When Dreaming Is Believing: The (Motivated) Interpretation of Dreams

Carey K. Morewedge
Carnegie Mellon University

Michael I. Norton
Harvard University

This research investigated laypeople's interpretation of their dreams. Participants from both Eastern and Western cultures believed that dreams contain hidden truths (Study 1) and considered dreams to provide more meaningful information about the world than similar waking thoughts (Studies 2 and 3). The meaningfulness attributed to specific dreams, however, was moderated by the extent to which the content of those dreams accorded with participants' preexisting beliefs—from the theories they endorsed to attitudes toward acquaintances, relationships with friends, and faith in God (Studies 3–6). Finally, dream content influenced judgment: Participants reported greater affection for a friend after considering a dream in which a friend protected rather than betrayed them (Study 5) and were equally reluctant to fly after dreaming or learning of a plane crash (Studies 2 and 3). Together, these results suggest that people engage in motivated interpretation of their dreams and that these interpretations impact their everyday lives.

Keywords: anchoring, attribution, dreams, motivated reasoning, unconscious thought

Yet it is in our idleness, in our dreams, that the submerged truth sometimes comes to the top.—Virginia Woolf, *A Room of One's Own*

A dream which is not interpreted is like a letter which is not read.—*The Talmud*

Each morning, many people glance suspiciously across the bed at the person who broke their heart moments before with imagined infidelities, or fight the urge to change travel plans despite having foreseen their death in a fiery plane crash. The bitter thoughts and strong emotions that such experiences evoke attest to the potency of information "revealed" in dreams. In the present investigation, we examined laypersons' beliefs about the importance of dreams, the manner in which they interpret dreams, and the consequences of these interpretations on their beliefs and behavior. Psychologists' interpretations of the meaning of dreams range widely, from a view of dreams as the by-product of increased activity in brain regions engaged during sleep (Muzur, Pace-Schott, & Hobson,

2002) to a view of dreams as "the royal road to the unconscious," which reveal hidden truths (Freud, 1900/1953; Jung, 1974; Wegner, Wenzlaff, & Kozak, 2004). We suggest that—despite disagreement among scientists—laypeople endorse the latter perspective, holding a general belief that dreams provide meaningful insight into both themselves and their world. In addition, we propose that people's interpretation of the meaningfulness of any specific dream is impacted, by the extent to which that dream accords with their beliefs and desires when awake, and that these interpretations subsequently influence the impact of dreams on their diurnal (i.e., waking) lives.

THE INTERPRETATION OF DREAMS

Aside from the ubiquity of psychoanalytic theories in art, literature, film, and other media (Baumeister, 2005), why might people endorse the Freudian theory that dream content is meaningful, believing that their dreams provide special insight?[1] First, events in dreams often feature familiar people and locations, and thus can be difficult to distinguish from events that occur while awake (Johnson, Foley, Suengas, & Raye, 1988; Mazzoni & Loftus, 1996). We suggest, however, that people do not merely lend the same amount of credence to thoughts that occur in dreams as thoughts that occur while awake but actually treat the content of their dreams as *more* meaningful than the content of similar waking thoughts. More specifically, a decreased ability to trace dream content to an external source may lead people to give

[1] We use Bering's (2003) conception of meaning throughout this article—that people believe that the mental and physical events they consider to be meaningful have some reason or purpose, even if the reason for or purpose of the event is unknown to them.

greater weight to that seemingly random information and increase the likelihood that it will impact subsequent judgments and behavior. Ironically, then, although the content of dreams often appears to be produced purely by random associations (Muzur et al., 2002), which might make one expect that information to seem less meaningful, it may be the apparent randomness of those associations that makes people believe their dreams.

This prediction is grounded in two classic lines of research in psychology: research exploring anchoring effects and research exploring attribution. Countless studies exploring numerical anchoring effects have demonstrated the remarkable tendency for random and irrelevant information to exert undue influence on subsequent judgment (Tversky & Kahneman, 1974). In standard experimenter-provided anchoring experiments, numerical estimates are biased in the direction of a number provided in a comparative judgment made before the estimate. For example, participants first asked whether the average price of a German car was greater or less than 20,000 Deutsche Marks (about $15,019 U.S.) for instance, they estimated the average price of a German car to be lower than did participants who first asked whether the average price of a German car was greater or less than 40,000 Deutsche Marks (about $30,039 U.S.) (Mussweiler & Strack, 2000). Because people display a general tendency to believe and seek validation for the content of their thoughts (Griffin & Ross, 1991; Klayman & Ha, 1987; Pronin, Gilovich, & Ross, 2004; Trope & Liberman, 1996), it is not surprising that, given some information, people first treat that information as valid and only subsequently attempt to adjust or correct those beliefs to reflect the actual veracity of that information (Gilbert, 1991). In some sense, the importance initially ascribed to one's thoughts can thus be attributed to a simple counterfactual: Why would I have thought (or dreamt) this if it were not meaningful? Indeed, implausible information (e.g., "Did Gandhi live to be greater or less than 1,000,000 years old?") exerts a similar impact (Ariely, Loewenstein, & Prelec, 2003; Mussweiler & Strack, 2000), attesting to the fact that even one's most outlandish thoughts can influence judgment in this manner.

The meaning attributed to one's thoughts does not, however, explain why thoughts that occur in dreams would be accorded more weight than thoughts that occur while awake. Certainly, unconscious thought influences judgment and behavior (Aarts & Dijkskterhuis, 1999; Bargh & Chartrand, 1999; Dijksterhuis, Chartrand, & Aarts, 2007; Greenwald, Poehlman, Uhlmann, & Banaji, in press), but it may be the manner of their generation rather than their concealed nature that lends them such importance. As Freud (1955/1910) first noted, unconscious thoughts appear powerful precisely because they seem immune to other influences to which conscious thoughts are susceptible (see Spence & Holland, 1962). We suggest that unconscious thoughts, such as dreams, exert a stronger influence on judgment than similar conscious information because they appear to be internally generated and are therefore less likely to trigger correction processes. Indeed, self-generated thoughts (i.e., those for which an external source is not evident) can exert a particularly powerful influence on judgment (Epley & Gilovich, 2001, 2006; Slamecka & Graf, 1978). A lack of awareness of primes, for example, can increase the magnitude of mere exposure effects (Bornstein, 1989; Bornstein & D'Agostino, 1994). Most important for our account, when people become aware that their thoughts may have been externally generated, as

when primed supraliminally, they attempt to correct for those external influences (Schwarz & Bless, 1992; Wegener & Petty, 1995, 1997; Wilson & Brekke, 1994). In short, unconscious thoughts such as dreams should be more likely to influence judgment than conscious thoughts with similar content because of the tendency to correct for the apparent influence of external sources on the latter form of thinking.

Our assertion that people are more likely to perceive dreams as internally generated than waking thoughts—a necessary precursor to according dreams more meaning—is grounded in research examining the attribution of attitudes and beliefs to other actors. The fundamental distinction in the attribution literature is whether behavior is attributed either to an actor's situation or to an actor's disposition (Bem, 1972; Ross & Nisbett, 1991), and the extent to which observers believe a behavior reveals something meaningful about the actor is largely a function of whether that behavior can be attributed to the actor's situation. We suggest that a similar process underlies people's interpretations of the meaning of their conscious thoughts and dreams. When thoughts are easily attributed to an external source, they are unlikely to be perceived as internally generated and consequently are considered less important and are less likely to influence the thinker's judgment and behavior. In Schachter and Singer's (1962) classic study, for example, participants who were not informed that their arousal was externally generated were most likely to attribute that arousal to their irritation with a confederate, whereas participants who were informed that their arousal was externally generated (and could attribute that emotion to the shot they were administered) were less likely to behave in a manner suggesting that they were irritated.

It is thus the more tenuous link between the external world and unconscious thoughts that rise to the level of consciousness such as dreams than between the external world and similar conscious thoughts that make unconscious thoughts more likely to be perceived as internally generated and interpreted as more meaningful to the thinker. Dreams are perhaps the form of unconscious thought best suited to test this prediction, as dreams are unconscious thoughts that are ambiguously linked to the external world, but at the same time are unconscious thoughts to which the thinker has some access. Compare interpsychic information that appears in a dream to the same information appearing in a thought during the day: Imagine a woman who has either a waking thought or a dream of her husband being unfaithful. If the thought occurred during the day, then the thinker could easily attribute that thought to the fact that she just received an e-mail from her husband, for example, or may even have seen a coworker to whom she is sure her husband would be attracted. In either case, the waking thought could easily be attributed to an external stimulus in the immediate environment. Although the thought may still be upsetting, it is more likely that the thinker might "correct" for the external source of her suspicions than confront her husband.

Should that thought of infidelity occur in a dream, however, the connection to the external stimuli that may have prompted it is less evident. By definition, sleep involves a decreased awareness of external events, and thus the thoughts that occur during sleep (i.e., dreams) generally lack an immediate external cause to which they may be attributed. Of course, dreams are sometimes attributed to external causes (e.g., a loud ringing in a dream may be readily attributed to the sound of one's alarm clock ringing in the morning), but their internal generation in the absence of immediate

external stimuli makes them less likely to be attributed to external causes and more likely to be interpreted. As it is thus more difficult to attribute the suspicious thought in her dream to an external source, the wife may be less likely to correct for this suspicion and therefore be more likely to confront her husband.

The increased meaning attributed to dreams compared with similar thoughts is not limited to interpsychic dreams of infidelity. Our account suggests that whenever people are less able to attribute some thought to an external source, that thought will be seen as more meaningful. Indeed, even a quick survey through one's own dreams reveals the enormous variability of dream content, from mundane dreams about one's daily life, to communications with deceased loved ones and deities, to dreams about future real-world events such as one's death. We suggest that across this wide range of both inter- and intrapsychic content, dreams are not only unlikely to be dismissed but also likely to be considered more meaningful than conscious thoughts containing similar information, and are therefore more likely to influence attitudes and behavior.

MOTIVATED INTERPRETATIONS

Of course, people do not entirely fail to correct for their dream content: Not everyone who dreams of a plane crash cancels his or her flight. Rather, we suggest that people are less likely to correct for the possibility of external influence when ascribing meaning to their dreams than to similar conscious thoughts, and are therefore more likely to be influenced by their dreams. What might prompt individuals to correct for the impact of the thoughts and images that arise in their dreams? Imagine the different emotions experienced after a dream of an intimate encounter with one's own significant other compared with a dream of an intimate encounter with the significant other of a close friend. Both dreams should be considered more meaningful and be more influential than similar waking thoughts. Factors that impact the influence of conscious thoughts on judgment and behavior, however, should impact the influence of those dreams as well.

