

Cognitive Appraisals and Transformations in Delay Behavior

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The effects of different cognitive representations of the rewards (outcomes) in a delay of gratification paradigm on children's ability to wait for these rewards were investigated. Consummatory (arousing) ideation directed at the relevant (contingent) rewards hindered effective delay. In contrast, cognitive transformations of the rewards which focused on their nonconsummatory qualities and associations significantly facilitated delay behavior more than did comparable ideation about similar rewards irrelevant to the delay contingency. Finally, consummatory ideation focused on rewards irrelevant to the contingency also greatly helped to maintain delay. Theoretical implications for the role of fantasy and cognitive appraisal in self-control were examined.

In view of the central importance of the "reinforcement" concept in contemporary psychology, it is surprising that so little is known about how the mental representation of rewards affects the individual's pursuit of them. There is an enormous discrepancy between the theoretical significance attributed to rewards in the regulation of goal-directed behavior and our lack of understanding of how their cognitive representation by the subject influences his behavior. The present study is part of a program to explore this topic by focusing specifically on how a person's ideation about the contingent rewards in a choice situation affects his ability to maintain goal-directed activity until he achieves his preferred outcomes.

Several experiments have indicated that the capacity to sustain self-imposed delay of gratification depends in part on the extent to which the person avoids cues that remind him of the rewards (outcomes) that he expects and wants but is prevented (interrupted, blocked, or delayed) from getting (e.g., Mischel & Ebbesen, 1970; Mischel, Ebbesen, & Zeiss, 1972; Schack & Massari, 1973). To increase subjective frustration, one would have to focus cognitively on the blocked goal objects (e.g., by engaging covertly in

anticipatory goal responses); to decrease frustration, one would have to suppress the goal objects by avoiding them cognitively. "Frustration tolerance" in the delay paradigm would depend on the subject's ability to suppress his attention to the rewards while remaining in the frustrative situation until he has attained the goal.

While this interpretation seems reasonable, it is probably incomplete. Indeed, Mischel and Moore (1973) found that exposure to symbolically presented rewards (slides) during the delay period significantly *increased* delay of gratification. This facilitative effect of exposure to slides of the rewards was directly opposite to the earlier finding that visual exposure to the rewards themselves greatly decreased delay time (Mischel & Ebbesen, 1970; Mischel et al., 1972). The earlier findings had been obtained in basically the same subject population (i.e., preschool children in the same nursery school) and from an essentially similar delay paradigm. Nevertheless, the Mischel and Moore study showed that exposure to slides of the relevant rewards enhanced delay behavior more than did exposure to comparable distractions (slides of similar but reward-irrelevant objects and blank slides). The critical difference between the reward-relevant attention manipulations in the earlier experiments and in the Mischel and Moore study was that previously children had been exposed to the actual reward objects, but in the Mischel and Moore experiment they were exposed to symbolically

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presented *images* (slides) of these rewards. It therefore seems that while attention to the rewards themselves decreases delay behavior, attention to the symbolically presented rewards enhances delay behavior.

At this juncture, the overall results on attention and imagery in self-control suggested that the mode of presentation of the reward stimuli (i.e., real versus symbolic in the form of slide-presented images) has extremely significant effects. Why? Mischel and Moore (1973) speculated that this pattern of results may reflect two different functions of reinforcing (rewarding) stimuli that, in turn, may have completely different effects on self-control behavior. Extrapolating from Berlyne's (1960) distinctions, a stimulus may be said to have both a motivating (consummatory, arousal) function and a cue (informative) function. The actual reward stimuli probably have a more powerful motivational effect than do their symbolic representations (i.e., slide images), whereas the latter have a more abstract cue function. Attention to the real rewards increases the person's motivation to make the blocked consummatory responses appropriate to the outcome (e.g., eat it, play with it). Since the subject cannot let himself make the consummatory response, frustration is increased, thus leading to decreased delay. In contrast, the cue or informative function of the symbolic reward stimulus may serve to guide and sustain the subject's delay behavior. It may do so by serving as a reminder of the contingency in the delay situation (a reminder of what the person will get) without being so real as to frustrate him. This interpretation suggests that exposure to the reward stimuli themselves may lead the subject to become too frustrated ("aroused") and ready to perform the terminal response, but exposure to their slide-presented symbolic representations may preserve the cue function of the rewards while reducing their arousal value. That is, the "image" of the objects may serve more as a "token" or reminder to sustain delay behavior, while the real presence of the objects interferes with effective self-control by generating excessive arousal and frustration.

