowledge the role of chance in the occurrence of many uncontrollable, negative life events. Experimental and observational evidence suggests that people

have an "illusion of control" over random outcomes. Perceived control over past and future chance outcomes appears to be enhanced by factors such as choice, foreknowledge, involvement, and practice. Moreover, in their explanations of many negative life events that are generally regarded as unforeseeable and uncontrollable, people appear to deny the operation of chance and to exaggerate, in retrospect, their influence over such outcomes. Minimizing the role of chance and/or maximizing the contribution of oneself or others in explanations of negative life events should have the effect of promoting the belief that a person can avoid similar misfortune in the future.

The Illusion of Invulnerability

For many controllable and chance events, the perception--or illusion--of personal control should promote optimistic expectations for the future. However, there are many negative events, such as natural disasters, over which individuals clearly have little or no control. In their reactions to such threats, there is some evidence that people maintain an illusion of invulnerability.

In her study of reactions to disasters, Martha Wolfenstein (1957) observed that an attitude of denial is the usual reaction to remote threats: "It won't happen to me." Even when individuals acknowledge a danger, they may frequently express no concern or worry about the danger. Further, Wolfenstein (1957) noted that the absence of concern is often associated with the belief that there is nothing that an individual can do about the threat. The usual reaction, then, is an

absence of worry, accompanied by an implicit or explicit belief that the threat will not materialize, or that it will not affect oneself.

The tendency to deny danger often persists in the face of a more imminent threat:

Here we have the feeling of personal immunity. Even when the denial of a threatened danger occurring . . . yields to contrary evidence, the belief remains: it can't affect me. The pre-disaster conviction seems to be: it can't happen, but if it does I will remain immune. (Wolfenstein, 1957, p. 18)

Similarly, Mechanic (1972, 1978) argued that a sense of invulnerability protects individuals from anxiety and fear concerning low-risk occurrences to which everyone is exposed, and dangers that people are powerless to prevent. In a discussion of the effects of fear arousal on attitude change, Janis (1967) noted that "an endangered person will sometimes resort to a fatalistic outlook, superstitious rituals for warding off bad luck, and other unrealistic forms of reassurance that foster anticipations of total invulnerability" (p. 191). Janis referred to the beliefs that danger will not materialize, or will not affect the individual personally, as "blanket reassurances."

The denial of danger and a belief in personal invulnerability may appear to be extremely unrealistic and irrational. As previously suggested, there are a number of reasons why people may hold certain beliefs other than for the sake of rationality. Abelson (1974) has observed that most of these reasons, such as self-esteem or protection against anxiety, are concerned with "systems-maintenance"--negotiating a complicated, unpredictable, and sometimes threatening world. An

illusion of invulnerability may be a critical source of protection from anxiety, and can be viewed as an effort to cope with uncontrollable and unpredictable negative outcomes. Moreover, the uncertainty of future outcomes, compared with the reality of past events, should afford individuals greater latitude for departures from rationality in their beliefs.

It is important to distinguish between this illusion of personal immunity or invulnerability and the illusion of control. Perceived immunity and perceived control both provide the individual with a sense of safety from negative outcomes, but perceived control applies to positive outcomes as well. Moreover, the sense of safety created by each of these illusions derives from two very different processes--denial versus mastery. To exercise control--real or illusory--over negative outcomes, an individual must acknowledge the threat. Wolfenstein (1957) described this paradox in the relationship between perceived immunity and control:

As to the feeling of immunity, it may be, paradoxically, especially strong when there is nothing one can do to ward off an impending danger. If there is something one can do as a precaution, one may acknowledge the threat to the extent of taking the precautionary measures at one's disposal. Where there is nothing one can do, denial of the threat continues to recommend itself as a defense against anxiety. (p. 20)

Thus, when people perceive themselves to have some control over a negative outcome, denial of the threat and a belief in personal immunity are not only unnecessary, but increase the risk through failure to exercise available precautions. Denial of the threat, involving a clear distortion of reality, is likely to be an

individual's last defense against the prospect of danger (cf. Aronson, 1969).

Two important factors affecting attitudes toward remote threats, according to Wolfenstein (1957), are the perceived likelihood that the threat will materialize, and judgments regarding the possibilities and costs of remedial or preventive action. If there is nothing an individual can do to influence or avoid a remote threat, the individual will tend to deny the threat, even if it is perceived as likely to occur. In addition, there are many dangers over which the individual has some control that are regarded as very unlikely to materialize. Such dangers abound in people's lives, but an individual cannot anticipate and exercise available precautions against all of these remote threats:

Human life is liable to many hazards. People are run over in the street, automobiles collide, travelers are injured or killed in train wrecks or airplane crashes. In the seeming security of one's home one may fall down stairs and break a leg. A child playing hide and seek may close himself in an old ice box and suffocate. One may fall prey to disease or something may go amiss with a vital organ--a heart attack, a brain hemorrhage. The cocktails and cigarettes which we enjoy may be working irremediable internal damage. And then there are the more large scale dangers of fire, flood, earthquake, tornado, and the man-made destruction unleashed in war. As we consider such a list, is not our first reaction apt to be one of smiling? Yes, we will say, and as you are walking down the street a tile may fall from a roof and hit you on the head. But who can worry about all these things? (p. 3)

The inability of an individual to anticipate and take precautions against all remote threats suggests one reason why, from the vantage of hindsight, people may be able to readily identify circumstances or behaviors that contributed to the occurrence of a specific negative

outcome. That is, most people probably fail to exercise precautions against many dangers regarded as possible but unlikely to occur. The individual may be able to influence the occurrence of several, specific dangers, but is unable to guard against all possible threats; denial and belief in personal immunity may be the individual's only defense against this entire class of remote threats. As a result, when one of these many dangers does materialize, individuals are likely to be blamed by themselves or others for failure to foresee the danger or to exercise the precautions available.

Denial, and the feeling of personal immunity, may contribute to the difficulty of inducing people to heed warnings about serious risks such as lung cancer or nuclear accidents (cf. Janis, 1967, 1974; Robertson & Heagarty, 1975). As previously noted, people appear to underestimate their own vulnerability to negative life events; when a threat is acknowledged, people generally judge their own vulnerability to be less than the vulnerability of others. For example, people rate themselves as less susceptible to a variety of diseases (e.g., cancer, diabetes, pneumonia) than "others" or the "average person" (Harris & Guten, 1979; Kirscht et al., 1966; Lang-Gunn, Note 1). Similarly, people judge their chances of being killed or injured in an automobile accident to be less than (40%) or the same as (45%) the chances of people like themselves (Robertson, 1977). In Weinstein's (1980) study, students rated their chances of experiencing a variety of negative events (e.g., divorce, cancer, being fired) as less than their classmates' chances.

The perceived probability of actual danger may be critical in

changing relevant attitudes and behaviors, according to Janis (1967). When people become convinced of their personal vulnerability to a potential danger, they are more likely to accept recommended precautionary measures. However, when there is little or nothing an individual can do to avoid a danger, when an illusion of personal invulnerability is the individual's only defense against a threat, the experience of a personal disaster or a "near miss" can severely challenge the illusion. Exposure to danger can affect the individual's specific expectations regarding a recurrence of the event, or the individual's general expectations about future danger and misfortune.

An illusion of invulnerability that involves a total, rather than a qualified, belief in immunity may be much less resistant to disconfirming evidence in the form of a personal disaster or near-miss experience (cf. Janis, 1951). Janis (1974) observed that "narrowly escaping from danger, losing close friends or relatives, and witnessing maimed bodies appear to have the effect of shattering the entire set of psychological defenses involved in maintaining expectations of personal invulnerability" (p. 162). Mechanic (1978) argued that people are generally able to maintain a relatively strong sense of invulnerability through coping processes and actions, even when they are exposed to increased risk (e.g., combat, disease). However, Mechanic also suggested that a "near miss," such as the death of a close friend or experiencing an automobile accident, can "dramatically undermine one's sense of invulnerability and may lead to extreme anxiety and fear" (p. 258).

Investigators have observed that symptoms of psychological distress are frequently manifested by the individual whose sense of invulnerability has been challenged by the experience of a disaster or near miss (e.g., Janis, 1951, 1974; Grinker & Spiegel, 1945; Wolfenstein, 1957). For example, in their classic account of war neuroses and treatment during World War II, Grinker and Spiegel (1945) observed that soldiers who had lost a sense of personal invulnerability tended to severely over-react to mild threats. These men generally had high morale and confidence about their survival abilities at the beginning of their service, but they gradually lost this sense of personal safety, especially following narrow escapes or other near misses. Grinker and Spiegel (1945) reported that the pilots they studied had experienced a basic change in self-confidence and a sense of helplessness; their ability to fly deteriorated dramatically, and their attitude changed from "nothing terrible will happen to me" to "something terrible is bound to happen to me." Similarly, feelings of vulnerability and loss of control over one's life appear to be common reactions among victims of rape (e.g., Bard & Ellison, 1974; Bryant & Cirel, 1977).

Whether an individual's sense of safety and invulnerability is shattered or preserved following exposure to danger may depend upon the nature of the disaster experience and the individual's past experience. Wolfenstein (1957) described the various reactions:

For the individual who has had his illusion of invulnerability shattered in undergoing the disaster there is apt to be an apprehension that anything may now happen to him. He feels vulnerable; he has lost confidence in his luck . . . But for the one who retained confidence in his

immunity during the worst of the disaster, his survival may serve to confirm his belief that nothing can happen to him. (p. 159)

The person who loses a feeling of personal invulnerability after a near miss may experience emotional disturbances such as acute anxiety, excessive fear, and hypervigilance, and may expect further misfortune. Others may regard their survival as confirmation of their personal invulnerability, and may feel increased confidence about their ability to avoid future negative outcomes (Janis, 1951; Wolfenstein, 1957); they may experience "a feeling of relief, of being blessed, of being warned" (Heider, 1958, p. 141).³

The fear of recurrence is a common reaction among people who have experienced a disaster, and it is often accompanied by a tendency to relive the event (Janis, 1951; Wolfenstein, 1957). This fear is usually unrealistic, and ignores the objective probability of recurrence:

It would seem that for the disaster victim the world has been transformed from the secure one in which he believed such things could not happen to one where catastrophe becomes the regular order. In his drastically altered view a catastrophic universe has come into being . . . In reliving the past event people are preoccupied with what they should have done which they omitted to do. . . . there is apt to be the recurrent question: is there something I can do which will assure immunity? (Wolfenstein, 1957, p. 153)

In summary, an attitude of denial seems to be a common reaction to threats over which individuals clearly have little or no control (e.g., natural disasters). When people cannot maintain an illusion of control over negative outcomes, they appear to adopt an illusion of personal invulnerability: "It won't happen to me." In addition,

there are many events over which the individual may have some measure of control or precaution, but which are sufficiently numerous and remote to recommend a belief in invulnerability as a general defense.

This illusion provides the individual with a "blanket reassurance" that he or she will not experience negative outcomes, but it can have serious consequences when the individual ignores available precautionary measures. Moreover, the actual experience of a disaster or near miss may shatter an individual's illusion of invulnerability and lead to unrealistic, negative expectations. In general, however, an illusion of invulnerability appears to promote positive expectations about one's personal future, and may be resistant to disconfirming evidence in the form of a disaster or near miss experience.

Cognitive Processes and Heuristics

The preceding formulations emphasized motivational processes through which individuals' beliefs and expectations are influenced by their needs and desires. Other research has focused on the cognitive processes involved in making judgments about uncertain events (see Slovic, Fischhoff, & Lichtenstein, 1977, for a comprehensive review). Since an individual's expectations for the future involve judgments about the likelihood of uncertain events, research in this area may elucidate some of the cognitive processes involved in judging the likelihood of future outcomes. Research has revealed that people rely on a limited number of cognitive heuristics, or rules of thumb, to

make judgments about the likelihood of uncertain events. Cognitive heuristics are useful shortcuts in making complex likelihood estimates or predictions, but they can sometimes lead to errors or biases in judgment that are severe and systematic. Several of these judgment heuristics and associated biases are especially relevant to an understanding of how people assess the likelihood of uncertain future outcomes.

Availability. One judgmental heuristic--availability--applies to situations in which people assess the frequency of a class, or the probability of an event, by the ease with which relevant instances of the event can be brought to mind. "For example, one may assess the risk of heart attack among middle-aged people by recalling such occurrences among one's acquaintances" (Tversky & Kahneman, 1974, p. 27). Use of the availability heuristic may bias estimates since some classes or events may be more or less difficult to retrieve from memory, to imagine, or to associate with another event.

In the present context, the availability heuristic suggests that people's estimates of the likelihood of experiencing specific events will be influenced by the ease with which they can recall or imagine the event. Since frequent events are probably easier to recall than infrequent events, availability may often be a useful and valid cue in judgments of frequency or probability (Slovic, Fischhoff, & Lichtenstein, 1977). However, when availability is affected by factors unrelated to likelihood, such as familiarity or emotional salience, use of this heuristic may result in systematic biases.

Research cited earlier on the selective recall of life

experiences suggests that use of the availability heuristic in predicting one's future outcomes will tend to bias predictions toward positive outcomes. To the extent that people's estimates of their future outcomes are based on their recall of past personal experiences, their predictions should favor positive outcomes. The affective neutralization of negative experiences and the tendency to forget neutral experiences (Holmes, 1970) should result in unrealistically optimistic expectations for the future.

Alternatively, the emotional salience and imaginability of events may influence availability and bias predictions. Many negative life events are dramatic and salient, and thus may be more easily recalled or imagined (Tversky & Kahneman, 1973). Catastrophic events such as natural disasters and air disasters are often vivid, sensational events that are highly publicized by the news media. Although most people probably have no direct experience or familiarity with catastrophe, the ease with which they can remember or imagine reports of catastrophe may lead individuals to overestimate the likelihood of such events.

In general, recent or extreme events are likely to be "available" and recalled with relative ease. Tversky and Kahneman (1973) described the operation of the availability heuristic in daily experience:

Perhaps the most obvious demonstration of availability in real life is the impact of the fortuitous availability of incidents or scenarios. Many readers must have experienced the temporary rise in the subjective probability of an accident after seeing a car overturned by the side of the road. Similarly, many must have noticed an increase in the subjective probability that an accident or malfunction will

start a thermonuclear war after seeing a movie in which such an occurrence was vividly portrayed. Continued preoccupation with an outcome may increase its availability and hence its perceived likelihood. People are preoccupied with highly desirable outcomes, such as winning the sweepstakes, or with highly undesirable outcomes, such as an airplane crash. Consequently, availability provides a mechanism by which occurrences of extreme utility (or disutility) may appear more likely than they actually are." (p. 230)

In a series of studies of the judged frequency of various lethal events, Lichtenstein, Slovic, Fischhoff, Layman, and Combs (1978) demonstrated that the frequencies of some lethal events are consistently misjudged. For 41 different causes of death, respondents made paired-comparison judgments of general likelihood (i.e., likelihood for a person in the United States), and judgments of the absolute frequency. The results indicated that the overall accuracy of the relative and absolute frequency judgments was poor, but the judgments were consistent, and were sensitive to the true frequency. In general, the respondents tended to overestimate low frequency causes of death, and to underestimate high frequency causes.

In a subsequent study, Lichtenstein et al. (1978) examined the effects of people's direct and indirect experience with the events, extent of media coverage, and characteristics of the events, such as catastrophic potential (i.e., multiple fatalities from a single occurrence). The results indicated that these measures of the availability of information about the causes of death were related to individuals' judgments of relative and absolute frequency of the events. In addition, personal experience and media coverage were more strongly related to individuals' judgments than to the true

frequencies of the events. Few of the causes of death were judged to be catastrophic in terms of the average number of fatalities from a single episode. However, of the seven causes of death given relatively high catastrophe ratings, six were among the ten most overestimated causes of death: All accidents, motor vehicle accidents, flood, botulism, tornado, and fire and flames.

Examination of the newspaper coverage revealed that many of the causes of death were not mentioned at all during the six month period, including relatively frequent causes such as diabetes and breast cancer. In contrast, some rare causes of death, such as tornadoes, were reported frequently. For example, homicide was reported more often than suicide, although it is considerably less frequent as a cause of death. These investigators suggested that the unrepresentative media coverage of causes of death, particularly the emphasis on sensational and unusual events, may contribute to the tendency to overestimate the likelihood of these events.

In general, the causes of death that were overestimated tended to be sensational or catastrophic: tornado, flood, botulism, homicide, motor vehicle accident, and cancer. The relatively undramatic, "quiet killers" such as asthma, tuberculosis, diabetes, stroke, stomach cancer, and heart disease were underestimated as causes of death. Lichtenstein et al. (1978) concluded that these biases in the judged frequency of lethal events probably reflected use of the availability heuristic, and the influence of the disproportionate exposure, memorability, or imaginability of the events.

The results of these and other studies indicate that individuals'

judgments of the absolute or relative likelihood of various events may reflect the availability of relevant instances, and may be biased by factors such as emotional salience or familiarity. However, these data do not necessarily suggest, for example, that people will tend to overestimate their own chances of experiencing catastrophic events. Other evidence that people neglect population base-rate information in favor of individuating information suggests that these normative judgments are not likely to be regarded as diagnostic of an individual's own chances of experiencing a particular event.

In estimating their own likelihood of experiencing various events or outcomes, people seem to rely on their own personal experience and knowledge. A study of anxiety about illness suggested that personal familiarity increases fear about specific illnesses. Levine (1962) found that people who know a victim of a disease--particularly someone close to them--are more likely to express fear about the disease than people who do not know a victim. Levine (1962) concluded that "familiarity breeds fear . . . those who have had personal experience with an ailment are obviously more aware of its ability to cripple the body and mind of the sufferer" (p. 31). This suggests that in the case of highly undesirable events, both familiarity and emotional salience may contribute to the availability of the information.

In summary, the availability heuristic provides a cognitive mechanism by which people may overestimate the likelihood of positive future outcomes, given the tendency to selectively recall and reminisce about positive past experiences. In making such judgments, people may also be influenced by the ease with which they can recall

relevant instances from the experiences of their acquaintances, and by the familiarity or emotional salience of the events. Moreover, recall of instances from their own personal experience and knowledge should tend to attenuate the inaccuracy in judgment reported by Lichtenstein et al. (1978), in that most individuals probably know more people who have suffered or died from the more frequent quiet killers than from sensational or catastrophic events, such as tornadoes or homicide.

Representativeness. According to Kahneman and Tversky (1973), another judgmental heuristic that people use to make intuitive predictions is representativeness. By this heuristic, people predict the outcome that appears most representative of the evidence. For example, "the probability that Steve is a librarian is assessed by the degree to which he is a representative of, or similar to, the stereotype of a librarian" (Tversky & Kahneman, 1974, p. 1124). Use of the representativeness heuristic may result in serious errors of judgment because similarity, or representativeness, is not influenced by factors that should affect predictions, including the reliability of the evidence and the prior probability, or base rate of the judged event.