In waking life, people exhibit a motivated interpretation of thoughts and information, ascribing more meaning to thoughts and information that accord with their existing beliefs and desires. Like conscious thoughts, undesirable or negative dreams could thus be interpreted defensively, in a manner that allows dreamers to maintain a positive view of the self (Kruglanski, 1989; Kunda, 1990; Murray, 1938; Pyszczynski & Greenberg, 1987; Taylor & Brown, 1988). This account would predict that greater meaning would be ascribed to the dream of an intimate encounter with one's own significant other than with the significant other of a close friend, as the latter would have more disturbing implications. Alternatively, dreamers may be motivated to interpret dreams as providing unfiltered insight into their unconscious beliefs and desires (Molden & Higgins, 2005), which would suggest that both desirable and undesirable dreams should be considered meaningful.[2]

When such conflicts arise, we suggest that people exhibit the former kind of motivated interpretation, viewing the ambiguous images and thoughts that arise in dreams in a manner that bolsters their diurnal beliefs and desires (Ditto & Lopez, 1992; Gilovich, 1983; Hastorf & Cantril, 1954; Lord, Ross, & Lepper, 1979; Swann, Stein-Seroussi, & Giesler, 1992). Certainly, perceivers take a motivated approach when interpreting their environment,

thoughts, and behavior. Basic visual perception is affected by perceivers' motivations, such that ambiguous images are interpreted in a manner that foretells desirable rather than undesirable future experiences (Balcetis & Dunning, 2006). Explicit self-evaluations tend to be peculiarly charitable in ambiguous domains, in which there is ample room for favorable interpretation (Dunning, Meyerowitz, & Holzberg, 1989; Kruger & Dunning, 1999). Most important, just as people view tests that reflect favorably on them to be more "truthful" than tests that do not (Ditto, Munro, Apanovitch, Scepansky, & Lockhart, 2003; Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998), dreamers may consider dreams reflecting their existing beliefs and desires to be more "truthful" than dreams that do not. In short, dreaming may be believing—in that people are likely to see meaning in their dreams—but the weight accorded to particular dreams may be moderated by the extent to which dreams are in accordance with dreamers' agendas once awake.

OVERVIEW

We report the results of six studies in which we examined two hypotheses related to the motivated interpretation of dreams. First, we propose that people perceive dream content to be particularly meaningful and to provide insight into their diurnal lives. In Study 1, we tested the validity of this assertion by examining laypersons' endorsement of four prominent theories of dreaming, including the Freudian view that dreams contain hidden meaning. In Study 2, we further tested whether lay perceivers consider dreams to be more meaningful than similar conscious thoughts by comparing the impact of dreamed events with the impact of conscious thoughts on intentions to engage in a future behavior. In Study 3, we explored whether the belief that dreams are more meaningful than similar waking thoughts is restricted to individuals who endorse the Freudian view that dreams contain hidden meaning or whether the belief that dreams are more meaningful than thoughts is widely held.

Second, although dreams should be seen as more meaningful than similar thoughts, we propose that perceivers take a motivated approach to the interpretation of their dreams, engaging in correction processes when such correction is self-serving. In Study 4, participants recalled actual dreams involving an acquaintance. We examined the extent to which the meaning attributed to those real dreams could be predicted by the correspondence between the positivity of their dreams and the positivity of their attitudes toward those acquaintances. In Study 5, we explored the impact of dream interpretations on perceivers' diurnal lives by examining how interpretations of a dream about a friend's commendable or deplorable behavior impacted attitudes toward that friend. Finally, in Study 6, we examined two motivated components of dream interpretation by testing whether the meaningfulness attributed to dreams about communications from deities depended both on the (religious) beliefs of the perceiver and the desirability of the message communicated.

---

[2] Interestingly, Freud embraced both notions: The idea that people contort reality to preserve and buttress their beliefs and opinions can be traced to Freud's (1894/1962) taxonomy of defense mechanisms, yet he also argued that dreams provide privileged insight into the unconscious (Freud, 1900/1953).

STUDIES 1, 2, AND 3: DREAMING IS BELIEVING

To test our first hypothesis, we examined the extent to which dreams are considered meaningful sources of information in several different ways. In Study 1, we assessed how three distinct groups of participants—students from the United States, South Korea, and India—endorsed four prominent theories of dreaming. We predicted that participants from all three cultures would be more likely to endorse a theory suggesting that dream content has meaning than theories suggesting otherwise. Participants in Study 2 imagined that a frightening event (a plane crash) either occurred in a dream, occurred in a diurnal conscious thought, actually occurred, or was deemed likely to occur by federal authorities. We predicted that participants would report being more affected by the dream than by the conscious thought and used the meaningfulness attributed to the other sources of information as benchmarks by which to further assess the meaningfulness attributed to the dream. Finally, in Study 3, we explored whether the meaning attributed to dream content varies as a function of the theory of dreams one endorses. We expected that all participants would consider a dream more meaningful than a similar conscious thought, whereas the extent to which participants considered the dream more meaningful than other sources of information would vary in accordance with the theory of dreaming that they endorsed.

Study 1

Participants rated the extent to which they endorsed four prominent theories of dreaming. We expected participants to consider dreams meaningful and rate the Freudian view of dreams—that dreams reveal hidden truths about the self—more highly than a theory that dream content is a by-product of unrelated brain activity as well as two other theories suggesting that the function of dreams is important but that dream content results from the filtration of external stimuli. Most important, we attempted to assess the universality of the belief that dream content is meaningful by surveying populations from three cultures: the United States, South Korea, and India (Markus & Kitayama, 1991; Nisbett, Peng, Choi, & Norenzayan, 2001).

Method

Participants

United States student sample. Fifty undergraduate and graduate students at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts (31 women; M_{age} = 27.3, SD = 12.0) participated in a short survey in a campus student center in exchange for candy.

South Korean student sample. Fifty-seven students in a psychology class at Korea University in Seoul, Korea (22 women; M_{age} = 21.8, SD = 2.5) completed the survey in a packet of unrelated surveys as part of a requirement for an introductory psychology course. The survey was translated into Korean by a Korean research assistant unaware of the hypothesis and checked for accuracy by an independent translator.

Indian student sample. Forty-two undergraduate students at the Delhi School of Economics and master's students at Jawaharlal Nehru University in New Delhi, India (9 women; M_{age} = 21.6, SD = 3.2) participated in a short online survey in ex-

change for participation in a lottery. The survey was administered in English.

Procedure

In a within-subjects design, each participant assessed four prominent theories of dreams, described in nontechnical language: Dreams provide "useful insights into how to *solve problems*" (Cartwright, 1974; Cavallero & Foulkes, 1993; Wagner, Gais, Haider, Verleger, & Born, 2004); dreams are a *by-product* of unrelated brain activity that occur "when the brain tries to interpret random impulses from the pons as sensory input, producing vivid hallucinations" (Hobson & McCarley, 1977; Muzur et al., 2002); dreams reveal *hidden truths* "when emotions buried in the unconscious surface in disguised form" (Freud 1953/1900; Wegner et al., 2004); and dreams assist *learning* as they "throw out unwanted information to prevent information from becoming jumbled" (Crick & Mitchison, 1983; Maquet, 2001; Revonsuo, 2000; Stickgold, 2005).[3] The exact wording of each theory appears in the Appendix; the theories were not labeled. Participants reported the extent to which they agreed with each theory on four identical 7-point scales ranging from 1 (*do not agree at all*) to 7 (*agree completely*). Finally, participants circled the theory they considered most true.

Results

United States Student Sample

As expected, participants were more likely to endorse the Freudian theory that dreams reveal hidden truths (M = 4.84, SD = 1.70) than the problem-solving (M = 3.40, SD = 1.81), by-product (M = 3.98, SD = 1.56), or learning theories (M = 3.78, SD = 1.93); support for the Freudian theory was significantly greater than for each of the other theories, all $ts(49) > 2.54$, all $ps < .01$. In addition, the majority of participants (56%) selected the Freudian theory as most true, far more than any of the other options: problem solving (8%), by-product (18%), or learning (18%), $\chi^2(3, N = 50) = 26.96, p < .001$ (see Figure 1).

South Korean Student Sample

As before, the Freudian theory that dreams reveal hidden truths (M = 5.28, SD = 1.07) was endorsed more highly than each of the other theories: problem solving (M = 3.53, SD = 1.44), by-product (M = 4.60, SD = 1.39), or learning theories (M = 3.05, SD = 1.22), all $ts(56) > 3.28$, all $ps < .001$. In this sample, nearly two thirds of participants (64.9%) thought the Freudian theory most true, far more than any of the other options: problem solving (3.5%), by-product (29.8%), or learning (1.8%), $\chi^2(3, N = 57) = 59.70, p < .001$ (see Figure 1).

Indian Student Sample

Once again, the Freudian theory that dreams reveal hidden truths (M = 5.29, SD = 1.60) was endorsed more highly than each of the

---

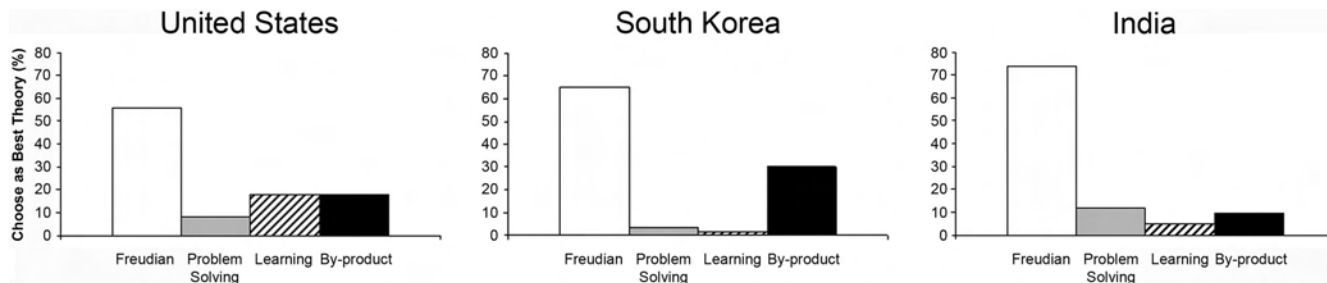[3] Italics in quotes were added for emphasis.