The foregoing reasoning suggests that the effects of attention to the rewards upon delay

behavior may depend on how the subject attends to the reward stimuli rather than on whether or not he does attend or how the rewards are physically presented. We speculated that if attention is focused on the motivational (consummatory, arousing) qualities of the rewards, the frustration of delay should be increased and interfere with effective self-control. But if the same rewards are transformed by a cognitive focus on their nonconsummatory qualities, delay behavior would not be impaired and might even be facilitated. The present study began to explore these theoretical possibilities by investigating how the impact of attention to the rewards in the delay paradigm can be modified by specific *cognitive transformations* which the subject performs on the reward stimuli.

For this purpose, just before the start of the delay period, children were given brief instructions (plans) designed to encourage them to ideate in different ways during the actual delay time. The study compared the effects of instructions to ideate about the motivational (consummatory) qualities of the rewards in the delay contingency with instructions to cognitively transform the rewards and to ideate about their nonmotivational (nonconsummatory) qualities and associations. Moreover, these same two types of instructions were used for both the "relevant rewards" (the rewards in the delay contingency) and the "irrelevant rewards" (comparable objects but not relevant to the actual delay contingency). We expected that consummatory ideation about the relevant rewards would result in less delay than would nonconsummatory (transformational) ideation about them. We also predicted that consummatory ideation about the relevant rewards would impede delay more than would comparable ideation about the irrelevant reward objects. Finally, we hypothesized that the detrimental effects of attention to the relevant rewards would be eliminated and even reversed if subjects transformed the reward objects cognitively by focusing in ideation on their nonconsummatory qualities and associations. Hence, nonconsummatory ideation about the relevant rewards should facilitate delay more than should

comparable ideation about the irrelevant rewards (i.e., distraction).

METHOD

Design

Consistent with the basic delay of gratification paradigm developed by Mischel et al. (1972), all subjects were given a choice between two rewards. Then they were allowed to wait (20 minutes) to get their preferred choice or to signal at any time to receive the less preferred outcome immediately. Two different pairs of reward choices were used; half of the children chose between one marshmallow versus two marshmallows, and half chose between one pretzel and two pretzels. All of the children waited with both the immediate and delayed rewards in their choice pair facing them. The dependent variable was the length of time each child waited alone in the room before signaling for the experimenter to return by ringing a bell.

Before the start of the delay period, experimental subjects were given instructions to ideate in different ways while waiting. For half of the experimental subjects, the ideation instructions dealt with the rewards between which the subjects had chosen (relevant rewards); for the other half, the instructions dealt with comparable objects which the subject had not seen before (irrelevant rewards). For example, if a subject had been given a choice between one versus two marshmallows, the relevant reward instructions dealt with those objects; conversely, the irrelevant reward instructions dealt with the other objects (pretzels) to which he had not been exposed previously and which thus were not relevant to the waiting contingency.

Within the relevant reward and irrelevant reward conditions, half of the children received consummatory ideation instructions and half, nonconsummatory (transformational) instructions. The consummatory instructions emphasized the consummatory (arousing) aspects of the objects, primarily taste and texture. The nonconsummatory (transformational) instructions emphasized nonconsummatory aspects of the objects and their associations with other objects and activities.

Thus four experimental groups were used: (a) consummatory instructions for the relevant objects (consume relevant), (b) transformational instructions for the relevant objects (transform relevant), (c) consummatory instructions for the irrelevant objects (consume irrelevant), and (d) transformational instructions for the irrelevant objects (transform irrelevant). In addition to the four experimental treatments, a group which received no imagery instructions was included as an additional control.

