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Mood Effects on Subjective Probability Assessment

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A person's mood may directly affect a judgment of the uncertainty of a future event. Subjective probabilities were reported by subjects in a happy, neutral, or sad mood for personal and nonpersonal events. Two moods were induced by having the subject focus on particularly happy and sad personal experiences. Large, consistent mood effects are indicated. Relative to control subjects, happy people are "optimistic;" i.e., they report higher probabilities for positive events and lower probabilities for negative events. Conversely, sad people are "pessimistic," providing lower (higher) probabilities for positive (negative) events. Mood-state-dependent retrieval of information is indicated.

Research on the impact of affect on cognition is a contemporary topic in cognitive (Blaney, 1986; Gilligan & Bower, 1986), social (Clarke, 1982; Clark & Isen, 1982), and organizational (George, 1989) psychology. Emotions can have a substantial impact on the retrieval of knowledge from memory (Gilligan & Bower, 1984), and on the processing of information (Isen, Means, Patrick, & Nowicki, 1982; Clark, 1982). For example, subjects in a sad mood will learn or recall more negative than positive material (Blaney, 1986).

A basic premise of rational decision-making is logical, consistent, and unbiased understanding of environmental uncertainty, and choice of the optimal decision. Subjective probabilities (SPs hereafter) are elicited to quantify subjective uncertainty (Wallsten & Budescu, 1983), to provide information for formal decision models (Howard, 1988; Raiffa, 1968), and to study information integration and evaluate the quality of judgments (Tversky & Kahneman, 1974).

Mood effects may exist in decision-making contexts (e.g., Isen & Geva,

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1987; Isen & Patrick, 1983). Subjective probability judgments require retrieval of information from long-term memory and use of an inference procedure to generate the probabilities. A person's mood could affect memory retrieval and probability judgments resulting in distorted analyses, unintended decisions, and serious negative effects for the welfare of decision-makers and individuals impacted by the decision. Unintended (and undetected) mood effects could be particularly consequential for medical diagnosis, personal or environmental risk assessment (Johnson & Tversky, 1983; Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978; Slovic, Fischhoff, & Lichtenstein, 1982), and financial analysis tasks.

We hypothesized that happy and sad moods would affect estimation of subjective probabilities for positive and negative events. Our focus here is on the mood prevailing at the time of estimation, and the quality of probabilistic judgments.

PREVIOUS RESEARCH

Bower and Cohen (1982, pp. 292–307) and Blaney (1986) summarize three general findings on affect[1] and cognition:

1. Feelings act as a selective attentional filter for incoming stimuli, focusing attention on aspects of the situation that are consistent with the mood. Feelings therefore partially determine how a stimulus is *encoded* in memory (mood-congruent learning).[2]

2. Feelings affect what information is subsequently *retrieved* from memory, a mood-context retrieval effect (given mood-congruent learning). Evocation of an affectively charged region of long-term memory, perhaps based on an associative network memory model (Gilligan & Bower, 1984, pp. 571–585), produces greater activation for memories of events stored during earlier emotional experiences (mood-dependent retrieval).

3. Apart from any memory retrieval effects, feelings influence the availability of different constructs and strategies used in arriving at social perceptions, personality assessments, risky decisions, and other judgments, i.e., the *processing* of information to yield a conclusion, and the quality of such conclusions (Isen *et al.*, 1982; Clark, 1982).

Experiments on mood and memory typically investigate memory for word lists, story events, and autobiographical occurrences. The existence of mood congruent learning is supported consistently (Blaney, 1986, pp.

[1] Affect can be manifested in a variety of emotions including fear, anger, pessimism, and the more pleasant emotions of bliss, joy, and optimism (Mandler, 1982).

[2] This learning effect may be due to greater semantic elaboration of mood-consistent material and/or selective reminding of other mood-consistent events in memory, including possible intensification of the mood given consistent material.