Figure 1. Participants in the United States, South Korea, and India were more likely to prefer the Freudian theory of dream content than three other prominent theories of dream content (Study 1).

other theories: problem solving ($M = 3.33$, $SD = 1.72$), by-product ($M = 3.90$, $SD = 1.54$), or learning theories ($M = 2.90$, $SD = 1.41$), all $ts(41) > 3.78$, all $ps \leq .001$. In this sample, nearly three quarters of participants (73.8%) thought the Freudian theory most true, far more than any of the other options: problem solving (11.9%), by-product (9.5%), or learning (4.8%), $\chi^2(3, N = 42) = 53.81$, $p < .001$ (see Figure 1).

Discussion

As predicted, the theory of dreams that emphasized their meaning (i.e., the Freudian view that dreams contain hidden truths) was most strongly endorsed, whether assessed with scale ratings or a forced-choice measure. Participants were thus more likely to endorse a theory of dreams suggesting that dreams reveal meaningful internally generated information that bubbles to the surface of consciousness than two theories suggesting that dreams' function is meaningful, but dream content merely reflects the day's events (the learning and problem-solving theories), and a theory suggesting that neither dreams' function nor content are meaningful (the by-product theory). These results held across three different cultures, in samples of college students in South Korea, India, and the United States. Although researchers still debate the function of dreams and dream content's meaning, laypeople around the world appear to believe that dreams serve an important function and have meaning, revealing hidden truths.

Study 2

Participants in our first study were most likely to endorse a theory of dreams suggesting that dreams contain meaningful information. In our next study, we examined the extent to which people attribute meaning to the information revealed in dreams. In an ancillary survey of commuters in Boston, Massachussets ($N = 81$; 46 women; $M_{age} = 24.0$, $SD = 8.1$), the majority of participants reported that dreams impacted their everyday behavior—influencing both their social relations (67%) and decision making (52%)—perhaps due to their reported belief that dreams foretell the future (68%) and that at least one of their dreams had come true (63%). These results lend further support to our assertion that lay perceivers consider dreams to provide important insight into their diurnal lives.

We sought to establish in Study 2 the degree of importance lay perceivers grant to dreams by comparing the impact of dreamed events with the impact of both imagined and real-world events on

their proclivity to engage in a behavior. As outlined earlier, we suggest that dreams should be ascribed more importance than similar conscious thoughts. Therefore, we expected participants to report being more affected by events occurring in dreams than by the same event occurring in a waking thought. To benchmark the importance of dreams in comparison to other forms of information, we compared the impact of dreams with the impact of similar real-world events.

Method

Participants

One hundred eighty-two commuters at South Station in Boston (95 women; $M_{age} = 35.9$, $SD = 16.0$) volunteered to participate.

Procedure

In a between-subjects design, participants completing a survey on "air traffic safety" were asked to imagine one of four scenarios: that the night before one of their scheduled airline trips either (a) the United States Department of Homeland Security (n.d.) issued a warning by raising the national threat level to "Orange," indicating a high risk of terrorist attack; (b) they thought consciously about their plane crashing on the flight they planned to take; (c) they dreamt about a plane crash on the flight they planned to take; or that (d) a real plane crash occurred on the route they planned to take. Participants then reported how anxious they would feel if they were scheduled to fly that day and how likely they would be to avoid flying on 5-point scales ranging from 0 (*not at all anxious/likely*) to 4 (*extremely anxious/likely*). A composite measure of these two items was created, as they were highly correlated, $r(180) = .69$, $p < .001$.

Results

As expected, participants were differently impacted by the type of information they considered, $F(3, 178) = 4.15$, $p = .007$, $\eta_p^2 = .07$. Participants were more likely to report that a dream of a plane crash would affect their travel plans than a conscious thought of a crash or a warning from the government, $F(1, 178) = 9.16$, $p = .003$, $r = .32$; and, $F(1, 178) = 3.54$, $p = .05$, $r = .19$, respectively. Even an actual plane crash did not exceed a dream of a

plane crash in its impact on the likelihood that they would engage in air travel ($F < 1$; see Figure 2).[4]

Discussion

Dreams appear to be potent sources of information. Participants considered a dream of a plane crash to be more unsettling than an identical waking thought and a federal warning indicating a "high risk of a terrorist attack," and as unsettling as an actual crash. While these reports reflect the impact of information on feelings about flying rather than actual behavior, results from our ancillary survey—in which the majority of participants reported that dreams influence their everyday lives—suggest a general willingness to heed advice distilled from dream content. In short, the results of the first two studies suggest that dreamed events, even when unpleasant, are perceived to be meaningful sources of information, to be more meaningful than similar conscious thoughts, and can even be perceived to provide information as important as similar real-world events.

Study 3

Endorsement of the Freudian theory of dreams appears most prevalent across cultures, yet a portion of each of the populations surveyed endorsed one of the other three prominent theories of dreaming (Study 1). It is thus important to assess whether the meaningfulness attributed to information appearing in dreams in Study 2 reflected only the opinions of those endorsing the Freudian view or whether dreams are generally considered meaningful sources of information. In Study 3, we assessed whether belief in the meaningfulness of information appearing in dreams varied with regard to the theory of dreams that participants endorsed.

Our account predicts a greater impact of dreams than similar thoughts on judgment and behavior, irrespective of the theory of dreams that people believe most true. As those theories may influence the extent to which dreams are considered important sources of information, however, we also expected participants who believe dream content is generated for external reasons or for no reason (i.e., reflecting one's current problems, distilling the day's events, or completely random) to consider dreams less

meaningful than participants who believe dreams are generated for internal reasons (i.e., revealing hidden truths about the self).

Method

Participants

Three hundred forty-one pedestrians in Cambridge, Massachussets (205 women; $M_{age} = 26.6$, $SD = 13.0$) participated in exchange for candy.

Procedure

In a within-subjects design, participants first rated four theories of dreams (see the Appendix) on scales identical to those described in Study 1 and reported which theory was their favorite and then imagined each of the following three scenarios: that the night before one of their scheduled airline trips, either (a) they consciously thought about their plane crashing on the flight they planned to take; (b) they dreamt about a plane crash on a flight they planned to take; or that (c) a real plane crash occurred on the route they planned to take. Participants then ranked the events, from the event (1) *most likely* to make them cancel or miss their flight to the event (3) *least likely* to make them cancel or miss their flight.

Results

As in Study 1, the Freudian view theory that dreams reveal hidden truths ($M = 5.17$, $SD = 1.60$) was endorsed more highly by participants than each of the other theories: problem solving ($M = 3.99$, $SD = 1.75$), by-product ($M = 4.26$, $SD = 1.57$), or learning theories ($M = 3.58$, $SD = 1.79$), all $ts(340) > 8.03$, all $ps < .001$, all $rs > .40$. It was also most often selected as the favorite theory (49.3%), more often than the problem-solving (12.3%), by-product (22.0%), or learning theories (16.4%), $\chi^2(3, N = 341) = 113.53$, $p < .001$.

To test whether beliefs about the source of dream content influences the meaningfulness ascribed to information distilled from dreams, we divided participants into two groups—those who most preferred the Freudian theory of dream content (i.e., *Freudians*) and those who most preferred one of the three alternative theories (i.e., *non-Freudians*). First, we performed Friedman chi-square tests within each group of participants to test whether the
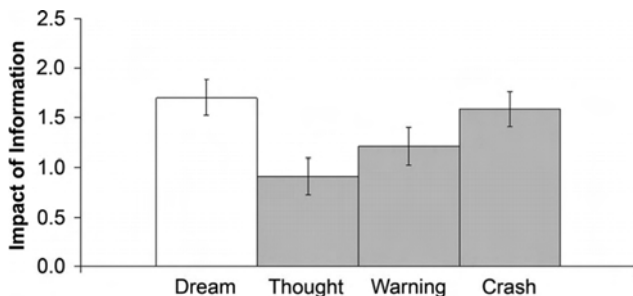

Figure 2. Participants were more likely to report that a dream of a plane crash would affect their travel plans than a conscious thought of a crash or a warning from the federal government. Even an actual plane crash did not exceed a dream of a plane crash in its impact on the reported likelihood that they would engage in air travel (Study 2). Bars represent ± 1 standard error.

---

[4] Considered separately, participants' reports of the anxiety they would feel and how likely they would avoid flying were similarly influenced by the type of information they considered, $F(3, 178) = 4.38$, $p = .005$, $\eta_p^2 = .07$; and, $F(3, 178) = 2.81$, $p = .04$, $\eta_p^2 = .05$. Reported feelings and behavior were influenced to a greater extent by a dream of a plane crash ($M_{anxiety} = 2.16$, $SD = 1.38$; $M_{avoid\ flying} = 1.25$, $SD = 1.56$) than by the conscious thought of a crash ($M_{anxiety} = 1.26$, $SD = 1.20$; $M_{avoid\ flying} = 0.56$, $SD = 0.93$), $Fs(1, 178) \geq 6.19$, $ps < .01$, $rs \geq .26$, respectively. Of interest is that dreams made participants more anxious but no more likely to avoid flying than a warning from the government ($M_{anxiety} = 1.48$, $SD = 1.37$; $M_{avoid\ flying} = .94$, $SD = 1.30$), $F_{anxiety}(1, 178) = 5.77$, $p = .02$, $r = .24$; and, $F_{avoid\ flying}(1, 178) = 1.25$, $p = .27$. Even an actual plane crash did not exceed a dream of a plane crash in its impact on their feelings or behavior ($M_{anxiety} = 2.00$, $SD = 1.46$; $M_{avoid\ flying} = 1.28$, $SD = 1.44$) ($F < 1$).

three kinds of information (i.e., an actual plane crash, a dream of a plane crash, and a thought of a plane crash) were attributed different degrees of importance. Those tests revealed significant differences between the importance attributed to the three kinds of information within both groups of participants, $\chi^2_{\text{Freudians}}$ (2, $N = 168$) = 55.84, $p < .001$; and, $\chi^2_{\text{non-Freudians}}$ (2, $N = 173$) = 70.18, $p < .001$. Next, we compared the rank orderings made by the two groups using Schucany and Frawley's (1973) $\mathcal{L}$ statistic (as suggested by Dekle, Leung, & Zhu, 2008), which revealed that their rank orderings were not concordant ($Z = -.88$, $p = .48$). As the two groups' rank orderings were discordant, they were examined separately.