In general, there are two types of information available to the individual--individuating and base-rate information. Individuating, or case-specific information, refers to evidence about the particular case under consideration. Base-rate, or distributional information, refers to the distribution of outcomes in a particular situation. For example, in assessing the likelihood that a person will develop a particular illness, information about the person's physical

characteristics, current health, and medical history provides individuating information, whereas the relevant population statistics would constitute base-rate information.

In a series of studies of intuitive prediction, Kahneman and Tversky (1973) demonstrated use of the representativeness heuristic. In these studies, participants neglected base-rate information when individuating information was available. Participants apparently judged the likelihood of different outcomes (e.g., category membership) by evaluating the representativeness of case-specific information, even when this individuating information was regarded by the participants as insufficient or unreliable. By neglecting the base-rate information, participants in these studies erroneously predicted rare events and extreme values.

Nisbett and Borgida (1975) extended these findings and demonstrated that people also neglect base-rate information in making intuitive predictions about behavior. Respondents were provided with information about the behavior of subjects in previous psychological experiments. This base-rate information did not influence respondents' judgments about the behavior of particular subjects in the original experiments, their attributions about the causes of such behavior, nor their predictions about their own behavior in the same situation. In their interpretation of the results, Nisbett and Borgida (1975) contrasted the pallid, abstract, statistical character of base-rate information with the concrete, vivid nature of individuating information.

In the present context, use of the representativeness heuristic

suggests that individuals may ignore base-rate information in judging the likelihood that they will experience specific outcomes, and rely instead on case-specific information. For example, individuals may assess the probability that they will experience a heart attack by evaluating the similarity between their own characteristics (e.g., relevant physical attributes and behaviors) and salient characteristics of people who have had heart attacks. To the extent that individuals perceive shared characteristics among people who have experienced a particular outcome (e.g., the stereotype of heart attack victims as overweight, middle-aged, male executives), they may assess their own likelihood of experiencing the outcome by the representativeness of superficial characteristics, rather than the incidence of heart attack among a specified population.

It is important to note that judgments about one's own future outcomes may represent a special case. When the particular case under consideration is oneself, individuating information is always available in abundance and detail (cf. Jones & Nisbett, 1971). Moreover, base-rate information about many outcomes is usually not available to an individual. Given greater knowledge and involvement, the tendency to rely on individuating information in evaluating the likelihood of an outcome should be enhanced. More detailed knowledge about oneself may allow individuals to make judgments based on the perceived similarity of very specific or minor characteristics that are essentially irrelevant to the outcome. Moreover, increased involvement may encourage individuals to seek points of similarity or dissimilarity between their own case and the general category or

stereotype. For example, if individuals are able to readily identify superficial or minute dissimilarities between themselves and their stereotype of the person who experiences a heart attack, they may severely underestimate their risk of experiencing a heart attack.

The representativeness heuristic is also pertinent to the suggestion that people may have a stereotype of the kind of person who generally experiences positive or negative outcomes (cf. Lerner, 1965, 1970; Lerner & Miller, 1978). Use of the representativeness heuristic may lead people to evaluate their general prospects for the future by the degree of similarity perceived between themselves and a stereotype of people who experience misfortune, for example. With knowledge of themselves and a past perceived as generally positive, individuals may find it easy to conclude that they differ from the type of person likely to experience misfortune, and that their future outcomes, in general, are likely to be positive.

In summary, research indicates that when individuating information is available, people tend to neglect base-rate information in making predictions about outcomes. By emphasizing the similarity (or dissimilarity) of characteristics that may be irrelevant to the outcome, use of the representativeness heuristic may sometimes lead individuals to make inaccurate, unrealistic predictions about their own future outcomes. In addition, judgments about one's own future outcomes appear to represent a special case in which use of the representativeness heuristic may be enhanced by the availability and detail of individuating information, and the importance of the case under consideration.

Causality heuristic. In contrast to Kahneman and Tversky's (1973) assertion that base-rate information is generally neglected in favor of individuating information, Ajzen (1977) demonstrated that individuals' intuitive predictions are influenced by base-rate information when the base-rates have causal relevance to the outcome under consideration. Ajzen (1977) proposed that people have intuitive causal theories of events, and that these theories are invoked in the explanation and the prediction of events. The causality heuristic is a judgmental strategy that relies on these intuitive theories:

Judgment by causality can be described as follows. When asked to make a prediction, people look for factors that would cause the behavior or event under consideration. Information that provides evidence concerning the presence or absence of causal factors is therefore likely to influence predictions. Other items of information . . . will tend to be neglected if they have no apparent causal significance. (p. 304)

Ajzen observed that the base-rate information provided by Kahneman and Tversky (1973) had no causal significance for the outcome (e.g., the proportion of lawyers in a sample does not cause a particular member of the sample to be a lawyer). When respondents are provided with base-rate information that has causal significance (e.g., the rate of passing an examination), their predictions are influenced by the base-rate information. Ajzen (1977) concluded that people utilize information, including population base-rates, to the extent that the information can be incorporated within their intuitive theories of causal relationships.

Following Ajzen (1977), Tversky and Kahneman (1977) also proposed that the influence of information on intuitive predictions depends

upon the perceived causal relevance of the information. In studies of the role of causal thinking in judgments under uncertainty, Tversky and Kahneman (1977) demonstrated the greater impact of causal data on judgments, and provided some evidence that people tend to focus on the causal implications of data for the future, and to neglect the diagnostic implications for the past.

These investigators also concluded that the neglect of base-rate information is a more general phenomenon that is not limited to the use of the representativeness heuristic. When base-rate data have causal significance, or indicate an increased tendency for a particular outcome to occur, the base-rate information should influence intuitive predictions. For example, the differential incidence of lung cancer among men and women should, in addition to any individuating information available, influence judgments about the likelihood of a particular person (or oneself) developing lung cancer.

There is indirect evidence that people use base-rate information about events such as illness. One of the strongest findings reported by Levine (1962) in his study of anxiety about illness was that the perceived prevalence of a disease and personal anxiety were highly and consistently correlated. For example, among the respondents who believed that many people suffer from cancer, two-thirds feared cancer "a lot." In contrast, only 42% of the respondents who believed that relatively few people suffer from cancer expressed the same degree of anxiety. In his interpretation of this finding, Levine (1962) argued that:

People worry about the threat a disease poses for their own well-being (or for their immediate families) more than they worry about threats to the health of others. If, for example, a person believes that his own chances of becoming afflicted with arthritis are great, he is more likely to be fearful of that affliction than if he thinks there is little chance of his contracting it. Thus, the higher the incidence of a disease is thought to be, the greater a person believes his own chances are of becoming afflicted--and, it follows, the greater his anxiety about the disease. (p. 32)

Tversky and Kahneman (1977) argued that people generally rely on causal schemata in explaining or predicting outcomes, and that these schemata are often incomplete and imprecise, and sometimes incorrect (cf. Kelley, 1972, 1973). These investigators suggested that the use or non-use of base-rates can be best understood in terms of the role of this information in causal schemata. Base-rate information which is not causally relevant, or conflicts with an established schema, should have little influence on judgments when individuating information is also available.

The importance of causal reasoning is evident in the apparent ease with which people can provide causal explanations of outcomes they could not predict, and in the apparent difficulty of revising causal theories or schemata in the face of contradictory evidence. Tversky and Kahneman (1977) proposed that people will attempt to assimilate new information, however unexpected, with minimal change in an existing schema.

Intuitive theories of events, or conceptions of cause and effect relationships, offer a cognitive mechanism by which individuals may develop and maintain beliefs about the causes and consequences of events, and judge the likelihood of future outcomes. Exercising

control over some events is not sufficient for understanding or forecasting; predictions about a broad range of events requires generalized principles or "theories." The nature of individuals' theories or "assumptive worlds" was described by Parkes (1971):

Changes in the life space are important or unimportant, depending upon their influence upon the assumptions which we make about the world. . . . Out of the total set of assumptions which we build up on the basis of past experience in carrying out our purposes we create our own "Assumptive World". . . . The assumptive world . . . includes our interpretation of the past and our expectations of the future, our plans and our prejudices. (p. 103)

Intuitive theories represent an individual's understanding of themselves and the world (e.g., Epstein, 1973; Parkes, 1971), and may include, for example, beliefs about the causes of one's own behavior (Nisbett & Wilson, 1977), the contingencies between different events, and the relationship between one's intentions or actions and one's outcomes.

The range in the nature and specificity of beliefs comprising individuals' intuitive theories is suggested by the related concept of cognitive scripts (e.g., Abelson, 1976). A cognitive script is defined by Abelson as "a coherent sequence of events expected by the individual, involving him either as a participant or as an observer" (1976, p. 33). Scripts are learned by participation in, or observation of, event sequences throughout an individual's lifetime. Depending on the level of complexity and abstractness, scripts can be described as episodic, categorical, or hypothetical. Similarly, intuitive theories may include specific beliefs, such as the causes of illness, or factors that contribute to divorce, for example, as well

as general beliefs (or "illusions") of contingency or control, or the distribution of outcomes in a just world (cf. Heider, 1958).

The influence of individuals' a priori understandings and their expectations on judgments was established early in research on impression formation (e.g., Asch, 1946), and has been well-documented and replicated (e.g., Chapman & Chapman, 1967, 1969; Hastorf & Cantril, 1954; Jones & Goethals, 1971; Schneider, 1973; Zadny & Gerard, 1974). Intuitive theories may not be inaccurate (or even verifiable), but they may systematically bias judgments through selective attention to, and use of, information (cf. Erdelyi, 1974; Freedman & Sears, 1965; Matlin & Stang, 1978). Intuitive, a priori theories may sensitize a person to certain information, or may lead to the neglect or rejection of information that is relevant but inconsistent (or incompatible) with the person's understanding.

Ross and his colleagues (e.g., Ross, 1977; Ross, Lepper, & Hubbard, 1975) have provided clear demonstrations of the difficulty of reversing initial perceptions or judgments. These investigators have proposed that two mechanisms are involved in this "perseverance" phenomenon--distortion and autonomy. Distortion in the evaluation of information may lead individuals, for example, to accept information that is consistent with their initial impressions, but is irrelevant or unreliable. As a result, when individuals have an impression or belief, subsequent information will tend to be selectively distorted in support of the existing conception (cf. Festinger, 1957; Heider, 1958).

The second mechanism involves the autonomy achieved by distorted

evidence: "Once formed, an initial impression may not only be enhanced by the distortion of evidence, it may ultimately be sustained by such distortion" (Ross, 1977, p. 206). Thus, once evidence supporting an impression or belief has been accepted and achieves autonomy, it can be discredited without challenging the impression:

The autonomy enjoyed by distorted inferences may further contribute to the perseverance of non-optimal theories . . . The intuitive scientist detects more support for his general theory than is warranted and, having . . . summarized his findings, he is then disposed to maintain his theory in the face of subsequent logical or empirical attacks by "citing" the wealth of seemingly independent support that it enjoys. (Ross, 1977, p. 209)

Ross (1977) suggested that intuitive theories will change, albeit slowly, in response to evidence that presents a strong or consistent challenge.

In the present context, intuitive theories provide a basis for future expectations in the form of an individual's explanations and summary of past outcomes. Such theories may include many beliefs relevant to the likelihood of various outcomes, including general beliefs about the nature of the world, the distribution of outcomes, and the relationship of intentions and actions to outcomes, as well as beliefs about the causes of specific events. Intuitive theories may bias an individual's expectations and judgments about the likelihood of specific outcomes when the individual evaluates information in terms of its compatibility with the theory, rather than its relevance, reliability, or validity.

In summary, research evidence indicates that use of information in making predictions will depend in part on the relationship of the

information to the individual's intuitive theories, including beliefs about cause and effect relationships. The concept of intuitive theories can incorporate many of the illusions discussed earlier, and provides a cognitive mechanism by which individuals may maintain beliefs about the nature of the world, and develop expectations for the future. Such a priori theories may lead to systematic biases in judgments or expectations by sensitizing individuals to information that is consistent (or compatible) with their theories, irrespective of the relevance or quality of the information.

Hindsight effect. Studies of the effect of outcome knowledge suggest that, in hindsight, individuals may revise their predictions about the likelihood of an unexpected outcome (Fischhoff, 1975; Fischhoff & Beyth, 1975). When individuals have knowledge of an outcome and are asked to recall their original predictions, they "remember" assigning a greater likelihood to the event. Moreover, people are largely unaware of the changes in their perceptions resulting from outcome knowledge. Consequently, individuals' impressions of what they would have known without knowledge of the actual outcome are biased, as are their impressions of what they and others did know in foresight.

Thus, once an uncertain outcome has occurred, it may be perceived, in retrospect, as having been almost inevitable. In their hindsight revisions of the perceived likelihood of an outcome, individuals also unknowingly alter their perceptions of the relevance of various information about the event (Fischhoff, 1975). The wisdom conferred by hindsight, particularly the changes in the perceived

relevance of preceding events, was described by Wohlstetter (1962) in her historical analysis of the surprise attack on Pearl Harbor:

It is much easier after the event to sort the relevant from the irrelevant signals. After the event, of course, a signal is always crystal clear. We can now see what disaster it was signaling since the disaster has occurred, but before the event it is obscure and pregnant with conflicting meanings. (p. 387)

Fischhoff (1975) proposed that retrospective changes in the perceived relevance of data reflect individuals' efforts to assimilate knowledge of an outcome with what they know about the event. As previously suggested, the explanation of how or why an event occurred is relatively easy, compared to the task of predicting future outcomes. In hindsight, individuals can often evaluate a sequence of events and identify factors consistent with the occurrence of a particular outcome; inconsistent information may be reinterpreted or ignored. The perceived inevitability of an outcome in hindsight, the conviction that "I knew it would happen," reveal the relative ease with which individuals can identify possible causes in retrospect.

These results indicate one way in which individuals may distort information and perceptions in an effort to assimilate unexpected outcomes with the intuitive theories they use to interpret and anticipate the world. Fischhoff (1975), in a discussion of the implications of the hindsight effect, noted that the increase in the perceived likelihood of an outcome systematically reduces the surprisingness of events, and minimizes learning and improvement of one's intuitive theories: "The very outcome knowledge which gives us the feeling that we understand what the past was all about may prevent

us from learning anything from it" (pp. 298-299).

The hindsight effect may also provide some insight into the tendency to blame victims, including oneself. As previously suggested, blaming oneself or a victim of misfortune implies that similar negative outcomes can be predicted, and perhaps avoided, in the future (e.g., Janoff-Bulman & Lang-Gunn, in press; Lerner, 1970; Wortman, 1976). Exaggeration of the degree to which a person could have foreseen and predicted an outcome should increase the perceived responsibility of the victim. That is, to the extent that an unexpected negative outcome is perceived, in hindsight, as the inevitable and foreseeable result of a person's (or one's own) actions or other known factors, the victim is likely to be blamed, at least in part, for the misfortune. Thus, the hindsight effect reported by Fischhoff suggests a cognitive mechanism that may contribute to the phenomenon of blaming the victim of misfortune.

In the present analysis, the hindsight effect suggests that inaccurate or unrealistic expectations will tend to "persevere." By systematically and unknowingly minimizing the unexpected nature of many events, individuals fail to recognize the inaccuracy of their predictions, and to improve their estimates of the likelihood of uncertain events. As a result, individuals are likely to maintain unrealistic expectations about the future, and they may, in fact, deny themselves the increased ability to anticipate, and perhaps control, future outcomes.

In summary, research has revealed a number of cognitive heuristics that may influence and systematically bias judgments about

the likelihood of uncertain events. Like the motivational influences discussed earlier, these cognitive biases generally appear to promote optimistic expectations for the future. In assessing the likelihood of future outcomes, the biases associated with the use of cognitive heuristics appear to contribute to a tendency to overestimate the likelihood of positive outcomes in the future, and to underestimate the likelihood of negative outcomes. Moreover, unrealistic expectations may persevere, even in the face of disconfirmation, since individuals appear to systematically and unknowingly reduce the surprisingness of unexpected events. Some implications and consequences of unrealistic optimism will be considered in the following section.

The Consequences of Optimism

The theoretical formulations and empirical evidence reviewed in this paper have suggested a number of factors that may tend to promote optimistic expectations for the future. In concluding this review, it is important to consider some possible consequences of optimism, including the psychological functions that may be served by optimism, the psychological benefits of an optimistic outlook, and the psychological effects of unrealistic optimism about the future.

Research suggests that perceived control and an expectation of positive future outcomes are related to psychological and physical well-being. Hopelessness has been viewed as a central component of depression, suicide, sociopathy, and illness (e.g., Beck, 1963, 1967;

Beck, Weissman, Lester, & Trexler, 1974; Melges & Bowlby, 1969; Minkoff, Bergman, Beck, & Beck, 1973; Schamale, 1958). Depressed individuals, for example, appear to have unrealistically negative attitudes toward the future, and recovery from depression involves increases in hopefulness (Vatz, Winig, & Beck, 1969, cited in Matlin & Stang, 1978).

Seligman (1974, 1975) has argued that feelings of helplessness and hopelessness are the result of prolonged experience of non-contingency between one's behavior and outcomes. Learned helplessness, the perception of independence between one's actions and outcomes, involves the belief that one cannot influence the occurrence of positive and negative outcomes. Depressives appear to have a decreased sense of personal control and a markedly increased sense of vulnerability. Langer (1975) suggested that the "illusion of control" may be the inverse of learned helplessness, and research indicates that depressives are less likely than non-depressives to manifest a non-veridical "illusion of control" (e.g., Alloy & Abramson, 1979; Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1979). Thus, some types of depression may be rooted in feelings of a loss of control over one's outcomes, and an "illusion of control" generally appears to be adaptive (Seligman, 1974, 1975).

The perceived ability to prevent or avoid negative outcomes, in particular, has generated considerable research interest. There is a substantial body of empirical evidence indicating that actual or perceived control over aversive stimulation is beneficial (for reviews, see Averill, 1973; Glass & Singer, 1972; Wortman & Brehm,

1975). Even a non-veridical perception of control over an aversive stimulus appears to reduce stress reactions. In a brief review of this research, Lefcourt (1973) concluded:

The perception of control would seem to be a common predictor of the response to aversive events . . . the sense of control, the illusion that one can exercise personal choice, has a definite and positive role in sustaining life. (p. 424)

There is other evidence to suggest that optimism may be physically as well as psychologically adaptive. Feelings of hope and optimism are being recognized as important not only to a sense of well-being, but in the etiology and course of physical illness. The significance of psychological state to disease onset is increasingly being acknowledged (e.g., APA Task Force on Health Research, 1976; Cohen, 1979). For example, Engel (1968) and Schamale (1972) have proposed that feelings of helplessness or hopelessness following an actual or threatened loss may contribute to the onset of disease. Optimism and a positive state of mind are also regarded as significant in the course of physical illness and recovery (e.g., Cousins, 1979; Frank, 1975). Thus, in the case of physical illness, optimism may actually create a self-fulfilling prophecy, decreasing the likelihood of some serious illnesses, or increasing the likelihood of recovery.

