

# Beyond the Obvious: Chronic Vividness of Imagery and the Use of Information in Decision Making

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The authors investigate two competing hypotheses about how chronic vividness of imagery interacts with the vividness and salience of information in decision making. Results from four studies, covering a variety of decision domains, indicate that chronic imagery vividness rarely amplifies the effects of vivid and salient information. Imagery vividness may, in fact, attenuate the effects of vivid and salient information. This is because, relative to nonvivid imagers, vivid imagers rely less on information that appears obvious and rely more on information that seems less obvious. This tendency is so robust that vividness of imagery may amplify the effects of vivid information only when this information is the only information available in the decision field. The findings seem to reflect vivid imagers' tendency to totally immerse themselves in a decision problem and scrutinize the available information creatively. © 2000 Academic Press

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I am myself a very poor visualizer, and find that I can seldom call to mind even a single letter of the alphabet in purely retinal terms. . . . On questioning a large number of other people, mostly students, I find that perhaps half of them say they have no such difficulty in seeing letters mentally.

—William James (1890/1950, p. 61)

While behavioral decision research has traditionally focused on the invariant principles of judgment and decision making, recent work has uncovered stable individual differences in how people make judgments and decisions. Such differences have been recorded, for instance, in studies of the overconfidence bias (Klayman, Soll, Gonzalez-Vallejo, & Barlas, 1999), statistical reasoning (Stanovich & West, 1998), and the reliance on feelings in decision making (Pham, 1998). Analysis of these individual differences has important implications for our understanding of human decision making (Stanovich & West, 1998).

In the opening quote, William James (1890/1950) alluded to one of psychology's oldest certitudes: that individuals differ systematically with respect to the vividness of their imagery (cf. Betts, 1909; Galton, 1880). A century has passed, and we still know very little about how this difference influences the way people make decisions. This void is surprising considering the ample attention that imagery vividness has received in other areas of psychology (e.g., Crawford, 1982; Katz, 1983; Shaw & Belmore, 1982) and considering that imagery vividness has been hypothesized to improve decision making (e.g., Wheatley, Anthony, & Maddox, 1991). This article is a step toward filling this void.

The research examines how people who differ in their chronic vividness of imagery utilize vivid and salient information in decision making. Although one might expect vivid imagers to be more influenced by vivid and salient information than are nonvivid imagers (Swann & Miller, 1982), this research indicates the reverse. The results of four studies, covering a variety of decision problems, indicate that vivid imagers are often *less* influenced by vivid information than are nonvivid imagers. This result appears to be caused by vivid imagers' inclination to "look beyond the obvious" and rely on information that is not salient in the decision field at the expense of information that is salient. This tendency is in fact so pronounced that, compared to nonvivid imagers, vivid imagers may be more influenced by vivid information only if the vivid information is the only information available in the decision field.

## IMAGERY VIVIDNESS AND DECISION MAKING

### *Chronic Imagery Vividness as a Trait*

Vividness of imagery is one of the two primary facets of a person's imagery ability—the other facet being the person's ability to control and manipulate

mental images (e.g., Katz, 1983; White, Sheehan, & Ashton, 1977). Although vividness of imagery applies to multiple sensory modalities—visual, auditory, gustatory, and so on—it is generally believed that a common trait underlies peoples' vividness of imagery across modalities (e.g., Richardson, 1969; Sheehan 1967a; White, Ashton, & Law, 1974). Vividness of imagery does not appear to be correlated with gender (Sheehan, Ashton, & White, 1983) or with intelligence (e.g., Richardson 1969; Rossi & Fingeret, 1977). Vividness of imagery has been found to be related to a variety of variables, such as proofreading ability (Wallace, 1991), hypnotizability (e.g., Crawford, 1982; Sheehan & McConkey, 1982), divergent thinking (e.g., Forisha, 1981; Shaw & Belmore, 1982), and paired-associate recall (Rossi & Fingeret, 1977). However, its effects on decision making are essentially unknown. There exist two competing hypotheses about how this trait might influence the use of vivid and salient information in decision making.

### *The Affinity Hypothesis: Why Chronic Imagery Vividness May Amplify the Influence of Vivid Information*

It is common in decision making that some information (e.g., a recent argument with a co-worker) is more vivid—that is, concrete, imagery-provoking, and emotionally rich (Nisbett & Ross, 1980)—than other pieces of information (e.g., the company's benefits). The influence of vivid information, compared to nonvivid information, on judgment and decision making has been the subject of a considerable amount of research (e.g., Borgida & Nisbett, 1977; Frey & Eagly, 1993; Nisbett & Ross, 1980; Reyes, Thomson, & Bower, 1980; Taylor & Thomson, 1982; Wilson, Northcraft, & Neale, 1989). It has been found that, compared to nonvivid information, vivid information carries a disproportionate weight in judgment and decision making (e.g., Borgida & Nisbett, 1977; Reyes et al., 1980; Shedler & Manis, 1986)—the so-called “vividness effect.”

Little is known, however, about how vivid and nonvivid information is processed by vivid and nonvivid imagers. Swann and Miller (1982) hypothesized that vivid imagers would be more responsive to vivid information than nonvivid imagers. In other words, chronic vividness of imagery would *amplify* the influence of vivid information on judgment and decision making. While these authors did not elaborate on this hypothesis, theoretically, amplification may occur for two reasons. First, vivid imagers may be more *sensitive* to vivid information. As vivid imagers seem to be more efficient processors of vivid and imaginal materials than nonvivid imagers (e.g., Hanggi, 1989; Hiscock, 1976; Marks, 1973), it would be logical that the former should be more responsive to concrete and imagery-provoking information (e.g., Sheehan et al., 1983). Second, vivid imagers may have a *preference* toward processing concrete, imagery-rich information (cf. Richardson, 1977). It has been observed, for instance, that when asked about their preferred strategies across a variety of tasks, high imagers seem to favor imagery-based strategies over verbal strategies (Katz, 1983). Therefore, chronic vividness of imagery may amplify the influence of vivid information in judgment and decision making because there is an intrinsic

fit—in terms of sensitivity and/or preference—between this trait and this type of information. We refer to this prediction as the *affinity hypothesis*.

### *The Creativity Hypothesis: Why Chronic Imagery Vividness May Attenuate the Influence of Vivid Information*

Another line of evidence suggests that vivid imagers may be significantly less influenced by vivid information than nonvivid imagers. Ill-structured decisions are like problems to be solved. There is evidence that the vividness of people's imagery is correlated with their creativity in problem solving (Forisha, 1981; Gonzales, Campos, & Perez, 1997; Rhodes, 1981; Shaw & Belmore, 1982; Schmeidler, 1965). Although this evidence is not very strong (e.g., Forisha, 1978; Parrott & Strongman, 1985), it does echo a widely held belief that imagery enhances creativity in problem solving (e.g., Finke, 1993; Intons-Peterson, 1993; Shepard, 1978). Shepard (1978) offered several possible explanations: (1) Imagery is less constrained than verbal communication, which is primarily used for perpetuating established ideas; (2) imagery possesses a perceptual richness that allows for details and nonobvious relationships to be noticed; (3) imagery allows for spatial manipulation and intuition; and (4) imagery has greater motivating power because of its potential affective load. Research on imagery and hypnotizability suggests another explanation. Vividness of imagery seems to be associated with a tendency to perceive and interpret information in an idiosyncratic manner as well as a tendency to totally immerse oneself with attentional objects (Crawford, 1982; Sheehan & McConkey, 1982).

Research on imagery, creativity, and hypnotizability thus suggests that vivid imagers may have a distinctive way of solving problems. Compared to nonvivid imagers, they may be more absorbed in the problem and inclined to use information in an idiosyncratic and creative manner. Should these tendencies carry over to decision making, they may translate into less attention to information that appears to be "obvious" and more attention to information that appears to go "beyond the obvious." We refer to this prediction as the *creativity hypothesis*. According to this hypothesis, decision makers who are vivid imagers may, for instance, emphasize information that others would find of limited relevance, possibly at the expense of information that others would find highly relevant.