Both participants endorsing the Freudian theory and participants endorsing the alternative theories considered dreams to be more meaningful than similar conscious thoughts ($Z_{\text{Wilcoxon Signed Ranks}} = 7.35$, $p < .001$ and $Z_{\text{Wilcoxon Signed Ranks}} = 6.81$, $p < .001$, respectively). As expected, however, the theory of dreaming participants endorsed affected the relative importance they attributed to dreams. Participants who did not endorse the Freudian theory reported that an actual plane crash would be more influential than a dream of a plane crash ($Z_{\text{Wilcoxon Signed Ranks}} = 1.96$, $p = .05$), whereas participants who endorsed the Freudian theory reported that a dream of a plane crash would be marginally more influential than an actual plane crash ($Z_{\text{Wilcoxon Signed Ranks}} = 1.90$, $p < .06$; see Figure 3).

Discussion

Irrespective of the theory of dreaming that they endorsed, participants considered dreams to provide meaningful information. Participants endorsing Freudian and non-Freudian theories of
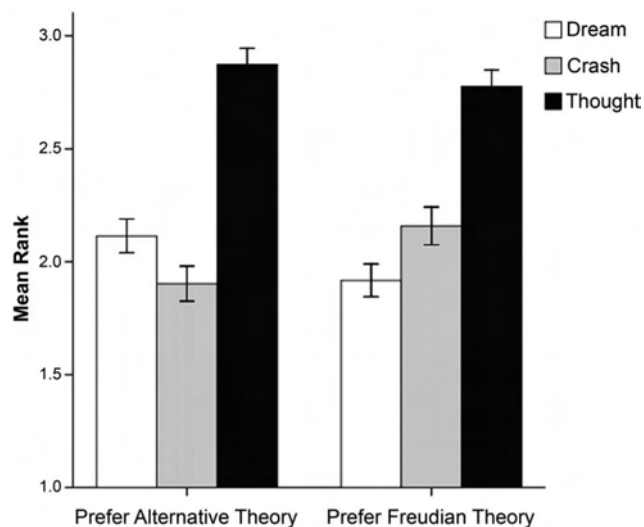

Figure 3. Participants who preferred the Freudian theory reported that a dream of their plane crashing would be more likely to induce them to cancel a flight than an actual plane crash on their scheduled route, whereas participants who preferred alternative theories of dream content reported that a dream of their plane crashing would be less likely to induce them to cancel a flight than an actual plane crash. Both groups considered the dream to be more influential than a similar conscious thought (Study 3). Bars represent ± 1 standard error.

dreams reported that a dream of their plane crashing would make them more likely to avoid a future flight than a similar conscious thought. Remarkably, participants who endorsed the Freudian theory considered information distilled from dreams to be even more influential than similar real-world events, whereas participants endorsing non-Freudian theories of dreaming considered information distilled from dreams to be only slightly less important than similar real-world events. Regardless of the theory of dreams that they endorsed, participants thus considered dreams to be more important than similar thoughts occurring to them while awake and almost as important as or more important than the real-world event that the dream reflected. These findings suggest not only that dreams are considered to be more meaningful sources of information than similar conscious thoughts but also that the meaning accorded to dreams is influenced by the theory of dreams that the dreamer endorses. Although all participants considered a dream of a plane crash to be meaningful, participants endorsing the Freudian theory of dreams were more affected by that dream than participants endorsing other theories.

STUDIES 4, 5, AND 6: THE (MOTIVATED) INTERPRETATION OF DREAMS

The first three studies elucidate two important and interrelated aspects of laypersons' beliefs about dream content: Most people believe that dreams reveal meaningful information about themselves and their world and that their dreams hold more meaning than similar waking thoughts. Using a plane crash to test the latter point constitutes a strong test of the importance of dreams: If people have any desire to dismiss their dreams as meaningless, then they should be most likely to do so with negative dreams, as such dreams provide undesirable information about one's self and world. Indeed, it would be much more pleasant to simply consider that dream meaningless and fly without the lingering image of a plane crash in the back of one's mind. Although dreams of this negative event were considered meaningful, many participants were not willing to accord a dream of a plane crash the same significance as an actual plane crash, suggesting that people do engage in some correction when determining the importance of negative dreams. Subsequent studies explored whether participants would be less motivated to engage in correction when dreams contained information confirming their beliefs and desires than when dreams contained disconfirming or negative information.

Having found support in Studies 1, 2, and 3 for our first hypothesis—that people consider dream content to be meaningful and provide important insight into their waking lives—we tested our second hypothesis in Studies 4, 5, and 6: That people do not consider all information in dreams to be equally important, but rather that their dream interpretations are influenced by the extent to which events in dreams accord with their views of reality when awake. Just as more effort is exerted when critiquing undesirable real-world information (Ditto et al., 2003, 1998; Klein & Kunda, 1992), we predicted that people would take a motivated approach when interpreting dream content—ascribing greater meaning to dreams that matched their preexisting beliefs and desires. Initial evidence for a motivated interpretation of dreams is present in Study 3. Although participants were unable to entirely dismiss an unsettling dream of a plane crash (or dismiss that dream as easily as a similar conscious thought), the dream theory participants

endorsed influenced the extent to which they dismissed it. Participants in Study 3 who endorsed the Freudian theory of dreams were relatively less likely to dismiss the dream than participants endorsing one of the other three theories. These results suggest not only that dreams are considered important sources of information but also that the extent to which a dream is ascribed meaning may vary according to the beliefs of the dreamer. Thus, Studies 4–6 were designed to examine in greater depth whether dreams are selectively interpreted.

This possibility was first tested in the domain of social relationships, as emotional dreams about friends and loved ones are particularly frequent (McNamara, McLaren, Smith, Brown, & Stickgold, 2005). In Study 4, participants recalled a real dream that involved another person. We assessed the extent to which the correspondence between the positivity of dream content and attitudes toward those people influenced the meaning participants attributed to their dreams. We expected that participants who reported dreams involving a liked person would evaluate dreams containing positive content to be more meaningful than dreams containing negative content, whereas participants who reported dreams involving a disliked person would rate dreams containing positive content to be less meaningful than dreams containing negative content. In Study 5, we held the positivity toward the person who appeared in dreams constant by asking all participants to imagine they dreamt about a randomly selected friend but varied the positivity of the dream imagined. In addition to assessing the meaning ascribed to those dreams, we also assessed whether the meaning ascribed to those dreams impacted the strength of their friendship.

Finally, we examined the influence of important general beliefs and the desirability of dream content on dream interpretation by exploring how religious believers and skeptics differed in their interpretations of dreams containing divine communications. In Study 6, participants assessed the meaningfulness of a dream in which God commanded them to engage in hedonistic or self-abnegating behavior. We predicted that religious believers would be motivated to consider all such otherworldly dreams as meaningful irrespective of the desirability of the commandment, whereas skeptics might be motivated to consider otherworldly dreams meaningful only when the commandment reflected their worldly desires.

Study 4

Method

Participants

A representative national sample of two hundred seventy Americans (144 men; $M_{age} = 44.2$, $SD = 14.1$) completed a short Internet survey. Participants were randomly selected from a database of 2.5 million respondents with parameters ensuring that the sample reflected the gender, age, education level, and income distribution reported by the most recent (2000) U.S. Census. The sample included citizens from all 50 states and the District of Columbia.

Procedure

After completing an unrelated survey, participants were asked to think of a dream about a person they knew that they could clearly

recall and to briefly describe its content. Participants then rated the extent to which they considered that dream to be meaningful, to provide insight into their relationship with that person, and to be pleasant on 5-point scales where 1 = *not at all*, *slightly*, 2 = *slightly*, 3 = *somewhat*, 4 = *moderately*, and 5 = *extremely*. Participants then reported the extent to which they liked or disliked the person who appeared in their dream on a 7-point scale ranging from 1 (*dislike extremely*) to 7 (*like extremely*).

Results

We predicted that participants would exhibit a motivated interpretation of their dreams, ascribing more importance to pleasant dreams about liked individuals than disliked individuals, and ascribing more importance to unpleasant dreams about disliked individuals than liked individuals. As the meaningfulness and insight ascribed to dreams was highly correlated, $r(268) = .81$, $p < .001$, those reports were averaged into a single measure of the importance attributed to the dream.

We then analyzed participants' reports of importance with regression by using centered values for the predictors (liking for person in the dream and the pleasantness of the dream), which yielded a significant linear fit ($R^2 = .13$), $F(3, 266) = 13.14$, $p < .001$. Importance ascribed to dreams varied according to the extent to which participants liked the person who appeared in the dream ($\beta = .24$), $t(268) = 3.52$, $p = .001$, such that dreams about liked individuals were seen as more meaningful than dreams about disliked individuals, but overall importance did not vary according to the pleasantness of the dream ($\beta = .01$), $t(268) = .10$, $p = .92$. More important, the model revealed that the importance ascribed to dreams varied according to the predicted interaction of liking and pleasantness ($\beta = .28$), $t(268) = 2.52$, $p = .01$. To clarify the nature of the interaction, we calculated the simple slopes for dreams with pleasant and unpleasant content (i.e., one standard deviation above and below the mean of pleasantness). As illustrated by Figure 4, greater meaning was ascribed to pleasant dreams about liked individuals than disliked individuals ($\beta = .33$),
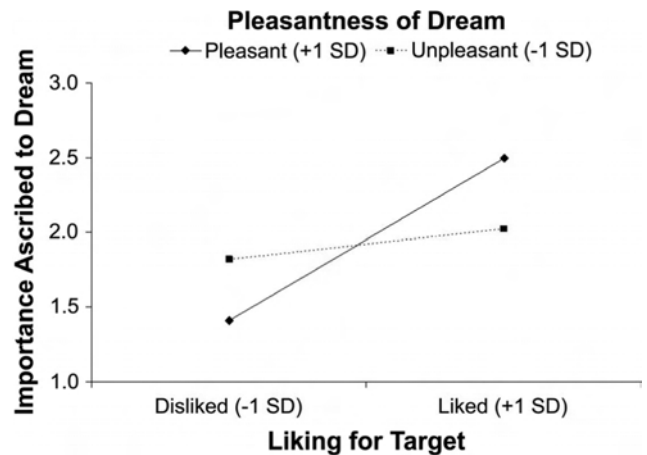

Figure 4. Participants ascribed more importance to pleasant than to unpleasant dreams that they recalled about liked individuals, and more importance to unpleasant than to pleasant dreams that they recalled about disliked individuals (Study 4).

