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# Feeling Validated Versus Being Correct: A Meta-Analysis of Selective Exposure to Information

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A meta-analysis assessed whether exposure to information is guided by defense or accuracy motives. The studies examined information preferences in relation to attitudes, beliefs, and behaviors in situations that provided choices between congenial information, which supported participants' pre-existing attitudes, beliefs, or behaviors, and uncongenial information, which challenged these tendencies. Analyses indicated a moderate preference for congenial over uncongenial information ($d = 0.36$). As predicted, this congeniality bias was moderated by variables that affect the strength of participants' defense motivation and accuracy motivation. In support of the importance of defense motivation, the congeniality bias was weaker when participants' attitudes, beliefs, or behaviors were supported prior to information selection; when participants' attitudes, beliefs, or behaviors were not relevant to their values or not held with conviction; when the available information was low in quality; when participants' closed-mindedness was low; and when their confidence in the attitude, belief, or behavior was high. In support of the importance of accuracy motivation, an uncongeniality bias emerged when uncongenial information was relevant to accomplishing a current goal.

*Keywords:* selective exposure, confirmation bias, cognitive dissonance, decision making, self-regulation

The availability of diverse information in an environment does not guarantee that a person's views will be equally diverse. Former United States Vice President Dick Cheney, for example, reportedly requires the television set be tuned into a conservative news channel before he enters a hotel room (The Smoking Gun, 2006). Individuals strongly committed to certain religions often avoid contact with information or people that can tempt them away from their doctrine. For example, science teachers at a public school in Arkansas were prevented from discussing evolution following complaints from religious parents, teachers, and faculty (Wiles, 2006). But what is the extent of people's inclination to receive congenial information? Is there a predominance of exposure to information that confirms pre-existing views? And, if there is such a bias, is it mitigated by factors that highlight the benefits of reaching accurate conclusions? Research on information exposure, which is synthesized in this article, can answer these questions.

Although recent research has carefully analyzed the role of motivated reasoning in creating positive illusions (e.g., Kunda, 1990; Molden & Higgins, 2005), processes that allow access to the truth are just as important. Receiving information that supports one's position on an issue allows people to conclude that their views are correct but may often obscure reality. In contrast, receiving information that contradicts one's view on an issue can cause people to feel misled or ignorant but may allow access to a valid representation of reality. Therefore, understanding how people strive to *feel* validated versus to *be* correct is critical to explicating how they select information about an issue when several alternatives are present. We conducted a meta-analysis of field and laboratory studies on information exposure to shed light on these issues.

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## Selective Exposure: Feeling Validated Versus Knowing the Truth

The classic assumption in selective exposure research is that people are motivated to defend their attitudes, beliefs, and behaviors from challenges (e.g., Festinger, 1957; Olson & Stone, 2005). In attitude theory (e.g., Albarracín, Johnson, & Zanna, 2005; Eagly & Chaiken, 1993; Zanna & Rempel, 1988), *attitude* is defined as the individual's evaluation of an entity (an issue, person, event, object, or behavior; e.g., President Obama); *belief* is defined as an association between an entity and an attribute or outcome (e.g., President Obama is honest); and *behavior* is defined as an overt action performed in relation to an entity (e.g., voting for President Obama). Selective exposure enables people to defend their attitudes, beliefs, and behaviors by avoiding information likely to challenge them and seeking information likely to support them. Selectivity of this type has often been called a *congeniality* bias (e.g., Eagly & Chaiken, 1993, 1998, 2005) but has also been called a *confirmation bias* (e.g., Jonas, Schulz-Hardt, Frey, & Thelen, 2001). In this article, we use the term *congeniality bias*.