### *Overview of the Studies*

To summarize, the interplay between chronic vividness of imagery and information vividness is not self-evident. Some literature suggests that chronic vividness of imagery may *amplify* the effects of vivid information—the affinity hypothesis (e.g., Katz, 1983; Swann & Miller, 1982). Other research on imagery, hypnotizability, and creativity suggests that vividness of imagery may *attenuate* the effects of vivid and, more generally, salient information—the creativity hypothesis (e.g., Gonzales et al., 1997; Sheehan & McConkey, 1982; Shepard, 1978).

These competing predictions were tested in four studies using a variety of

decision problems. In each study, participants were presented with a decision problem and asked to make a decision. In each study, a subset of the information presented was made vivid (Studies 1, 2, and 4) or salient (Study 3). The participants' reliance on the vivid and salient information was examined in relation to their vividness of imagery, which was assessed using the shortened form of the Questionnaire upon Mental Imagery (QMI, Sheehan, 1967a), the most established measure of imagery vividness (Dadds, Bovbjerg, Redd, & Cutmore, 1997). The QMI's psychometric properties are well documented. QMI scores have been found to be (a) internally consistent (Juhasz, 1972; Westcott & Rosenstock, 1976), (b) stable over time (e.g., Sheehan, 1967b; Sutherland, Harrell, & Isaacs, 1987; Westcott & Rosenstock, 1976), (c) correlated with other measures of imagery ability (e.g., Kihlstrom et al., 1991; Morris & Gale, 1974; Rehm, 1973; Rossi & Fingeret, 1977), and (d) predictive of imagery-related criterion variables (e.g., Hatakeyama, 1984; Sheehan & McConkey, 1982; Sutherland et al., 1987).<sup>1</sup>

## STUDY 1

The first study examined how vivid and nonvivid imagers respond to vivid information in a choice situation. Participants, whose vividness of imagery was assessed, were asked to imagine that they had won a vacation package as one of two grand prizes in a lottery. They were told that the winner of the other prize wanted to exchange his package with their original prize. While the original prize was described in a concise and pallid manner, the trading option was described in more vivid detail. Two factors were manipulated. The first factor manipulated the attractiveness of the (briefly described) original prize; the second factor varied the attractiveness of the (vividly described) trading option. The main dependent measure was participants' intention to exchange their original prize for the trading option.

If imagery vividness amplifies the effects of vivid information, vivid imagers should be more responsive to the attractiveness of the vividly described trading option. Compared to nonvivid imagers, vivid imagers should be more willing to trade their original prize when the trading option is very attractive than when it is less attractive. On the other hand, if vividness of imagery prompts people to elaborate on nonsalient information, vivid imagers should *not* be

<sup>1</sup> Although ample empirical evidence thus supports the construct validity of the QMI, this measure has also been criticized (e.g., Kihlstrom et al., 1991). We adopted the QMI for several reasons. First, the QMI remains the most widely used self-report measure of imagery ability (Dadds et al., 1997). Second, alternative measures of imagery ability have also been criticized (e.g., Childers, Houston, & Heckler, 1985; MacInnis 1987). Finally, results from our own pretests substantiate the construct validity of the QMI. We found that—at least among participants at Columbia University and the University of Florida—QMI scores are (1) strongly correlated with Mark's (1973) VVIQ measure of imagery vividness ( $n = 173$ ,  $r = .64$ ,  $p < .0001$ ); (2) less strongly, but positively correlated with Gordon's (1949) VIC measure of imagery control ( $n = 173$ ,  $r = .19$ ,  $p < .05$ ); (3) uncorrelated with gender ( $n = 254$ ,  $F < 1$ ); and (4) uncorrelated with social desirability ( $n = 153$ ,  $r = .008$ ,  $ns$ ) assessed with items from Ballard, Crino, and Rubenfeld (1988).

more sensitive than nonvivid imagers to the attractiveness of the trading option. Instead, compared to nonvivid imagers, vivid imagers should be more sensitive to the attractiveness of the less salient original prize and be more willing to exchange their original prize when it was less attractive.

## Method

### *Participants and Design*

Eighty-three undergraduates (46 men and 37 women) at the Catholic University of Leuven in Belgium participated in the study to fulfill a course requirement. They were randomly assigned to one of four conditions of a  $2 \times 2$  design, crossed with the continuous QMI measure of imagery vividness (Sheehan, 1967a). The first factor manipulated the attractiveness of the vividly described trading option (high vs moderate). The second factor manipulated the attractiveness of the less salient original prize (high vs moderate).

### *Procedure*

Participants read a scenario instructing them to imagine that they had won one of two prizes in a lottery. The participants' prize (the "original prize") was described in a brief and pallid manner. It was either an attractive cruise, called "Casablanca," or a slightly less attractive safari. The scenario also provided a more extensive and vivid description of the other winner's prize (the "trading option"), a cruise called "Sigma." In addition to some general information, the description of the trading option included a paragraph-long testimonial, narrated in the first person, using vivid, imagery-provoking language. The testimonial manipulated the attractiveness of the trading option across conditions. The main dependent measure was participants' intention to trade their original prize for the trading option, as measured on a 9-point scale (1 = *would definitely not exchange*; 9 = *would definitely exchange*). Manipulation checks then had participants assess the attractiveness of both the original prize and the trading option. Finally, after a five-min filler task, participants completed the QMI.

### *Chronic Vividness of Imagery*

The shortened form of the QMI (Sheehan, 1967a) consists of 35 items, assessing people's vividness of imagery along seven modalities: visual, auditory, cutaneous, gustatory, kinesthetic, olfactory, and organic. Participants were asked to mentally picture each item (e.g., the sun sinking below the horizon and the feeling of touching sand) and rate the vividness of each image on a scale of 1 (*perfectly clear and vivid*) to 7 (*no image present at all*). Because it has been shown that a single factor underlies responses across modalities (Sheehan, 1967a), a summary imagery vividness score was computed for each participant by averaging the responses to all items.

### *Manipulations*

*Attractiveness of the original prize.* The original prize was described in a more succinct and pallid manner than the trading option. In the attractive-original-prize condition, this prize was described as a 5-day cruise for two persons. The cruise, called “Casablanca,” went from France to Morocco. In the less-attractive-original-prize condition, the original prize was described as a 10-day photo safari for one person in Kenya, where lodging would be in tents. It was expected that, upon elaboration, this original prize would appear slightly less attractive because it was for one person only and camping could be somewhat uncomfortable.

*Attractiveness of the trading option.* The trading option was described with much greater detail than the original prize. Three sentences of general information explained that it was a 7-day cruise, called Sigma, for two persons, going from Spain to Greece. The scenario also provided a paragraph-long vivid testimonial from a trusted friend who had been on that cruise. In the attractive-trading-option condition, the testimonial conveyed a very pleasant experience. It included statements such as, “The weather was fantastic,” “We were sunbathing every day by the pool,” and “The bartender . . . fixed for us all sorts of exotic fruit juices and cocktails.” In the less-attractive-trading-option condition, the testimonial was more mitigated. It included statements such as “The weather was not so great,” “The pool was a little too small,” and “We often ordered sodas and beers.”

*Salience of the two prizes.* To test the differential salience of the two prizes, 44 participants were exposed to one of the four versions of the stimuli used in the main experiment and asked to rate which of the two prizes attracted most of their attention. These ratings were collected on a 7-point scale ranging from 1 (*The information about the prize I won attracted most of my attention*) to 7 (*The information about the other winner’s prize attracted most of my attention*). As expected, the trading option attracted relatively more attention than the original prize did [ $M = 4.64$ ,  $t(43) = 1.89$ ,  $p < .05$ ], one-tailed.<sup>2</sup> A 2 (attractiveness of the trading option)  $\times$  2 (attractiveness of the original prize) ANOVA also indicated that the greater salience of the trading option was parallel across conditions (all  $F$ s  $< 1$ ).

## Results

### *Preliminary Analyses*

The QMI ratings were internally consistent ( $\alpha = .90$ ) and thus averaged (after reverse scoring) into a single overall score of vividness of imagery, where higher scores reflected more vivid imagery. The overall mean was 5.11, which indicates a vividness of imagery similar to that observed in previous studies

<sup>2</sup> Test of the deviation from the midpoint (scale of 1–7), which indicates equal attention to the two prizes.