$t(267) = 7.09$, $p < .001$, whereas equal meaning was ascribed to unpleasant dreams about liked individuals and disliked individuals ($\beta = .04$), $t(267) = .29$, *ns*. These results suggest a motivated interpretation of dreams: Participants ascribed more importance to pleasant dreams about liked individuals than to unpleasant dreams about liked individuals but relatively more importance to unpleasant dreams about disliked individuals than to pleasant dreams about disliked individuals.

Posttest

Although participants appeared to interpret the dreams they recalled in accordance with their beliefs about the individuals who appeared in them, it is possible that participants instead recalled dreams in accordance with their beliefs about the individual that first came to mind (Conway & Ross, 1984; Sanitioso, Kunda, & Fong, 1990). To address the possibility that rather than exhibiting a motivated interpretation of dreams, participants exhibited a motivated recollection of dreams, we conducted an ancillary posttest in which participants were asked to recall the most recent dream they could clearly remember, indicate when that dream occurred, and rate the valence of that dream. We tested for the presence of motivated recollection in two ways. First, if people routinely engage in a motivated recollection of dreams, then it could be expected that the overall valence of the dreams they remembered would be positive, rather than neutral or negative. Second, if motivated recollection unfolds over time, then negative dreams should be less likely to be remembered than positive dreams as time passes, suggesting that the valence of dreams and the amount of time between their recollection and occurrence should be positively correlated.

We conducted the posttest among a representative national sample of 309 Americans (174 women; $M_{age} = 42.6$, $SD = 17.6$) who were randomly drawn from the database described in Study 4. Participants were first asked whether they could clearly recall a dream from the previous evening. Participants who could recall a dream from the previous evening were then asked to describe that dream. Participants who could not recall a dream from the previous evening were asked to report the date of the most recent dream they could clearly recall and then describe that dream. Each participant then rated the pleasantness of their dream on a 7-point scale ranging from 1 (*extremely unpleasant*) to 7 (*extremely pleasant*).

We first tested for the overall valence of the dreams people recalled to see whether the valence of the dreams participants recalled was skewed positive. The mean pleasantness rating of the dreams participants reported ($M = 4.05$, $SD = 1.63$) was remarkably close to the scale midpoint (4) and did not differ from it, $t(308) = 0.52$, $p = .60$, suggesting that participants tended to recall dreams that were neither uniformly positive nor uniformly negative. Indeed, if any bias was present, then it would be in the opposite direction, as the dreams participants reported had a slight negative skew (skewness = $-.12$; $SD = 0.14$). Second, we explored whether negative dreams were more likely to be forgotten over time than positive dreams by examining the relationship between the reported pleasantness of the dreams reported and their recency (in days). Again, we found no evidence for motivated recollection, as there was no relationship between these two measures, $r(307) = -.04$, $p = .45$.

Two trained coders assessed each dream report on the extent to which its content was mundane or extraordinary, vague or vivid, appeared to indicate a recurring dream, did or did not appear to be related to the current concerns of the dreamer, and featured moral or immoral behavior, all on 7-point scales ranging from 1 (*definitely vague*) to 7 (*definitely vivid*). Coder agreement was sufficiently high, $r(307)_{average} = .73$, $p < .001$, range = .65–.84. As with the above analyses for valence, an examination of these five dimensions revealed little impact of dream recency: Older dreams were seen as less mundane than newer dreams, $r(307) = .12$, $p < .05$, and newer dreams were (not significantly) more likely to reflect current concerns, $r(307) = -.08$, $p = .15$, but none of the other dimensions exhibited any relationship with dream recency (all $ps > .44$).

Discussion

Results from Study 4 and the posttest suggest a motivated component to the interpretation of dreams that cannot be attributed solely to biases in recollection. Participants attributed meaning to dreams when dream content corresponded with their preexisting beliefs about people in their lives: Dreams about friends were deemed meaningful when those dreams reflected positively upon friends and were deemed less meaningful when they did not, whereas dreams about disliked individuals demonstrated the opposite pattern. Despite a lack of evidence for motivated recollection in the posttest data, it is of course possible that participants in Study 4 were more likely to recall meaningful dreams in accordance with their attitudes toward their acquaintances rather than in opposition to those attitudes. To ensure there was no possibility for participants to selectively recall the dreams they evaluated in subsequent studies, participants evaluated the extent to which they considered hypothetical dreams to be meaningful in Studies 5 and 6.

Study 5

In Study 5, each participant named a friend and then was randomly assigned to consider a pleasant, neutral, or unpleasant dream featuring the friend they named. This method was chosen because unpleasant dreams disconfirming preexisting (positive) attitudes toward a friend serve as an interesting case in which to compare perceivers' tendency to believe that dreams contain meaningful information (exhibited in Studies 1, 2, and 3) with perceivers' tendency to protect their beliefs and attitudes by discounting the importance of contradictory information (exhibited in Study 4). We predicted that motivated reasoning processes would determine the extent to which individuals engaged in correction processes, discounting the meaningfulness of negative dreams about friends relative to the meaning they attributed to neutral and positive dreams about those friends. Additionally, we explored the impact of participants' interpretations on their attitudes. Whereas Studies 2 and 3 demonstrated that dream interpretations impacted people's attitudes toward flying, we expected dream interpretations in Study 5 to impact people's perceptions of the strength of their friendships.

Method

Participants

One hundred thirty-five pedestrians in Cambridge (76 women; $M_{age} = 29.4$, $SD = 15.4$) volunteered to participate.

Procedure

In a between-subjects design, participants first wrote the initials of a same-sex friend on one side of a sheet of paper. After turning the page, participants were randomly assigned to imagine that the previous night they dreamt either about their friend (*controls*), that their friend kissed the participant's present/most recent significant other in an intimate way (*cheaters*), or that their friend defended the participant from someone trying to hurt them (*defenders*). Participants then rated the extent to which they thought the dream was meaningful and (our measure of the impact of dreams on attitudes) how close they felt to that friend on 7-point scales ranging from 1 (*definitely purely coincidental/ not at all close*) to 7(*definitely meaningful/very close*).

Results

Meaningfulness

As in the previous study, the extent to which dreams matched individuals' existing beliefs impacted the meaning attributed to those dreams, $F(2, 126) = 19.47$, $p = .005$, $\eta_p^2 = .08$. Participants with cheating dream friends reported that dream to be less meaningful ($M = 3.2$, $SD = 1.8$) than did participants with defending dream friends ($M = 4.4$, $SD = 1.9$) and controls ($M = 4.1$, $SD = 1.9$), $F(1, 126) = 9.81$, $p < .01$, $r = .31$; and, $F(1, 126) = 6.00$, $p < .03$, $r = .24$, respectively. Participants with defending dream friends and controls did not differ with regard to the meaning they attributed to the dream considered ($F < 1$).

Attitudes

Most important, the randomly assigned dreams differently impacted participants' feelings of closeness to their friends, $F(2, 126) = 7.41$, $p = .03$, $\eta_p^2 = .05$. Participants reported greater affection for defending dream friends ($M = 6.0$, $SD = 1.2$) than both controls ($M = 5.4$, $SD = 1.5$), $F(1, 126) = 7.10$, $p < .01$, $r = .22$, and cheating dream friends ($M = 5.3$, $SD = 1.8$), $F(1, 126) = 10.13$, $p < .005$, $r = .22$. Controls did not differ from cheating dream friends with regard to the closeness they reported ($F < 1$).

Mediation

Finally, we checked to see whether participants' interpretations of their dreams—the meaningfulness ascribed—determined the influence of dreams on their feelings of closeness for their friends. Condition, meaning, and closeness were significantly related (see Figure 5), and a Sobel test confirmed that the meaning participants assigned to the dream mediated the impact of the type of dream on participants' feelings of closeness to their friend ($Z = 2.36$, $p = .02$; Baron & Kenny, 1986).

Discussion

As with real dreams recalled from memory in Study 4, participants in this experiment engaged in motivated interpretations when ascribing meaning to dreams involving their friends. Participants believed that neutral dreams were as meaningful as positive dreams but that negative dreams were less meaningful, demonstrating both a general tendency to see meaning in dreams and a discounting of the importance of dreams with undesirable implications. Most surprising, participants' perceptions of the strength of their friendships were influenced by their dream interpretations, even though the dreams participants considered were hypothetical and randomly assigned. Indeed, the greater closeness participants reported feeling to friends who treated them well in a dream than to friends in the control condition or in the condition in which their friends treated them badly was mediated by the greater meaning attributed to dreams with attitude-consistent content. It thus appears that perceivers ascribe truth value to dreams and are affected by dream content but discount the meaningfulness of dreams with content that conflicts with their beliefs and desires while awake.

Study 6

Study 1 demonstrated that people from divergent cultures endorse the Freudian view of dreams as containing hidden meaning. Clearly not all people do, however, as the second most frequently endorsed theory in Study 1 was the Freudian theory's antithesis— that dreams are the by-product of random neural impulses (Hobson & McCarley, 1977; Muzur et al., 2002). Given our evidence suggesting dream interpretations are influenced by perceivers' motivations in Studies 4 and 5, we wanted to test whether perceivers who would normally profess disbelief in the truth of a dream might be persuaded to consider it meaningful if their motivation to believe it was sufficiently high. In Study 6, religious believers and agnostics imagined that God spoke to them in a dream and commanded them to do something they would enjoy (i.e., world travel) or dislike (i.e., self-sacrifice). We expected religious believers to endorse both dreams, irrespective of the commandment's desirability, as their beliefs suggest that both pleasant and unpleasant commands from God are important and sacred (Baumeister, 2002; Festinger, Riecken, & Schachter, 1956). More interesting, we expected agnostics—people who do not fully believe in God but are not quite willing to completely rule out the existence of one—to find greater truth in God's words when God commanded them to engage in world travel than when God commanded them to engage in self-sacrifice, as they should engage in more correction when determining the importance of a dream that both contradicted their doubt in the existence of God and had negative implications.
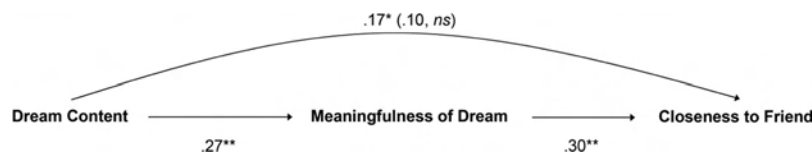

Figure 5. Interpretations of the meaningfulness of dreams mediate the influence of dream content on the closeness felt toward a friend (Study 5). * $p < .05$. ** $p < .01$.