Although the idea that selective exposure typically takes the form of a congeniality bias has a history extending back to William James (1890) and even to Francis Bacon (1620/1960), the topic first attained prominence among social psychologists in the context of Festinger's (1957, 1964) theory of cognitive dissonance. According to dissonance theory, after people commit to an attitude, belief, or decision, they gather supportive information and neglect unsupportive information to avoid or eliminate the unpleasant state of postdecisional conflict known as cognitive dissonance. Typically, researchers have tested this *congeniality principle* in a laboratory paradigm in which participants select information from alternatives. Prior to this selection, participants make a decision (e.g., about the guilt of a defendant in a mock trial), form an attitude (e.g., toward a work of art), report an existing attitude (e.g., on abortion), or report a prior behavior (e.g., whether they have smoked). Then participants are given an opportunity to receive information about the same issue (e.g., abortion, smoking) from a list of options usually presented as titles or abstracts of available articles. Typically half of these options support the participant's attitude, belief, or behavior, and the other half contradict it. The researcher records the numbers of chosen articles that agree or disagree with each participant's attitude, belief, or behavior. Selection of more articles that agree and fewer that disagree indicates a *congeniality bias*. Selection of more articles that disagree and fewer that agree indicates an *uncongeniality bias*.

In one of the initial studies testing selective exposure (Adams, 1961), mothers reported their belief that child development was predominantly influenced by genetic or environmental factors and then could choose to hear a speech that advocated either position. Consistent with the congeniality principle, mothers overwhelmingly chose the speech that favored their view on the issue. More recent investigations have used more complex designs to identify the moderators of the congeniality principle. For example, in a study showing that people select more uncongenial information when it is viewed as easy to refute, participants were offered congenial and uncongenial information attributed to either expert or novice sources (Lowin, 1969). Moreover, many studies have included manipulations to study the effects of perceiving that a previously reported decision could be altered (Frey & Rosch, 1984; Lowe & Steiner, 1968) and of challenging initially reported attitudes (Brodbeck, 1956; Frey, 1981b).

As the intensive study of moderators might suggest, Festinger's (1957) assumptions about selective exposure did not receive universal support. In fact, Freedman and Sears's (1965) narrative review revealed that selective exposure appears to be strong when people are exposed to information in natural settings because congenial information predominates in their environment (de facto selective exposure). In contrast, this review indicated that laboratory experiments in which people were free to choose the information were as likely to disconfirm as to confirm the congeniality principle. However, in the mid-1980s, reviewers who took a fresh look at the available research concluded that considerable evidence supported Festinger's theory (Cotton, 1985; Frey, 1986). Specifically, these reviewers argued that selectivity in favor of attitudes, beliefs, and behaviors occurs under some conditions more than others, such as when people possess high (vs. low) commitment to their attitudes. Like Festinger (1957, 1964), these authors also maintained that a congeniality bias is not the only psychological principle regulating information selection. They noted additional principles, which need to be controlled in testing selective exposure, that include preferences for information that is unfamiliar (e.g., Sears, 1965) and information that is useful for making decisions or performing upcoming tasks (e.g., Lowe & Steiner, 1968; for a discussion of these principles, see Wicklund & Brehm, 1976).

To date, only qualitative reviews have examined selective exposure research. Importantly, however, a meta-analysis is the best way to examine whether a congeniality bias exists, as well as its precise size and variability. Our meta-analysis corrects this omission and provides the most inclusive literature coverage to date. In the first available review, Freedman and Sears (1965) analyzed 14 research reports and found little support for the congeniality principle. In subsequent reviews, Cotton (1985) and Frey (1986) examined 29 and 34 research reports, respectively, and concluded that congeniality exists under a variety of circumstances consistent with dissonance theory. Although these past reviews were comprehensive, our meta-analysis includes 21 new research reports that have emerged since 1986. Given the additional research on this topic, it is important to re-examine the issue of selective exposure in light of the most recent evidence. Moreover, reexamining past conclusions is critical because many of the recent studies have assessed selective exposure using novel methods (e.g., Jonas, Greenberg, & Frey, 2003; Lundgren & Prislin, 1998). In conducting this reanalysis, we were also able to examine new moderators and estimate the contribution of motivational factors not examined in earlier reviews.