(e.g., Kilhstrom et al., 1991; Rhodes, 1981; Sheehan, 1967a). There was no difference between men and women ( $F < 1$ ). As recommended by Jaccard, Turrisi, and Wan (1990), in this study as well as in the subsequent studies, the main analyses were based on the *continuous* scores of vividness of imagery. These scores were discretized only to plot significant interactions and to test selected contrasts.

To assess the effectiveness of the manipulations, both the perceived attractiveness of the original prize and the perceived attractiveness of the trading option were submitted to 2 (original prize)  $\times$  2 (trading option) ANOVAs. As expected, the original prize was rated as more attractive when it involved the Casablanca cruise ( $M = 5.79$ ) than when it involved the safari [ $M = 4.56$ ;  $F(1, 79) = 27.25, p < .0001$ ]. Similarly, the trading option was rated as more attractive when the testimonial was very positive ( $M = 5.19$ ) than when it was more neutral [ $M = 3.95$ ],  $F(1, 79) = 16.17, p < .0001$ . Interestingly, the testimonial about the trading option influenced the perceived attractiveness of the original prize, [ $F(1, 79) = 4.59, p < .05$ ]. The original prize was perceived to be less attractive when the testimonial was positive ( $M = 4.90$ ) than when it was more neutral ( $M = 5.46$ ). In contrast, the original prize did not influence the perceived attractiveness of the trading option ( $F < 1$ ). These results further support the notion that the trading option was more salient than the original prize. No other effect was significant.<sup>3</sup>

### *Effects on Behavioral Intentions*

Intentions to exchange the original prize for the trading option were submitted to an ANOVA with two discrete factors (attractiveness of original prize and attractiveness of trading option) and one continuous factor (vividness of imagery). The analysis revealed a main effect of the attractiveness of the trading option [ $F(1, 75) = 10.23, p < 0.01$ ]. As expected, participants were more willing to exchange their prize when the trading option was described positively ( $M = 4.64$ ) than when it was described in a more neutral manner ( $M = 3.05$ ). However, the attractiveness of the trading option did not interact with participants' vividness of imagery as the affinity hypothesis would predict,  $F < 1$ . Vivid imagers and nonvivid imagers were equally responsive to the attractiveness of the more vividly described trading option.

A main effect of vividness of imagery [ $F(1, 75) = 7.08, p < .01$ ] showed that vivid imagers were more likely to trade than were nonvivid imagers ( $r = .24, p < .05$ ).<sup>4</sup> More important, this effect was qualified by an interaction with the attractiveness of the less salient original prize [ $F(1, 75) = 4.01, p < .05$ ]. To interpret this interaction, participants were divided into three groups based on

<sup>3</sup> Additional analyses revealed that the vividness of imagery did not influence the rated attractiveness of either prize (all  $p$ 's  $> .15$ ). This suggests that imagery vividness may not affect how information is perceived, but how it is weighted (see Study 2).

<sup>4</sup> The mean intentions were  $M = 3.12$ ,  $M = 3.56$ , and  $M = 4.69$  for low, medium, and high imagers, respectively (see Fig. 1).



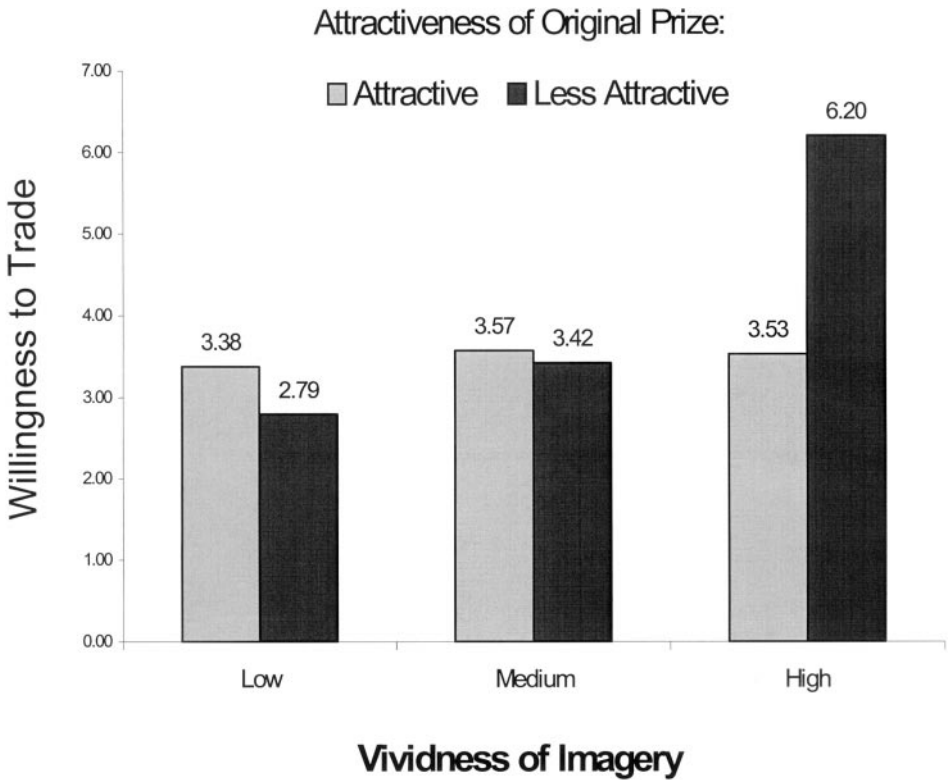


FIG. 1. Study 1: Participants' willingness to trade the original prize as a function of attractiveness of the original prize and participants' vividness of imagery.

their imagery score (lowest third, middle third, and highest third). Behavioral intentions were then plotted for each group and each original prize separately.

As shown in Fig. 1, participants with low and medium vividness of imagery were generally insensitive to the nature of the original prize ( $M_{\text{Casablanca}} = 3.60$ ,  $M_{\text{Safari}} = 3.08$ ,  $F < 1$ ). Regardless of whether they had won a cruise or a safari, they were somewhat reluctant to exchange their original prize for the trading option ( $M = 3.33$ ), a tendency consistent with the well-known "status quo bias" (e.g., Kahneman, Knetsch, & Thaler, 1990). In contrast, consistent with the creativity hypothesis, participants with the highest vividness of imagery were very sensitive to the nature of the less salient original prize. They were much more likely to exchange the original prize when it was less attractive ( $M = 6.20$ ) than when it was more attractive [ $M = 3.35$ ,  $F(1, 75) = 10.39$ ,  $p < .01$ ]. No other effects approached significance.

### Discussion

Contrary to the predictions of the affinity hypothesis, vividness of imagery did not amplify the effects of the vivid testimonial about the salient trading option. This null result cannot be attributed to a floor effect nor to a lack of power because both vividness of imagery and the attractiveness of the trading

option had independent main effects on behavioral intentions. Instead, vividness of imagery appeared to increase the influence of the less salient information. While participants with low and medium vividness of imagery seemed to be indifferent to the attractiveness of the original prize, participants with the highest vividness of imagery were much more likely to exchange the less attractive original prize than the more attractive one. This finding is consistent with the creativity hypothesis that vivid imagers rely more than nonvivid imagers on nonsalient information.

One limitation of this study is that the vividness and salience of the information was manipulated across alternatives. It is therefore difficult to determine whether vivid and nonvivid imagers differ in terms of how they process salient and vivid information or whether they differ in terms of how they attend to different alternatives. This issue is addressed in Study 2.

## STUDY 2

The objectives of this second study were to (a) replicate the main results of Study 1 while addressing its limitations and (b) examine more closely how vividness of imagery influences the relative weight of vivid and nonvivid information in decision making. All participants received a common set of information about two vacation packages and were asked to determine which of the two packages they would choose. Unlike in Study 1, each alternative was described with *both* abstract attribute information and vivid experiential information. In other words, vividness of information varied within alternatives rather than across alternatives. The vivid experiential information clearly pointed to one package as the superior alternative, whereas the abstract attribute information was ambiguous as to which package was the better alternative. Participants provided ratings of the relative attractiveness of the two alternatives based on the abstract attribute information alone and based on the vivid experiential information alone. The choice intentions were regressed against these ratings to estimate the weight that each type of information carried in the decision.