In his investigations of sudden death, Richter (1959) concluded that "some of these instances seem best described in terms of hopelessness--literally a giving up when all avenues of escape appeared to be closed and the future holds no hope" (p. 311). Schulz (1976) also suggested that hope is among the most important psychological mediators of life and death outcomes, and identified

perceived control over future outcomes as an essential component of hope (cf. Seligman, 1975). Similarly, Bettelheim (1960) described the relatively swift deaths of concentration camp inmates who had lost hope that they would ever leave the camp alive. Thus, evidence from a variety of sources suggests that feelings of hopefulness about the future, and perceived control over future outcomes, are important to an individual's psychological and physical well-being.

The literature on reactions to disaster reveals the difficulty people have coping with uncontrollable negative life events, and maintaining a view of the world as relatively safe and oneself as relatively invulnerable. Janis (1951, 1974) and Mechanic (1972, 1978) emphasized the psychological importance of a sense of personal invulnerability, and described the effect of a disaster or near miss experience as challenging, and sometimes shattering, an individual's feeling of invulnerability. In his study of the survivors of Hiroshima, Lifton (1971) described the sense of heightened vulnerability experienced by the victims of severe negative events:

This is usually attributed to the shattering of the illusion of personal invulnerability which people tend to hold in both ordinary and dangerous situations. But what also needs to be emphasized is the survivor's having experienced a jarring awareness of the fact of death, as well as its extent and violence. Not only has any pre-existing illusion of invulnerability been shattered, but he has been disturbingly confronted with his own mortality . . . This sense of heightened vulnerability strongly affects the survivor's overall sense of the world around him. (p. 481)

An illusion of personal invulnerability, as previously suggested, may be the individual's final defense against the prospect of uncontrollable negative outcomes. This illusion appears to be a major

source of optimism and protection against anxiety regarding remote threats over which the individual has little or no control. As such, an illusion of invulnerability may be a psychological necessity, a primary postulate in individuals' theories of themselves and the world, relatively resistant to change (cf. Eagly, 1967). Epstein (1973) described an individual's "self-theory" as part of a "broader theory which he holds with respect to his entire range of significant experience. Accordingly, there are major postulate systems for the nature of the world, for the nature of the self, and for their interaction" (p. 407). In the present context, an illusion of relative invulnerability to severe negative events may be viewed as a "higher order postulate" regarding the interaction of oneself and the world, fundamental to the maintenance of an individual's "theory."

The importance and the difficulty of integrating a disaster experience with one's view of the world was described by Wolfenstein (1957):

It is both frightening and offensive to our self-esteem to suppose that our lives can be drastically altered or disposed of altogether by the action of chance and meaningless forces. . . . When the toll of the disaster is reckoned up afterwards the problem arises for many of those affected how to fit the occurrence of such devastation and loss into their view of the world. The question of why such a thing should have happened comes up repeatedly, and answers in terms of mere physical forces (in the case of a tornado, for instance) often leave a sense of painful puzzlement. Answers are sought rather in terms of a purpose which would give meaning to what has happened, or an agency to which responsibility and blame can be attached. (pp. 199-200)

Thus, in the aftermath of a disaster or near-miss experience, the individual must attempt the difficult task of reconstructing a

world-view that promotes a sense of personal safety and relative invulnerability, and reassures the individual about future outcomes.

In the case of severe and unexpected outcomes, the individual is likely to seek control over the possible recurrence of the outcome by an understanding of how or why the outcome occurred (cf. Bucher, 1957; Drabeck & Quarantelli, 1967). Heider (1958) emphasized the importance of causal attribution in understanding the meaning of a harmful event: "Without attribution to causal source and intention, (the person) could neither avoid nor prevent, but would be at the mercy of seemingly fickle events in the environment" (p. 257). Lazarus (1966) also noted the importance of control and mastery in an individual's cognitive appraisal of a threat, and an individual's sense of control over future threatening outcomes in delayed appraisals, after a confrontation with danger: "If . . . the experience is interpreted to mean that his impressions of invulnerability are not justified and that he lacks control over his destiny, it may frighten him greatly" (p. 42).

Self-blame attributions, as previously noted, provide the individual with a means of restoring a sense of safety regarding future outcomes. It may be difficult to blame oneself for negative outcomes, but it may be more threatening to view the world as a place where severe, uncontrollable outcomes happen to people on a random basis (Janoff-Bulman & Lang-Gunn, in press; Lerner & Miller, 1978; Wortman, 1976). Medea and Thompson (1974), for example, described the need for future control expressed in the self-blame of rape victims:

What appears to be guilt . . . may be the way the woman's mind interprets a positive impulse, a need to be in control of her life. If the woman can believe that somehow she got herself into the situation, if she can feel that in some way she caused it, if she can make herself responsible for it, then she's established a sort of control over the rape . . . If it happened entirely without provocation, then it could happen again. This is too horrifying to believe, so the victim creates an illusion of safety by declaring herself responsible for the incident. (pp. 105-106)

Thus, optimism about the future appears to be significant in terms of the individual's psychological and physical well-being. When the source of that optimism, such as perceived control or invulnerability, is challenged, individuals are likely to make efforts, through their interpretation and explanation of the event, to restore the source of their optimism, and to reassure themselves about future outcomes. However, the distinction between perceived control and an illusion of invulnerability suggests that optimism may not always be adaptive, depending upon the source and accuracy of individuals' expectations. Individuals' responses before and after a severe negative event may depend, in part, on whether their expectations are based primarily on perceived control or on an illusion of invulnerability.

In general, when the individual can, in fact, influence the occurrence of a particular outcome, optimism about that outcome based on perceived control will likely be realistic and adaptive. For example, if individuals are optimistic that they will not develop lung cancer because they do not smoke cigarettes, their optimism is probably warranted and beneficial.⁴ Likewise, optimism based on denial and an illusion of invulnerability is probably an accurate and

adaptive response toward unlikely, remote threats. Events such as natural disasters or air disasters are so unlikely and uncontrollable, denial that they will happen, or happen to oneself, is probably realistic and adaptive for the individual.

In contrast, minimizing one's control and maintaining an illusion of personal invulnerability may be maladaptive for outcomes over which the individual can exert some control (e.g., lung cancer). A degree of perceived vulnerability necessary to acknowledge a danger may be important in dealing effectively with realistic threats and risks. The individual who denies that he or she will experience a particular outcome, who maintains that "it won't happen to me," may actually increase their risk by neglecting to exercise available precautions (Janis, 1967, 1974). Moreover, the person who denies a threat and fails to take precautions may experience more emotional distress if the threat actually materializes.

Likewise, optimism that exaggerates the individual's actual control is likely to be maladaptive. Wortman and Brehm (1975) have argued that an accurate assessment of one's potential for control will generally be more adaptive than an assessment which exaggerates an individual's perceived control. There are many life events that are largely unpredictable or uncontrollable (e.g., natural disasters, serious illness), events over which the individual cannot, realistically, exert control. When a threat is truly uncontrollable and remote, it may be most adaptive for the individual to acknowledge the uncontrollable nature of the event and to maintain an illusion of relative invulnerability. Exaggerated notions of personal control, or

extensive past experience with control over important events in one's life, may make it more difficult for an individual to accept and cope with uncontrollable outcomes when they do occur (Wortman, 1976). Moreover, Langer (1975) suggested that an illusion of control may contribute to manic reactions, and noted Beck's (1967) description of the manic patient as "optimistic about anything he undertakes. Even when confronted with an insoluble problem he is confident that he will find a solution (p. 93)."

In general, then, optimism based on a relatively accurate assessment of the likelihood of specific outcomes, and an individual's potential for control, is probably the most adaptive for the individual (cf. Wortman & Brehm, 1975). There is evidence suggesting that individuals who have accurate expectations about a stressful event cope better than individuals with unrealistic expectations (e.g., Janis, 1958). However, the preceding review has identified many cognitive and motivational factors that may bias individuals' judgments about the likelihood and controllability of outcomes, making an accurate assessment difficult, at best.

Moreover, since individuals rarely have complete control over important outcomes, some sense of personal invulnerability toward most negative events may be beneficial. Janis (1951) argued that a qualified rather than total belief in personal immunity may be the most favorable condition for coping with extreme events. Similarly, in a discussion of the consequences of the denial of danger, Wolfenstein (1957) suggested that:

There is likely to be more emotional disturbance following the event on the part of those who beforehand warded off all anxiety, and denied the reality of the threat, than on the part of those who were able to tolerate some anticipatory alarm and to acknowledge that the danger could happen. Anticipation constitutes a small-scale preliminary exposure on the level of imagination and can have an inoculating effect. By rehearsing and familiarizing oneself with the coming event one may reduce the risk of being overwhelmed by the experience. . . . The individual who to retain his sense of safety must deny that anything terrible will happen has his feeling of security shattered when danger materializes. The person who admits that extremely dangerous events may occur, but retains the belief that he himself will survive, is the one who is apt to emerge from danger with less disturbance. (pp. 25-26)

Thus, optimism, and an illusion of invulnerability qualified by an acknowledgement of potential danger, may be the most adaptive response to the prospect of severe negative events. Janis (1958) has suggested that awareness and rehearsal of potential threats--the "work of worry"--is a form of cognitive preparation that may ultimately enhance the individual's ability to accept and cope with unpleasant events, at the cost of immediate stress reactions. In addition, accurate information about what to expect, and what one can do, if anything, may benefit the individual.

Similarly, in the cognitive model of stress and coping developed by Lazarus (1966) and his colleagues, coping involves cognitive appraisals of a threat and coping options both before and after the threat has materialized. According to this model, cognitive (or intrapsychic) processes, including denial, avoidance, and detachment, are an especially important mode of coping when there is little that an individual can do directly. This model suggests that for uncontrollable negative outcomes, an individual's expectations about

future outcomes, and attributions for past outcomes, represent a significant aspect of the coping process.

From this perspective, optimism about future outcomes, particularly uncontrollable negative outcomes, can be regarded as a form of "anticipatory coping." Research on coping with events such as serious illness, natural disasters, and criminal victimization, has focused almost exclusively on individuals' subsequent reactions, and has sometimes noted the impact of the event on individuals' future expectations. However, the role of individuals' prior expectations regarding an outcome, and the relationship between their expectations and their subsequent coping efforts (including attributions), has been largely ignored.

In summary, there is some evidence to suggest that optimism may be psychologically and physically adaptive, and that a sense of relative invulnerability may be a psychological necessity in a world full of remote threats. Optimism about negative events can be viewed as a form of anticipatory coping, and individuals' expectations about an outcome are likely to affect their reactions following the experience of the outcome. The experience of severe negative events (e.g., natural disasters) that disconfirms an individual's optimism and violates a sense of control or invulnerability appears to produce psychological distress and a heightened sense of vulnerability. Efforts to cope in the aftermath of an unexpected negative outcome and to restore optimism about the future often seem to involve a search for meaning and attributions about the cause of the event. The most psychologically adaptive attitude toward remote threats may be an

illusion of relative invulnerability qualified by an acknowledgement of potential danger, and an accurate assessment of one's control over the outcome.

Optimism: Meaning and Measurement

Throughout this review, issues concerning the definition and veridicality of optimism have been diligently avoided, on the assumption that readers share an understanding of the term, and in an effort to consider a broad range of phenomena that might be regarded as optimistic. Clearly, however, any endeavor to systematically investigate optimism must ultimately address issues of meaning and measurement. Optimism is commonly understood to denote "an inclination to put the most favorable construction upon actions and events or to anticipate the best possible outcome" (Webster's New Collegiate Dictionary), "an attitude characterized by hope . . . and faith in the future" (Chaplin, Dictionary of Psychology). These popular definitions refer primarily to the relative perceived likelihood of positive and negative outcomes. By definition, then, the essence of optimism is an asymmetry in the expectation of positive and negative outcomes.

Beyond the fundamental definition of optimism as the expectation of positive outcomes, the term "optimism" sometimes connotes an unfounded or unrealistic expectation of positive outcomes. In this sense, optimism approaches what is usually regarded as "wishful thinking," expectations based on one's desires, independent, and

sometimes a contradiction of reality. In such instances, an individual's optimism about the future may be evaluated by others as "unwarranted" or "unrealistic." Similarly, an individual may express optimism with varying degrees of certainty or conviction, as in "guardedly" or "cautiously" optimistic. Thus, optimism, per se, is not inherently unrealistic or biased, but it may be regarded, in some instances, as unrealistic.

The degree to which an optimistic expectation is realistic may be evaluated in terms of the accuracy or completeness of the information on which the expectation is based. For example, optimism may be unwarranted, or unrealistic, because its source is inaccurate (e.g., an illusion of contingency, control, or invulnerability), or inappropriate, in that it bears no relationship to the occurrence of the outcome (e.g., desire). Optimism may also be unrealistic if it is not based, at least in part, on relevant information available about the likelihood of a particular outcome, including both individuating information and the actual or perceived base-rate of the outcome.

Thus, optimism about specific positive or negative outcomes may be evaluated as unrealistic, at least in part, by the extent to which it departs from the objective prior probability of the outcome. For example, the individual who expects to win the state lottery despite the very low odds of winning may be described as unrealistically optimistic. Similarly, the person who does not wear seat belts and expects to survive an automobile accident is unrealistically optimistic. In each of these instances, the individual's expectations clearly contradict the known or estimated probability of the

particular outcome.

However, it is usually difficult to determine whether or not a given individual's expectations about the future are realistic. The source of an individual's optimism may include fundamental beliefs or postulates that are not easily articulated or assessed. In addition, information about the base-rate or prior probability of the outcome is not readily available for many positive and negative life events. Moreover, expectations should also be influenced by relevant individuating data, and individuating information is almost always available in making judgments about oneself.

This analysis has important implications for an understanding and evaluation of optimism. Evidence of optimism generally derives from the two asymmetries in judgment described in this review--the asymmetries in expectations of positive versus negative events, and expectations for oneself versus others. Specifically, people judge that positive outcomes are more likely than negative outcomes, and that they are more likely to experience positive outcomes and less likely to experience negative outcomes than others. These comparisons provide evidence of optimism in individuals' judgments, but they do not necessarily demonstrate bias or distortion in judgment.

An asymmetry in the expectation of positive versus negative outcomes may simply reflect individuals' perceptions of the actual distribution of positive and negative outcomes (cf. Kanouse & Hanson, 1971). This perception may be an accurate reflection of the individual's personal history and experience, or may develop as a product of selective recall of one's experiences (cf. Matlin & Stang,

1978). Thus, differences in the judged likelihood of positive and negative outcomes may demonstrate optimism, but not necessarily optimism that is unrealistic or distorted by personal motivations and desires.

Similarly, asymmetries in individuals' expectations for themselves versus others may simply reflect differences in the availability of relevant individuating information. The individual, as Weinstein (1980) noted, may be quite correct in asserting that his or her chances of experiencing an outcome are greater or less than average. The perceived or actual base-rate provides individuals with the best estimate of the likelihood of experiencing an outcome for an unknown other or the "average" person, given the absence of individuating information. However, individuals' judgments about their own likelihood of experiencing an outcome may qualify the base-rate prediction with individuating information in the form of their personal knowledge and experience.

In short, differences in individuals' expectations for positive versus negative outcomes, and for themselves versus others, demonstrate optimism, but do not necessarily provide evidence of systematic bias or distortion in judgments about future outcomes. The demonstration of bias would require evidence, for example, that individuals' judgments are systematically influenced by factors irrelevant to outcome likelihood, such as perceived threat or desirability. For instance, the judgment that positive events are more likely than negative events given equal base-rates would provide evidence of bias. Similarly, judgments that are differentially

influenced by relevant information may provide evidence of distortion. For example, the selective use or neglect of base-rate information as a function of its favorability would provide some evidence of bias.

An alternative approach, used by Weinstein (1980), is to demonstrate optimistic bias in group judgments. If the average judgment of a group is that their chances of experiencing an outcome are greater or less than average, Weinstein (1980) argued, the judgments are systematically biased, and provide evidence of unrealistic optimism. As previously noted, Weinstein (1980) acknowledged that discrepancies between the perceived population average and judgments about one's own likelihood do not provide evidence of bias, since a given individual's likelihood may not coincide with the population base-rate. However, the control of event characteristics, such as desirability or base-rate, can provide tests of bias that are not limited to group judgments, and provide information about some of the processes involved in judgments about future events, rather than simply a demonstration of bias.

In the measurement of perceived likelihood or probability, it is important that investigations of optimism and the differential effects of event characteristics on judgments, obtain separate, rather than comparative judgments of likelihood for oneself and others. In contrast, respondents in Weinstein's (1980) study made a comparative judgment of their chances of experiencing various outcomes compared to other students at the college (i.e., perceived base-rate). Response options ranged from "100% less than average" to "five times greater

than average." Use of a comparative judgment limited this study to a demonstration of "optimistic bias," rather than optimism, per se, since these judgments obscure the absolute degree of optimism or perceived likelihood. That is, respondents may perceive their own chances of experiencing an outcome to be greater or less than average, but they may judge the outcome to be relatively likely or unlikely.

Moreover, the use of comparative judgments about one's own likelihood compared to others obscures potential differences in the relationship between event characteristics and judgments about oneself versus others. Weinstein (1980) found that event characteristics were differentially related to comparative judgments about positive versus negative outcomes. The present review and analysis suggests that many of these characteristics should also differentially affect judgments about oneself versus others. For instance, motivational considerations suggest that the desirability or importance of an event should have a greater influence on judgments about one's own likelihood of experiencing an event than on judgments regarding others. Thus, measures of comparative rather than separate judgments of outcome likelihood for self versus others involves a considerable loss of information significant to an understanding of optimism.

In summary, optimism denotes an expectation of positive outcomes that is not inherently unrealistic or biased. The degree to which an optimistic expectation is unrealistic or unfounded generally depends upon the accuracy and completeness of the beliefs and information on which the expectation is based. Optimism may be unrealistic if it is based on inaccurate beliefs (e.g., illusion of control, illusion of

contingency between desire and outcome), or if it neglects relevant information about the likelihood of the outcome, including both base-rate and individuating information.

Asymmetries in expectations of positive versus negative outcomes, and expectations for oneself versus others, demonstrate optimism, but do not necessarily reveal bias or distortion in judgment. Bias may be evident in discrepancies between group judgments and the perceived or actual base-rate, or in the influence of factors varying in relevance to judgments of outcome likelihood. Demonstrations of optimism would seem to require separate, absolute measures of perceived likelihood or probability, rather than comparative judgments.

Summary

The studies reviewed in this paper provide considerable evidence that people expect that their personal futures will be positive, in general, and in terms of specific outcomes. The review of relevant social psychological theory and research identified a number of motivational and cognitive factors that may promote optimistic expectations for the future by leading individuals to overestimate the likelihood of positive outcomes and to underestimate the likelihood of negative outcomes.

The asymmetry often observed in individuals' explanations for positive and negative outcomes apparently extends to their predictions about future outcomes. This review suggests that many of the same motivational and cognitive processes may contribute to the divergence

in individuals' explanations and expectations of positive and negative outcomes. People appear to exaggerate the relationship between their desires, intentions, and actions, and their past and future outcomes. They minimize the role of chance in producing outcomes, and exaggerate their own control. Not surprisingly, people also seem to rely heavily on their own personal experience, through which they appear to develop generalized beliefs or "theories" about themselves and the world. Moreover, these theories tend to persevere, even in the face of contradictory information.