Method

Pretest

To ensure that dreams advocating world travel or self-sacrifice were considered pleasant and unpleasant, undergraduate students in a pretest, using a within-subject design ($N = 20$; 6 women; $M_{age} = 19.62$, $SD = 1.24$), rated the desirability of taking a year off from their studies to travel the world and the desirability of taking a year off from their studies to work in a leper colony on 7-point scales ranging from 1 (*extremely undesirable*) to 7 (*extremely desirable*). As expected, students considered taking a year off to travel ($M = 6.25$, $SD = 1.16$) more desirable than taking a year off to work in a leper colony ($M = 2.15$, $SD = 1.56$), $t(19) = 11.81$, $p < .001$, $r = .94$.

Participants

Sixty undergraduate students enrolled in a psychology course at Rutgers University in New Brunswick, New Jersey (37 women) participated as part of a course requirement.

Procedure

Participants first reported the extent to which they believed in the existence of God on a 5-point scale ranging from 1 (*I definitely do not believe that God exists*) to 5 (*I definitely believe God exists*). Participants were divided into *believers*, who reported definitely believing (5) in the existence of God on this measure ($n = 35$), and *agnostics*, who reported doubting (1–4) the existence of God ($n = 25$). In a between-subjects design, participants were then asked to imagine that God spoke to them in a dream during the previous evening and informed them to take a year off from their studies to either "travel the world" or "work in a leper colony." Participants reported the extent to which they considered the dream to be meaningful on a 7-point scale ranging from 1 (*definitely purely coincidental*) to 7 (*definitely meaningful*).

Results

Not surprisingly, believers rated dreams in which God spoke to them as more meaningful than did agnostics, $F(1, 56) = 15.70$, $p < .001$, $\eta_p^2 = .22$. However, this main effect was qualified by the more interesting predicted interaction, $F(1, 56) = 4.40$, $p < .05$, $\eta_p^2 = .07$. Whereas believers felt both dreams were equally meaningful irrespective of the desirability of the dreams' content ($F < 1$), agnostics reported that dreams were more meaningful when God suggested that they should take a year off to travel the world than when God suggested they should take a year off to work in a leper colony, $F(1, 56) = 6.19$, $p < .05$, $r = .42$ (see Figure 6).[5]

Discussion

These results again suggest that perceivers use motivated interpretations of dream content, as their preexisting religious beliefs and secular desires moderated the meaning they ascribed to dreams: Dreams about communications from God were deemed more meaningful by believers than by agnostics. Agnostics, however, were influenced by the extent to which dreams matched their secular desires, finding greater truth in God's commandments
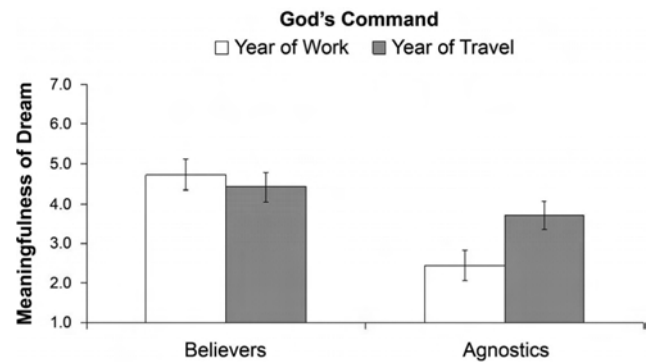

Figure 6. The meaning attributed to dreams containing commands from God is moderated by the religious beliefs and secular desires of the dreamer (Study 6). Bars represent ± 1 standard error.

when those commandments entailed world travel rather than self-sacrifice. In other words, when dreams reinforced and reflected (religious) beliefs that were important to perceivers, those dreams were considered to be meaningful regardless of the desirability of the dream content. When dreams did not reinforce or reflect beliefs that were important to perceivers, those dreams were considered to be less meaningful, particularly when the dream content conflicted with perceivers' preexisting worldly desires.

GENERAL DISCUSSION

Across a series of studies using common dream motifs such as infidelity, accidents, and messages from deities, participants treated dreams as meaningful sources of information. A majority of participants across three cultures believed that dreams were meaningful sources of information (Study 1), and participants in two experiments (Studies 2 and 3) believed a dream to be a more important source of information than a similar conscious thought. The importance attributed to dreams is evidenced in part by the motivated interpretation of dreams—if individuals do not treat dreams as important sources of information, then it is unlikely that they would have corrected for dream content that conflicted with their beliefs or contained undesirable information. Rather, greater importance was attributed to dreams when dream content supported or confirmed participants' religious beliefs, secular attitudes, and desires, whether dreams were real (Study 4) or hypothetical (Studies 5 and 6). Furthermore, the importance attributed to dreams influenced personal relationships (Study 5) and was sufficient to impact behavioral intentions to travel (Studies 2 and 3). It thus appears that dreaming is believing—individuals from different cultures believe that dreams provide meaningful insight into the self and the world—but not all dreams hold similar insight and meaning. Individuals take a motivated approach to dream interpretation: Dreams incongruous with existing beliefs and desires are less likely to be endorsed and influence diurnal life.

---

[5] We did not divide participants into believers (5), agnostics (4–2), and atheists (1) because there were only 2 atheists in our sample. With these 2 participants removed, the main effect of belief and the interaction remain significant, $F(1, 54) = 17.52$, $p < .001$, $\eta_p^2 = .25$; and, $F(1, 54) = 5.57$, $p = .02$, $\eta_p^2 = .09$, respectively.

Curiously, although participants in our studies engaged in motivated dream interpretation, they still ascribed importance to very negative dreams that conflicted with basic motivations such as self-preservation (i.e., dreams of a plane crash before traveling). As we suggested earlier, the ascription of meaning to dreams with such undesirable content may simply attest to the potency of information contained in dreams relative to the same information contained in conscious thoughts. It is possible, however, that particular kinds of dreams are especially likely to be considered meaningful, such as dreams that evoke thoughts of death and injury (Solomon, Greenberg, & Pyszczynski, 1991), whereas relatively less important negative dreams might be somewhat easier to dismiss (e.g., dreams of a friend's regrettable behavior). Future research is certainly needed to elucidate fully how the interplay between beliefs and the desirability of the content of dreams affects their perceived importance, and whether particular kinds of dream content are attributed special meaning.

More generally, we have focused our investigation on the distinction between thoughts that occur while awake and while asleep, in part, because lay intuitions about the power of dreams are strongly and consensually held. Yet thoughts that occur during dreams and while awake clearly lie on a continuum of thought interpretation. For example, the very same waking thought might be ascribed greater meaning if it appears to have been generated for entirely internal reasons than if it appears to have occurred because of exposure to some external stimulus. We would expect thoughts that appear to be the product of mind wandering (i.e., "day dreaming") to be accorded more meaning by the thinker than thoughts that appear to be the product of deliberate attention, and having suddenly found the solution to a problem may lead solvers to consider their solutions more creative and important than if the same solution was discovered after they engaged in effortful concentration.

Examining the interpretation of thought with this framework may have implications not just for understanding "normal" thought but for disordered thought as well. We have focused on fairly innocuous consequences of attributing meaning to the sometimes random thoughts that occur in dreams (Hobson & McCarley, 1977; Muzur et al., 2002), yet many psychopathologies have at their core the notion that people overattribute meaning to their thoughts. For instance, failing to attribute others' mildly intrusive questions to their genuine concern might result in one considering a fleeting paranoid thought that others are spying on one to hold meaning and reflect a veridical state of the world.[6] When the system that interprets thoughts goes awry, misinterpretation of thoughts may thus have negative consequences for the thinker. The attributional processes underlying the interpretation of dreams that we have identified may thus be applicable to a wide spectrum of research exploring the antecedents and consequences of thought interpretation.

Which Dreams Are Interpreted?

Our experiments demonstrate that people exhibit a general belief that dreams hold hidden meaning and therefore have a general tendency to interpret their dreams and allow those dreams to impact their judgment and behavior. As our cross-cultural data indicates, this tendency appears widespread. Indeed, although most commonly associated in Western culture with theorists such as Freud and Jung, the presence of dream interpretation in ancient

religious and mythological texts (Hard, 2004)—as illustrated by our opening quote from the Talmud—suggests that the tendency to interpret dreams has been prevalent since antiquity.

Does this ubiquitous tendency imply, however, that all dreams are interpreted? Many of our studies featured commonplace situations and dream motifs—from interactions with friends to plane crashes—precisely the kinds of dreams that would appear to have the most relevance to one's life (and thus be least likely to be dismissed). At the same time, however, people seemed willing to lend some weight to dreams about commandments from God, hardly a commonplace occurrence. Although future research is needed to explore the boundaries of dream interpretation, some existing research suggests that its latitude might be quite wide. First, even when events in the world are explicitly and undeniably random (as many dreams certainly seem to be; Hobson & McCarley, 1977; Muzur et al., 2002), people seek to explain those events in an effort to control and predict them (Langer, 1975; Pronin, Wegner, McCarthy, & Rodriguez, 2006; Skinner, 1948; Wright, 1962). Second, returning to our earlier discussion of correction processes, even blatantly implausible and obviously false information can exert an impact on judgment: Participants who answer no to the question of whether Gandhi lived to be more than 1,000,000 years old (Mussweiler & Strack, 2000) surely realize the outlandishness of this anchor, yet that information still biases their subsequent judgments. Even when people are informed that feedback they received about their abilities was randomly assigned, their judgments of their past and future performance are still influenced by that false information, again suggesting a lack of sufficient correction for information known to be untrue (Ross, Lepper, & Hubbard, 1975).

Can images and thoughts in dreams become too bizarre to impact judgment? We suggest that in particularly strange cases, people may realize that the actual event is unlikely to happen, but their desire to interpret dreams leads them to perceive meaning nonetheless. Indeed, the industry of dream interpretation is reliant on people's desire for even the most fantastical dreams to be interpreted. For instance, a dream about flying through the air under one's own power is very unlikely to indicate that one will actually become capable of flight, yet a quick search of the Internet reveals countless interpretations of this motif. Freud (1900/1953) himself suggested that dreams of flying revealed thoughts of sexual desire. Interestingly, in the same text, Freud also suggested that dreams about the absence of the ability to fly (i.e., falling) also indicate succumbing to sexual desire. It is thus possible that even when outrageous thoughts arise in dreams, those thoughts may still be likely to be seen as sources of meaningful information rather than as random by-products of a restless mind's frequent wanderings (Mason et al., 2007; Smallwood & Schooler, 2006), and whatever interpretation one places (or one's psychoanalyst places) on that dream then influences subsequent judgment and behavior.