Subjects and Experimenters

The subjects were 30 boys and 30 girls attending the Bing Nursery School of Stanford University. The children ranged in age from 3 years 4 months to

5 years 5 months, with a mean age of 4 years 6 months and a median age of 4 years 7 months. The procedures were conducted by one male and two female experimenters. Twelve subjects were randomly assigned to each of four experimental conditions and one control group. In each condition, all experimenters tested an equal number of males and females in each group to avoid systematic biasing effects of sex or experimenters.

Procedure

The experimental room and setting was similar to that described previously (Mischel & Ebbesen, 1970; Mischel et al., 1972). The experimental room was divided by a wooden barrier on one side of which was a box containing various battery-operated toys and interesting games. A small table and chair were on the other side of the barrier, and a desk bell was on the table. One side of the experimental room contained two large one-way mirrors which allowed an observer to watch the child during the entire procedure. Except for a small vision strip at the top of the mirror which permitted observation (above the child's direct line of vision), the mirrors were covered with brown paper so the child would not be distracted by looking into them.

During the initial part of the experiment, the procedure was essentially the same as that in previous studies (Mischel et al., 1972). The experimenter escorted the child into the room, showed the child the box of toys, explained that he and the experimenter would play with them later in the session, and seated the subject in a chair in front of the table. The experimenter then showed the child how to ring the desk bell on the table and explained that by ringing it, the child could always "bring back" the experimenter. At this point the experimenter and the child played a "game" which involved the experimenter stepping out of the room and returning immediately when the child signaled by ringing the bell. This game was played three times. Following the bell-signal training, the experimenter returned to the table and picked up an opaque cake dish which had been placed under the table. The cake dish contained either three marshmallows (arranged with two marshmallows together and one marshmallow on the other side of the dish) or three pretzels arranged in the same manner. The experimenter explained as follows:

If you sit in the waiting chair and don't get up, and wait until I come back by myself, you can have the two _____. But if you don't want to wait, you can ring the bell and make me come back anytime you want to. But if you ring the bell and make me come back, you can't have the two _____ but you can have the one _____. So, if you wait for me to come back by myself, you can have the two _____. But if you don't want to wait until I come back by myself, you can ring the bell and bring me back. But if you ring the bell and make me come back, you can't have the two _____ but you can have the one _____.

The experimenter then asked the child three criterion questions to assess whether or not the child understood the instructions:

What do you get if you wait for me to come back? But, if you want to, how can you make me come back? If you ring the bell and make me come back, what do you get?

If the child successfully answered these questions, the experimenter consulted a slip of paper which informed him of the condition to which the subject was assigned. In the experimental conditions the experimenter then introduced the imagery instructions by saying, "And now I have another game you can play, if you want to, for as long as you want to, while I'm gone. It's called the 'think about' game." For subjects in the control condition, the experimenter skipped that section entirely and proceeded immediately to the final criterion questions which were readministered to the experimental subjects after the imagery instructions.

Ideation Instructions

Subjects in the *consume relevant* group received the following instructions designed to focus attention on the consummatory qualities of the objects for which they were waiting.

[For subjects waiting for marshmallows] Look at the marshmallows. They are sweet and chewy and soft. When you look at marshmallows, think about how sweet they are when you eat them. When you look at marshmallows, think about how sweet they taste. Or you can think about how soft they are. When you look at marshmallows, think about how soft and sticky they are in your mouth when you eat them. Or you can think about how chewy they are. When you look at marshmallows, think about how chewy and fun they are to eat. Now, why don't you try playing "think about"? When you look at marshmallows, what can you think about?