The operation of these various motivational and cognitive processes in individuals' explanations and expectations about positive and negative outcomes may be influenced by two characteristics unique to judgments about oneself. First, an individual's own past experience and future prospects are inherently important, and this importance to the individual may qualify the influence of motivational and cognitive factors. Motivations for control, safety, or wish fulfillment, for example, may be magnified in the consideration of one's own past and future outcomes. Second, individuals have detailed knowledge about themselves--their own motives, intentions, personal experience and history (Jones & Nisbett, 1971). The availability and richness of this information makes it likely to be favored over other types of information (e.g., normative data) in forming judgments.

In addition, individuals' predictions about their future outcomes may be even more susceptible to bias than their explanations of past outcomes because of a fundamental difference in the nature of these two judgment tasks. Uncertainty, or ambiguity, is a key feature of

efforts to forecast the future. In contrast, explanations about past outcomes are constrained, to some degree, by the facts, which must be incorporated into any "reasonable" or satisfactory explanation. Thus, the uncertain nature of future events may enhance the potential influence of motivational and cognitive biases.

The source and degree of optimism in judgments about the likelihood of a future event are likely to vary as a function of the perceived characteristics of the event. This review has revealed several event characteristics that are likely to influence judgments and optimism: perceived desirability or severity, perceived likelihood (or base-rate), and the perceived controllability of the event. In addition to these event characteristics, personal experience or familiarity with an event appears to affect judgments about the likelihood of experiencing an outcome.

However, despite the wealth of indirect evidence of optimism about the future, and the considerable body of research on how people judge the likelihood of uncertain events, there is relatively little direct evidence regarding the nature and sources of optimism about future life events. Research on judgment processes has focused almost exclusively on judgments about hypothetical or remote events, and have not studied judgments about oneself, or events of importance to the individual. Similarly, the early studies of "wishful thinking" (e.g., Cantril, 1938; Lund, 1925; McGregor, 1938), which emphasized the roles of ambiguity and personal importance in the influence of subjective factors on predictions, generally examined judgments about remote social events, rather than events of personal consequence to the

individual.

Weinstein's (1980) research provided a demonstration of an "optimistic bias" in comparative judgments about self and other, and indicated that individuating information about others (viz., lists of relevant factors prepared by other students) reduced but did not eliminate the optimism expressed in comparative judgments. However, it is not clear from these data whether the individuating information about others affected judgments about oneself or others. Moreover, given the relatively small, albeit significant, reduction in optimism, Weinstein (1980) concluded that "there appear to be more persistent sources of optimism . . . that cannot be eliminated just by encouraging people to think more carefully about their comparative judgments or by providing them with information about others" (p. 817). Similarly, in their study of egocentrism in judgments about negative events, Weinstein and Lachendro (1982) concluded that optimism about oneself relative to others does not result from a lack of information about the attributes and actions of others.

In an effort to further establish some of the motivational and cognitive factors that may contribute to optimistic expectations, the present study examined the effects of event severity and information about population base-rates on judgments about the likelihood of negative life events. It is commonly observed that people expect misfortune to happen to others, not to themselves. The present analysis suggests that event severity and the use (or non-use) of base-rate information may contribute to optimistic expectations and this asymmetry in judgments about the likelihood of future events.

A fundamental hypothesis regarding optimism about negative life events is that severe negative outcomes are perceived as less likely than mild negative outcomes. To control the objective likelihood of mild and severe events, base-rate information was provided in some conditions, with mild and severe events matched on the base-rates specified. It was hypothesized that event severity (mild versus severe) would influence judgments even when the perceived probability is controlled. That is, individuals would judge severe outcomes to be less likely, in general, than mild outcomes, even under conditions of equal base-rate. Given the personal importance of predictions about one's own future outcomes, it was also predicted that event severity would have a stronger effect on judgments about oneself than on judgments about others. Thus, underestimation of the likelihood of negative events, especially severe negative events, was predicted to be greatest in judgments regarding one's own future outcomes.

In addition, it was hypothesized that both mild and severe negative outcomes would be judged less likely to happen to oneself than to others. Like the preceding hypothesis, this hypothesis derived from a consideration of both cognitive and motivational processes. Under conditions of no base-rate information, this pattern of results for self versus other judgments would be a partial replication of Weinstein's (1980) major finding, using separate judgments for self and other.

When base-rate information is provided, it was predicted that judgments of outcome likelihood for others would be revised in the direction of the base-rate specified. Base-rate information should

affect judgments about the likelihood of future events, even when case-specific (i.e., individuating) information is available. To the extent that individuating information is available, judgments should not be expected to coincide with the population base-rate, but should be influenced by base-rate information.

It was hypothesized that for judgments of their own likelihood of experiencing various life events, individuals would selectively use base-rate information. That is, it was predicted that individuals would use base-rate information "objectively" to the extent that the information is favorable and supports or enhances optimistic expectations for the future. If the base-rate specified is more favorable than the perceived base-rate (i.e., lower probability), individuals would revise their judgments of their own likelihood of experiencing the outcome. If the base-rate specified is less favorable (i.e., higher probability) than their estimate, individuals would reject base-rate information in judging the likelihood of their own future outcomes.

The latter hypotheses regarding the use of base-rate information predicted that individuals would not consistently ignore base-rate information in making judgments about future life events. Rather, individuals would use causally significant base-rate information to the extent that it has no personal consequences, as in judgments about others, or to the extent that it is consistent with their self-interest (cf. Abelson, 1974).

This study was intended to provide further evidence of optimism in judgments about future life events, and to elucidate some of the

factors that influence judgments about uncertain events. The selective use of base-rate information would establish a possible mechanism by which optimistic expectations are maintained or enhanced--the selective use of objective information (cf. Ross, 1977). Selective use of base-rate information may lead to large and persistent biases in individuals' expectations for the future. These biases may be serious in their implications, in terms of the likelihood of unexpected or unrealized outcomes, and responses to realistic risks. For example, public health efforts often rely on success in convincing members of the population, or subgroups, that they are "at risk."

In addition to the major hypotheses tested in the present study, secondary measures were included to assess judgment certainty, some perceived characteristics of each outcome, personal concern about each outcome, and personal experience with each outcome. These measures were included to explore the potentially significant relationships between each of these variables and judgments of outcome likelihood. For example, a measure of judgment certainty was included in an exploratory effort to determine whether optimism that is unrealistic is associated with greater uncertainty. Similarly, measures of perceived controllability were included to examine the relationship between perceived controllability and optimism about negative life events. This review suggests that if individuals have an "illusion of invulnerability," optimism will not be limited to events perceived as controllable, contrary to Weinstein's (1980) conclusion.

C H A P T E R I I

METHOD

Overview

The primary purpose of this study was to investigate the effects of the severity of an event (mild or severe) and base-rate information on judgments about the likelihood of negative future life events. The respondents were asked to make judgments about the likelihood of themselves and others experiencing each of several negative life events. Some respondents were provided with information specifying a population base-rate for each event. The questionnaire contained items designed to measure judgment certainty, perceived characteristics of each event (e.g., severity, predictability, and controllability), personal concern, and personal experience with each event.

Respondents

The respondents were 206 students enrolled in an introductory psychology course at the University of Massachusetts. The respondents received course credit for their participation in the study.

Design

The experimental design was a mixed design, with two between-subjects factors (severity of event, base-rate information), and one within-subjects factor (events within severity condition). The design included two event severity conditions (mild versus severe), and two base-rate information conditions (no base-rate information versus base-rate information). Both severity conditions contained four events (see Table 1). The mild and severe versions of each event were matched on specified base-rate.

Table 1
Experimental Design

	Mild	Severe
	Event ₁ - Event ₄	Event ₁ - Event ₄
No base-rate information	53	51
Base-rate information	51	51

Note. Values represent cell ns.

Procedure

The study was conducted during a regularly scheduled class session, and was introduced as a study of predictions about the future. The cover sheet with instructions included examples to clarify the meaning of probability judgments. Respondents were given a questionnaire about either mild or severe negative life events. Events were presented in a fixed sequence, with the order of self and other judgments (i.e., probability estimates and certainty judgments) counterbalanced across conditions. One-half of the questionnaires specified a population base-rate for each event. The four versions of the questionnaire (see Appendix) were distributed randomly.

Independent Variables

Event severity (mild versus severe) was manipulated by varying the relative severity in the description of each event. Four life events in the areas of marriage, health, crime, and employment were described, with a relatively "mild" and severe version of each event (see Table 2). For example, the mild and severe negative life events concerning marriage were "temporary marital difficulties resulting in a short-term separation" and "divorce," respectively.

The availability of base-rate information (no base-rate information versus base-rate information) was manipulated by providing population base-rate figures in the description of each event for respondents in the base-rate information conditions. For example:

Table 2
Life Events & Base-rates Specified

<u>Base-Rate</u>	<u>Severity</u>	<u>Event</u>
MARRIAGE		
35%	Mild	Temporary marital difficulties resulting in a short-term separation
	Severe	Divorce
EMPLOYMENT		
20%	Mild	Required to accept a job outside chosen field for a year or longer
	Severe	Unemployed and unable to find a job for a year or longer
CRIME		
25%	Mild	Victim of major property crime (motor vehicle or major household theft, etc.)
	Severe	Victim of personal crime (assault, rape, mugging, etc.)
HEALTH		
15%	Mild	Curable (non-fatal) form of cancer
	Severe	Terminal (fatal) form of cancer

Divorce. Figures published recently by the U. S. Department of Health and Human Services indicate that 35% of married persons will experience a divorce during their lifetime.

The base-rates specified ranged from 15% to 35% for the four events, with the same base-rate specified for the mild and severe version of each event (see Table 2).

The base-rates specified were estimates based on the limited information available, and the constraint of equal base-rates in the mild and severe conditions. For some events, actual base-rate information was not readily available, and available information was not in the form required (i.e, probability during one's lifetime). Thus, the figures provided as actual rates were derived from population data, but are estimates adjusted to serve as a common base-rate in the mild and severe conditions.

Dependent Measures

All respondents were asked to complete a questionnaire containing the following measures.

Perceived Population Base-rate

Respondents were asked first to judge the probability that the average person in the general population would experience each event. In the base-rate information conditions, these judgments were made prior to receiving base-rate information. In addition, in the series

of questions about each event, respondents were asked to judge the general likelihood of the event on a 7-point scale ranging from "very unlikely" to "very likely." This item was included as an independent measure of perceived likelihood.

Probability Judgments: Self and Other

For each event, respondents were asked to estimate the probability that they would experience the event in the future, and the probability that the average person in the class would experience the event.

Judgment Certainty

Respondents were asked to indicate their degree of certainty in their probability estimates for self and other by rating their certainty on 7-point scales anchored by "completely certain" to "not certain at all."

Perceived Characteristics of Event

For each event, respondents were asked to provide the following ratings on 7-point bipolar adjective scales: mild-severe, predictable-unpredictable, important-not important, fair-unfair, and threatening-not threatening.

Perceived Control: Self and Other

To measure perceived control over each event, respondents were asked to indicate the extent to which they believe that they can effectively control or prevent the occurrence of each event. Ratings were provided on 7-point scales, ranging from "no control" to "complete control." Respondents were asked to make the same judgment about the average person in the class.

Personal Concern

To measure personal concern about each event, respondents were asked to indicate the degree of their concern or worry about the possibility of experiencing each of the four events. Ratings were provided on 7-point scales ranging from "very concerned" to "not at all concerned."

Personal Experience

Respondents were asked to describe their experience with each event using the following response categories: 1 = has not happened to anyone I know; 2 = has happened to acquaintances; 3 = has happened to close friends or relatives; 4 = has happened to me personally. In addition, respondents reporting that acquaintances, close friends, or relatives have experienced the event were asked to indicate the number of people they know who have experienced the event.

Self Descriptions

Finally, the respondents were asked a series of questions to assess self-perceptions of optimism and both general and relative life satisfaction. Three items asked respondents to rate on 7-point scales how optimistic they are, and how happy and lucky they are compared to most people. Two items asked the respondents about their relative life satisfaction; specifically, respondents were asked to rate how life has treated them, compared to the average person in the country, and compared to the average person in the class. Finally, three items to assess life satisfaction were adapted from the personal ladder ratings of Cantril's (1965) "self-anchoring striving scale." For these questions, respondents were asked to imagine the worst and best possible life for themselves, and to rate, on 7-point scales, where they stand at the present time, where they stood five years ago, and where they think they will stand five years from now. These three items--past, present, and expected future life satisfaction--were treated separately and combined, as an index of life satisfaction.

CHAPTER III

RESULTS

Overview

The data were analyzed by 2 x 2 x 2 x 4 mixed design unweighted means analyses of variance, with three between-subjects factors (severity, base-rate, and sex of respondent) and one within-subjects factor (event). These analyses provided tests of the main effects for severity, base-rate information, sex, and event, and the interactions among these factors. To assess the differential effects of the independent variables on self versus other judgments, five-way mixed design analyses of variance were conducted for the measures of probability, certainty, and control, treating type of judgment (self or other) as an additional within-subjects factor.

Subsequent to the analyses of variance, differences among cell means for significant effects were analyzed with the Newman-Keuls ($\alpha_{EW} = .05$) and other multiple comparison procedures. Specific internal analyses were conducted to test the hypothesis regarding the selective use of base-rate information, and correlations among selected measures were also examined.

Manipulation Checks

The effect of order of judgments (self and other), counterbalanced across conditions, was tested directly. For the first and subsequent events, there were no significant differences between self and other probability judgments as a function of order of presentation (all p s $> .25$). Therefore, all subsequent analyses are reported for conditions collapsed over order of presentation of self and other items.

The manipulation of event severity was confirmed by respondents' ratings of severity and threat. There was a significant main effect of severity for both the mild-severe rating [$F(1, 192) = 77.85, p < .001$] and the threatening-not threatening rating [$F(1, 193) = 60.31, p < .001$]. Each of the events in the severe condition was judged to be more severe and more threatening than the corresponding event in the mild condition (see Table 13).

As expected, base-rate information had no significant effect on the initial probability judgments (i.e., perceived population base-rates) made prior to the presentation of base-rate information (all p s $> .20$). Base-rate information also had no significant effect on ratings of event likelihood [$F(1, 195) = 0.84, p > .60$], but did have significant effects on the more direct measures of self and other probability estimates. The nature of these effects will be described in the following section.

Probability Judgments

Effects of Severity

The first hypothesis advanced regarding optimism about negative life events stated that severe negative outcomes are perceived as less likely than mild negative outcomes. For the estimates of population, self, and other probability, a consistent, significant main effect for event severity was obtained (see Table 3). For each of these measures, the mild negative event was judged to have a higher probability than the severe negative event. The magnitude of the effect for event severity varied across the four life events, as indicated by significant severity x event interactions for each of these measures. However, for every probability judgment and event, the mild version of the event was judged to be more probable than the severe version.

The hypothesized main effect for type of judgment (self versus other) on probability estimates was confirmed. Both mild and severe outcomes were judged less likely to happen to oneself than to others [$F(1, 187) = 142.31, p < .001$]. That is, the average person in the class judged themselves to be significantly less likely than the "average person in the class" to experience both the mild and the severe negative events.

The extended hypothesis that event severity would have a stronger effect on judgments regarding one's own future outcomes than on judgments about others received only marginal support from the data.

Table 3
Mean Probability Estimates for Population, Self, and Other

Condition	Probability Estimate		
	Population	Self	Other
Mild	52.20*	39.94*	47.76*
Severe	43.95	28.93	38.24
No base-rate	49.10	37.88*	48.18*
Base-rate	47.23	30.97	37.71
Females	51.97*	38.64*	47.00*
Males	43.95	29.47	38.49
Event #1	52.19*	28.49*	46.07*
Event #2	55.04	39.03	47.19
Event #3	48.35	40.06	44.85
Event #4	37.03	30.05	33.88

Note. Significance levels refer to analysis of variance main effects for each of the dependent measures.

* $p < .001$

The interaction between severity and type of judgment (self versus other) was not significant [$F(1, 187) = 0.55, p > .50$] over all events (see Table 3). However, there was a significant interaction of severity, type of judgment (self versus other), and event [$F(3, 561) = 3.63, p < .02$]. The means presented in Table 4 suggest that, with the exception of Event #4 (health), severity tended to have a greater impact on self than other judgments, resulting in a greater

discrepancy between self and other probability estimates for severe events. However, given the relatively large between-subjects variability in probability estimates, the differential effect of severity on self and other judgments for these events only approached statistical significance. Orthogonal contrasts comparing the magnitude of the severity effect between self and other judgments for the first three events were only marginally significant [$t(561) = 1.63, p < .15$]. For the fourth event, the magnitude of the severity

Table 4

Mean Probability Estimates for Population, Self, and Other
as a Function of Severity and Event

Severity	Event	Probability Estimate		
		Population	Self	Other
Mild	Event #1	54.83 _b	32.95 _a	48.75 _b
	Event #2	64.09 _c	49.24 _b	54.77 _c
	Event #3	52.11 _b	45.92 _b	49.42 _{bc}
	Event #4	37.77 _a	31.64 _a	38.11 _a
	Total	52.20	39.94	47.76
Severe	Event #1	49.44 _b	24.08 _a	43.39 _b
	Event #2	45.63 _b	28.91 _{ab}	39.62 _b
	Event #3	44.44 _b	34.25 _b	40.28 _b
	Event #4	36.27 _a	28.47 _{ab}	29.66 _a
	Total	43.95	28.93	38.24

Note. Newman-Keuls comparisons were conducted separately within severity conditions for each dependent measure. Means sharing no common subscript differ significantly ($p < .05$).

effect was greater for other judgments than for self judgments, but again, the observed difference was not statistically significant [$t(561) = -1.32, p < .20$].

This interaction is contrary to Weinstein's (1980) unexpected finding that ratings of the comparative likelihood of negative events for self and other appear not to be affected by the relative severity of the event. The presence of a significant severity \times type of judgment (self versus other) \times event interaction suggests that for at least some events, severity may have a stronger effect on judgments about oneself than about others. This finding is inconsistent with Weinstein's (1980) failure to observe an effect of event severity on comparative self/other judgments (i.e., no differential effect on self and other judgments). However, given the relatively small magnitude of this three-way interaction--especially considering the large sample size--it is reasonable to conclude that the enhanced impact of severity on self judgments is not a very strong effect.

Effects of Base-rate Information

Prior to a discussion of the effect of base-rate information on judgments of probability, it is necessary to compare the perceived population base-rates with the population base-rate information provided. Contrary to expectation, respondents in the present study gave relatively high estimates of the population base-rates for the target events. For each of the four events, a majority of the respondents estimated the probability for the average person in the

general population to be higher than the base-rates specified. Consequently, in the internal analyses reported below, the provision of base-rate information must be viewed, in most cases, as providing information that is discrepant from the respondent's initial estimate in the direction of lower probability for the events. Overall, approximately 92% of the respondents' estimates were equal to or higher than the base-rates specified. Although the internal analyses reported in the evaluation of the selective use hypothesis classify respondents' population estimates as above or below the base-rates specified, in interpreting the overall effects of the manipulation of base-rate, the base-rate information should be viewed as a generally lower probability than respondents' initial estimates.