234–236),[3] while the results on mood-dependent retrieval are somewhat mixed (Blaney, 1986, pp. 230, 231). In summary, feelings can impact the encoding, retrieval, and processing of information.[4]

Several methods can be used to induce different moods (Blaney, 1986, p. 235; Perrig & Perrig, 1988, p. 102). Mood induction methods include playing of music known to produce a particular type of affect (Teasdale & Spencer, 1984), provision of small rewards (Isen *et al.*, 1982), focusing on self-referential comments of an affective nature (Velton, 1968), seeing happy or sad films, explicitly recalling positive or negative experiences, reading affect-laden stories (Johnson & Tversky, 1983), and hypnotic suggestions to get into a mood by reliving memory of a positive or negative experience (Gilligan & Bower, 1984). Clark (1983) and Isen *et al.* (1982, p. 245) report that these several mood induction methods have common effects that persist for 5 to 15 min.

Elicitation of SPs continues to be an important decision research topic (Wallsten & Budescu, 1983, provide an overview). Work in this area typically concentrates on the impact of characteristics of the particular elicitation method being used, the task, or the information, rather than the possible effects of "situational" variables such as emotional states (Isen *et al.*, 1982; Johnson & Tversky, 1983) or subject motivation (Wright & Aboul-Ezz, 1988). Comparisons of SP elicitation procedures (e.g., Ludke, Strauss, & Gustafson, 1977; Seaver, von Winterfeldt, & Edwards, 1978; Wright, 1988) indicate that direct reporting, in probabilities, of the relative uncertainty of outcomes will yield results as good as, or better than, a variety of other elicitation procedures.

HYPOTHESIS

To generate an SP judgment for the likelihood of a future event, one must search long-term memory, retrieve salient episodic (and conceptual) knowledge, and combine retrieved knowledge into a SP inference. One's prevailing mood may focus attention on mood-consistent aspects of the situation, bias memory retrieval toward mood-congruent knowledge (Blaney, 1986, pp. 234–236), and result in a different SP than would be concluded in a mood-neutral situation.[5,6] The probability inference pro-

[3] Perrig and Perrig (1988) report results indicating that, by applying their knowledge of mood-oriented processing, subjects may produce similar "mood congruity" effects.

[4] While one can discuss separately the processes of accessing the content of long-term memory vs the strategies used to process stimuli and knowledge into a judgment (Isen *et al.*, 1982), Simon (1982, pp. 333, 334) has noted the fundamental linkage of memory usage and cognitive processing.

[5] Synder and White (1982, Experiments 1 and 2) and Bower (1981) reported that their subjects were more likely to remember events and experiences consistent with their pre-

cess could be an availability-based procedure (Tversky & Kahneman, 1973), where the perceived event likelihood is determined by the ease of recall and weighting of pertinent (and mood congruent) information, or a causal reasoning procedure (Tversky & Kahneman, 1980) where the mood-consistent knowledge affects when, and to what extent, explanatory scenarios are interpreted to be applicable.

METHOD

Subjects

Fifty-one Stanford undergraduates participated voluntarily. Twenty-two subjects known to be hypnotizable were in the mood condition, each receiving a payment of $3.50. Another 29 undergraduates served as control subjects to provide baseline data, receiving course credit for their time.

The mood condition subjects were obtained from a list of subjects known to be potentially hypnotizable. The control group was obtained from a sample of general university students. Since no mood induction was carried out on these subjects, we assume that they constitute, on average, a baseline mood somewhere between neutrality and mildly happy.

Design and Materials

The experiment was introduced to the subjects as part of an ongoing project to obtain and compare types of risk judgments. Moods were induced by asking a subject to recall and elaborate on past situations where happy or sad circumstances were experienced, recreating the mood that was experienced; hypnosis was used to suggest that subjects follow the mood suggestion and concentrate on the task. The induced emotions approximate the intensity induced by experiencing a funny comedy or a sad movie. Hypnosis was described as a way to help the subjects relax and think carefully about their judgments.