[For subjects waiting for pretzels] Look at the pretzels; they are crunchy and salty. When you look at pretzels, think about how crunchy they are. When you look at pretzels, think about how crunchy they are when you bite them. Or you can think about how salty they are. When you look at pretzels, think about how salty they taste when you lick them or chew them. Or you can think about how toasty brown they are. When you look at pretzels, think about the toasty taste in your mouth when you eat them. Now, why don't you try playing "think about"? When you look at pretzels, what can you think about?

In the *consume irrelevant* condition, the instructions were the same except that they always referred to the set of reward objects for which subjects were *not* waiting and which was never shown. Thus subjects waiting for marshmallows were instructed to think about consummatory qualities of pretzels; conversely, those waiting for pretzels were instructed to

focus on the consummatory qualities of marshmallows. The only change in the wording of instructions was that instead of saying "look at [the objects]" the experimenter always said "think about."

In the *transform relevant* condition, subjects received instructions designed to distract attention from the consummatory aspects of the objects for which they were waiting and to focus instead on nonconsummatory qualities of the objects and their associations.

[For subjects waiting for marshmallows] Look at the marshmallows; they are round and white and puffy. When you look at marshmallows, think about how white and puffy they are. Clouds are white and puffy too—when you look at marshmallows, think about clouds. Or you can think about how round and white a marshmallow is. The moon is round and white. When you look at marshmallows, think about the moon. Or you can think about how round a marshmallow is on top. A ball is round. When you look at marshmallows, think about playing ball. Now, you try playing "think about." When you look at marshmallows, what can you think about?

[For subjects waiting for pretzels] Look at the pretzels; they are long and thin and brown. When you look at pretzels you can think about how long and brown they are. A log is long and brown. When you look at pretzels, think about logs and tree trunks. Or you can think about how round and tall they are. A pole is round and tall. When you look at pretzels, think about telephone poles, or light poles, or fishing poles. Or you can think about how round and thin it is. A thin coloring crayon or paint brush is round and thin. When you look at pretzels, think about coloring or painting. Now you try playing "think about." When you look at pretzels, what can you think about?

For the *transform irrelevant* condition, subjects were given the same instructions, but they always referred to a set of reward objects for which the subjects were not waiting (i.e., did not have in front of them and which was never shown). Thus for subjects waiting for marshmallows, the instructions referred to pretzels and vice versa. Moreover, instead of saying "when you look at" the experimenter always said "when you think about."

Practicing Ideation

In all experimental conditions, after delivering the imagery examples, the experimenter asked the child to try playing "think about," that is, to think aloud in the ways suggested by the instructions. If the subject volunteered an appropriate response, the experimenter responded, "Yes, you know how to play 'think about.'" If the subject failed to respond appropriately or said nothing, the experimenter would repeat the critical images from the "think about" instructions, saying, "You could think about . . . , couldn't you?" At this point the experimenter

TABLE 1
MEAN DELAY TIME IN EACH IDEATION
INSTRUCTION CONDITION

Relevance of rewards in ideation	Ideation instructions		Control (no instructions)
	Consummatory	Transformational (nonconsummatory)	
Relevant ^a	5.60	13.51	8.44
Irrelevant ^a	16.82	4.46	

Note. Data are given in minutes. Maximum possible delay time is 20 minutes. All subjects were facing the rewards.
^a To contingency in the waiting situation.

administered the wait-contingency criterion question again.

In all five conditions, the experimenter left after the final criterion questions. Departing instructions were the following: "Remember, if you wait for me to come back by myself and get the two _____, or if you ring the bell and make me come back and get the one _____, we'll play with all my toys when I get back." In the experimental conditions, the experimenter added, "And don't forget, you can play the 'think about' game for as long as you want to, if you want to, while I'm gone."

RESULTS

Table 1 shows the mean delay time in each of the five conditions. An analysis of variance for these groups (2 x 2 factorial design with a control group added) was computed (see Table 2). It showed that there was no main effect of ideation instructions (consume-transform) or of reward relevance, but there was a highly significant interaction between these two variables, $F = 22.45, p < .001$. Table 1 suggests that this interaction was due to high delay times in the transform relevant and consume irrelevant conditions but low delay times in the consume relevant and transform irrelevant conditions.