According to the affinity hypothesis, vivid imagers should be more sensitive to vivid information than nonvivid imagers. Therefore, the weight of the vivid experiential information in the decisions should increase with participants' vividness of imagery. According to the creativity hypothesis, vivid imagers need not be more responsive to vivid information because they may focus on information that is less obvious. Given that the attribute information—being more abstract and having more ambiguous choice implications—was less “obvious” than the experiential information, vividness of imagery may increase the weight of the former, possibly at the expense of the latter.

## Method

### *Participants and Design*

Fifty-three students and 21 employees at Columbia University (40% females) participated in exchange for money or a small gift. Participants were asked to

choose between two vacation packages based on a common set of information. Unlike in Study 1, both vivid and abstract information was provided for each alternative. The weight of each type of information in participants' decisions was estimated through multiple regression and related to participants' vividness of imagery, which was again assessed with the QMI.

### *Procedure and Stimuli*

Participants read a scenario in which they were given a choice between two Mediterranean cruises (labeled A and B). The information provided about each cruise consisted of abstract attribute information from a travel agency and vivid testimonials from previous travelers. The abstract attributes appeared in a bullet-point format, four bullet-points per cruise. They were selected so that neither alternative would clearly dominate the other based on this information alone. Vivid testimonials about each cruise appeared underneath each cruise's attributes. Although they were positive for both cruises, they were consistently more enthusiastic for Cruise B than for Cruise A. Therefore, the testimonials were expected to have clearer choice implications than the attribute information.

### *Measures*

After reading the two descriptions, participants reported their choice intentions on a 9-point scale (1 = *definitely choose A*; 9 = *definitely choose B*). Participants were then asked to reread the information about the two packages and rate the relative attractiveness of the two cruise packages (a) based on the travel agency information alone and (b) based on the previous travelers' comments alone. Both ratings were made on a 7-point scale (1 = *A seems more attractive*; 7 = *B seems more attractive*). A subset of participants ( $n = 31$ ) were also asked to rate on a 7-point scale "How easy or difficult is it to visualize (i.e., mentally picture)" each type of information for each alternative (1 = *easy*; 7 = *difficult*). Finally, participants completed the QMI.

## Results

### *Preliminary Analyses*

As in Study 1, participants' vividness of imagery ratings were internally consistent ( $\alpha = .90$ , overall mean = 5.44) and thus averaged into a single score. There were again no gender differences. As expected, the testimonials were rated as easier to visualize ( $M = 5.27$ ) than the attribute information [ $M = 4.69$ ,  $t(30) = 2.02$ ,  $p = .05$ ]. Furthermore, while Package B was significantly more attractive than Package A based on the testimonials alone [ $M = 5.04$ ,  $t(74) = 4.35$ ,  $p < .001$ ], the two packages were perceived to be equally attractive based on the travel agency attribute information alone [ $M = 3.80$ ,  $t(73) =$

-0.78,  $p = .44$ ].<sup>5</sup> As intended, the attribute information was relatively abstract and ambiguous, whereas the testimonials were relatively vivid and less ambiguous.

### *Choice Intentions and Weight of Information*

The choice intentions (CHOINT) were submitted to a multiple regression with five predictors: (a) participants' ratings of the relative attractiveness of the two alternatives based on the abstract attribute information (ATTRIB), (b) participants' ratings of the relative attractiveness of the two alternatives based on the vivid testimonials (TESTIM), (c) participants' imagery vividness scores (QMI), (d) the interaction between relative attractiveness based on the attribute information and imagery vividness (ATTRQMI), and (e) the interaction between relative attractiveness based on the testimonials and imagery vividness (TESTQMI). The regression equation was as follows:

$$\text{CHOINT} = \alpha + \beta_1 \text{ATTRIB} + \beta_2 \text{TESTIM} + \beta_3 \text{QMI} \\ + \beta_4 \text{ATTRQMI} + \beta_5 \text{TESTQMI}.^6 \quad (1)$$

The regression results revealed that, not surprisingly, both the attribute-based relative attractiveness (ATTRIB) and the testimonial-based relative attractiveness (TESTIM) were significant predictors of choice intentions ( $\beta_1 = 0.543$ ,  $t = 4.46$ ,  $p < .001$ ;  $\beta_2 = 0.466$ ,  $t = 3.52$ ,  $p < .001$ ; all coefficients are unstandardized). Vividness of imagery (QMI) did not have a significant main effect on choice intentions ( $\beta_3 = -0.611$ ,  $t < 1$ , *ns*). More interestingly, there was a significant positive interaction between vividness of imagery and attribute-based relative attractiveness ( $\beta_4 = 0.602$ ,  $t = 3.02$ ,  $p < .01$ ) and a marginally significant negative interaction between vividness of imagery and testimonial-based relative attractiveness ( $\beta_5 = -0.394$ ,  $t = -1.70$ ,  $p < .10$ ). That is, vividness of imagery *increased* the weight of the abstract attribute information and *decreased* the weight of the vivid testimonials.

To examine these interactions, participants were again divided into three groups based on their imagery vividness score (lowest third, middle third, and highest third). Within each group, choice intentions were submitted to a regression with two predictors, the attribute-based and testimonial-based relative attractiveness scores:

$$\text{CHOINT} = \alpha + \beta_1 \text{ATTRIB} + \beta_2 \text{TESTIM}. \quad (2)$$

<sup>5</sup> Tests of the deviation from the midpoints of the scales, which indicate equal attractiveness of the two packages based on the attributes alone and based on the testimonials alone.

<sup>6</sup> Preliminary analyses showed that vividness of imagery did not significantly influence ATTRIB ( $p > .50$ ) and TESTIM ( $p > .15$ ). Therefore, the interplay between vividness of imagery and the two type of information can be safely interpreted in terms of effects on weights rather than effects on subjective scale values.

The regression weights within each group are plotted in Fig. 2. The results indicate that low imagers were not influenced at all by the abstract attribute information ( $\beta_1 = -0.015$ ,  $t < 1$ , *ns*) and were influenced only by the vivid testimonials ( $\beta_2 = 0.886$ ,  $t = 4.49$ ,  $p < .001$ ). Medium imagers were influenced by both the abstract attribute information ( $\beta_1 = 0.860$ ,  $t = 3.89$ ,  $p < .001$ ) and the vivid testimonials ( $\beta_2 = 0.474$ ,  $t = 2.0$ ,  $p < .10$ ). Finally, high imagers were strongly influenced by the abstract attribute information ( $\beta_1 = 0.922$ ,  $t = 4.49$ ,  $p < .001$ ) and not at all influenced by the vivid testimonials ( $\beta_2 = 0.075$ ,  $t < 1$ , *ns*). This pattern of results again favors the creativity hypothesis over the affinity hypothesis.

### Discussion

The results replicate the first study's main finding that vividness of imagery may not amplify the effects of vivid information. On the contrary, vividness of imagery may attenuate the influence of vivid information. It was found that the weight of vivid testimonials in participants' decisions decreased steadily as participants' vividness of imagery increased. While low imagers relied almost exclusively on the vivid testimonials, high imagers did not rely on these testimonials at all. Medium imagers behaved somewhere in between. In contrast, the weight of the abstract attribute information increased steadily with increases in participants' vividness of imagery. While low imagers did not rely on this