All subjects considered 24 events, each requiring a subjective probability judgment (see Appendix). Twelve events were personal in nature (e.g., "I will be hit by a car in the next five years") and 12 were nonpersonal events (e.g., "The Soviet Union and China will sign a comprehen-

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vailing mood. This judgment bias is assumed to be "automatic," without conscious effort being required (Blaney, 1986).

[6] Gilligan and Bower (1984, pp. 571–585) explain how this effect may obtain based on an associative network representation of memory and spreading activation as the operative memory process (also see Blaney, 1986, p. 229).

sive peace agreement within the next two years"). These two categories were further subdivided into events with positive and negative consequences (a total of 13 negative and 11 positive events). Twelve of the 24 SPs were generated in each of the two moods (happy and sad) for the mood condition subjects. Two sets of 12 questions consisted of 6 personal and 6 nonpersonal events, divided nearly evenly between positive and negative consequence events.

The order of the 24 situations was randomized and split into two sets. The order of administration of the two sets was counterbalanced across the subjects as was the administration order of the two moods.

The experiment had two main conditions: 22 subjects provided 24 SP judgments in happy and sad moods, and 29 subjects provided the 24 SPs without any mood induction. The 22 mood condition subjects generated 12 SPs in a happy (or sad) mood, and then provided the other 12 SPs in the opposite mood.

Procedure

A discussion of the meaning and use of subjective probabilities preceded the mood induction and SP estimation phases. It was emphasized to the subjects that they were to provide accurate "objective" probability estimates, regardless of their "frame of mind." Sad and happy moods were then induced using hypnosis performed by an experienced hypnotist.[7] Each subject was instructed to relax and, for the happy (or sad) mood, to focus on a pleasant (or unpleasant) event from his/her past life and vividly reexperience the happy (or sad) mood associated with that event. After the subject acknowledged that the mood was being experienced sufficiently, the subject evaluated the first 12 future events. The subjects reported their SPs on a .00 to 1.00 probability scale. The subject's mood was then changed to the opposite mood by use of suggestions and revivification of the opposite affective experience. Once in this second, contrasting mood, the subject evaluated the SP for each of the 12 additional future events. The subject was then returned to a neutral mood and debriefed completely. The order of the happy and sad moods was counterbalanced over the subjects.

RESULTS

Effects of Mood on the Magnitude of Judgments

The effects of the happy and sad moods are clearly indicated in the

[7] Further details on the general induction procedure are provided in Gilligan and Bower (1984, pp. 548, 549).

TABLE 1
MEAN SUBJECTIVE PROBABILITIES PER EVENT AND MOOD

Event sequence number (see Appendix) (1)	Mood					
	Sad (S) (2)	Control (C) (3)	Happy (H) (4)	Sad-C (5)	Happy-C (6)	H-S (7)
A. Positive events						
			Personal events			
8	.565	.601	.623	−.04	.02	.06
10	.541	.458	.532	.08*	.07	−.01*
17	.508	.788	.844	−.28	.06	.34
23	.147	.133	.228	.01*	.10	.08
24	.275	.359	.483	−.08	.12	.21
			Nonpersonal events			
2	.373	.436	.502	−.06	.07	.13
7	.504	.480	.626	.02*	.15	.12
9	.371	.387	.553	−.02	.17	.18
14	.413	.436	.450	−.02	.01	.04
18	.196	.231	.319	−.04	.09	.12
20	.324	.475	.520	−.15	.05	.20
B. Negative events						
			Personal events			
1	.473	.309	.383	.16	.07*	−.09
3	.361	.169	.255	.19	.09*	−.11
6	.510	.422	.434	.09	.01*	−.08
11	.436	.315	.302	.12	−.01	−.13
15	.364	.266	.304	.10	.04*	−.06
16	.516	.323	.228	.19	−.10	−.29
22	.582	.484	.376	.10	−.11	−.21
			Nonpersonal events			
4	.629	.518	.453	.11	−.07	−.18
5	.394	.377	.372	.02	−.01	−.02
12	.723	.652	.535	.07	−.12	−.19
13	.581	.576	.445	.01	−.13	−.14
19	.692	.664	.448	.03	−.22	−.24
21	.523	.438	.248	.09	−.19	−.28