Inspection of the mean waiting times for each group (see Table 1) showed that the

TABLE 2
SUMMARY OF ANALYSIS OF VARIANCE

Source	df	MS	F
Ideation instruction:			
Consume-transform (A)	1	59.65	1.09
Relevance of rewards (B)	1	14.12	<1
A x B	1	1,231.91	22.44*
Error	55	54.89	

* $p < .001$.

TABLE 3
CONTRASTS FOR MEAN DELAY OF GRATIFICATION

Source	df	MS	F
Transform relevant versus consume relevant	1	374.70	6.83*
Consume relevant versus consume irrelevant	1	754.88	13.75***
Transform relevant versus transform irrelevant	1	491.14	8.95**
Error	55	54.89	

* $p < .025$.
** $p < .005$.
*** $p < .001$.

mean for the no-instruction control group was intermediate between the two high and two low experimental groups.¹ Because the strong interaction effect would prevent any overall differences between the control group and the experimental groups collectively, *t* tests were computed to compare the control group with each of the other groups individually. The control group was not significantly different from the consume relevant or the transform irrelevant conditions, $t_s = .94$ and 1.36 , respectively.² But the transform relevant condition and the consume irrelevant condition yielded delay times significantly higher than those in the control group, $t = 1.68, p < .05$, and $t = 2.77, p < .005$, respectively.

Contrasts (Winer, 1962) were computed to test for hypothesized differences between the experimental groups (see Table 3). As predicted, delay time was significantly lower, $p < .025$, when subjects were instructed to ideate about the consummatory qualities of the relevant rewards than when they transformed the irrelevant rewards by focusing on their nonconsummatory qualities and associa-

¹ In previous studies, conditions comparable to the present control group tended to have shorter mean waiting times (Mischel & Ebbesen, 1970; Mischel, Ebbesen, & Zeiss, 1972). However, cross-study comparisons are limited by the fact that in the present study, both the specific contingency and the total delay period to criterion (i.e., the experimenter's return) were different.

² The lack of a significant difference between the control group and the consume relevant conditions suggests that when the relevant reward objects are presented to children with no specific instructions, they tend to ideate about them in a consummatory fashion, as may have occurred in earlier studies (Mischel & Ebbesen, 1970; Mischel, Ebbesen, & Zeiss, 1972).

tions. Also, as predicted, consummatory ideation led to less delay, $p < .001$, when it was focused on the relevant rewards than on the irrelevant reward objects. Moreover, as hypothesized, transformational (nonconsummatory) ideation regarding the relevant rewards facilitated delay significantly more, $p < .005$, than did comparable ideation directed at the irrelevant rewards.

DISCUSSION

The results showed that through instructions, the child can cognitively transform the reward objects that face him during the delay period in ways that either permit or prevent effective delay of gratification. If the child has been instructed to focus cognitively on the consummatory qualities of the relevant reward objects (such as the pretzel's crunchy, salty taste or the chewy, sweet, soft taste of the marshmallows), it becomes difficult for him to wait. Conversely, if the child cognitively transforms the stimulus by focusing on consummatory qualities (by thinking about the pretzel sticks, for example, as long, thin brown logs or by thinking about the marshmallows as white, puffy clouds or as round, white moons), he can wait for long time periods.

More specifically, the hypotheses were strongly supported by the data. Consummatory ideation about the rewards in the contingency led to short delay, whereas transformational (nonconsummatory) ideation about the same rewards led to much longer delay of gratification. Most important, such nonconsummatory ideation about the rewards in the contingency led to significantly longer delay than did similar ideation directed at comparable rewards irrelevant to the delay contingency. Thus, attention to the consummatory features of the rewards in the contingency makes delay difficult, but attention to their nonconsummatory features and associations facilitates delay more than does either comparable cognitive distraction (i.e., the transform irrelevant condition) or no instructions.