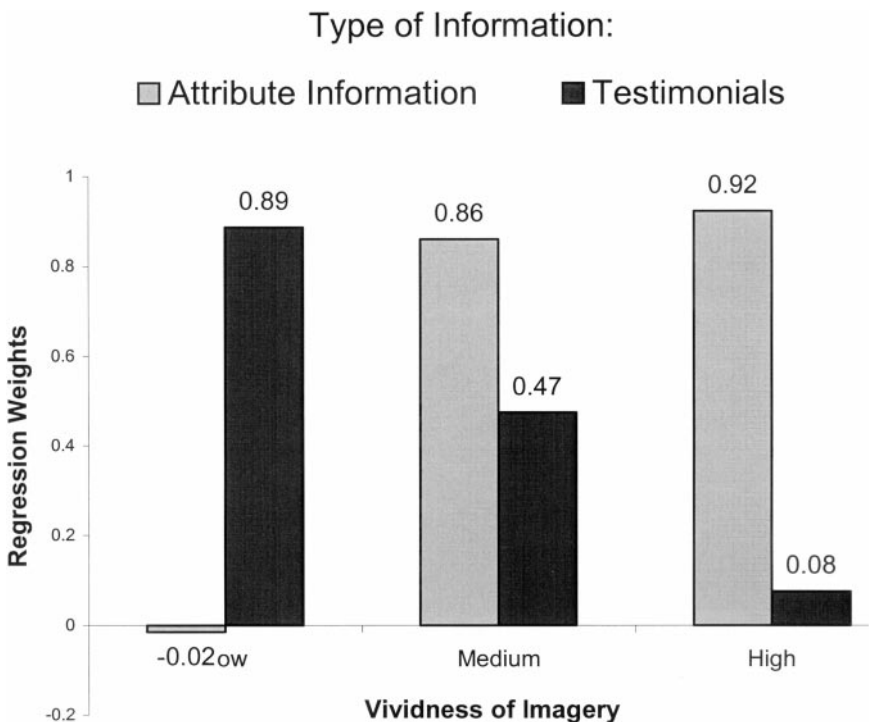


FIG. 2. Study 2: Unstandardized regression weights for attribute and testimonial information sorted by levels of vividness of imagery.

information at all, high imagers relied almost exclusively on this information. Again, medium imagers behaved somewhere in between.

Vivid imagers' distinctive use of information cannot be attributed to a propensity to process certain alternatives rather than others because both alternatives were described by abstract attributes and vivid testimonials. We propose that the results reflect a general tendency among vivid imagers to elaborate on parts of the decision field that seem less obvious. Vivid imagers relied primarily on the attribute information because, being abstract and ambiguous, it was less obvious.

The finding that vividness of imagery both increased participants' reliance on the attribute information and decreased reliance on the vivid testimonials is also noteworthy. It suggests that vivid imagers did *not* use more information than nonvivid imagers did. Thus, vividness of imagery does not simply increase the overall *amount* of information that people use in decision making. Instead, vividness of imagery determines *which* pieces of information are emphasized or deemphasized in making decisions. If our interpretation is correct, vivid imagers' reliance on information should not depend strictly on whether the information is presented in a vivid or more pallid manner. It should depend, more generally, on whether the information is perceived to be salient or not. This prediction can be tested by manipulating the "obviousness" or salience of the information *without* changing the information itself, as was done in Study 3.

### STUDY 3

The primary objective of this study was to lend further support to the creativity hypothesis that vivid imagers tend to focus on the part of the decision field that appears less obvious. A secondary objective was to examine whether the findings generalize to a social decision-making context. While in the first two studies the salience of the information was determined by its structural characteristics, in this study the information was kept constant across conditions. The salience of the information was manipulated by varying its relevance to the decision-maker's goal.

As they were supposedly evaluating the writing style of an article, participants were incidentally exposed to various pieces of information about a target person. Some of the information—positive or negative affective cues about the target (e.g., warm personality vs untidiness)—was expected to be highly relevant in the event of a romantic interaction with the target, but less relevant in the event of a professional interaction. After the incidental exposure to the target information, participants were asked to make one of two decisions. In the high affect relevance condition, participants were asked whether they would recommend the target to a friend for a romantic date. In the low affect relevance condition, participants were asked whether they would recommend the target to a friend as a source of information for a school project. It was predicted that, compared to nonvivid imagers, vivid imagers would be *less* influenced by the affective cues when their relevance was obvious (in the high affect relevance condition), and *more* influenced by these affective cues when their relevance

was less obvious (in the low affect relevance condition). A differential reliance on the same inputs depending on their relevance to the decision goal would indicate that it is the obviousness of the information—not its structural characteristics per se (e.g., its vividness)—that drives whether it will be used by vivid imagers.

## Method

### *Participants and Design*

Seventy-two female undergraduates at the University of Florida participated in return for course credit. They were randomly assigned to one of four conditions of a 2 (target affect)  $\times$  2 (affect relevance) between-subjects design. The first factor manipulated whether positive or negative affective cues were incidentally disclosed about the target. The second factor manipulated whether these affective cues had high or low relevance to the decision. Again, these two factors were crossed with a continuous measure of participants' vividness of imagery.

### *Procedure*

The study allegedly examined writing styles and was administered on a PC (except for the QMI). Participants were told that their task was to evaluate the writing style of an article written by a journalism student. The article related an interview with a student, named Matthew Robinson, who served on the city's traffic management committee. He was described across conditions as being a very good student who had many friends and was polite and friendly. The article also featured his alleged picture—that of a college-aged Caucasian male of moderate attractiveness.

While the overall structure of the article was the same across conditions, the article varied in several respects that manipulated how socially pleasant and affectively rewarding Matthew was. In the positive target affect condition, he was described as energetic, charming, and having a contagious sense of humor. In the negative target affect condition, he was described as a late riser who was not physically clean and lived in a filthy apartment. After reading the article, participants rated the style of the article on several dimensions. They were then presented with the target decision, which varied between conditions.

In the high affect relevance condition, participants were asked to imagine that Matthew had expressed a romantic interest in their best female friend, who was not currently dating anyone. They were asked to assess whether they would recommend Matthew as a possible date for their friend. In the low affect relevance condition, participants were asked to imagine that their best female friend had to write a term paper on a subject in which Matthew would be competent. They were asked to assess whether they would recommend Matthew as a source of information for her paper. Participants in both conditions indicated their behavioral intentions by moving a slider on a scale of 0–100. As a

manipulation check, participants rated on a similar scale how pleasant it would be to be around Matthew. As a confounding check, they also rated how competent Matthew was on a similar scale. Finally, they completed the QMI.

### *Affect Relevance Manipulation*

The affect relevance manipulation was tested among a separate group of 33 female students from the same population. After reading a description of the interview used in the main experiment, they were presented with one of the two decision contexts used in the main experiment and asked to allocate 100 points to different personality attributes to reflect their relative importance given this particular decision context (e.g., recommending Matthew for a date). The attributes were “physically attractive,” “competent/good student,” “pleasant to be around/sociable,” “serious and hard working,” and “neat and clean.” The task was then repeated for the other decision context (e.g., recommending Matthew for a term paper). The order of the scenarios was counterbalanced across participants. Finally, participants completed the QMI.

The importance of “affective” attributes was assessed by taking the average weight allocated to attractiveness, pleasantness to be around, and neatness. The importance of “professional” attributes was assessed by taking the average weight allocated to competence and hard work. These two measures were submitted to a three-way ANOVA, with type of attributes (professional versus affective) and type of decision (date versus term paper) as repeated factors and imagery vividness as a continuous factor. As expected, the analysis revealed a strong type-of-attributes by type-of-decision interaction, [ $F(1, 32) = 116.70, p < .0001$ ]. Follow-up contrasts show that, under a date scenario, affective attributes were significantly more important ( $M = 22.54$ ) than professional attributes [ $M = 16.19, F(1, 32) = 11.74, p < .01$ ]. On the other hand, under a term paper scenario, professional attributes ( $M = 32.44$ ) were significantly more important than affective attributes [ $M = 11.08, F(1, 32) = 109.58, p < .0001$ ]. These results indicate that the decision scenarios were effective in inducing different levels of affect relevance. Interestingly, the analysis also uncovered a three-way interaction with vividness of imagery [ $F(1, 31) = 5.17, p < .01$ ]. As illustrated in Fig. 3, vivid imagers were even more responsive to the affect relevance manipulation than were nonvivid imagers. This finding is elaborated in the discussion.