* Difference in means inconsistent with expected mood effect. Notice that out of 72 comparisons (columns 5, 6, and 7), only 8 are inconsistent with the mood effect. Use of the median SPs (versus the means) reveals an even larger mood effect given that all 72 differences in the medians are consistent with the mood effect, and larger differences are indicated.

figures (and Table 1). Aggregated over the 24 events, for positive future events, the mean SP reported in a happy mood (.516) is higher than the mean SP reported in the control condition (.435) and is much higher than the sad mood mean SP (.383)—see Fig. 1. The converse is true for negative future events, i.e., the lowest probability is indicated for the happy

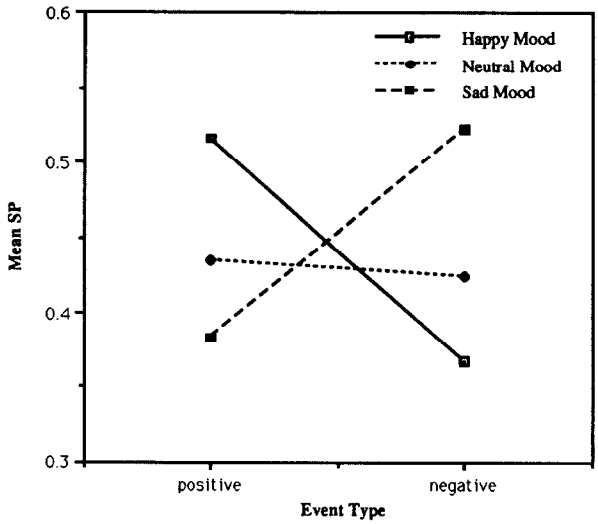

FIG. 1. Overall mean SP judgments.

mood subjects (.368), the highest probability is indicated for the sad mood subjects (.522) and the control subjects indicate an in-between SP (.424).[8]

The mean SPs for the 24 events, given the sad, happy, and control conditions, are reported in Table 1. The consistent mood effect is apparent. Consider the SPs for the positive events (Table 1, Panel A and Fig. 2). The mean happy mood SP for the positive events is higher than the mean SP for the subjects in the control condition for all 11 comparisons ($p < .01$, Wilcoxon signed ranks test—Table 1, column 6). The happy mood subjects indicate higher means than the sad mood subjects in 10 of 11 comparisons ($p < .01$, Wilcoxon—see column 7), usually by a wide margin, the only inconsistency being a trivial difference of .01 (see Fig. 2). The sad mood subjects indicate lower means for positive events than the control subjects in 8 of 11 comparisons ($p < .10$, Wilcoxon—see column 5). A similar pattern of mood effects is indicated for both the personal and nonpersonal events.

Subject SP judgments for the 13 negative events (Table 1, Panel B, and Fig. 3) follow a similar pattern. The average likelihoods for these undesirable events provided by the happy mood subjects are lower than those for the sad mood subjects for all 13 comparisons ($p < .001$, Wilcoxon—

[8] The mean (median) standard deviation for the control condition SPs over the 24 events is .197 (.182) with an interquartile range of .150 to .223, and an absolute range of .126 to .346. The standard deviations for the two mood conditions tend to be slightly higher; e.g., the mean SP standard deviation was .226 for the sad mood judgments and .213 for the happy mood judgments.