Might Dreams Provide Insight Into Ourselves and the World?

We have suggested that dreams are more impactful than similar waking thoughts because they lack a clear external cause and

---

[6] We thank an anonymous reviewer for this suggestion.

therefore seem to "come from nowhere." To be fair, we have focused our attention on cases in which people's beliefs that dreams provide hidden clues cause them to use such information in suspect ways, as when using dreams of plane crashes as a useful input to their future travel plans. Dreams certainly can provide insight into the state of the dreamer. We suggest, however, that this insight is of a different sort than that which laypeople believe dreams provide. For example, nightmares are more likely to occur when people are under emotional stress (Levin & Nielsen, 2007); a study conducted in the wake of the 1989 San Francisco earthquake found that the frequency of nightmares among local college students was predicted by their proximity to the earthquake's epicenter (Wood, Bootzin, Rosenhan, Nolen-Hoeksema, & Jurden, 1992). More generally, the content of dreams often reflects people's current concerns—their worries and fears about their jobs, marriages, and children (Nikles, Brecht, Klinger, & Bursell, 1998). If a person were to describe the content of her or his dreams to a therapist or friend, then it is thus very likely that those dreams would provide insight into the dreamer. If she or he were to speak about experiencing frequent nightmares, for example, then it might be wise to treat their occurrence as meaningful and inquire about sources of stress. What is much less likely, however, is that dreams provide hidden insights into future world events. Horrible dreams about plane crashes might be evidence that someone is anxious about a meeting they are scheduled to attend, but such dreams are certainly not evidence that a plane crash is imminent.[7]

Still, though the lay belief that dreams contain hidden insight and foreshadow events to come seems dubious at best, there are at least two plausible reasons to believe that dreams may provide insight into the present and future. First, given laypeople's strong endorsement of the Freudian perspective and their willingness to use dreams to guide behavior, dreams may create self-fulfilling prophecies (Merton, 1948): Dreams of spousal infidelity may lead to suspicious accusations, alienating one's spouse and potentially provoking actual infidelity. Second, merely thinking of an action may make one more likely to later perform the action considered (Gollwitzer, 1999; Greenwald, Carnot, Beach, & Young, 1987; Levav & Fitzsimons, 2006). Asking people whether they intend to purchase a car or computer in the near future, for example, increases the likelihood of that item being purchased (Morwitz, Johnson, & Schmittlein, 1993). Having dreamt of an event may thus make one more likely to consider and engage in that behavior. While we cannot be sure, the effects of either of these processes may be responsible for participants' reports that their dreams had come true in the survey ancillary to Study 2.

We close by noting that, although dreams are unlikely to predict future world events, it is possible that they may provide some hidden insight into diurnal life in the way that laypeople believe they do. Just as unconscious thought can provide insight that is superior to more deliberative forms of thinking when making decisions (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Dijksterhuis & van Olden, 2006; Wilson & Schooler, 1991), generating creative solutions (Dijksterhuis & Meurs, 2006), recalling directions (Fiore & Schooler, 2002), and solving puzzles (Lane & Schooler, 2004), dreams may integrate seemingly unrelated evidence—unexplained credit card charges, smudges of lipstick, distant behavior—into a correct diagnosis of infidelity. Although future research is needed to explore this possibility, if sleep lends insight into solving abstract problems (Stickgold & Walker, 2004;

Wagner et al., 2004), perhaps sleep and dreaming provide insight into the concrete problem of making sense of ourselves as well.

---

[7] Because people's interpretations of their dreams appear to be motivated, the content of those dreams may hold meaning that they are not willing to acknowledge despite their general belief in the power of their dreams (Brown & Donderi, 1986; Cann & Donderi, 1986; Domino, 1976). To the extent that dreams do contain insight, dreamers may thus be particularly poorly suited to interpret those dreams themselves, whereas a more impartial evaluator, such as a psychoanalyst, may actually be more accurate than dreamers at dream interpretation.

References

Aarts, H., & Dijksterhuis, A. (1999). The silence of the library: Environment, situational norm, and social behavior. *Journal of Personality and Social Psychology, 84,* 18–28.

Ariely, D., Loewenstein, G., & Prelec, D. (2003). Coherent arbitrariness: Stable demand curves without stable preferences. *Quarterly Journal of Economics, 118,* 73–105.

Balcetis, E., & Dunning, D. (2006). See what you want to see: Motivational influences on visual perception. *Journal of Personality and Social Psychology, 91,* 612–625.

Bargh, J. A., & Chartrand, T. (1999). The unbearable automaticity of being. *American Psychologist, 54,* 462–479.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173–1182.

Baumeister, R. F. (2002). Religion and psychology: Introduction to the special issue. *Psychological Inquiry, 13,* 165–167.

Baumeister, R. F. (2005). The unconscious is alive and well, and friendly too. *Journal of Social and Clinical Psychology, 24,* 293–295.

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). New York: Academic Press.

Bering, J. M. (2003). Towards a cognitive theory of existential meaning. *New Ideas in Psychology, 21,* 101–120.

Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin, 106,* 265–285.

Bornstein, R. F., & D'Agostino, P. R. (1994). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology, 63,* 545–552.

Brown, R. J., & Donderi, D. C. (1986). Dream content and self-reported well-being among recurrent dreamers, past-recurrent dreamers, and non-recurrent dreamers. *Journal of Personality and Social Psychology, 50,* 612–623.

Cann, D. R., & Donderi, D. C. (1986). Jungian personality typology and the recall of everyday and archetypal dreams. *Journal of Personality and Social Psychology, 50,* 1021–1030.

Cartwright, R. D. (1974). Problem solving: Waking and dreaming. *Journal of Abnormal Psychology, 83,* 451–455.

Cavallero, C., & Foulkes, D. (1993). *Dreaming as cognition.* Hertfordshire, England: Harvester Wheatsheaf.

Conway, M., & Ross, M. (1984). Getting what you want by revising what you had. *Journal of Personality and Social Psychology, 47,* 738–748.

Crick, F., & Mitchison, G. (1983, July 14). The function of dream sleep. *Nature, 304,* 111–114.

Dekle, D. J., Leung, D. H. Y., & Zhu, M. (2008). Testing intergroup concordance in ranking experiments with two groups of judges. *Psychological Methods, 13,* 58–71.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006,

February 17). On making the right choice: The deliberation-without-attention effect. *Science, 311,* 1005–1007.

Dijksterhuis, A., Chartrand, T., & Aarts, H. (2007). Effects of priming and perception on social behavior and goal pursuit. In J. Bargh (Ed.), *Social psychology and the unconscious: The automaticity of higher mental processes* (pp. 51–133). New York: Psychology Press.

Dijksterhuis, A., & Meurs, T. (2006). Where creativity resides: The generative power of unconscious thought. *Consciousness and Cognition, 15,* 135–146.

Dijksterhuis, A., & van Olden, Z. (2006). On the benefits of thinking unconsciously: Unconscious thought can increase post-choice satisfaction. *Journal of Experimental Social Psychology, 42,* 627–631.

Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria for preferred and nonpreferred conclusions. *Journal of Personality and Social Psychology, 63,* 568–584.

Ditto, P. H., Munro, G. D., Apanovitch, A. M., Scepansky, J. A., & Lockhart, L. K. (2003). Spontaneous skepticism: The interplay of motivation and expectation in responses to favorable and unfavorable medical diagnoses. *Personality and Social Psychology Bulletin, 29,* 1120–1132.

Ditto, P. H., Scepansky, J. A., Munro, G. D., Apanovitch, A. M., & Lockhart, L. K. (1998). Motivated sensitivity to preference-inconsistent information. *Journal of Personality and Social Psychology, 75,* 53–69.

Domino, G. (1976). Compensatory aspects of dreams: An empirical test of Jung's theory. *Journal of Personality and Social Psychology, 34,* 658–662.

Dunning, D., Meyerowitz, J. A., & Holzberg, A. D. (1989). Ambiguity and self-evaluation: The role of idiosyncratic trait definitions in self-serving assessments of ability. *Journal of Personality and Social Psychology, 57,* 1082–1090.

Epley, N., & Gilovich, T. (2001). Putting adjustment back in the anchoring and adjustment heuristic: Divergent processing of self-generated and experimenter-provided anchors. *Psychological Science, 12,* 391–396.

Epley, N., & Gilovich, T. (2006). The anchoring and adjustment heuristic: Why adjustments are insufficient. *Psychological Science, 17,* 311–318.

Festinger, L., Riecken, H. W., & Schachter, S. (1956). *When prophecy fails: A social psychological study of a modern group that predicted the destruction of the world.* New York: Harper & Row.

Fiore, S. M., & Schooler, J. W. (2002). How did you get here from there? Verbal overshadowing of spatial mental models. *Applied Cognitive Psychology, 16,* 897–909.

Freud, S. (1953). *The interpretation of dreams.* London: Hogarth Press. (Original work published 1900).

Freud, S. (1955). Five lectures on psychoanalysis. In J. Strachey (Ed. & Trans.), *The standard edition of the complete psychological works of Sigmund Freud* (Vol. 11, pp. 3–58). London: Hogarth Press. (Original work published 1910).

Freud, S. (1962). The neuro-psychoses of defense. In J. Strachey (Ed. & Trans.) *The standard edition of the complete works of Sigmund Freud* (Vol. 3, pp. 45–61). London: Hogarth Press. (Original work published 1894).

Gilbert, D. T. (1991). How mental systems believe. *American Psychologist, 46,* 107–119.

Gilovich, T. (1983). Biased evaluation and persistence in gambling. *Journal of Personality and Social Psychology, 44,* 1110–1126.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54,* 493–503.

Greenwald, A. G., Carnot, C. G., Beach, R., & Young, B. (1987). Increasing voting behavior by asking people if they expect to vote. *Journal of Applied Psychology, 72,* 315–318.

Greenwald, A. G., Poehlman, A., Uhlmann, E., & Banaji, M. R. (in press). Understanding and interpreting the Implicit Association Test III: Meta-analysis of predictive validity. *Journal of Personality and Social Psychology.*

Griffin, D. W., & Ross, L. (1991). Subjective construal, social inference, and human misunderstanding. *Advances in Experimental Social Psychology, 24,* 319–359.

Hard, R. (2004). *The Routledge handbook of Greek mythology: Based on H. J. Rose's "Handbook of Greek mythology."* London: Routledge.

Hastorf, A. H., & Cantril, H. (1954). They saw a game: A case study. *Journal of Abnormal Psychology, 49,* 129–134.