It is most interesting, and must be emphasized, that transformations of the reward objects that focus on their nonconsummatory qualities provide more than mere cognitive

distraction. In this regard, compare the effects of instructions that focus on nonconsummatory qualities of the relevant reward objects (i.e., those for which the subject is actually waiting) with the same instructions for irrelevant rewards. When the children were instructed to ideate about nonconsummatory qualities of the relevant objects (i.e., those for which they were actually waiting), their mean delay time was 13.51 minutes. In contrast, when subjects were given the same instructions with regard to the irrelevant rewards (i.e., comparable but not in the delay contingency), their average delay time was less than 5 minutes. Thus attention to the nonconsummatory qualities and associations of the actual reward objects in the delay contingency substantially enhances the ability to wait for these rewards, and does so more effectively than when the same ideation instructions focus on comparable objects irrelevant to the delay contingency. The exact mechanisms underlying this facilitative effect merit further study. We suggest that when subjects ideate about the nonconsummatory qualities of the relevant rewards and their associations, they may remind themselves of what they will get if they fulfill the contingency and thus reinforce their own delay without becoming excessively frustrated by dwelling on the consummatory qualities of what they cannot have.

It might be argued that the relatively low delay time obtained when instructions dealt with ideation for the irrelevant rewards reflects that young children simply have trouble thinking about reward objects that are not present. Note, however, that the longest mean delay time (almost 17 minutes)³ occurred when subjects were instructed to ideate about those same objects but with regard to their consummatory qualities (see Table 1). This finding is also provocative theoretically. It suggests that while consummatory ideation about a potentially available object makes it difficult to delay gratification, similar consummatory ideation about an outcome that is simply unattainable in the situation (i.e., the irrelevant rewards), rather than being aver-

³ Although this was the highest mean delay time, it was not significantly greater than that in the transform relevant condition.

sive, is highly pleasurable and may serve to sustain prolonged delay behavior. That is, consummatory ideation about reward objects that are not expected and not available in the delay contingency (the irrelevant rewards) may serve as an interesting and effective distractor and hence facilitate waiting. In contrast, similar ideation about the relevant but blocked rewards heightens the frustration of wanting what one expects but cannot yet have and, by making the delay more aversive, reduces the length of time that one continues to wait.

The conclusion that when the subject is aroused (e.g., to attain a goal, to consume a reward) and unable to achieve immediate satisfaction, additional arousing (consummatory) ideation is increasingly frustrative and hence avoided is congruent with data from other studies on goal-related fantasies emerging from extremely different paradigms. Recall the fact that aroused subjects avoid goal-related ideation, as seen, for example, in the tendency of severely food-deprived persons to engage in less food-related ideation (Lazarus, Yousem, & Arenberg, 1953). In the same vein, Clark (1952) noted less sexual imagery in the Thematic Apperception Test stories of sexually aroused males compared with non-aroused males. The present study, while supporting these conclusions, also points to some of the specific conditions that may render consummatory ideation positive and facilitative, rather than debilitating, in its effects; namely, when consummatory ideation is directed at outcomes irrelevant to the psychological situation at the moment, it may facilitate the maintenance of behavior toward the relevant goals in the situation. For example, if subjects are in a sexually arousing but sexually frustrative situation, consummatory food ideation might help them tolerate the delay of sexual gratification (while arousing sexual ideation would be frustrative and hence avoided). Conversely, if subjects are in a hunger-arousing but frustrative situation (i.e., one in which eating must be postponed), consummatory sexual ideation might be an excellent way to help bridge the temporal delay before food becomes available (although food-relevant consummatory ideation would be aversive). Thus, the impact of ideation about

goal objects on self-regulatory behavior depends on both the type of ideation (consummatory versus nonconsummatory) and its particular relation (relevant-irrelevant) to the outcomes in the self-control situation.