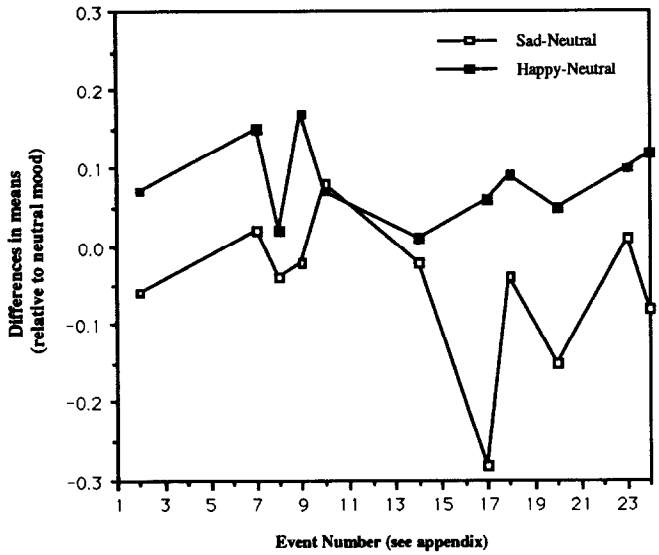

FIG. 2. Differences in sad and happy mean subjective probabilities for positive events (adjusted for the control condition means).

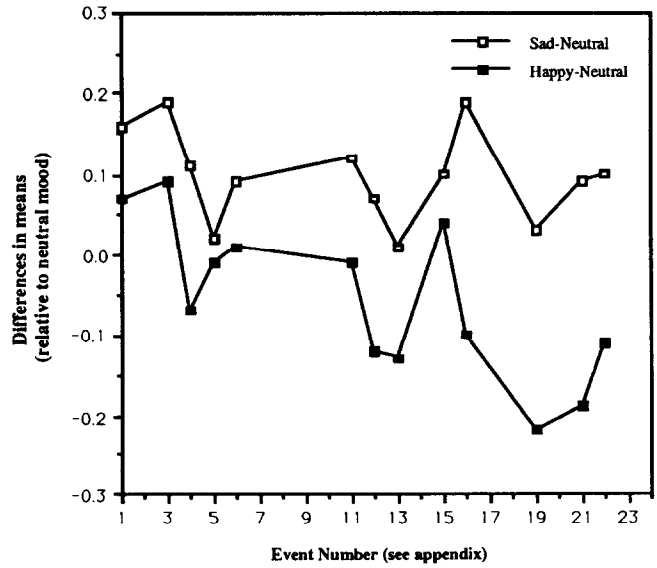

FIG. 3. Differences in sad and happy mean subjective probabilities for negative events (adjusted for the control condition means).

see Table 1, column 7). The happy mood subjects indicate that the negative events are less likely than the control subjects for 9 of 13 comparisons ($p < .10$, Wilcoxon—see column 6). In contrast, the sad mood subjects reveal a most pessimistic view of the future (Fig. 3) since they indicate higher likelihoods than those of the control subjects for all 13 negative events ($p < .001$, Wilcoxon—see column 5).[9]

To simultaneously consider all 24 event SPs, a repeated-measures ANOVA model was estimated with mood as a fixed, within-subject factor and subjects as a random factor. The SPs for the negative questions were rescaled by subtracting each SP from 1.00 to produce effects in the same direction for both the sad and the happy conditions, if the mood factor was producing an effect.[10] A highly significant impact of mood was revealed, $F(1,21) = 24.05$, $p < .001$.[11]

Johnson and Tversky (1983, p. 29) report data suggesting that more frequently occurring events are more susceptible to mood effects than less frequently occurring events. If this "susceptibility hypothesis" applies here, the gap between the happy and the sad mean SPs for the positive events will increase as the base rate perceived event frequencies increase. Similarly, the gap between the sad and the happy mood mean SPs for the negative events will become larger given increasing base rate frequency.