## Results

### *Preliminary Analyses*

The QMI ratings in the main study were internally consistent ( $\alpha = .93$ ), with an overall mean of 5.53. As expected, compared to participants in the negative target affect condition ( $M = 60.26$ ), participants in the positive-target-affect condition rated Matthew as significantly more “pleasant to be around” [ $M = 90.00, F(1, 68) = 44.23, p < .0001$ ]. These ratings were not affected by the affect relevance manipulation [ $F(1, 68) = 1.66, ns$ ], nor by an interaction



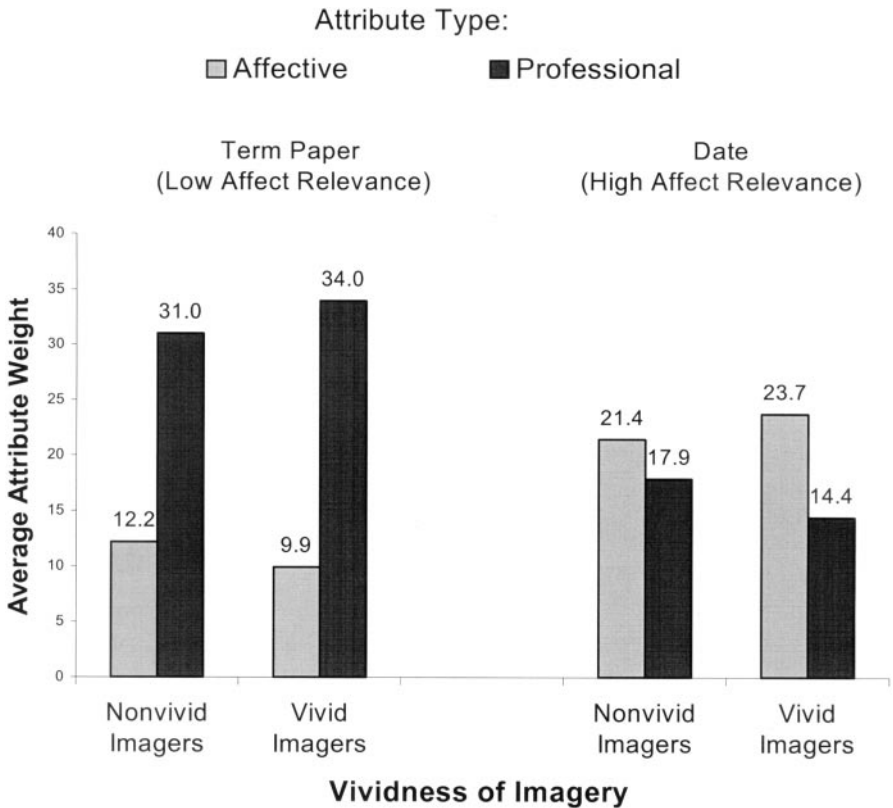


FIG. 3. Pretest for Study 3: Perceived attribute importance as a function of attribute type, decision context, and vividness of imagery.

between target affect and affect relevance [ $F(1, 68) = 1.10, ns$ ]. Furthermore, the target affect manipulation did not influence participants' perception of Matthew's competence ( $F < 1$ ). These results suggest that the target affect manipulation was effective.

### *Behavioral Intentions*

It was predicted that, compared to nonvid imagers, vivid imagers would rely *less* on the affective information when it was clearly relevant to the decision, but rely *more* on the affective information when the relevance of this information was not obvious. To test this prediction, behavioral intentions were submitted to a three-way ANOVA with two discrete factors, target affect and affect relevance, and one continuous factor, imagery vividness. The analysis revealed a main effect of target affect showing that intentions to recommend a meeting with Matthew were higher in the positive-affect condition ( $M = 75.49$ ) than in the negative affect condition [ $M = 49.54, F(1, 64) = 12.62, p < .001$ ]. There was also a main effect of vividness of imagery [ $F(1, 64) = 3.78, p = .06$ ], reflecting that, on average, vividness of imagery was positively related to intentions to recommend Matthew ( $r = .24, p < .05$ ). More importantly, the analysis uncovered a marginally significant three-way interaction between target affect,

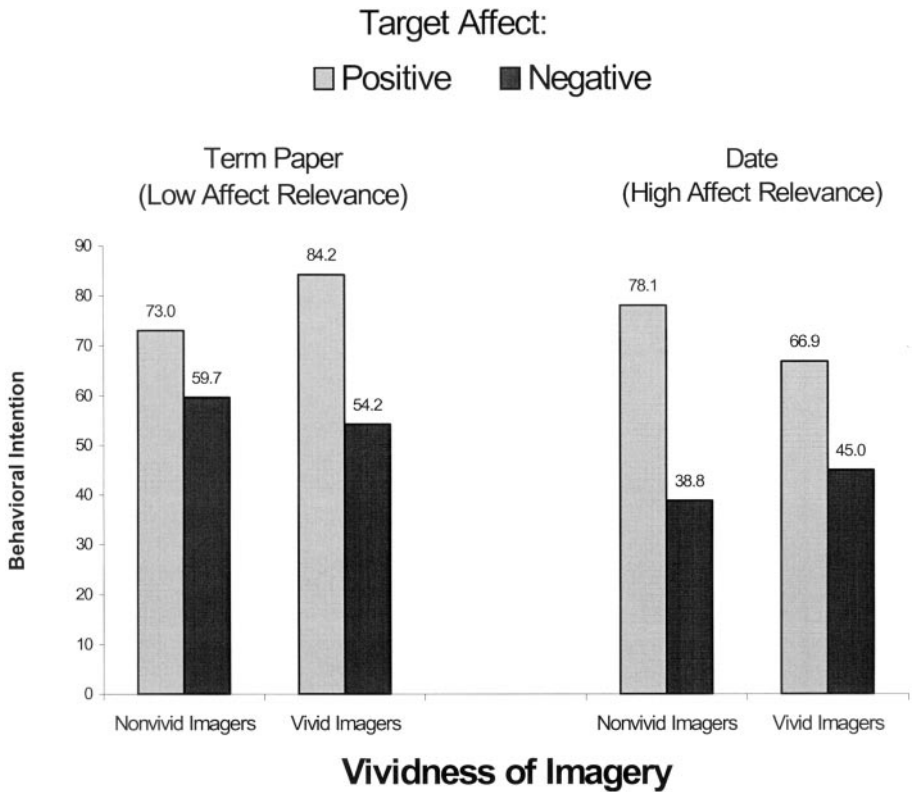


FIG. 4. Study 3: Behavioral intentions as a function of valence of target affect, affect relevance, and vividness of imagery.

affect relevance, and vividness of imagery [ $F(1, 64) = 3.13, p = .08$ ]. To examine this interaction, vivid and nonvidid imagers were first separated based on a median split within each condition.<sup>7</sup> The simple effect of the target affect manipulation was then tested for each level of affect relevance and each level of imagery vividness separately. The mean behavioral intentions across conditions and levels of imagery vividness are depicted in Fig. 4.

When affect toward the target had low relevance, nonvidid imagers were not significantly influenced by the target affect manipulation [ $M_{\text{Positive}} = 73.0, M_{\text{Negative}} = 59.7; F(1, 64) = 1.57, ns$ ] as would be expected. In contrast, vivid imagers were significantly influenced by the target affect manipulation when affect toward the target had low relevance, [ $M_{\text{Positive}} = 84.2, M_{\text{Negative}} = 54.2; F(1, 64) = 12.99, p < .001$ ]. However, the simple interaction between imagery vividness and target affect, within the low-affect-relevance condition, was not significant, ( $F < 1$ ). When affect toward the target had high relevance, nonvidid imagers were strongly influenced by the target affect manipulation [ $M_{\text{Positive}} = 78.1, M_{\text{Negative}} = 38.8, F(1, 64) = 7.55, p < .001$ ], as again would be expected. In contrast, vivid imagers were only moderately influenced by the target affect manipulation [ $M_{\text{Positive}} = 66.9, M_{\text{Negative}} = 45.0; F(1, 64) = 3.78,$

<sup>7</sup> A three-way split was not feasible because of smaller cell size than in the other studies.

$p = .06$ ]. The simple interaction between imagery vividness and target affect, within the high-affect-relevance condition, was marginally significant [ $F(1, 64) = 2.90, p = .09$ ]. In other words, when affect toward the target had low relevance, the target affect manipulation tended to have a *greater* influence on vivid imagers than on nonvivid imagers. However, when affect toward the target had high relevance, the target affect manipulation tended to have a *smaller* influence on vivid imagers than on nonvivid imagers. This finding is consistent with the hypothesis that, compared to nonvivid imagers, vivid imagers tend to place a greater emphasis on seemingly irrelevant information and a lesser emphasis on obviously relevant information.