In sum, in the delay-of-gratification paradigm, cognitions about the rewards are frustrative and impede delay when they fulfill both of two requirements. Such cognitions must focus on (a) the outcomes that are currently blocked in the situation and (b) the consummatory qualities of those outcomes. In contrast, cognitions directed at the nonconsummatory qualities of the relevant rewards, or which focus on the consummatory qualities of outcomes that are not in the current contingency, facilitate delay of gratification. The total pattern of results reveals both the specificity and the meaningfulness of the complex relationship between thought and action in self-control. The findings also show how the subject's specific cognitive activities can transform the objective reward stimuli so as to either help or hinder his chances of ultimately receiving them.

Additional support for the important role of cognitive transformations in delay behavior also comes from another source. A follow-up of the Mischel and Moore (1973) experiment replicated the original finding that exposure to slides of the relevant rewards leads to significantly longer delay than does exposure to slides of the comparable rewards that are irrelevant to the delay contingency (Moore & Mischel, Note 1). The same study also showed that the delay-enhancing effects of the relevant slides can be completely obliterated when subjects are instructed (before the delay interval) to ideate about the consummatory qualities of the relevant rewards while waiting for them.

Our studies on cognitive transformation also have implications for earlier research under the label "cognitive appraisal." Previous research has investigated how the cognitive appraisal of threatening stimuli (a film of crude, primitive genital operations) influences emotional responses to these stimuli (Speisman, Lazarus, Mordkoff, & Davison, 1964). The findings showed that emotional responses were higher when the film was accompanied by a sound track that emphasized

the dangers of such an operation as opposed to sound tracks that denied such dangers or "intellectualized" them in a detached manner. The authors of this widely cited, interesting study interpreted their results as due to differences in cognitive appraisal generated by the different sound tracks. The present study provides a more direct demonstration of the importance of cognitive appraisal because the stimulus situation remained identical across situations: All children faced the identical rewards. (In contrast, in the Spiesman et al. study, different sound tracks accompanied the film across groups, thus creating different stimulus conditions.) The present study provides a method of manipulating cognitive appraisal more directly by means of instructions through which subjects may transform the identical stimuli into diverse cognitive representations. The results demonstrate the powerful role of such cognitive transformations and support the theoretical view that the cognitive encoding of stimuli significantly and predictably influences their impact on behavior (Mischel, 1973, 1974).

REFERENCE NOTE

1. Moore, B., & Mischel, W. *Further studies on symbolic reward presentation in delay of gratification*. Unpublished manuscript, 1973. (Available from Walter Mischel, Department of Psychology, Stanford University, Stanford, California 94305.)

REFERENCES

- Berlyne, D. Conflict, arousal and curiosity. New York: McGraw-Hill, 1960.
- Clark, R. A. The projective measurement of experimentally induced levels of sexual motivation. *Journal of Experimental Psychology*, 1952, 44, 391-399.
- Lazarus, R. S., Yousem, H., & Arenberg, D. Hunger and perception. *Journal of Personality*, 1953, 21, 312-328.
- Mischel, W. Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 7). New York: Academic Press, 1974.
- Mischel, W. Toward a cognitive social learning reconceptualization of personality. *Psychological Review*, 1973, 80, 252-283.
- Mischel, W., & Ebbesen, E. B. Attention in delay of gratification. *Journal of Personality and Social Psychology*, 1970, 16, 329-337.
- Mischel, W., Ebbesen, E. B., & Zeiss, A. Cognitive and attentional mechanisms in delay of gratification. *Journal of Personality and Social Psychology*, 1972, 21, 204-218.
- Mischel, W., & Moore, B. Effects of attention to symbolically presented rewards on self-control. *Journal of Personality and Social Psychology*, 1973, 28, 172-179.
- Schack, M. L., & Massari, D. J. Effects of temporal aids on delay of gratification. *Developmental Psychology*, 1973, 8, 168-171.
- Speisman, J. C., Lazarus, R. S., Mordkoff, A. M., & Davison, L. A. The experimental reduction of stress based on ego-defense theory. *Journal of Abnormal and Social Psychology*, 1964, 68, 367-380.
- Winer, B. J. *Statistical principles in experimental design*. New York: McGraw-Hill, 1962.

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