To test the susceptibility hypothesis, we computed the differences between the two mean mood SPs for both the positive and the negative events and regressed the differences on the mean control condition probabilities. Consistent with the susceptibility hypothesis, the differences in the mean mood SPs increase with increasing base rate frequencies. The product-moment correlation of .40 is statistically significant ($p < 0.05$).[12]

[9] The above tests were repeated using the median SPs; stronger effects were obtained given that all 72 differences in the medians were consistent with the mood effect, and larger differences are indicated.

[10] A normal probability plot indicated only a slight deviation from normality for the SPs. The estimated cell standard deviations displayed some variation (38 of 44 were between .14 and .31).

[11] Concerning individual differences in the effect of the two moods, for all 24 events, the average number of inconsistent signs for the mood versus neutral mood differences is 8.4 of 24, with a range of 3 to 13 inconsistent. The magnitudes of the mood versus control group mean differences at the individual level reveal a considerable mood effect.

[12] The plot of the 24 differences in the Happy–Sad mood means and the 24 control conditions mean SPs indicates a consistently positive, linear relationship with considerable variance. The R^2 for the linear regression is .164. Also, given that the control condition means range from .169 to .788, our conclusions are not an artifact of the estimates approaching the ends of the probability scale.

Mood Effects on the Processing of Information

Eleven of the 22 mood condition subjects were asked for description of the cognitive process they used to generate their probabilities. The typical description (in either mood) consisted of concentration on either a particularly recent, vivid, sometimes personal event or experience, or a well-known relevant fact, prior to making the SP judgment. The bit of information focused on was usually mood congruent. This phenomenon is exactly what is predicted by the hypothesis of mood-dependent retrieval. Occasionally, before providing the SP judgment, a subject would mentally scan over aspects of the event to which the SPs were to be assigned, e.g., different kinds of cancer given Event #2 (see Appendix), with this initial focusing suggesting possible use of an anchoring (on first information retrieved) procedure followed by adjustment given information subsequently retrieved (Tversky & Kahneman, 1973). With self-reported descriptions of cognitive processing, however, one must keep in mind the possible tendency to report an "appropriate, rational," perhaps contextually "acceptable," procedure in contrast to what the subject may have actually done (assuming awareness of his/her retrieval and inference procedures—cf. Ericsson & Simon, 1980; Nisbett & Wilson, 1977).

DISCUSSION

Moods were induced to replicate the feelings associated with feeling noticeably happy or sad. A happy or sad mood directly affected subjective probability judgments. For both positive and negative personal and nonpersonal future events, the mood effects are in the direction of the prevailing mood (see Fig. 1). Relative to control subjects, happy subjects overestimate the likelihood of positive events and underestimate that of negative events; sad subjects display the opposite tendencies, overestimating bad and underestimating good events. The gap between the happy and the sad mean SPs tends to increase given increasing event frequencies, consistent with data reported by Johnson & Tversky (1983).

Of several issues to be discussed, we begin with our mood induction method of having subjects get happy or sad by slowly reviewing in imagery for several minutes a happy or sad experience from their past. Hypnosis was used as an adjunct to help subjects concentrate, visualize the scene more vividly, and become better absorbed in the mood associated with that scene. The scientific validity of hypnosis has long been established (Hilgard, 1965; Orne, 1959). Reliable production of emotional effects using hypnosis is well supported in the literature (see Gilligan & Bower, 1984, p. 549, for references). Our subjects typically displayed facial, vocal, and bodily expressions consistent with the induced mood. The results from hypnotic mood inductions seem to be quite genuine and

are consistent with results from other induction methods (see Bower & Cohen, 1982, pp. 292, 296). Also relevant is the fact that Johnson & Tversky (1983) report similar mood effects on event fatality frequency judgments[13] using reading of affect-laden stories as the mood induction technique (without use of hypnosis).