### Discussion

The results suggest that the phenomenon observed in the first two studies is not limited to the domain of consumer decision making. It applies to social decision making as well. The results also provide further evidence for the creativity hypothesis. A three-way interaction showed that the interplay between imagery vividness and target affect depended on the relevance of affective information. Specifically, when affective trait information about the target was apparently *not* relevant (in the term paper scenario), vivid imagers were slightly more influenced than nonvivid imagers by the valence of this information. In contrast, when affective trait information about the target was clearly relevant (in the date scenario), vivid imagers were less influenced than nonvivid imagers by the valence of this information. This finding is noteworthy considering that in the pretest vivid imagers were *more* sensitive than nonvivid imagers to the relevance (or irrelevance) of the affective target information. Stated differently, vivid imagers were well aware of the relative relevance of the information—perhaps even more so than nonvivid imagers. Yet, vivid imagers relied more than nonvivid imagers on the less relevant information and less on the more relevant information. This is consistent with the hypothesis that vivid imagers have a distinct tendency to go beyond the obvious.

It is also noteworthy that, when the target affect information was relevant, vivid imagers were less influenced than nonvivid imagers by this information. This again suggests that vivid imagers do not necessarily use more information overall than nonvivid imagers do.

### STUDY 4

The first three studies clearly indicate that vivid imagers rely less than nonvivid imagers on vivid and more generally salient information. One wonders if vivid imagers *ever* do respond to vivid information more than nonvivid imagers, as the affinity hypothesis would suggest. This study identifies a situation where vivid imagers are indeed more responsive than nonvivid imagers to vivid information.

The previous studies show that if vivid imagers do not respond to vivid information, it may be because they often rely on information that is less

obvious. Perhaps, they would be more sensitive to vivid information if the possibility to rely on less obvious information were taken away from them. More specifically, vivid imagers may be more responsive to vivid information (than nonvivid imagers are) if the vivid information is the *only* information available. Study 4 tests this prediction in the context of a decision about restaurant patronage. Compared to the previous studies, the decision problem was considerably simpler. Participants read the review of a newly opened restaurant that included only vivid information. Depending on the condition, the review conveyed either attractive images or less attractive images. After reading the review, participants reported their intention to patronize the restaurant. It was predicted that, under such conditions, unlike in the other studies, vividness of imagery would indeed amplify the effects of the vivid information, as the affinity hypothesis would predict.

## Method

### *Participants and Design*

Participants were 107 students at Columbia University and at the University of Florida (52 men and 55 women) who received either extra course credits or money for their participation. They were randomly assigned to one of the two experimental conditions (attractive or less attractive target description), crossed with a continuous measure of participants' vividness of imagery.

### *Procedure*

The study was administered in two questionnaires separated by a 10-min filler task. In the first questionnaire participants were asked to imagine that they had to plan a romantic dinner with a significant other. The choice of restaurant was entirely theirs. They were asked to carefully read a fictitious review of a newly opened French bistro, which was described as "relatively expensive" across conditions. In the attractive-description condition, the review was intended to convey vivid positive images. It included statements such as "The dining room, with its old wooden floors and peach color walls basks in a soft gentle light" and "The meat is so tender, you can feel it melt on your tongue." In the less-attractive-description condition, the review was intended to convey less positive images, with statements such as "The large dining room, with its dark brown carpet and white-washed walls, is brightly lit" and "The various meat dishes come with standard, but unexceptional chunky sauces." In both conditions, however, the service was described as "excellent, professional, and discreet." After reading the review, participants reported the likelihood that they would select the restaurant for the romantic dinner on a 9-point scale ranging from 1 (*I would definitely not select it*) to 9 (*I would definitely select it*). As manipulation checks, participants were asked to assess the ease of visualizing a dinner experience at the restaurant (1 = *Easy to visualize*; 7 = *Difficult to visualize*) and the expected pleasantness of a dinner at the restaurant (1 = *Very unpleasant*; 7 = *Very pleasant*). Participants then filled

out various control measures such as the average price paid on their last three restaurant dinners. Finally, after completing a filler task, participants were again administered the QMI.

## Results

### *Preliminary Analyses*

The QMI ratings were internally consistent ( $\alpha = .89$ ), with a mean of 5.59 and no gender differences ( $F < 1$ ). As expected, participants found a dinner experience at the restaurant to be relatively easy to visualize based on the review ( $M = 5.67$  of 7). However, the attractive description conveyed an experience that was easier ( $M = 6.09$ ) than the less attractive description to visualize [ $M = 5.25$ ,  $F(1, 105) = 10.41$ ,  $p < .01$ ]. As anticipated, a dinner at the restaurant was expected to be more pleasant in the attractive-description condition ( $M = 6.37$ ) than in the less-attractive-description condition [ $M = 4.27$ ,  $F(1, 105) = 68.07$ ,  $p < .001$ ].

### *Behavioral Intentions*

The reported intentions to select the restaurant were submitted to an ANOVA with one discrete factor (target information) and one continuous factor (imagery vividness). The analysis revealed a predictable main effect of target description [ $F(1, 103) = 55.54$ ,  $p < .0001$ ], showing that behavioral intentions were higher in the attractive description condition ( $M = 6.62$ ) than in the less-attractive-description condition ( $M = 3.42$ ). There was no main effect of imagery vividness,  $F < 1$ . More important, there was a significant interaction between the valence of the target information and imagery vividness [ $F(1, 103) = 4.40$ ,  $p < .05$ ]. To further examine the nature of this interaction, participants were again categorized as low, medium, or high imagers based on their overall score of imagery vividness. As depicted in Fig. 5, the content of the description had a significant influence on behavioral intentions at all three levels of imagery vividness. However, this influence was significantly stronger among high imagers [ $F(1, 103) = 41.21$ ,  $p < .0001$ ,  $\omega^2 = .24$ ] than among medium imagers [ $F(1, 103) = 11.27$ ,  $p < .01$ ,  $\omega^2 = .06$ ] and low imagers [ $F(1, 103) = 10.18$ ,  $p < .01$ ,  $\omega^2 = .06$ ].<sup>8</sup> The amplification effect predicted by the affinity hypothesis was thus obtained.

## Discussion

The results of this fourth study indicate that chronic vividness of imagery *can* indeed amplify responses to vividly presented information in judgment and decision making. Consistent with the affinity hypothesis, high imagers showed a greater responsiveness than medium and low imagers to the valence

<sup>8</sup> Follow-up contrasts show that the influence of the target information was equivalent among low and medium imagers ( $F < 1$ ) and significantly smaller than among high imagers,  $F(1, 103) = 6.86$ ,  $p < .05$ .

of the vivid target information. However, this amplification effect apparently only occurs under limited circumstances. In this study, the vivid information was essentially the *only* information available. It was therefore difficult to go beyond the obvious. Confronted with this very simple decision field, vivid imagers used their imagery abilities to derive more polarized implications from the vividly conveyed information.