The analyses of variance yielded significant and consistent effects of base-rate information on estimates of event probability for both self [$F(1, 189) = 12.03, p < .001$] and other [$F(1, 189) = 31.13, p < .001$] judgments (see Table 3). For each event and severity condition, provision of base-rate information produced significantly lower estimates of event probability for both self and other (the average person in the class). The effect of base-rate information on estimates of self probability did not interact with severity [$F(1, 189) = 1.59, p < .20$], although for other probability there was a tendency for base-rate information to have a greater effect on judgments for mild compared to severe events [$F(1, 190) = 3.51, p < .06$]. In addition, there was a significant interaction between base-rate and type of judgment (self versus other); provision of base-rate information led to a significantly greater decrease in

estimates of event probability for other than for self (see Table 3). In other words, the self-other discrepancy in probability estimates was reduced when base-rate information was provided.

This interaction may result from the significantly higher initial estimates of other probability compared to self, in the absence of base-rate information. That is, under the condition of no base-rate information, there was a greater discrepancy between the probability estimates for other and the base-rate specified than between self judgments and the base-rate. Moreover, even in the base-rate condition, self probability estimates were still significantly lower than estimates for other. This interaction suggests greater change for other than self judgments in response to the base-rate information. However, when these data are expressed in terms of

Table 5

Mean Difference Between Probability Estimates & Base-rate Specified
as a Function of Base-rate Information

Type of Judgment	Condition		Decrease	
	No Base-rate Information	Base-rate Information	Absolute	Percent
Self	14.13	7.22	6.91	48.9%
Other	24.43	13.96	10.47	42.9%

Note. The average of the base-rates specified was 23.75%.

differences between the probability estimates and the base-rates specified (see Table 5), it is evident that while the absolute decrease in the base-rate information condition is greater for other judgments than self judgments, the percentage of change in the direction of the base-rate specified was actually greater for self judgments than for other judgments. That is, relative to respondents in the no base-rate condition, respondents receiving base-rate information evidenced a decrease of 48.9% in the discrepancy between their self probability estimates and the base-rates specified; the corresponding decrease for other probability estimates was 42.9%. Thus, the observed magnitude of change in probability estimates for other judgments may be a result of the larger initial (i.e., no base-rate condition) discrepancy between the estimate for other and the base-rate specified.

The interactive effects of base-rate information and severity are also evident in the percentage of change in the direction of the base-rates specified (see Table 6). Although the absolute decrease in probability in the base-rate condition is greater for mild compared to severe events, and for other compared to self judgments, the interaction evident in these data is reversed when viewed in terms of the difference between respondents' estimates and the base-rates specified. For mild events, the percentage of reduction toward the specified base-rates was approximately 45% for both self and other probability estimates by respondents in the base-rate information condition. For severe events, however, the percent of revision toward the base-rate was greater for self (58.7%) compared to other judgments

Table 6

Mean Difference Between Probability Estimates & Base-rate Specified
as a Function of Base-rate Information and Severity

Severity	Type of Judgment	Condition		Decrease	
		No Base-rate Information	Base-rate Information	Absolute	Percent
Mild	Self	20.89	11.49	9.40	45.0%
	Other	30.69	16.92	13.77	44.9%
Severe	Self	7.36	3.04	4.32	58.7%
	Other	17.92	11.13	6.79	37.9%

Note. The average of the base-rates specified was 23.75%.

(37.9%). That is, when the initial differences in the discrepancy between the estimates of no base-rate control respondents and the base-rates specified are controlled by expressing revisions as percentage of change, the data indicate that base-rate information had the greatest effect on self probability estimates for severe events.

Selective Use of Base-Rate Information

To test the selective use of base-rate information hypothesis, internal analyses were conducted. For these analyses, each respondent was classified as above or below the specified base-rate for each event on the basis of their initial estimate of population

probability. Since the classifications were made independently for each event, it was not possible to retain the within-subjects nature of the experimental design; all internal analyses treat each probability judgment (one self and other judgment per event) as an independent observation. This procedure produces more conservative tests of hypotheses than the preceding analyses in that between-subjects variability is not removed from the error terms.

For each of the four life events, respondents whose population probability estimate was greater than or equal to the base-rate specified by the experimental manipulation were classified as above the base-rate for that event; respondents who gave population estimates that were less than the base-rate specified were classified into the below base-rate condition. The decision to classify as above respondents giving a response equal to the base-rate was based on the distribution of responses and on the assumption that such information was at least consistent with their expectations (i.e., not "unfavorable").

Based on this classification procedure, 92.0% of judgments by respondents in the no base-rate information condition, and 92.3% of judgments in the base-rate condition were greater than or equal to the base-rates specified. The percent of judgments classified as below the base-rate ranged from 14.2% for Event #3 (crime) to 3.5% for Event #2 (employment). Consistent with the lower probability estimates for severe events, there was a greater proportion of judgments classified as below the base-rate in the severe condition (11.9%) compared with the mild condition (5.3%). These cell sizes did not permit analysis

for individual events.

Probability judgments for self and other, and perceived population rates are presented in Table 7 for the internal classification and the base-rate and severity conditions. For respondents in the above condition, estimates of probability for themselves and the average person in the class were significantly lower in the base-rate condition compared with the estimates of no base-rate respondents [$t(699) = 3.85$, $p < .001$ for self estimates; $t(699) = 7.20$, $p < .001$ for other estimates]. Thus, respondents receiving "favorable" information (i.e., information that the population base-rate is lower than their estimate) revised their judgments of event probability in the direction of the base-rate specified. It is interesting to note, however, that although self and other estimates were lower in the base-rate than the no base-rate condition, the estimates remained higher than the base-rates specified.

Data for respondents in the below condition, however, failed to confirm the selective use hypothesis. In response to "unfavorable" information in the form of a base-rate higher than their initial estimate, respondents in the below condition also tended to reduce their estimates for self and other, although these differences were not statistically significant. It should be noted that, contrary to expectation, respondents in the no base-rate condition whose perceived population base-rate was lower than the base-rate specified (i.e., below condition) estimated the probability for self and other to be higher, on average, than their initial estimate of the population probability.

Table 7
Mean Probability Estimates
as a Function of Internal Classification, Base-rate, and Severity

Severity	Classification		Probability Estimate		
	Base-Rate	<u>n</u>	Population	Self	Other
TOTAL	<u>Above</u>				
	No Base-Rate	368	52.03	38.97***	49.56***
	Base-Rate	360	49.94	32.16	38.94
	<u>Below</u>				
	No Base-Rate	32	16.59	18.69	26.47
	Base-Rate	30	16.60	15.97	23.33
MILD	<u>Above</u>				
	No Base-Rate	192	55.51	45.65***	55.65***
	Base-Rate	182	52.98	35.56	41.62
	<u>Below</u>				
	No Base-Rate	8	20.00	23.13	31.25
	Base-Rate	12	17.00	25.42	27.92
SEVERE	<u>Above</u>				
	No Base-Rate	176	48.24	31.69	42.91***
	Base-Rate	178	46.82	28.67	36.20
	<u>Below</u>				
	No Base-Rate	24	15.46	17.21*	24.88
	Base-Rate	18	16.33	9.67	20.28

Note. The average of the base-rates specified across the four life events was 23.75%.

* $p < .10$

** $p < .01$

*** $p < .001$

A similar pattern of results obtained when the data were analyzed separately for the mild and severe conditions (see Table 7). For respondents classified above the base-rate specified, in both the mild and severe conditions, estimates for other probability were significantly lower in the base-rate compared to the no base-rate condition. For self probability estimates by respondents classified as above, the decrease in the base-rate condition was significant only in the mild condition. Again, although estimates were generally lower in the below condition for respondents given base-rate information, none of these differences were statistically significant.

Other Factors Influencing Probability Judgments

In addition to severity and base-rate, both sex of respondent and event had significant effects on probability judgments. There were significant main effects for sex of respondent on all three probability measures: population [$F(1, 194) = 26.79, p < .001$], self [$F(1, 189) = 23.26, p < .001$], and other [$F(1, 190) = 23.38, p < .001$]. For each of these measures, females made significantly higher probability estimates than males (see Table 8). In addition, there was a significant sex \times event interaction for self probability estimates [$F(3, 567) = 2.97, p < .04$], reflecting a differential ordering of the events by female and male respondents. For both female and male respondents, Events #2 and #3 (employment and crime, respectively) were judged to have a significantly higher probability for oneself than Events #1 and #4 (marriage and health).

Table 8
Mean Probability Estimates as a Function of Sex of Respondent

Probability Estimate	Sex of Respondent	
	Female	Male
Population	51.97	43.95
Other	47.00	38.49
Self	38.64	29.47
Event #1	30.79 _a	25.81 _a
Event #2	44.59 _c	32.54 _b
Event #3	42.58 _c	37.12 _b
Event #4	36.60 _b	22.42 _a

Note. Newman-Keuls comparisons were conducted separately for female and male respondents. Means sharing no common subscript differ significantly ($p < .05$).

However, females respondents judged Event #4 (health--cancer) to have a significantly higher self probability than Event #1 (marriage--separation/divorce); there was no significant difference in the probability estimates for these two events by male respondents.

There were significant main effects for event and significant severity x event interactions on the probability estimates for population, self, and other (see Table 4). The interaction of severity and event for perceived population base-rate [$F(3, 582) = 11.44, p < .001$] revealed a significantly higher probability estimate [$t(194) = 7.53, p < .001$] for the mild version of Event #2 (required

to accept a job outside chosen field for a year or longer), compared to the severe version (unemployed for a year or longer). In addition, the higher probability estimates for mild compared to severe events did not occur for Event #4. Apparently, respondents perceived non-fatal and fatal forms of cancer to be equally probable for the average person in the general population.

In addition to the severity x event interactions previously reported for self and for other judgments, there was a three-way interaction of severity, event, and type of judgment (self versus other) on the probability estimates for self and other (see Table 3). As noted earlier in the discussion of the effects of the severity manipulation, this interaction reflects the differential effect of severity on self and other judgments within different event conditions (see Table 4). It is also of interest to consider in some detail the significant event x type of judgment interaction [$F(3, 561) = 27.03$, $p < .001$] which obtained in the five-way analysis of variance. Two different sets of comparisons among the event x self-other means were computed using the Scheffe procedure to control the experiment-wise error rate. Similar to the findings reported for the severity x event interaction on the perceived population base-rate measure, pairwise comparisons between mean self and other probability judgments within each event revealed significant effects for type of judgment (self-other) for the first three events, and a non-significant self-other difference for Event #4 (health--cancer).

The second set of comparisons conducted to explore the event x type of judgment interaction evaluated the similarity in magnitude of

the self-other difference in probability estimates between event pairs. These comparisons indicated that the self-other difference obtained for Event #1 (marriage) was significantly greater than the self-other differences in the remaining three event conditions. No significant differences in the magnitude of the self-other discrepancy were observed among the employment, crime, and health event conditions. In summary, these comparisons indicated that the respondents judged their own probability of experiencing the events to be significantly lower than the probability of "the average person in the class" for every event except cancer. Moreover, the difference in estimated probability for self versus other was significantly greater for the marriage event than for the other three life events.

Event Likelihood

Ratings of event likelihood were included as an independent measure of perceived likelihood. However, this item apparently lacked sufficient precision to assess the effects of the experimental manipulations. In contrast to the numerous effects of the independent variables on the probability measures, the analysis of variance of event likelihood yielded only two significant effects: Main effects for sex of respondent and for event.

The effect of sex of respondent on the event likelihood ratings [$F(1, 195) = 20.46, p < .001$] paralleled the strong and consistent effects of sex on the probability measures. Compared to the ratings of their male counterparts ($M = 4.34$), female respondents rated the events as significantly more likely ($M = 4.96$). The main effect for event was also significant [$F(3, 585) = 6.14, p < .001$], but subsequent Newman-Keuls comparisons indicated that this item lacked the sensitivity of the probability measures; a lower mean likelihood rating for Event #4 provided the only significant difference among the four life events.

Judgment Certainty: Self and Other

The analysis of respondents' ratings of the certainty with which they made their probability estimates for self and other yielded a number of significant effects. Main effects for event in the separate analyses of self-certainty [$F(3, 582) = 18.13, p < .001$] and

other-certainty [$F(3, 583) = 6.99, p < .001$], and an event \times type of judgment (self versus other) interaction in the five-way analysis of variance [$F(3, 582) = 6.28, p < .001$] were each statistically significant. Comparisons among the event \times type of judgment means (see Table 9) using the Newman-Keuls procedure revealed that for both self and other ratings, respondents reported significantly lower certainty in their estimates about Event #4 (health--cancer) than in their estimates about the other three events. In addition, the ratings of self-judgment certainty for marriage and employment events were significantly higher than self-judgment certainty for crime, and other-judgment certainty for marriage, employment, and crime.

Table 9

Mean Certainty Ratings for Self and Other as a Function of Event

Probability Estimate	Event			
	1	2	3	4
Self	4.72 _d	4.81 _d	4.37 _c	3.89 _{ab}
Other	4.18 _{bc}	4.17 _{bc}	4.23 _{bc}	3.79 _a

Note. Means sharing no common subscripts are significantly different ($p < .05$) by Newman-Keuls comparison.

Significant interactions of sex of respondent and event were obtained in the analysis of variance of judgment certainty for both self [$F(3, 582) = 2.85, p < .04$] and other [$F(3, 585) = 4.80, p < .003$] judgments. Comparisons among the means involved in these interactions (see Table 10) indicated that the lower certainty in judgments about Event #4 (health) was primarily due to the certainty ratings by male respondents. That is, for male respondents only, reported certainty in probability estimates for self and other was significantly lower for Event #4 than for the remaining three events.

Table 10

Mean Certainty Ratings as a Function of Event and Sex of Respondent

Sex	Judgment	Event			
		1	2	3	4
Females	Self	4.82 _b	4.71 _{ab}	4.38 _{ab}	4.18 _a
	Other	4.22	4.09	4.19	4.08
Males	Self	4.61 _b	4.93 _b	4.35 _b	3.57 _a
	Other	4.14 _b	4.26 _b	4.27 _b	3.46 _a

Note. Newman-Keuls comparisons were conducted separately for each sex of respondent x type of judgment (self or other) condition. Means sharing no common subscript differ significantly ($p < .05$).

Sex of respondent also interacted with base-rate and event severity on the self-certainty measure [$F(1, 194) = 4.93, p < .03$]. As revealed in Table 11, within the base-rate condition, female respondents reported significantly greater certainty in probability estimates for severe compared to mild events. The severity effect was not significant in any of the other sex \times base-rate conditions. It should also be noted that the general effect of event severity was reversed for male compared to female respondents. That is, for males, judgment certainty tended to decrease for severe compared to mild events in the base-rate condition, and increase in the no base-rate condition. For females, judgment certainty increased for severe

Table 11
Mean Self Certainty Ratings as a Function of
Severity, Sex, and Base-rate

Sex	Base-rate	Severity Condition	
		Mild	Severe
Females	No Base-rate	4.65 _{bc}	4.37 _{abc}
	Base-rate	4.16 _a	4.90 _c
Males	No Base-rate	4.26 _{ab}	4.40 _{abc}
	Base-rate	4.50 _{abc}	4.32 _{abc}

Note. Means sharing no common subscripts are significantly different ($p < .05$) by Newman-Keuls comparison.

events in the base-rate information condition and tended to decrease in the no base-rate condition.

The analysis of variance of self-judgment certainty yielded a significant base-rate \times severity \times event interaction [$F(3, 52) = 5.17, p < .002$]. A series of orthogonal contrasts was applied to the base-rate \times severity means separately for each event (see Table 12) in order to assess the differential effect of these two manipulations on self-certainty judgments for each event. The contrasts selected represent a simple effects analysis for the main effects of base-rate and severity and their interaction separately by event (Winer, 1971, p. 130). This comparison procedure indicated that for the marriage

Table 12
Mean Self Certainty Ratings as a Function of
Base-rate, Severity, and Event

Base-rate	Severity	Event			
		1	2	3	4
No Base-rate	Mild	4.43 _a	4.90	4.75 _a	3.73 _a
	Severe	5.18 _b	4.73	3.90 _b	3.71 _a
Base-rate	Mild	4.41 _a	5.10	4.10 _b	3.67 _a
	Severe	4.88 _b	4.51	4.71 _a	4.45 _b

Note. Contrasts were conducted separately for each of the four event conditions.

events, certainty was significantly higher for the severe than for the mild version [$t(194) = 2.63, p < .01$]. For the employment event (Event #2), the effect of severity was reversed with marginally higher certainty ratings for the mild compared to the severe version of this event [$t(194) = 1.64, p < .10$]. For the third event, crime, base-rate and severity interacted such that the no base-rate/mild and the base-rate/severe conditions led to greater judgment certainty than the base-rate/mild and no base-rate/severe conditions [$t(194) = 3.17, p < .001$]. Finally, for the fourth event, health, the interaction of base-rate and severity approached significance [$t(194) = 1.72, p < .10$]. An additional non-orthogonal contrast indicated that the severe/base-rate condition produced significantly higher judgment certainty than the other three conditions [$t(194) = 3.16, p < .001$].

In the five-way analysis of variance of certainty ratings, the four-way interaction of base-rate information, severity, event, and type of judgment (self versus other) was significant [$F(3, 582) = 2.66, p < .05$]. This result was due to the absence of differential effects of base-rate x severity among events for certainty of other judgments, in contrast to the base-rate x severity effects described above for certainty in self-judgments.

Event Characteristics

Respondents rated the events on dimensions of severity, predictability, importance, fairness, and threat. These data were

analyzed with a series of four-way analyses of variance. With the exception of the predictability measure, the analyses yielded significant main effects for severity, event, and a significant severity x event interaction for each measure. On the predictability rating, the interaction was not significant. The severity, event, and severity x event means for each measure are presented in Table 13.

On the severity ratings, severe events were judged to be more severe than the mild events [$F(1, 192) = 77.85, p < .001$]. Comparisons of the severity x event means [$F(3, 576) = 4.67, p < .004$] indicated that in the mild conditions, the crime and health events were rated as most severe; the employment event was rated least severe, and the marriage event was intermediate. In the severe conditions, crime and health were rated more severe than marriage or employment. There was a significant main effect for event [$F(3, 576) = 32.63, p < .001$], and a significant severity x event interaction obtained due to a much larger effect of severity on the employment event [$t(192) = 8.79, p < .001$].

For ratings of event predictability, severe events were rated as less predictable than mild events [$F(1, 192) = 6.24, p < .02$]. The significant main effect for event [$F(3, 576) = 42.73, p < .001$] and subsequent comparisons revealed that the crime and health events were perceived as significantly less predictable than the marriage and employment events.