Another issue is the possibility that the results are artifactual, because the subjects provided what they thought the researchers were looking for, i.e., "experimenter demand" effects. Several arguments can be marshaled against this demand interpretation. First, laboratory mood inductions are typically accompanied by behavioral (e.g., laughing, crying) and physiological indicators of the corresponding emotion (see Teasdale & Taylor, 1981). In this sense, the mood is "real," despite its being suggested. Second, several controlled studies of mood induction methods have shown that influences of mood on behavior are typically quite distinct from effects due to experimenter demand. As one example, Synder and White (1982, Experiment 3) misled subjects into thinking that a particular procedure would make them happy or sad, whereas the experimenters knew that the technique was in fact ineffective; despite obvious indication of strong experimenter demand, "mood-congruent" effects did not occur. As a second example, Teasdale and Fogarty (1979) report that, despite an explicit request for fast retrieval in all cases, subjects consistently retrieved mood-congruent memories more rapidly than incongruent memories. Third, congruent mood effects on memory and judgment have been obtained in many situations where the induction of mood was relatively unobtrusive, e.g., the use of background music (Bower, 1981, p. 141; Teasdale & Spencer, 1984), success or failure on a computer game (Isen, Shalker, Clark, & Karp, 1978), provision of a small, noncontingent gift (Isen *et al.*, 1978; Isen & Geva, 1987), emotional films at commercial theaters, and reading of simple three paragraph stories embedded among other stories (Johnson & Tversky, 1983).[14] Overall, the evidence indicates that induced moods and their effects are real, and results obtained are not due solely to subjects' perceptions of experimenter demand (Blaney, 1986; Gilligan & Bower, 1984, pp. 570, 571).

[13] Johnson and Tversky (1983) had their subjects estimate mortality frequency rates due to various causes (disease categories, accidents of various kinds, etc.) whereas some of our questions require subjects to estimate subjective probabilities of unique future events, e.g., that a major accident at a nuclear power plant will occur in the next 5 years or that a miracle cure for cancer will be discovered within the next 5 years. We suggest that similar mood biases occur for both frequency and probability judgments. The same psychological mechanisms are likely to cause biases in both cases, i.e., availability in memory of relevant instances; or availability of causal scenarios that would lead to a particular outcome; or availability to memory of arguments favoring the outcome.

[14] Table 1 in Blaney (1986, pp. 234, 235) indicates six general types of mood induction methods and the considerable number, and breath, of published research.

In our experiment, verbal reports obtained during the debriefing phase indicate that subjects frequently tried to produce results *opposite to* the documented mood effects. The task was described as part of an ongoing project to compare risk assessments to "actual probabilities" for nonpersonal and personal events. The need for judgment accuracy was emphasized to the subjects. The subjects were told that hypnosis was being used to put people in a relaxed state so that they could carefully consider their risk assessment SPs. Not surprisingly, several subjects spontaneously volunteered during the debriefing session that, because they were aware of the potential impact of their mood, they "compensated" by adjusting their SPs to be closer to the probabilities they thought they would generate in a neutral mood. In general, when asked about the impact of the two moods on their SPs, subjects usually reported they expected a slight effect, or no effect at all, on their SP judgments (however, with a tendency to report more expected impact for the personal versus nonpersonal events). Despite subjects' attempts to compensate for the effect of being in a particular mood, the results indicate a consistent mood effect on SP judgments.

The current study and work on other decision-making tasks suggest that decision-making research might explicitly incorporate possible effects of different moods. For example, Isen and Geva (1987) suggest that affective states may impact the magnitude of utility assessments. Different levels of risk-taking propensity given positive and neutral moods are reported by Isen and Patrick (1983). Johnson and Tversky (1983) indicate effects of negative and positive moods on risk frequency judgments. Work on the merits of various probability (Wallsten & Budescu, 1983) and utility preference (Farquhar, 1984) elicitation procedures tends to concentrate on the impact of technical differences in procedures and their results, without explicit concern for emotional or motivational aspects. Our research suggests that a broader perspective might be appropriate.