Given the acknowledged complexities of the determinants of selective exposure, we present a general framework, displayed in Figure 1, of the motivational forces that shape exposure decisions. These motivational forces and their empirical instantiations organize our meta-analysis of the direction, size, and variability of exposure biases. In this framework, information choices are meant to fulfill goals to defend attitudes, beliefs, and behaviors and to accurately appraise and represent reality (Chaiken, Liberman, & Eagly, 1989). By extending our analysis beyond the defense motivation principle central to cognitive dissonance theory (Cotton, 1985; Frey, 1986), we present a framework for understanding

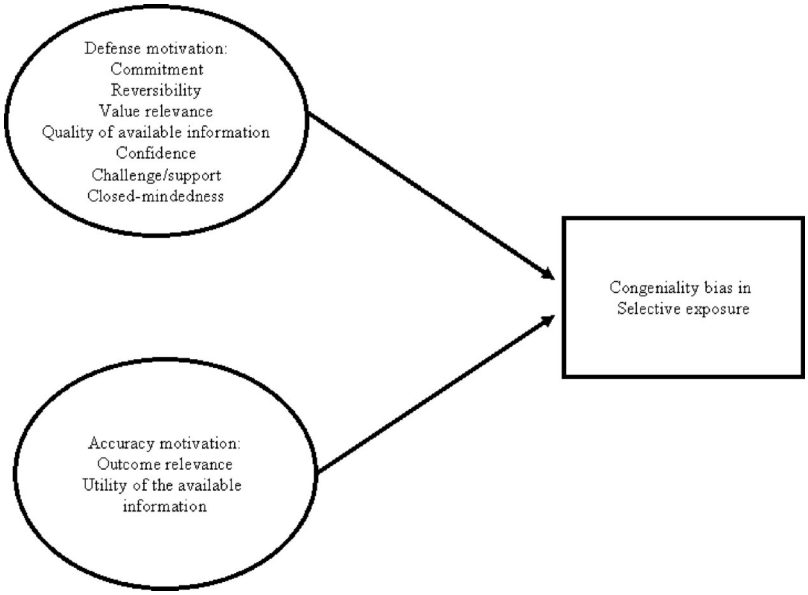


*Figure 1.* The opposing motivations and their concrete instantiations influence exposure to congenial over uncongenial information (congeniality bias).

selective exposure that is broad enough to encompass most empirical findings. In addition to investigating whether defense and accuracy motivations guide selective exposure, our review furthers understanding by examining the relative strength of these motivations.

Defense and accuracy motives have proved to be popular in analyses of how people process attitude-relevant information (Chaiken, Wood, & Eagly, 1996; Eagly, Chen, Chaiken, & Shaw-Barnes, 1999; B. T. Johnson & Eagly, 1989; Prislin & Wood, 2005; Wyer & Albarracín, 2005). In one of the most prominent discussions of motivated information processing, Chaiken et al. (1989) distinguished between defense and accuracy motivation. *Defense motivation* is the desire to defend one's existing attitudes, beliefs, and behaviors; *accuracy motivation* is the desire to form accurate appraisals of stimuli. Although these theorists also proposed a third motive, *impression motivation*, the desire to form and maintain positive interpersonal relations, the research on this aspect of selective exposure does not offer sufficient evidence for a meta-analysis. Even though past research has varied the anonymity of attitudes and selection decisions, such manipulations are uninformative because the effect of anonymity on selective exposure should depend on characteristics of the audience that one intends to impress (Schlenker, 1980; e.g., the congeniality of the audience). In the absence of appropriate manipulations, our meta-analysis focused only on defense and accuracy motivations.

### *Defense Motivation*

In dissonance theory, selective exposure to congenial information is a strategy to relieve or avoid cognitive dissonance, which is the discomfort arising from the heightened presence of dissonant cognitions (Festinger, 1957). This discomfort can arise from the mere presence of cognitive conflict (Beauvois & Joule, 1996; Harmon-Jones, 2000; Harmon-Jones, Brehm, Greenberg, Simon, & Nelson, 1996) or from a self-threat, such as the perception that one is poorly informed (Aronson, 1968; Greenwald & Ronis, 1978; Schlenker, 1980, 2003; Steele, 1988). Presumably, experiencing or anticipating cognitive dissonance motivates people to defend themselves by seeking more congenial than uncongenial information. Hence, factors that enhance the experience or anticipation of cognitive dissonance should strengthen defense motivation and, in turn, accentuate the congeniality bias.