## GENERAL DISCUSSION

### *Beyond the Obvious*

It was observed across a variety of domains that vivid imagers have a peculiar way of using information when making decisions. Although according to the affinity hypothesis, vivid imagers should be very responsive to vivid information, they apparently rarely are. In fact, as Study 2 showed, vivid imagers may sometimes be *less* responsive than nonvivid imagers to vivid information. The only instance in which chronic vividness of imagery did amplify the effects of vivid information—as the affinity hypothesis would predict—occurred in Study 4, where the vivid information was essentially the only information available. Consistent with the creativity hypothesis, compared to nonvivid imagers, vivid imagers appeared to downplay information that was salient or obvious and to emphasize information that was less obvious. It is noteworthy that this tendency was observed across multiple operationalizations of “obviousness”: the relative detail and vividness of information across alternatives (Study 1), the relative vividness and diagnosticity of information within alternative (Study 2), and the relevance of the information to the decision task

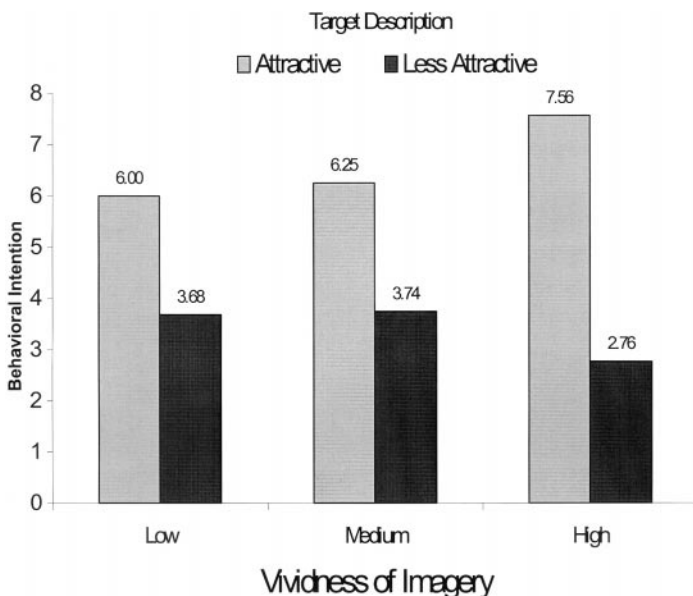


FIG. 5. Study 4: Behavioral intentions as a function of valence of target affect and vividness of imagery.

(Study 3). The parallelism of the findings across studies limits the number of plausible explanations.

### *In The Mind of the Vivid Imager*

Why do vivid imagers process decision information the way they do? We doubt that it is because they are more “intelligent.” Previous findings suggest that vividness of imagery is unrelated to people’s intellectual abilities (Richardson, 1969; Rossi & Fingeret, 1977). In addition, we conducted a follow-up study in which 139 respondents reported their verbal, mathematical, and total SAT scores in addition to completing the QMI. There was no correlation between the QMI and verbal SAT ( $r = .01$ , *ns*), mathematical SAT ( $r = -.07$ , *ns*), and total SAT ( $r = -.07$ , *ns*). The answer must lie elsewhere.

One could argue that because vivid imagers are better able to process abstract information they just use *more information* overall than nonvivid imagers do. Two sets of results suggest that this may not be the case. In Study 2, while imagery vividness increased the weight of the abstract information, it also *decreased* the weight of the vivid information (see Fig. 2). Similarly, in Study 3, when the target affect information was clearly relevant, vivid imagers relied less on this information than nonvivid imagers did (see Fig. 4). Therefore, overall, vivid imagers do not necessarily use a greater amount of information in their decisions than nonvivid imagers do.

A third possibility is that information that is salient and relevant to the nonvivid imagers may be less salient or relevant to the vivid imagers and vice versa. Thus, vivid and nonvivid imagers could both be relying on information that is salient and relevant *to them*, but in effect base their decisions on different sets of inputs. Results from Study 3’s pretest suggest otherwise. Vivid and nonvivid imagers both agreed that “affective attributes” were more relevant than “professional attributes” in the date context and that “professional attributes” were more relevant than “affective attributes” in the term paper context. In fact, vivid imagers appeared to be more aware of the differential relevance of the information than nonvivid imagers. Yet, in their decisions, vivid imagers were less influenced than nonvivid imagers by the more relevant information and more influenced than nonvivid imagers by the less relevant information. Thus, the difference in vivid and nonvivid imagers’ use of information cannot be explained by dissimilar perceptions of what is obvious or not—at least in that study.

The answer, we believe, lies in the determinants of vivid imagers’ seemingly creative minds. As we noted earlier, vivid imagers seem to have an independent cognitive style and an idiosyncratic way of processing information. When submitted to hypnotists’ messages, for instance, vivid imagers tend to scrutinize which pieces of information to focus on. They also tend to reinterpret the messages to accommodate their personal views (Sheehan & McConkey, 1982). We also noted earlier that vivid imagers tend to immerse themselves totally into the attentional object (Crawford, 1982; Sheehan & McConkey, 1982)—a tendency known as absorption (Tellegen & Atkinson, 1974). We believe that it

is this combination of total immersion and independent cognitive style that has vivid imagers look beyond the obvious, even if it entails relying less on vivid information with which they have greater affinity. As readers will recognize, this combination of total immersion and independent cognitive style is reminiscent of the “need-for-cognition” trait identified in social psychology (Cacioppo & Petty, 1982). To substantiate the (loose) connection between the two traits, we conducted another follow-up study in which another 121 respondents completed the QMI in addition to the short form of the need-for-cognition scale (Cacioppo, Petty, & Kao, 1984). As expected, there was a significant, but moderate positive correlation between the two measures ( $r = .21, p < .05$ ), suggesting that chronic vividness of imagery is related—though not identical—to the need for cognition.

To summarize, the results indicate that, compared to nonvivid imagers, vivid imagers tend to (a) rely more on information that is less salient and (b) rely less on information that is highly salient. The former tendency can be explained by the vivid imagers’ propensity for total immersion and their independent cognitive style. The process underlying the latter tendency is less transparent. One explanation builds on the limits of attentional resources. As vivid imagers devote more resources to the less obvious information, they may not be able to devote as much attention to the more obvious information as nonvivid imagers do. Another explanation builds on vivid imagers’ idiosyncratic processing style. Vivid imagers may be skeptical of information that seems “too obvious.” They may thus discount the more obvious information even though they do pay attention to it. These explanations call for future research.

### *The Vivid Imager’s Tales*

It is interesting to relate our findings to research on the vividness effect. Pointing out that empirical support for this effect has been rather mixed, Swann and Miller (1982) speculated that the vividness effect may be moderated by individual differences in imagery vividness. Specifically, they hypothesized that, whereas vivid imagers would exhibit the vividness effect, nonvivid imagers would not. These authors’ early vision of the complex interplay between imagery vividness and decision making was partly correct and partly incorrect. Although the vividness effect may indeed depend on people’s chronic vividness of imagery, the nature of this interaction may be the opposite of that hypothesized by Swann and Miller (1982). Vivid imagers may be less likely to display a vividness effect than nonvivid imagers are.

Our findings suggest another interesting relation between the chronic vividness of imagery and the vividness effect. Previous research has shown that the vividness effect is more likely to occur when there is competition between vivid and nonvivid information (e.g., Taylor & Thompson, 1982; Wilson et al., 1989). Our studies suggest that chronic vividness of imagery will amplify the influence of vivid information only when there is *no* such competition.

More broadly, this research calls for greater attention to noncomputational



processes in decision making, including mental imagery. The influence of imagery processes and imagery abilities on decision making is probably more complex than once believed. Some have assumed that because imagery vividness is correlated with creativity, it should improve decision-making (e.g., Wheatley et al., 1991). To conclude that vivid imagers would be better decision makers seems rather premature. First, as mentioned earlier, compared to nonvivid imagers, vivid imagers do not necessarily use more information when making decisions. Second, vivid imagers can be logically inconsistent in their use of information, as observed in Study 3. If one expects from “better” decision makers to consider a large amount of information and be consistent in their weighting of this information, one should probably abstain from recruiting individuals based on their vividness of imagery alone.

Does vividness of imagery ever help in decision making? It theoretically should, through two sets of mechanisms. First, imagery vividness may support decision making through mechanisms *other* than immersion and creative scrutiny. A growing body of research suggests that decision making may also involve the monitoring of one’s affective responses to anticipated outcomes (e.g., Damasio, 1994; Mellers, Schwartz, & Ritov, 1999; Pham, 1998; Pham, Cohen, Pracejus, & Hughes, 2000; Raghunathan & Pham, 1999; Cooke, Meyvis, & Schwartz, 2000). To the extent that vividness of imagery should intensify these anticipatory affective responses, it should make this alternative mode of decision making more efficient (Pham, 1998; Wilkins, 1976).

Second, the total immersion and creativity associated with chronically vivid imagery may indeed improve decision making, but under specific circumstances. When the more relevant information is not salient, when the more salient information is not relevant: this is when vivid imagers should be at their best—whenever it pays to look beyond the obvious. Imagine a crime scene, filled with misleading evidence and where the few valuable clues are neatly concealed. Who else could process this scene effectively, but the vivid imagers? Sherlock Holmes, after all, might have been one of them.

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