Hobson, J. A., & McCarley, R. (1977). The brain as a dream state generator: An activation-synthesis hypothesis of the dream process. *American Journal of Psychiatry, 134,* 1335–1348.

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General, 117,* 371–376.

Jung, C. G. (1974). *Dreams.* Princeton, NJ: Princeton University Press.

Klayman, J., & Ha, Y. W. (1987). Confirmation, disconfirmation, and information in hypothesis testing. *Psychological Review, 94,* 211–228.

Klein, W. M., & Kunda, Z. (1992). Motivated person perception: Constructing justifications for desired beliefs. *Journal of Experimental Social Psychology, 28,* 145–168.

Kruger, J. M., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology, 77,* 1121–1134.

Kruglanski, A. W. (1989). *Lay epistemics and human knowledge: Cognitive and motivational biases.* New York: Plenum Press.

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108,* 480–498.

Lane, S. M., & Schooler, J. W. (2004). Skimming the surface: Verbal overshadowing of analogical retrieval. *Psychological Science, 15,* 715–719.

Langer, E. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32,* 311–328.

Levav, J., & Fitzsimons, G. J. (2006). When questions change behavior: The role of ease of representation. *Psychological Science, 17,* 207–213.

Levin, R., & Nielsen, T. A. (2007). Disturbed dreaming, posttraumatic stress disorder, and affect distress: A review and neurocognitive model. *Psychological Bulletin, 133,* 482–528.

Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology, 37,* 2098–2109.

Maquet, P. (2001, November 2). The role of sleep in learning and memory. *Science, 294,* 1048–1052.

Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98,* 224–253.

Mason, M. F., Norton, M. I., Van Horn, J. D., Wegner, D. M., Grafton, S. T., & Macrae, C. N. (2007, January 19). Wandering minds: The default network and stimulus-independent thought. *Science, 315,* 393–395.

Mazzoni, G. A. L., & Loftus, E. F. (1996). When dreams become reality. *Consciousness and Cognition, 5,* 442–462.

McNamara, P., McLaren, D., Smith, D., Brown, A., & Stickgold, R. (2005). A "Jekyll and Hyde" within: Aggressive versus friendly interactions in REM and non-REM dreams. *Psychological Science, 16,* 130–136.

Merton, R. K. (1948). The self-fulfilling prophecy. *Antioch Review, 8,* 193–210.

Molden, D. C., & Higgins, E. T. (2005). Motivated thinking. In K. Holyoak & B. Morrison (Eds.), *Handbook of thinking and reasoning* (pp. 295–320). New York: Cambridge University Press.

Morwitz, V. G., Johnson, E. J., & Schmittlein, D. (1993). Does measuring intent change behavior? *Journal of Consumer Research, 20,* 46–61.

Murray, H. A. (1938). *Explorations in personality.* New York: Oxford University Press.

Mussweiler, T., & Strack, F. (2000). The use of category and exemplar knowledge in the solution of anchoring and adjustment tasks. *Journal of Personality and Social Psychology, 78,* 1038–1052.

Muzur, A., Pace-Schott, E., & Hobson, J. A. (2002). The prefrontal cortex in sleep. *Trends in Cognitive Sciences, 6,* 475–481.

Nikles, C. D., II, Brecht, D. L., Klinger, E., & Bursell, A. L. (1998). The effect of current-concern and nonconcern-related waking suggestions on nocturnal dream content. *Journal of Personality and Social Psychology, 75,* 242–255.

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review, 108,* 291–310.

Pronin, E., Gilovich, T., & Ross, L. (2004). Objectivity in the eye of the beholder: Divergent perceptions of bias in self versus others. *Psychological Review, 111,* 781–799.

Pronin, E., Wegner, D. M., McCarthy, K., & Rodriguez, S. (2006). Everyday magical powers: The role of apparent mental causation in the overestimation of personal influence. *Journal of Personality and Social Psychology, 91,* 218–231.

Pyszczynski, T., & Greenberg, J. (1987). Toward an integration of cognitive and motivational perspectives on social inference: A biased hypothesis-testing model. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 20, pp. 297–340). San Diego, CA: Academic Press.

Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences, 23,* 877–901.

Ross, L., Lepper, M. R., & Hubbard, M. (1975). Perseverance in self-perception and social perception: Biased attributional processes in the debriefing paradigm. *Journal of Personality and Social Psychology, 32,* 880–892.

Ross, L., & Nisbett, R. E. (1991). *The person and the situation.* New York: McGraw-Hill.

Sanitioso, R., Kunda, Z., & Fong, G. T. (1990). Motivated recruitment of autobiographical memories. *Journal of Personality and Social Psychology, 59,* 229–241.

Schachter, S., & Singer, J. (1962). Cognitive, social and physiological determinants of emotional state. *Psychological Review, 69,* 379–399.

Schucany, W. R., & Frawley, W. H. (1973). A rank test for two group concordance. *Psychometrika, 38,* 249–257.

Schwarz, N., & Bless, H. (1992). Constructing reality and its alternatives: An inclusion/exclusion model of assimilation and contrast effects in social judgment. In L. L. Martin & A. Tesser (Eds.), *The construction of social judgment* (pp. 249–275). Hillsdale, NJ: Erlbaum.

Skinner, B. F. (1948). "Superstition" in the pigeon. *Journal of Experimental Psychology, 38,* 168–172.

Slamecka, N. J., & Graf, P. (1978). The generation effect: Delineation of a phenomenon. *Journal of Experimental Psychology: Human Learning and Memory, 4,* 592–604.

Smallwood, J. M., & Schooler, J. W. (2006). The restless mind. *Psychological Bulletin, 132,* 946–958.

Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. *Advances in Experimental Social Psychology, 24,* 93–159.

Spence, D. P., & Holland, B. (1962). The restricting effects of awareness: A paradox and an explanation. *Journal of Abnormal and Social Psychology, 64,* 163–174.

Stickgold, R. (2005). Sleep-dependent memory consolidation. *Nature, 437,* 1272–1278.

Stickgold, R., & Walker, M. (2004). To sleep, perchance to gain creative insight? *Trends in Cognitive Sciences, 8,* 191–192.

Swann, W. B., Stein-Seroussi, A., & Giesler, R. B. (1992). Why people self-verify. *Journal of Personality and Social Psychology, 62,* 392–401.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103,* 193–210.

Trope, Y., & Liberman, A. (1996). Social hypothesis testing: Cognitive and motivational mechanisms. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 239–270). New York: Guilford Press.

Tversky, A., & Kahneman, D. (1974, September 27). Judgment under uncertainty: Heuristics and biases. *Science, 184,* 1124–1131.

United States Department of Homeland Security. (n.d.). *Threats and protection.* Retrieved March 12, 2008, from http://www.dhs.gov/dhspublic/display?theme=29

Wagner, U., Gais, S., Haider, H., Verleger, R., & Born, J. (2004, January 22). Sleep inspires insight. *Nature, 427,* 352–355.

Wegener, D. T., & Petty, R. E. (1995). Flexible correction processes in social judgment: The role of naive theories in corrections for perceived bias. *Journal of Personality and Social Psychology, 68,* 36–51.

Wegener, D. T., & Petty, R. E. (1997). The flexible correction model: The role of naïve theories of bias in bias correction. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 141–208). New York: Academic Press.

Wegner, D. M., Wenzlaff, R. M., & Kozak, M. (2004). Dream rebound: The return of suppressed thoughts in dreams. *Psychological Science, 15,* 232–236.

Wilson, T. D., & Brekke, N. (1994). Mental contamination and mental correction: Unwanted influences on judgments and evaluations. *Psychological Bulletin, 116,* 117–142.

Wilson, T. D., & Schooler, J. W. (1991). Thinking too much: Introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology, 60,* 181–192.

Wood, J. M., Bootzin, R., Rosenhan, D., Nolen-Hoeksema, S., & Jurden, F. (1992). Effects of the 1989 San Francisco earthquake on frequency and content of nightmares. *Journal of Abnormal Psychology, 101,* 219–224.

Wright, J. C. (1962). Consistency and complexity of response sequences as a function of schedules of noncontingent reward. *Journal of Experimental Psychology, 63,* 601–609.

(*Appendix follows*)

Appendix

Dream Theories

Freudian Theory

"Emotions buried in the unconscious surface in disguised form during dreaming, and the remembered fragments of dreams can help uncover the buried feelings."

Problem-Solving Theory

"Dreams are used to sort out information that is useful for our immediate survival. As such, our dreams can give us useful insights into how to solve problems."

Learning Theory

"Dreams are the brain sorting through the day's information and are used to 'throw out' the unwanted information to prevent the information from becoming jumbled."

By-product Theory

"Dreams are when the brain tries to interpret random impulses from the pons as sensory input, producing the vivid hallucinations we know as dreams."

New Editors Appointed, 2010–2015

The Publications and Communications Board of the American Psychological Association announces the appointment of 4 new editors for 6-year terms beginning in 2010. As of January 1, 2009, manuscripts should be directed as follows:

- *Psychological Assessment* (http://www.apa.org/journals/pas), **Cecil R. Reynolds, PhD,** Department of Educational Psychology, Texas A&M University, 704 Harrington Education Center, College Station, TX 77843.
- *Journal of Family Psychology* (http://www.apa.org/journals/fam), **Nadine Kaslow, PhD,** Department of Psychiatry and Behavioral Sciences, Grady Health System, 80 Jesse Hill Jr. Drive, SE, Atlanta, GA 30303.
- *Journal of Experimental Psychology: Animal Behavior Processes* (http://www.apa.org/journals/xan), **Anthony Dickinson, PhD,** Department of Experimental Psychology, University of Cambridge, Downing Street, Cambridge CB2 3EB, United Kingdom
- *Journal of Personality and Social Psychology: Personality Processes and Individual Differences* (http://www.apa.org/journals/psp), **Laura A. King, PhD,** Department of Psychological Sciences, University of Missouri, McAlester Hall, Columbia, MO 65211.

Electronic manuscript submission: As of January 1, 2009, manuscripts should be submitted electronically via the journal's Manuscript Submission Portal (see the website listed above with each journal title).

Manuscript submission patterns make the precise date of completion of the 2009 volumes uncertain. Current editors, Milton E. Strauss, PhD, Anne E. Kazak, PhD, Nicholas Mackintosh, PhD, and Charles S. Carver, PhD, will receive and consider manuscripts through December 31, 2008. Should 2009 volumes be completed before that date, manuscripts will be redirected to the new editors for consideration in 2010 volumes.