Consider decision situations such as where to site a nuclear power plant or whether a new product should be introduced. Application of decision analysis (Howard, 1988; Keeney & Raiffa, 1976; Raiffa, 1968) is a natural analytical tool. Wallsten and Budescu (1983, p. 156) note that

> The lesson for the decision or risk analyst is that when encoding an expert's, or anyone else's, opinion it is necessary to carefully specify the context within which the opinion is desired. One has to be explicit about the class of events in question, the sources of information that the person should consider, and the causes of unreliability in the information. . . .

Given the considerable impact of a prevailing mood reported here, if the eventual decision is highly sensitive to the elicited SPs or the outcome preferences of an important decision-maker, and the SPs were obtained

while the expert was in a sad ("pessimistic") or happy ("optimistic") mood, the decision and the consequences of the decision could be materially affected by an unsuspected mood bias.

The evolving literature in cognitive psychology indicates that affect and cognition are interrelated (Blaney, 1986; Bower & Cohen, 1982; Isen *et al.*, 1982), as clearly reflected in the current study. Effects similar to those reported here may prevail for reasoning and inference processes leading to other decisions and problem-solving efforts. For example, Isen *et al.* (1982, p. 258) suggest that an individual who is feeling happy may ". . . reduce the load on working memory: to reduce the complexity of decision situations and the difficulty of tasks, by adopting the simplest strategy possible, considering the fewest number of alternatives possible, and doing little or no checking of information, hypotheses, and tentative conclusions."

APPENDIX

Event Questions Utilized in the Experiment[15] (The data were gathered in the spring of 1981)

Personal Events—Positive

8. I will be able to vacation in Europe within the next three years.
10. Within the next year, I will move to a new housing situation which is both more desirable and cheaper than where I am living now.
17. Within the next year, I will meet a new person who will come to be a very good friend.
23. Within the next year, I will return a questionnaire I received in the mail and win a contest that pays a large amount of money to the winner.
24. I will win an important honor or award during the next year for a hobby or creative ability I possess (e.g., sports, art, writing, acting, singing, photography).

Personal Events—Negative

1. I will lose my wallet/purse within the next year.
3. A close friend or relative will be in an airplane that is hijacked within the next ten years.
6. I will be mugged on the street at some point in my life.
11. I will be seriously injured (i.e., I will spend some time in a hospital due to physical injury) within the next five years.
15. There will be a fire at my home (or apartment) within the next ten years.

[15] The events were provided to the subjects using two different presentation sequences. The numbers utilized here correspond to one of the sequences.

16. I will be involved in a major automobile accident within the next five years.
22. My home (or apartment) will be burglarized within the next ten years.

Nonpersonal Events—Positive

2. Because of a medical breakthrough, a "miracle" treatment for the cure of most forms of cancer will be discovered within the next five years.
7. The stock market will be extremely "bullish;" i.e., prices will rise rapidly over the next three years.
9. The rate of inflation for the national economy will fall to acceptable levels (10 percent or less) by the end of 1982.
14. A technological innovation will become available in 1982 that permits economical purification of sea water for human consumption.
18. The Soviet Union and China will sign a comprehensive peace agreement within the next two years.
20. A new synthetic fuel will be discovered during the next ten years that will easily and economically replace fossil fuels (oil, coal, gasoline, etc.).

Nonpersonal Events—Negative

4. A president of the United States will be assassinated within the next ten years.
5. There will be a major accident at a nuclear power plant in California within the next five years.
12. There will be a major, destructive earthquake (having a magnitude of at least 6.0 on the Ritcher Scale) in San Francisco within the next ten years.
13. There will be a new war in the Middle East by the end of 1982.
19. There will be a major fire (resulting in a loss of life) at a San Francisco high rise apartment building within the next 12 months.
21. A suspension of oil supplies from the Middle East will result in gas rationing in the Bay Area within the next year.

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