Defense motivation should be stronger when people who just reported an attitude or belief, or engaged in a behavior, receive challenging (vs. supporting) information prior to information selection (Frey, 1986). If people encounter a challenge to recently expressed attitudes, beliefs, or behaviors, their effort to reduce the cognitive conflict may enhance the congeniality bias (Beauvois & Joule, 1996; Festinger, 1964). In one study (Frey, 1981b), participants made a decision about whether to extend the contract of a store manager. Afterwards, participants were asked to read congenial information, uncongenial information, both congenial and uncongenial information, or no information prior to selecting additional reading material. Results revealed that participants manifested an enhanced congeniality bias when they were asked to read uncongenial rather than congenial information prior to this selection.

Another consideration pertains to the quality of the information available for selection. Whereas the selection of high-quality uncongenial information has the potential to threaten individuals, the selection of low-quality uncongenial information does not. Hence, to the degree that defense motivation guides exposure decisions, the presence of apparently high-quality uncongenial information for selection may enhance the congeniality bias (i.e., people will be more likely to avoid such information). Correspondingly, whereas high-quality congenial information can potentially bolster one's pre-existing position, low-quality congenial information may

threaten one's position. Hence, expectations of high-quality congenial information for selection may enhance selection of congenial information as a way of defending a prior view (Festinger, 1964). As a result, regardless of whether information supports or refutes one's own position, expecting high-quality information should enhance the congeniality bias and expecting low-quality information should lessen it (Frey, 1986; Lowin, 1969).

Defense motivation is presumably also strengthened by individuals' commitment to the pre-existing attitude, belief, or behavior and by high relevance of the issue to enduring values. Personal commitment to an attitude, belief, or behavior is presumed to increase defense motivation because of the greater discomfort produced by holding an incorrect view on an important issue (Brehm & Cohen, 1962; Kiesler, 1971). Personal commitment is often conceptualized as feeling highly attached to a view (Kiesler, 1971) or contributing to feeling ownership for a view (i.e., belief possession; see Abelson, 1988). Several factors have been identified that might lead to commitment, such as sacrificing for the view (e.g., dedicating much time or effort to making a decision), freely choosing the view (e.g., forming an attitude without coercion), and explaining the view publicly or privately (e.g., defending a belief in a written essay; for reviews, see Harmon-Jones & Harmon-Jones, 2008; Olson & Stone, 2005). Accordingly, commitment has sometimes been assessed directly by having participants self-report their attachment or loyalty to a view (e.g., Jonas & Frey, 2003b). Moreover, commitment has also been manipulated by leading participants (a) to engage in a behavior under high- or low-choice conditions (e.g., Frey & Wicklund, 1978), (b) to dedicate more or less time or effort to attitude-relevant behavior (e.g., Betsch, Haberstroh, Glöckner, Haar, & Fiedler, 2001), or (c) to justify (e.g., Schwarz, Frey, & Kumpf, 1980) or anticipate having to justify their opinions to an audience (e.g., Canon, 1964; Lowin, 1969; Sears & Freedman, 1965).

Another factor that may affect the strength of defense motivation is the ability to reverse a prior attitude, belief, or behavior (reversibility). On the one hand, reversibility may decrease defense motivation by, for example, reducing attachment to a prior view that is seen as tentative because of its reversibility (Abelson, 1988; Kiesler, 1971). On the other hand, reversibility may increase defense motivation by, for example, increasing thoughts about reasons to change the view and thus increasing the number of dissonant cognitions. As a result, reversibility may either attenuate or accentuate the congeniality bias.