With respect to perceived importance, severe events were judged to be more important than mild events [$F(1, 194) = 10.91, p < .002$]. In the mild event conditions, health was rated as most

Table 13

Mean Event Ratings as a Function of Severity and Event

Event Characteristic	Event	Severity		Total
		Mild	Severe	
Severity	Event #1	4.60 _b	5.55 _a	5.07
	Event #2	4.06 _a	5.75 _a	4.89
	Event #3	5.34 _c	6.31 _b	5.82
	Event #4	5.25 _c	6.27 _b	5.75
	Total	4.81	5.97	
Predictability	Event #1	3.84	3.95	3.89 _a
	Event #2	3.98	4.55	4.26 _a
	Event #3	4.97	5.49	5.23 _b
	Event #4	5.12	5.32	5.22 _b
	Total	4.48	4.83	
Importance	Event #1	5.29 _{ab}	5.50 _a	5.40
	Event #2	5.03 _a	6.12 _b	5.57
	Event #3	5.72 _{bc}	6.10 _b	5.91
	Event #4	6.16 _c	6.46 _b	6.31
	Total	5.55	6.04	
Fairness	Event #1	3.98 _a	4.28 _a	4.13
	Event #2	4.31 _a	5.28 _b	4.79
	Event #3	5.80 _c	6.04 _c	5.92
	Event #4	5.29 _b	5.79 _c	5.54
	Total	4.85	5.35	
Threat	Event #1	4.37 _a	4.76 _a	4.56
	Event #2	4.16 _a	6.12 _b	5.12
	Event #3	5.52 _b	6.54 _b	6.02
	Event #4	5.83 _b	6.44 _b	6.13
	Total	4.97	5.96	

Note. Newman-Keuls comparisons were conducted separately within severity conditions. Means sharing no common subscript differ significantly ($p < .05$).

important, employment as least important, with crime and marriage intermediate in respondents' ratings of importance. In the severe event conditions, the marriage event was rated as least important, and no significant differences were observed among the remaining three events. The main effect for event was significant [$F(3, 582) = 21.15, p < .001$]. In addition, the significant interaction of severity and event [$F(3, 582) = 5.15, p < .002$] revealed that event severity had a relatively stronger effect on the perceived importance of the employment event [$t(194) = 5.17, p < .001$], compared to the other three life events.

On the measure of perceived fairness, again both severity [$F(1, 187) = 15.82, p < .001$] and event [$F(3, 561) = 81.97, p < .001$] produced significant main effects, and a significant interaction [$F(3, 561) = 3.54, p < .02$]. In the mild event conditions, the crime event was rated as least fair, the marriage and employment events were rated as most fair, and the health event was intermediate in perceived fairness. Within the severe event conditions, crime and health were rated as least fair, marriage as most fair, and employment was rated intermediate in fairness. On this measure, the effect of the severity manipulation was significant only for the employment [$t(187) = 4.90, p < .001$] and health events [$t(187) = 2.53, p < .02$].

Severe events were also judged to be more threatening than mild events [$F(1, 193) = 60.31, p < .001$], and there were differences in perceived threat among the events [$F(3, 579) = 67.95, p < .001$]. Under the mild event conditions, the health and crime events were perceived as significantly more threatening than the marriage or

employment events. For the severe events, the marriage event was rated as less threatening than the other three events. The significant interaction of severity and event [$F(3, 579) = 14.72, p < .001$] reflects the much stronger effect of the severity manipulation on the employment event [$t(193) = 9.71, p < .001$], compared to the non-significant effect of severity on the marriage event [$t(193) = 1.93, p < .10$].

Taken together, the measures of perceived event characteristics indicated that the severe events were rated as significantly more severe, unpredictable, important, unfair, and threatening than the mild events. The effect of the severity manipulation was consistently stronger for the employment event and weaker for the marriage event than for either of the other two life events. Considering the events across the two levels of severity, the crime and health events were generally rated as more negative than the marriage and employment events.

There were unanticipated effects of base-rate condition on two items assessing the perceived characteristics of the events. Compared to the ratings of respondents in the no base-rate condition, respondents in the base-rate information condition judged the events to be less threatening [$F(1, 193) = 5.47, p < .02$] and less unfair [$F(1, 187) = 6.46, p < .02$]. In addition, there was a significant base-rate \times severity interaction for perceived fairness [$F(1, 187) = 4.81, p < .03$]. Newman-Keuls comparisons ($p < .05$) revealed that severe events in the no base-rate condition were perceived to be significantly more unfair than mild events in the no base-rate

condition, and than mild and severe events in the base-rate condition; there were no significant differences among the latter means. That is, the provision of base-rate information significantly reduced the perceived unfairness of the severe events, suggesting that perceptions of fairness may depend, in part, on the perceived likelihood of an event.

Finally, there was a significant main effect of sex of respondent for three of the event characteristics measures. Compared to their male counterparts, female respondents, who consistently judged the life events to be more probable, also perceived them to be more severe [$F(1, 192) = 7.63, p < .005$], more important [$F(1, 194) = 5.29, p < .03$], and more threatening [$F(1, 193) = 3.89, p < .05$].

Perceived Control: Self and Other

For each event, respondents were asked to indicate the extent to which they believe they could effectively control or prevent the occurrence of the event, and the extent to which they believe the average person in the class could control the event. The four-way and five-way (including type of judgment--self versus other) analyses of variance yielded significant main effects and interactions for event, sex of respondent, and type of judgment.

The main effect for type of judgment [$F(1, 191) = 36.82, p < .001$], indicated that the average person in the class attributed significantly greater control to themselves ($M = 3.81$) than to the "average person in the class" ($M = 3.56$). The main effect for sex of

respondent was significant for other judgments only [$F(1, 194) = 4.38, p < .04$], producing a significant sex and type of judgment interaction [$F(1, 191) = 6.32, p < .02$] in the five-way analysis (see Table 14). For self judgments, there was no difference between female and male respondents in perceived control, and both females [$t(191) = 2.34, p < .02$] and males [$t(191) = 6.34, p < .001$] attributed significantly greater control to themselves than to the average person in the class. However, compared to females respondents, males attributed significantly less control to others.

Table 14
Mean Ratings of Control as a Function of Sex of Respondent

Type of Judgment	Sex of Respondent		Total
	Female	Male	
Self	3.81	3.80	3.81
Other	3.67	3.42	3.56

There was a significant main effect for event on ratings of control for both self [$F(3, 576) = 83.15, p < .001$] and other [$F(3, 582) = 62.32, p < .001$], and an event \times type of judgment (self versus other) interaction [$F(3, 576) = 11.63, p < .001$]. The event

means presented in Table 15 reveal a similar pattern for both self and other ratings of control: Perceived control was highest for marriage, lowest for health (cancer), and intermediate for employment and crime. Comparisons among the means for the event x type of judgment interaction indicated that compared to the average person in the class, respondents attributed significantly greater control to themselves for the marriage and employment events. There were no significant differences between self and other ratings of perceived control over the crime and health events.

Table 15
Mean Ratings of Control as a Function of Event

Type of Judgment	Event			
	1	2	3	4
Self	4.82 _e	4.03 _c	3.71 _b	2.65 _a
Other	4.26 _d	3.67 _b	3.64 _b	2.63 _a

Note. Means sharing no common subscripts are significantly different ($p < .05$) by Newman-Keuls comparison.

The two-way interaction of sex of respondent and event [$F(3, 576) = 3.29, p < .02$] was significant for self ratings of control,

and the three-way interaction of sex, event, and type of judgment approached significance [$F(3, 573) = 2.49, p < .06$]. Compared to the female respondents, males attributed significantly greater control to themselves for the employment event [$t(192) = 2.23, p < .05$]; there were no significant differences between males and females in perceived control over the remaining three events, although there was a tendency for females to attribute greater control to themselves for the marriage and health events (see Table 16).

For the three-way interaction of sex, event, and type of judgment, comparisons were conducted among the ratings of self and other control separately for female and male respondents. These comparisons (see Table 16) indicated that females attributed

Table 16
Mean Ratings of Control as a Function of Event and Sex of Respondent

Sex	Type of Judgment	Event			
		1	2	3	4
Females	Self	4.94 _d	3.80 _b	3.72 _b	2.79 _a
	Other	4.37 _c	3.63 _b	3.88 _b	2.79 _a
Males	Self	4.68 _e	4.29 _d	3.71 _c	2.50 _a
	Other	4.13 _d	3.72 _c	3.38 _b	2.45 _a

Note. Newman-Keuls comparisons were conducted separately for female and male respondents. Means sharing no common subscript differ significantly ($p < .05$).

significantly greater control to themselves than to others for the marriage event only. By contrast, male respondents attributed significantly greater control to themselves than to others for all the events--marriage, employment, and crime--except health (cancer).

Personal Concern

For the personal concern item, respondents were asked to indicate the degree of their concern or worry about the possibility of experiencing each of the life events. Four-way analyses of variance of responses to this item yielded a significant main effect for event [$F(3, 582) = 12.82, p < .001$], marginally significant main effects for sex of respondent [$F(1, 194) = 3.71, p < .06$] and severity [$F(1, 194) = 2.90, p < .09$], and an interaction of severity and event [$F(3, 582) = 3.41, p < .02$].

Not surprisingly, given their higher probability estimates and ratings of event severity, female respondents expressed greater concern ($M = 5.03$) about the events than their male counterparts expressed ($M = 4.68$). Mean concern ratings as a function of severity and event are presented in Table 17. In the mild condition, respondents expressed significantly less concern about the marriage and employment events, compared with the crime and health events. In the severe condition, respondents reported significantly less concern about the marriage event (viz., divorce), compared with the other three life events.

Table 17
Mean Ratings of Concern as a Function of Severity and Event

Severity	Event				Total
	1	2	3	4	
Mild	4.38 _a	4.26 _a	4.96 _b	5.24 _b	4.71
Severe	4.51 _a	5.13 _b	5.14 _b	5.33 _b	5.03
Total	4.44 _a	4.69 _{ab}	5.05 _{bc}	5.29 _c	

Note. Newman-Keuls comparisons were conducted separately within severity conditions. Means sharing no common subscript differ significantly ($p < .05$).

Personal Experience

Respondents were asked to describe their experience with each life event using response categories designed to assess the nature and extent of respondents' personal experience with each of the events:

1 = no experience, 2 = has happened to acquaintances, 3 = has happened to close friends or relatives, and 4 = has happened to me personally.

Multiple responses were permitted, and the highest reported level of experience was used to establish a single scale. These data were then analyzed by the four-way analysis of variance. The analysis yielded a significant main effect for event [$F(3, 579) = 4.74, p < .005$] and a significant interaction of severity and event [$F(3, 579) = 11.51, p < .001$]. Despite the higher probability estimates for mild compared to

severe events, there was no significant difference in reported experience as a function of event severity [$F(1, 193) = 0.93, p > .60$]. The differences among the cell means which comprise the severity \times event interaction were evaluated with two procedures: 1) comparisons among the event means separately within each severity condition using Newman-Keuls tests, and 2) t -tests between the severity means within each event. As evident from Table 18, within the mild event conditions, respondents reported most experience with the crime event, and significantly less experience with the employment and health events. Within the severe event condition, reported personal experience was significantly lower for the employment and crime events than for the marriage and health events. The comparisons between the mild and severe versions of each event indicated that the

Table 18

Mean Personal Experience Ratings as a Function of Severity and Event

Severity	Event				Total
	1	2	3	4	
Mild	2.54 _{ab}	2.37 _a	2.73 _b	2.41 _a	2.51
Severe	2.69 _b	2.29 _a	2.15 _a	2.67 _b	2.45

Note. Newman-Keuls comparisons were conducted separately within severity conditions. Means sharing no common subscript differ significantly ($p < .05$).

interaction of severity and event obtained due to differential effects of the severity manipulation across events. For the marriage and employment events, there was no significant difference in reported experience between the mild and severe versions of the events. For the crime event, the respondents reported significantly greater experience with the mild version of the event [$t(193) = 4.90, p < .001$]. For the health event, the severe version of the event (terminal cancer) was associated with marginally greater experience [$t(193) = -2.196, p < .05$] than the mild version (non-fatal cancer).

Self Descriptions

Respondents' ratings of the self-description and life satisfaction items are reported in Table 19. In general, the respondents described themselves as moderately optimistic ($M = 4.96$), and somewhat more happy ($M = 5.32$) and lucky ($M = 4.81$) than most people. When asked to evaluate the quality of their lives relative to others, respondents reported that life has treated them somewhat better, compared to the average person in this country ($M = 5.60$) and the average person in the class ($M = 5.31$). For the life satisfaction items, respondents' average personal ratings of the past, present, and future were all above the midpoint in terms of the worst and best possible life, with present ratings intermediate ($M = 5.00$) between past ($M = 4.65$) and future ratings ($M = 5.85$). Like the participants in Cantril's (1965) cross-cultural survey, respondents in the present study regarded the present as better than the past, and expected the

future to be even better.

Despite their significantly higher probability estimates, females ($\bar{M} = 4.93$) did not describe themselves as more pessimistic compared to their male counterparts ($\bar{M} = 4.94$). Moreover, females tended to give slightly higher ratings ($\bar{M} = 5.93$) of their expected life

Table 19
Mean Self Description Ratings as a Function of Severity

Dependent Measure	Total	Severity	
		Mild	Severe
Happy	5.32	5.34	5.29
Optimistic	4.96	4.91	4.96
Lucky	4.81	4.80	4.77
Quality of life/ Average person in country	5.60	5.74	5.43 [*]
Quality of life/ Average person in class	5.31	5.45	5.11 ^{**}
Life Satisfaction			
Now	5.00	5.09	4.85
Five years ago	4.65	4.91	4.32 ^{***}
Five years from now	5.85	5.94	5.70 [*]
Total	15.44	15.94	14.97 ^{****}

Note. All ratings were made on scales ranging from 1 to 7. Higher ratings indicate optimism, happiness, and luckiness, better quality of life, and greater life satisfaction (best possible life).

^{*} $p < .10$

^{**} $p < .05$

^{***} $p < .01$

^{****} $p < .001$

satisfaction in the future [$F(1, 195) = 2.81, p < .10$], compared with male respondents ($M = 5.70$).

There was an unexpected main effect for event severity on several of the life satisfaction items (see Table 19). Compared to respondents in the severe condition, respondents in the mild condition tended to give higher ratings of the relative quality of their lives compared to the average person in the country [$F(1, 195) = 3.56, p < .06$] and the average person in the class [$F(1, 195) = 4.68, p < .03$]. In addition, respondents in the mild condition gave significantly higher ratings than respondents in the severe condition for their life satisfaction in the past [$F(1, 195) = 9.73, p < .003$], and the cumulative (past, present, and future) rating [$F(1, 195) = 8.68, p < .004$]. This pattern was also marginally significant for ratings of expected future satisfaction [$F(1, 195) = 2.95, p < .08$], but there was not a significant difference between respondents in the mild and the severe condition for ratings of their present life satisfaction.

Correlational Analyses

To explore relationships among the dependent measures, partial correlation coefficients were computed among selected items, adjusting for the effects of the independent variables and their interactions. Coefficients were computed for each of the four life events, and the average within-event correlation was also computed.

The probability judgments for population, self, and other were

highly intercorrelated for each of the four events, with coefficients ranging from .344 to .801 (all $p < .001$). Despite the ANOVA results for the likelihood ratings, judged likelihood was significantly correlated with the three probability measures for each of the events (all $p < .001$).

Probability estimates for the average person in the class and corresponding judgment certainty ratings were significantly correlated (average $r = .235$, $p < .001$), but estimates and certainty for self were not significantly correlated overall (average $r = .081$). However, there were significant correlations between self probability judgments and certainty for Event #3 ($r = .294$, $p < .001$) and Event #4 ($r = .173$, $p < .05$). For both self and other judgments, the correlation between respective probability judgments and judgment certainty was especially high for Event #3, crime. In addition, there was a significant correlation ($r = .398$, $p < .001$) between judgments of certainty for self and for other probability estimates.

In general, there was not a strong relationship between probability estimates and judgments of self and other control, although the relationship was consistently negative: The greater the perceived individual control, the lower the estimated probability of the event. For estimates of population probability, there were not significant overall correlations with ratings of self and other control, although the correlations for Event #2 were significant ($r = -.241$, $p < .001$, and $r = -.175$, $p < .05$, for self and other control ratings, respectively). Event #2 also yielded the only significant correlation between probability estimates and perceived control of

others ($r = -.171$, $p < .05$). Overall, there was a weak negative relationship between judgments of probability and control for self (average $r = -.167$, $p < .10$), due to the non-significant relationship between these measures for Event #4 (cancer), the event perceived to be the least controllable. The negative correlations between self probability judgments and self-attributed control were significant for Event #1 ($r = -.254$, $p < .001$), Event #2 ($r = -.246$, $p < .001$), and Event #3 ($r = -.143$, $p < .05$). Ratings of self and other control were highly correlated (average $r = .731$, $p < .001$). In addition, judgment certainty and perceived control for self were positively related overall ($r = .166$, $p < .05$), and for each of the individual life events except crime. Certainty and control judgments regarding others were not significantly correlated.

Expressed concern was not generally related to probability and likelihood judgments, but there was a consistent, significant positive relationship between concern and each of the probability/likelihood measures for Event #3--crime. For Event #4, cancer, concern was positively correlated with self probability estimates ($r = .202$, $p < .01$), and negatively correlated with the difference in judged probability for self and other. That is, the lower the magnitude of difference in the perceived probability for oneself versus the average person in the class, the greater concern expressed. The relationship between concern and ratings of control for both self and other was generally weak, but consistently negative. For self and other control ratings, respectively, the average within-event correlations with concern were $-.163$ ($p < .05$) and $-.133$ ($p < .05$), and this association

was strongest for Event #4 ($r = -.228$, $p < .01$ and $r = -.208$, $p < .01$).

There were few consistent patterns among the correlations between the probability judgments and the event characteristics ratings, although the direction of association was generally negative. For the population estimates, there were negative correlations with each of the five event characteristics, but only for Event #4--cancer. That is, the more severe, unpredictable, important, unfair, and threatening respondents perceived cancer to be, the lower their estimates of the probability of cancer in the general population. The self probability estimates were negatively correlated with each of the five event characteristics for Event #1: The more negatively respondents rated marital difficulties, the lower their estimate of the probability that they would personally experience marital difficulties.

For the crime event, ratings of severity were positively correlated with the three probability judgments--population ($r = .140$, $p < .05$), self ($r = .183$, $p < .01$), and other ($r = .253$, $p < .001$). In addition, perceived likelihood and severity ratings were positively correlated for each of the four events (average $r = .205$, $p < .001$).

The magnitude of the difference between self and other probability judgments was positively correlated with the perceived importance of each of the four life events (average $r = .151$, $p < .05$); the more important respondents perceived each of the events, the greater the difference in their probability estimates for themselves versus others. For Event #1, marital difficulties, severity and fairness ratings also yielded positive correlations: The more severe

and unfair the event was perceived to be, the greater the difference in estimated probability between self and other. For Event #2, employment, perceived threat was also associated with a greater difference in estimated self versus other probabilities.

Certainty about self and other probability estimates was consistently related to the perceived predictability of the four events: The more unpredictable an event was perceived to be, the lower the certainty about both self ($r = -.197$, $p < .01$) and other ($r = -.137$, $p < .05$) probability judgments.

There were positive correlations between concern and perceived severity (average $r = .171$, $p < .05$) and threat (average $r = .223$, $p < .01$) for each of the four life events. In general, ratings of the other event characteristics were also positively related to concern, with the exception of predictability, which was related to concern only for Event #4, cancer. In addition, perceived importance and fairness were not related to concern about Event #1, marital difficulties.

Predictability was correlated with ratings of control for self and other for Event #4: Greater perceived predictability of cancer was associated with greater perceived control by oneself ($r = -.206$, $p < .01$) and others ($r = -.194$, $p < .01$). Across the four life events and the five event characteristics ratings, there were no other consistent relationships with self and other control ratings.

Not surprisingly, the five event characteristics were highly intercorrelated. Generally, across the four events, there were significant positive correlations among the ratings of severity,

importance, unfairness, and threat. The fifth rating, predictability, was correlated with the other measures only for Event #4, cancer.

Analysis of the personal experience measure yielded modest but significant positive correlations between the personal experience index and the three probability judgments, with the strongest relationship between reported level of personal experience and self probability estimates (average $r = .218$, $p < .01$). For population probability estimates, the average correlation was $.173$ ($p < .05$), and the correlation was nonsignificant for Event #4, cancer. In addition, for Event #1--marital difficulties--the relationships between personal experience and both self and other probability estimates were not statistically significant. With the exception of weak correlations on isolated measures, there was no relationship between personal experience and judgment certainty, perceived control, concern, or event characteristics ratings.

There were also no consistent, significant relationships between the self-description items (i.e., optimism, relative quality of life, etc.) and the probability and likelihood judgments. Likewise, there was no consistent pattern of relationships between the self-description items and the ratings of control and certainty, with one exception: The self-description items were positively related to certainty about self probability estimates regarding Event #1, marital difficulties. The correlations ranged from $.108$ ($p < .10$) for expected future satisfaction, to $.219$ ($p < .01$) for quality of life relative to others in the class.

Concern was negatively correlated with many of the

self-description items for Event #2, employment; higher ratings of optimism ($r = -.140$, $p < .05$), quality of life relative to others in the country ($r = -.172$, $p < .05$) and the class ($r = -.143$, $p < .05$), and present ($r = -.157$, $p < .05$) and expected future life satisfaction ($r = -.256$, $p < .001$) were associated with less concern about employment difficulties. In addition, expected life satisfaction in the future was negatively correlated with concern about each of the events (average $r = -.183$, $p < .01$) except cancer.

The personal description items were also highly intercorrelated, with the exception of ratings of past life satisfaction. For example, self ratings of optimism were positively correlated with ratings for happy ($r = .498$, $p < .001$), lucky ($r = .249$, $p < .001$), quality of life relative to the average person in the country ($r = .333$, $p < .001$) and the class ($r = .313$, $p < .001$), present life satisfaction ($r = .320$, $p < .001$), and expected future life satisfaction ($r = .312$, $p < .001$). Among the life satisfaction items, present life satisfaction was highly correlated with both past ($r = .453$, $p < .001$) and expected future satisfaction ($r = .434$, $p < .001$), but the correlation between past and future satisfaction, albeit significant for three of the four events, was considerably lower in magnitude (average $r = .141$, $p < .05$).

Summary

The major findings of the present study may be summarized as follows:

1) The experimental manipulation of event severity appeared to be very effective; each of the events in the severe condition was judged to be more severe and more threatening than the corresponding event in the mild condition. There was no effect for the order in which the self and other judgments were made, and no significant effect of base-rate information on respondents' initial probability estimates (i.e., perceived population base-rates).

2) As predicted, severe events were judged to be less probable than mild events, and both mild and severe events were judged to be less likely to happen to oneself than others. The effect of severity on probability judgments varied across the four life events, with the greatest difference occurring for the employment event, and the smallest difference for the health event (cancer).

The extended hypothesis that event severity would have a stronger effect on judgments regarding one's own future outcomes received only marginal support in the present study. The predicted interaction between severity and type of judgment (self versus other) was not significant. However, a significant interaction of severity, type of judgment, and event indicated that, with the exception of Event #4 (health--cancer), severity tended to have a greater impact on self than other judgments.

3) Contrary to expectation, respondents in the present study gave relatively high estimates of population base-rates. For each of the four life events, a majority of the respondents estimated the probability for the average person in the general population to be higher than the base-rate specified. The provision of base-rate

information resulted in significantly lower estimates of event probability for both self and other judgments in every event and severity condition. The absolute reduction in probability estimates resulting from the provision of base-rate information was significantly greater for other than for self judgments. However, when compared to the discrepancy between judgments made without base-rate information and the base-rate specified, the percentage of change toward the base-rate was greater for self than other judgments.

Analysis of the probability estimates in terms of percentage of change toward the base-rates specified also revealed interactive effects of base-rate information and severity. Compared to the no base-rate information condition, the percentage of change in the base-rate condition was equivalent for self and other judgments about mild events. However, for severe events, the percent of change in the base-rate condition was greater for self than other judgments.

4) An internal analysis of respondents classified as above or below the specified base-rates provided, at best, only partial support for the selective use hypothesis. As predicted, for respondents classified as above the designated base-rates, provision of base-rate information led to significant reductions in probability estimates for both self and other. However, contrary to prediction, a similar, but non-significant reduction in probability estimates for both self and other also occurred within the below base-rate classification group. This apparent contradiction of the selective use hypothesis must be qualified due to the ambiguous nature of the below base-rate classification category. Since (a) fewer than 10% of respondents were

classified as below the base-rates specified, and (b) those respondents classified as below base-rate were actually quite close to the base-rates specified, the internal analysis cannot be considered to represent a stringent test of the selective use hypothesis.

5) Sex of respondent, event, and the joint effects of severity and event also affected judgments of event probability. Over all experimental conditions, females estimated event probability for self, other, and the population to be higher than did males. Males and females also differed somewhat in their ordering of the event probabilities. Main effects for event and the interaction of event and severity on probability estimates indicated that the marriage and health events were generally rated as lower in probability than the employment and crime events, and that the effect of severity on ratings of event probability was strongest for the employment event and non-significant for the health event. Self-other differences in probability estimates were strongest for the marriage event and, again, not significant for the health event.

6) Analyses of ratings of judgment certainty indicated highest certainty for judgments of self probability for marriage and employment, and lowest certainty for judgments of other probability for health; the latter effect was particularly true for male respondents. A three-way interaction of sex, severity, and base-rate revealed that, when provided with base-rate information, females were significantly more certain of their self-probability judgments for severe than for mild events. The effects of base-rate and severity on certainty of self judgments also varied across events: Severity

increased certainty for marriage, severity decreased certainty for employment, and base-rate and severity had interactive effects on judgment certainty for the crime and health events.

7) Respondents' ratings of event characteristics revealed that the severe events were generally rated as more severe, unpredictable, important, unfair, and threatening than the mild events. In general, the crime and health events were regarded as more negative than the marriage and employment events. The provision of base-rate information led to lower ratings of threat for both mild and severe events and lower ratings of unfairness for severe events. Female respondents rated the events as more severe, important, and threatening than did males.

8) On the measure of perceived control, respondents attributed significantly greater control to themselves than to others, and females attributed greater control to others than did males. For the individual life events, the self-other difference in perceived control was significant for the marriage and employment events only. There was an interaction of sex of respondent and type of judgment which varied across event: Females attributed greater control to self than to other for the marriage event only; males attributed greater control to self than to other for all events except health (cancer).

9) The personal concern expressed by respondents varied with severity and event: The marriage event evoked the least concern in both mild and severe conditions, and reported concern was also relatively low for the mild employment event. In addition, female respondents tended to report greater personal concern than males.

10) Despite their higher probability estimates for mild events, respondents did not report greater experience with mild compared to severe events. The analysis of amount of personal experience with the individual life events indicated that for mild events, respondents reported greatest experience with the crime event (property crime). For severe events, marriage (divorce) and health (terminal cancer) were associated with the greatest degree of personal experience. Comparing the mild and severe versions of each event, there were no significant differences in reported experience for the marriage and employment events, but respondents reported greater experience with property crime compared to personal crime, and marginally greater experience with fatal compared to non-fatal forms of cancer.

11) In response to the self-description and life satisfaction items, the participants generally described themselves in moderately positive terms with respect to optimism, happiness, and luck, and described their lives as somewhat better than the lives of the average person in the country and in the class. In addition, respondents reported their current life situation to be better than the past; and expected the future to be even better. Respondents in the mild event conditions gave somewhat more positive ratings of the quality of their lives than respondents in the severe event conditions. Female respondents, despite their relatively "pessimistic" probability estimates, did not describe themselves as more pessimistic compared to their male counterparts.

C H A P T E R I V

DISCUSSION

The present paper has described several cognitive and motivational processes that may contribute to optimism about future life events. This study was conducted to test hypotheses derived from a variety of theoretical perspectives, involving both cognitive and motivational considerations. In the following discussion, the hypotheses will be considered in light of the present findings, and the implications of the results for an understanding of optimism will be discussed. Finally, methodological issues will be considered, as well as potential directions for future research.

Factors Affecting Probability Judgments

To investigate the contribution of cognitive errors and motivational biases to optimistic expectations, the present study examined the effects of event severity and information about population base-rates on judgments about the likelihood of experiencing negative life events. In addition, this research was designed to investigate self-other differences in expectations about future negative life events.

Data from this study provide strong evidence of an asymmetry in expectations for self and others, consistent with earlier research (e.g., Harris & Guten, 1979; Kirscht et al., 1966; Lang-Gunn, Note 1; Weinstein, 1980). The average person in the study judged themselves to be significantly less likely than the "average person in the class" to experience both the mild and severe life events. As expected, self and other judgments, and the magnitude of the discrepancy, varied for the individual life events. In addition, there were consistent effects of event severity and the provision of base-rate information on respondents' judgments.

As predicted, severe negative life events were judged to be less likely than mild negative life events, even in the base-rate information condition, in which equal population base-rates were specified for the mild and severe version of each event. However, the reports of personal experience with each event do not support the position that the effects of severity on expectations reflect the actual or perceived likelihood or distribution of mild and severe life events, rather than motivational bias. That is, although the respondents judged the severe events to have a lower probability than the mild events, they did not report that the severe events occurred less frequently in their own actual experience.

The hypothesis that event severity would have a stronger effect on judgments about oneself than on judgments about others received only marginal support. This prediction, based on a motivational interpretation, was also disconfirmed in Weinstein's (1980) research using comparative self-other judgments. However, data from the

present study provided some evidence, albeit weak, that severity had a greater impact on self than other judgments for each of the life events except cancer.

The hypotheses regarding the selective use of base-rate information received somewhat mixed support in the present study. The internal analysis was of limited usefulness in evaluating the selective use hypothesis because of the unexpectedly high estimates of perceived population base-rates given by the respondents. Although the judgments of respondents above the base-rates specified are consistent with the selective use hypothesis, they are also consistent with an information-processing interpretation. There were too few judgments below the specified base-rates, judgments critical to an evaluation of the selective use hypothesis, to assess the use of base-rate information that is "unfavorable" or inconsistent with one's self-interest.

Perhaps the strongest evidence of the selective use of base-rate information was provided by the analysis of probability estimates in terms of the percentage of change in the base-rate information condition toward the base-rates specified. Compared to the no base-rate information condition, the percentage of change in the base-rate condition was greater for self than other judgments. Moreover, this difference was the result of a greater percentage of change in self probability estimates in response to base-rate information about severe events.

In addition to the factors hypothesized to affect estimates of the probability of future life events, sex of respondent also had

consistent effects on respondents' estimates. For every probability estimate and event likelihood judgment, females judged the negative life events to be more likely, compared to their male counterparts. This sex difference was not anticipated, and there are at least several possible interpretations. First, there may be differences in the interpretation and understanding of the concept of probability by males and females, although the difference also occurred on the event likelihood rating. Alternatively, the high probability estimates of females may reflect the operation of the availability heuristic in that a) females expressed greater concern about the life events, and may have thought about them more frequently than the male respondents, and b) females perceived the events to be more severe, important, and threatening, and the greater emotional salience of the events for females may have led to higher estimates.

Illusions of Control and Invulnerability

In addition to ascribing reduced risk to themselves compared to others for negative life events, respondents attributed significantly greater control to themselves than to others. The contribution of perceived control to the asymmetry in expectations for self and other is evident in the present study. The only life event in this study for which self-other differences in estimated probability were not significant--health (cancer)--was also the only event for which there was not a significant self-other difference in perceived control. Further evidence of an "illusion of control" was provided by the

judgments regarding the marriage event, especially for female respondents. Differences between self probability estimates and estimates for the population and the average person were greatest for the marriage event. Perceived personal control was greater for marriage compared to the other events, and significantly greater for self than other. In addition, among the severe events, respondents reported the least concern or worry about divorce, despite a high degree of personal experience with this event. In short, the marriage event, especially divorce, was clearly an event for which respondents believed they were uniquely exempt from risk and able to exert control.

In contrast, there was little evidence of optimism about uncontrollable life events, and little support in the present study for an illusion of invulnerability as a major source of optimism. The health event (cancer) was judged to be the most threatening and important, and among the most severe, unpredictable, and unfair of the life events. The estimated probability, while the lowest of the four events, was still relatively high (37% for the population, 34% for others, 30% for self), and respondents perceived cancer to be the least controllable of the events. However, the belief that there was little one could do to control or prevent cancer was apparently not associated with a belief in personal invulnerability, given the absence of a self-other difference in estimated probability. Nor was there an absence of reported concern or worry about cancer. Indeed, contrary to the pattern associated with an illusion of invulnerability about uncontrollable events (Wolfenstein, 1957), cancer was not only perceived to be the least controllable of the events, it evoked the

greatest concern or worry among respondents.

The perceived lack of control over cancer, and lack of control unique to oneself, is interesting in view of research on the attributions of actual cancer victims. It is not uncommon, as previously noted, for victims to formulate explanations for their misfortune, including explanations involving self-blame (e.g., Janoff-Bulman & Lang-Gunn, in press). Differences in the perceived or implied control in individuals' explanations versus predictions about cancer may reflect the hindsight effect (Fischhoff, 1975), and the magnitude of the event, which may compel the individual to explain the event in terms of their own contribution.

Evidence of Judgment Bias

The asymmetry in expectations for the future for oneself and similar others does not, in itself, demonstrate bias. However, data from the present study do reveal sources of bias in individuals' predictions about the future. First, respondents' judgments were influenced by event severity, a factor logically irrelevant to outcome likelihood, but motivationally important. The respondents judged severe negative events to be less likely than mild negative events even when the base-rates were specified as equal, and despite the same degree of personal experience reported for the mild and severe events.

Second, respondents' use of the information about population base-rates reflects some bias in their predictions. Although the respondents did not ignore the base-rate information, they also did

not fully use the information, and they used it differentially in making predictions about themselves and their classmates. In the base-rate condition, the relative judged likelihood of the events for the general population, oneself, and the average person in the class suggests that respondents did not replace their estimates of the population base-rates with the base-rates specified. Respondents reduced their probability estimates for themselves and their average classmate in response to the base-rate information, but their estimates were higher than the population base-rates specified. Respondents' failure to maintain the relative perceived likelihood for the population, self, and other suggests that they may have assimilated the base-rates specified with their initial estimates, rather than replacing their initial population estimates.

There are several possible explanations for this limited use of the population base-rate information by respondents in the present study. First, respondents may not have fully accepted the information since, in most instances, it was discrepant with their estimates. However, since the information was attributed to legitimate sources, was "favorable," and was obviously not rejected by the respondents, it is not clear why they did not fully use the information. Second, the act of making initial estimates of population base-rates may have limited respondents' use of the base-rates specified because of the perseverance of their initial estimates (cf. Ross, 1977), or self-presentation. That is, once respondents made their initial estimates, they may have resisted changing their initial impressions because the information was inconsistent, or because they did not want

to acknowledge that their estimates were erroneous.

The results of this study also demonstrate the differential influence of population base-rate information on predictions about oneself versus others and, to a lesser degree, on predictions about mild versus severe events. Even with individuating information available about oneself, the base-rate information should be equally relevant to judgments about oneself and others. However, respondents in the present study did not simply adjust their self and other estimates in response to information about the population base-rates; the base-rate information had a differential impact on self and other judgments. In addition, for self estimates, there was some evidence that the generally "favorable" base-rate information had a greater influence on predictions about severe compared to mild events.

There was little evidence that respondents relied on the availability heuristic in making their predictions. Reported personal experience with mild and severe events did not correspond to the greater judged likelihood of mild events. Moreover, the severe events were judged less likely despite their greater emotional salience in terms of perceived threat and importance to the respondents.

However, availability does provide a possible explanation for respondents' generally high probability estimates. The negative life events used in this study were selected precisely because they are relatively familiar "real-life" events for which most people are at risk. Consequently, most people, including the respondents, know others who have personally experienced each the events, and are exposed to information about the nature and frequency of the events by

the news media. Thus, the familiarity of the events may promote the perception that they occur more frequently than they actually occur, and may lead individuals to overestimate the probability of these events.

Optimism and Realism

The differences in predictions for oneself versus others may demonstrate an "optimistic bias" in expectations for the future (Weinstein, 1980), but the absolute probability judgments cannot be described as highly optimistic. The lowest probability estimates given by the respondents, estimates of their own future likelihood of experiencing the events, ranged from 28% - 40% for the four negative life events. It is difficult to evaluate the absolute level of respondents' predictions without estimates of the actual probability of experiencing each of the events during one's lifetime, but the estimates do appear to be relatively high, and not especially optimistic.

The relative optimism in individuals' predictions for themselves versus others was demonstrated by Weinstein (1980) and replicated in the present study. Weinstein (1980) described the asymmetry in expectations for self versus others as an error in judgment he labeled "unrealistic optimism." It is important to note, however, that while the difference in self-other expectations appears to represent an error in judgment and to be unrealistic, it may be very adaptive for the individual. There was little evidence that the relative optimism

of individuals' expectations was based on an illusion of invulnerability; instead, individuals appeared to exaggerate their personal control relative to others. An illusion of control over negative life events, although inaccurate, may encourage the individual to make every reasonable effort to prevent the undesirable outcome. Moreover, there was no evidence that individuals denied that the events could happen to themselves and others:

The individual who to retain his sense of safety must deny that anything terrible will happen has his feeling of security shattered when danger materializes. The person who admits that extremely dangerous events may occur, but retains the belief that he himself will survive, is the one who is apt to emerge from danger with less disturbance. (Wolfenstein, 1957, pp. 25-26)

Thus, the "unrealistic optimism" displayed in respondents' self and other judgments about the likelihood of experiencing negative life events may be the most adaptive response to the uncertain prospect of experiencing many possible negative life events. Their efforts to exert control over negative life events may actually reduce their risk, and acknowledgment of the threat may enable an individual to better cope with the negative life events that they do experience.

Methodological Considerations

The questionnaire and data collection methods used in the present study were designed to assess the degree to which unrealistic optimism contributes to individuals' judgments of the probabilities that negative life events would happen to themselves and to others. In this section of the discussion, consideration will be given to some of

the methodological issues raised by the results and some alternative strategies for future research will be described.

As mentioned earlier, the research by Weinstein and his associates (Weinstein, 1980; Weinstein & Lachendro, 1982) used comparative judgments of event likelihood for oneself versus others. In the present study, the estimates of event probability, as well as other related measures, were independent for self and other judgments. This feature of the study appears to be an improvement over the comparative judgment approach in that it allowed evaluation of the absolute levels of probabilities given for self and other, and the differential effects of the experimental factors on self versus other judgments. Further, through separate measurement of self and other judgments, it was possible to determine that, given differential effects for self and other for a particular independent variable, the effect was due to changes present on one measure but absent on the other, or to a different pattern, direction, or rate of change on one measure compared to the other.

A second feature of the methodology of the present study which warrants further discussion is the decision to use familiar, real-life events which pose some potential threat to the future well-being of the respondents. Given that the hypotheses relating to unrealistic optimism are, at least in part, based on motivational constructs, it would appear necessary to test those hypotheses within the context of stimulus events which represent a real, albeit remote, threat to the respondents and, thus, may be likely to arouse the motives in question.

The unexpectedly high probability estimates given by the

respondents in this study posed some significant problems for the analysis of selective use of base-rate information, and could limit the range of experimental manipulations of base-rate information in future research which used a similar methodology. As indicated earlier, the high estimates given by the respondents may have been due, in part, to the frequent media coverage and personal experience with the type of events included in the study. Therefore, it should be possible to reduce the overall level of probability estimates by selecting less familiar or available events. However, use of relatively unfamiliar events, while affording greater flexibility in the manipulation of base-rates, could reduce the motivational relevance of the events and, therefore, their usefulness in evaluating motivational hypotheses. Another approach would be to attempt to anchor the respondents' judgments by providing a variety of examples of familiar events with their associated probabilities as part of the introductory comments and directions included at the beginning of the questionnaire. By using this approach, it should be possible to retain the experimental realism afforded by the familiar events. However, as previously noted, for many life events, actual probabilities during one's lifetime are difficult to estimate. Alternatively, if the hypotheses do not involve the direction of change in judgments, these problems could be avoided simply by the use of a control group.

Future Directions

The present study suggests a number of different directions for future research. Optimism has received very little attention in psychology, and much more research is needed to establish the sources of optimism, the mechanisms by which individuals maintain optimistic expectations, and the psychological and behavioral consequences of optimism.

In the present study, it was proposed that the selective use of information, including relevant base-rate information, may be one mechanism which allows individuals to maintain relatively optimistic expectations for the future. Weinstein's (1980, Study 2; Weinstein & Lachendro, 1982) research involving the use of individuating information about others is consistent with this hypothesis. Individuals who received information in the form of reasons listed by others, reasons comparable in nature and number to their own, should have concluded that their chances were about the same as those of their classmates. Instead, they still maintained that they were more likely than their classmates to experience the positive events, and less likely to experience the negative events. However, evaluation of the selective use of base-rate information requires additional study. Research is needed to determine the conditions under which relevant information has less impact than it logically should have on relative expectations for oneself versus others. For example, as an extension of the present study, would the individuals in Weinstein's (1980) research have used the individuating information to a greater degree

if it were consistent with their expectation that their futures would be more positive than their classmates'?

Similarly, in the context of the present study, it would be possible to vary systematically the base-rate specified for each event. Manipulating the degree of discrepancy between the base-rate specified and respondents' untutored estimates may reveal differential tolerances for discrepant information for self versus other, positive versus negative events, and mild versus severe events.

Future research on the asymmetry in expectations for oneself versus others might also examine the contribution of perceived similarity between oneself and the "other" person. The classmates in the present study and Weinstein's research were presumably perceived as very similar by the respondents. Although the asymmetry in self-other expectations occurred with these similar others, it may be greater for less similar others, as the general population estimates by respondents in this study suggest. It may also be possible to reduce the discrepancy in self versus other expectations by increasing perceived similarity.

Moreover, individuals' estimates for others may be affected by the nature of the target person. For example, respondents in the present study may have reduced their probability estimates if they had made judgments about an actual person in the class, rather than a hypothetical "average person in the class." Alternatively, they may have increased their estimates, since judgments about a specific other person would involve at least minimal information about the person's physical attributes, as well as other inferred characteristics,

information which could be used to justify a discrepancy between one's own chances and the chances of the other person. Similarly, the greater anonymity of a hypothetical member of a large group (e.g., "average person in the general population") may encourage relative optimism about oneself.

Additional research is also needed to investigate illusions of control and of invulnerability as sources of optimism. Why do people believe that they are more able than others to effectively control or prevent negative life events? Do people believe that they are uniquely able to control or prevent these events, or that they will exert the effort to control the events, and others will not? Is perceived control a source of optimism about the future, or a consequence of it? That is, do individuals believe that they are less likely to experience negative life events because they are better able to control the events, or do they judge the events as less likely to happen to themselves in an effort to enhance their feelings of control?

Both the present study and Weinstein's (1980) research suggest that optimism relative to others requires that the event be perceived as controllable. Are there conditions which promote optimism about uncontrollable life events? Do individuals have an illusion of invulnerability about some uncontrollable events? For example, if a remote threat that individuals believe they can prevent actually materializes, will they tend to maintain their optimism and the belief that it won't happen to them by relying instead on an illusion of invulnerability?

It would be of considerable interest to study optimism about

specific events, and the judgment processes involved, over time. In addition to revealing changes in optimism and sources of optimism as a threat becomes imminent, this approach could help to illuminate the psychological relationship between prediction and explanation. For example, the occurrence of a positive outcome or the non-occurrence of a negative outcome might be expected to reinforce an individual's optimistic expectations and belief in their own control over the event. Similarly, it would be of interest to investigate the explanations of individuals confronted with an unexpected negative event or the absence of an expected positive event. How do individuals' expectations affect their ability to cope with unanticipated outcomes, and their subsequent explanations for those events?

Further, what are the behavioral implications of a tendency to perceive oneself as less vulnerable than others to negative life events? Does greater perceived control encourage the individual to exercise the available means of controlling or preventing negative events, or does it promote a false sense of security and increase risk through failure to take available precautions? Does an optimistic bias and an illusion of control hinder an individual's response to realistic threats or unexpected disappointments, or the ability to cope with uncontrollable events?

Finally, future research should also be expanded to include a wider sample of life events varying on other relevant dimensions. In addition, it would be valuable to study optimism among different subject populations. For example, does optimism decline with age, or

with the experience of negative life events? Future research should also include different measures of optimism and related processes, such as denial.

FOOTNOTES

¹In addition to the thirteen countries in this study, the Kibbutzim of Israel were included as a separate sample. Kibbutz members gave the highest personal rating, 7.0.

²In some countries, particularly countries that had experienced recent radical political change or were in the process of achieving national independence, Cantril (1965) found a high correlation between personal and national ratings.

³It is interesting to consider the emotional consequences of a "near success": "When a person almost obtains what he desires or almost loses what he is enjoying, emotional nuances occur. A near success leads to exasperation, heightened frustration, the feeling of being teased, of being unfortunate. . . . Consider the following situation. If someone holds number 5304 in a lottery and he learns that 5305 is the winning number, this near-success is probably harder to bear than if there is no winning number anywhere near his own" (Heider, 1958, pp. 141-142).

⁴However, perceived control may induce stress when the individual believes that there are actions he or she could take to produce or avoid an outcome, but does not take those actions (cf. Bandura, 1977).

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APPENDICES

APPENDIX A

Base-Rate Information

Base-Rate Information

MARRIAGE

Figures published recently by the U. S. Department of Health and Human Services indicate that 35% of married persons will experience temporary marital difficulties resulting in a short-term separation during their lifetime.

Figures published recently by the U. S. Department of Health and Human Services indicate that 35% of married persons will experience a divorce during their lifetime.

EMPLOYMENT

Figures released recently by the U. S. Department of Labor indicate that, sometime during their lives, 20% of employed persons must accept jobs outside their chosen fields for a year or longer.

Figures released recently by the U. S. Department of Labor indicate that, sometime during their lives, 20% of employed persons become unemployed and are unable to find a job for a year or longer.

CRIME

Recent estimates released by the National Criminal Justice Service indicate that, sometime during their lives, 25% of Americans will be victims of a major property crime (motor vehicle or major household theft, etc.).

Recent estimates released by the National Criminal Justice Service indicate that, sometime during their lives, 25% of Americans will be victims of a personal crime (assault, rape, mugging, etc.).

HEALTH

Estimates published recently by the National Center for Health Statistics indicate that 15% of Americans will develop a curable (non-fatal) form of cancer during their lifetimes.

Estimates published recently by the National Center for Health Statistics indicate that 15% of Americans will develop a terminal (fatal) form of cancer during their lifetimes.

APPENDIX B

Sample Questionnaire

No Base-rate/Severe Condition

This is a study of people's predictions and expectations about future life events. In this questionnaire, you will be asked to provide your own judgment of the likelihood that specific events will happen. We are interested only in your beliefs and expectations; there are no right or wrong answers.

Some questions will ask you to express a prediction in terms of the probability that the event will occur. You will be asked, for example, to give your estimate of the probability that the average person in the United States will experience a particular event in his or her lifetime. The probability that the average individual in the country will experience the event is the same as the percentage of people who will experience the event. For instance, if you think that 20% of the population will win a lottery or raffle in their lifetimes, then the probability that the average person in the population will win a lottery or raffle in his or her lifetime is also 20%. Of course, the probability will vary for specific individuals or groups. For example, people who regularly purchase lottery or raffle tickets will have a higher probability of winning (and of losing money!) than people who do not buy lottery or raffle tickets.

You would indicate a prediction of 20% as follows:

The probability that the average person in the country will win a lottery or raffle in his or her lifetime is ____%.

This is the same as predicting that 20% of the people in the country will win a lottery or raffle in their lifetimes. This also means that 20 of every 100 people (or 2 of every 10 people, etc.) will experience this event during their lifetimes.

The following chart provides a general guideline for estimating the probability of an event:

0%	Definitely will not happen
20%	Very unlikely
40%	Somewhat unlikely
50%	As likely to happen as to not happen
60%	Somewhat likely
80%	Very likely
100%	Definitely will happen

Of course, your estimate can be any value between (and including) 0% - 100%, and will probably fall somewhere between the numbers and categories on this chart. For example, if you think an event is more than "somewhat likely" but less than "very likely," your probability estimate might be 72%.

Please read and answer each question in the order in which it appears. We realize that predictions about future events are often difficult to make, but please try to answer every question. Remember, there are no right or wrong answers; we are interested only in your beliefs and expectations.

**** THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY ****

What do you think is the probability that the average person in this country will experience each of the following events during his or her lifetime?

_____ % Event #1: Divorce

_____ % Event #2: Unemployed and unable to find a job for a year or longer

_____ % Event #3: Victim of a personal crime (assault, rape, mugging, etc.)

_____ % Event #4: Terminal (fatal) form of cancer

EVENT #1: Divorce

1. In general, how likely do you think this event is? (Circle number)

Very unlikely	1	2	3	4	5	6	7	Very likely
------------------	---	---	---	---	---	---	---	----------------

2. What do you think is the probability that you will personally experience this event during your lifetime? _____%

3. How certain are you of your probability estimate for yourself?

Not at all certain	1	2	3	4	5	6	7	Completely certain
-----------------------	---	---	---	---	---	---	---	-----------------------

4. What do you think is the probability that the average person in this class will experience this event during their lifetime? _____%

5. How certain are you of your probability estimate for the average person in this class?

Not at all certain	1	2	3	4	5	6	7	Completely certain
-----------------------	---	---	---	---	---	---	---	-----------------------

6. Please rate this event on the following dimensions. (Circle the number which best represents your perception of the event)

Mild	1	2	3	4	5	6	7	Severe
Unpredictable	1	2	3	4	5	6	7	Predictable
Important	1	2	3	4	5	6	7	Not Important
Unfair	1	2	3	4	5	6	7	Fair
Threatening	1	2	3	4	5	6	7	Non-threatening

7. To what extent do you think that you can effectively control or prevent the occurrence of this event?

No Control	1	2	3	4	5	6	7	Complete Control
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EVENT #1 (Continued)

8. To what extent do you think that the average person in this class can effectively control or prevent the occurrence of this event?

No									Complete
Control	1	2	3	4	5	6	7		Control

9. How concerned or worried are you about the possibility that this event may occur to you?

Very									Not at all
Concerned	1	2	3	4	5	6	7		Concerned

10. How would you describe your experience with this event?
(Circle all that apply)

- 1) has not happened to anyone I know
- 2) has happened to acquaintancesHow many? _____
- 3) has happened to close friends or relatives. . . .How many? _____
- 4) has happened to me personally

EVENT #2: Unemployed and unable to find a job for a year or longer

1. In general, how likely do you think this event is?

Very									Very
unlikely	1	2	3	4	5	6	7		likely

2. What do you think is the probability that you will personally experience this event during your lifetime? _____%

3. How certain are you of your probability estimate for yourself?

Not at all									Completely
certain	1	2	3	4	5	6	7		certain

4. What do you think is the probability that the average person in this class will experience this event during their lifetime? _____%

EVENT #2 (Continued)

5. How certain are you of your probability estimate for the average person in this class?

Not at all certain	1	2	3	4	5	6	7	Completely certain
-----------------------	---	---	---	---	---	---	---	-----------------------

6. Please rate this event on the following dimensions. (Circle the number which best represents your perception of the event)

Mild	1	2	3	4	5	6	7	Severe
Unpredictable	1	2	3	4	5	6	7	Predictable
Important	1	2	3	4	5	6	7	Not Important
Unfair	1	2	3	4	5	6	7	Fair
Threatening	1	2	3	4	5	6	7	Non-threatening

7. To what extent do you think that you can effectively control or prevent the occurrence of this event?

No Control	1	2	3	4	5	6	7	Complete Control
---------------	---	---	---	---	---	---	---	---------------------

8. To what extent do you think that the average person in this class can effectively control or prevent the occurrence of this event?

No Control	1	2	3	4	5	6	7	Complete Control
---------------	---	---	---	---	---	---	---	---------------------

9. How concerned or worried are you about the possibility that this event may occur to you?

Very Concerned	1	2	3	4	5	6	7	Not at all Concerned
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10. How would you describe your experience with this event?
(Circle all that apply)

- 1) has not happened to anyone I know
- 2) has happened to acquaintancesHow many? _____
- 3) has happened to close friends or relatives. . . .How many? _____
- 4) has happened to me personally

EVENT #3: Victim of a personal crime (assault, rape, mugging, etc.)

1. In general, how likely do you think this event is?

Very unlikely	1	2	3	4	5	6	7	Very likely
------------------	---	---	---	---	---	---	---	----------------

2. What do you think is the probability that you will personally experience this event during your lifetime? _____%

3. How certain are you of your probability estimate for yourself?

Not at all certain	1	2	3	4	5	6	7	Completely certain
-----------------------	---	---	---	---	---	---	---	-----------------------

4. What do you think is the probability that the average person in this class will experience this event during their lifetime? _____%

5. How certain are you of your probability estimate for the average person in this class?

Not at all certain	1	2	3	4	5	6	7	Completely certain
-----------------------	---	---	---	---	---	---	---	-----------------------

6. Please rate this event on the following dimensions. (Circle the number which best represents your perception of the event)

Mild	1	2	3	4	5	6	7	Severe
Unpredictable	1	2	3	4	5	6	7	Predictable
Important	1	2	3	4	5	6	7	Not Important
Unfair	1	2	3	4	5	6	7	Fair
Threatening	1	2	3	4	5	6	7	Non-threatening

7. To what extent do you think that you can effectively control or prevent the occurrence of this event?

No Control	1	2	3	4	5	6	7	Complete Control
---------------	---	---	---	---	---	---	---	---------------------

EVENT #3 (Continued)

8. To what extent do you think that the average person in this class can effectively control or prevent the occurrence of this event?

No Control 1 2 3 4 5 6 7 Complete Control

9. How concerned or worried are you about the possibility that this event may occur to you?

Very Concerned 1 2 3 4 5 6 7 Not at all Concerned

10. How would you describe your experience with this event?
(Circle all that apply)

- 1) has not happened to anyone I know
- 2) has happened to acquaintancesHow many? _____
- 3) has happened to close friends or relatives. . . .How many? _____
- 4) has happened to me personally

EVENT #4: Terminal (fatal) form of cancer

1. In general, how likely do you think this event is?

Very unlikely 1 2 3 4 5 6 7 Very likely

2. What do you think is the probability that you will personally experience this event during your lifetime? _____%

3. How certain are you of your probability estimate for yourself?

Not at all certain 1 2 3 4 5 6 7 Completely certain

4. What do you think is the probability that the average person in this class will experience this event during their lifetime? _____%

EVENT #4 (Continued)

5. How certain are you of your probability estimate for the average person in this class?

Not at all Completely
certain 1 2 3 4 5 6 7 certain

6. Please rate this event on the following dimensions. (Circle the number which best represents your perception of the event)

Mild	1	2	3	4	5	6	7	Severe
Unpredictable	1	2	3	4	5	6	7	Predictable
Important	1	2	3	4	5	6	7	Not Important
Unfair	1	2	3	4	5	6	7	Fair
Threatening	1	2	3	4	5	6	7	Non-threatening

7. To what extent do you think that you can effectively control or prevent the occurrence of this event?

No Complete
Control 1 2 3 4 5 6 7 Control

8. To what extent do you think that the average person in this class can effectively control or prevent the occurrence of this event?

No Complete
Control 1 2 3 4 5 6 7 Control

9. How concerned or worried are you about the possibility that this event may occur to you?

Very Not at all
Concerned 1 2 3 4 5 6 7 Concerned

10. How would you describe your experience with this event?
(Circle all that apply)

- 1) has not happened to anyone I know
- 2) has happened to acquaintancesHow many? ____
- 3) has happened to close friends or relatives. . . .How many? ____
- 4) has happened to me personally

General Background Information

1. Your age: _____
2. Your sex: _____ female _____ male
3. In general, how would you describe yourself?

More happy than most people	1	2	3	4	5	6	7	Less happy than most people
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Pessimistic	1	2	3	4	5	6	7	Optimistic
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More lucky than most people	1	2	3	4	5	6	7	Less lucky than most people
--------------------------------	---	---	---	---	---	---	---	--------------------------------

4. Compared to the average person in this country, how would you say life has treated you?

Worse	1	2	3	4	5	6	7	Better
-------	---	---	---	---	---	---	---	--------

5. Compared to the average person in this class, how would you say life has treated you?

Worse	1	2	3	4	5	6	7	Better
-------	---	---	---	---	---	---	---	--------

6. Try to imagine the best and the worst possible life for yourself. Where do you feel you personally stand at the present time?

Worst possible life for me	1	2	3	4	5	6	7	Best possible life for me
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Where would you say you stood five years ago?

Worst possible life for me	1	2	3	4	5	6	7	Best possible life for me
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Where do you think you will be five years from now?

Worst possible life for me	1	2	3	4	5	6	7	Best possible life for me
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