Similarly, defense motivation should be strengthened when attitudes, beliefs, or behaviors are linked to individuals' enduring values (e.g., on the issues of euthanasia or abortion) and therefore promote value-relevant involvement with the issue (B. T. Johnson & Eagly, 1989). Value-relevant involvement with an issue often produces resistance to persuasion and, more generally, defensive processing of issue-relevant information (Chaiken et al., 1996). Hence, tendencies to prefer congenial over uncongenial information should be amplified when issues are high (vs. low) in value relevance (e.g., Festinger, 1964; B. T. Johnson & Eagly, 1989).

Finally, personality differences may affect the extent to which people are motivated to defend their views and behaviors. Closed-minded individuals may view challenging information as threatening, whereas open-minded people may view it as interesting (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950; Altemeyer, 1981, 1998). Consequently, individuals with trait closed-mindedness (i.e., high scores on measures of dogmatism or authoritarianism and high scores on the repression end of the Repression–Sensitization Scale; Byrne, 1964) should manifest a stronger congeniality bias. Furthermore, people who view themselves as incapable of refuting challenging information may be more motivated to proactively guard against such threats (e.g., Albarracín & Mitchell, 2004). If so, the congeniality bias should be more pronounced for individuals with lesser confidence in their attitude, belief, or behavior. Researchers have operationalized confidence by providing bogus positive (vs. negative) feedback about participants' ability to form accurate attitudes, beliefs, or decisions (e.g., Micucci, 1972; Thayer, 1969) or by assessing participants' (a) confidence in their attitude, belief, or behavior (e.g., Berkowitz, 1965; Brechan, 2002; Brodbeck, 1956), (b) chronic anxiety (Frey, Stahlberg, & Fries, 1986), or (c) consistency (vs. inconsistency) among behaviors and beliefs (Feather, 1962).[1]

### *Accuracy Motivation*

Accuracy motivation should promote tendencies to process information in an objective, open-minded fashion that fosters uncovering the truth (Chaiken et al., 1989; Kunda, 1990). One motivational variable linked to accuracy motivation is outcome-relevant involvement (B. T. Johnson & Eagly, 1989), which refers to attitudes, beliefs, and decisions linked to an important outcome. For example, in one study (Jonas & Frey, 2003a), participants made a decision assuming that they would (high outcome relevance) or would not (low outcome relevance) receive a prize for a correct choice. Unlike value-relevant involvement, which heightens defense motivation, outcome-relevant involvement has been shown to foster accuracy concerns and objective processing of available evidence (Albarracín, 2002; Chaiken et al., 1996; B. T. Johnson, 1994; B. T. Johnson & Eagly, 1989; Petty & Wegener, 1998). Therefore, the congeniality bias may be weaker for information about issues with important personal outcomes (high outcome relevance) than for information about issues without such outcomes (low outcome relevance).

Another factor linked to accuracy motivation is information utility, defined as the extent to which information can be used to facilitate good decisions. Accuracy motivation should direct individuals to information of the highest utility regardless of its congeniality and may therefore weaken the congeniality bias. Researchers have manipulated information utility by assigning participants either to debate an issue or to write an essay in support of their attitudes, beliefs, or behaviors (e.g., Canon, 1964; Freedman, 1965b). The expectation of participating in a debate enhances the selection of uncongenial information because accurate knowledge of the opposition's arguments is useful for planning a rebuttal (i.e., uncongenial information is higher in utility than in congenial information; Canon, 1964). In contrast, the expectation of writing a supporting essay enhances the selection of congenial information because this information is useful for preparing an intelligent defense of a current view (i.e., congenial information is higher in utility than uncongenial information; Canon, 1964). Addi-

[1] Although confidence and commitment should exert opposite effects on selective exposure, they may, in practice, go hand-in-hand. Therefore, our predicted effect of confidence assumes that commitment is controlled at a moderate level and our predicted effect of commitment assumes that confidence is controlled at a moderate level.

tionally, accuracy motivation, unlike defense motivation, should direct individuals to information that is of high quality regardless of its congeniality. Therefore, unlike defense motivation, accuracy motivation should reduce the congeniality bias when the uncongenial information is high (vs. low) in quality. Similar to defense motivation, however, accuracy motivation should accentuate the congeniality bias when the congenial information is high (vs. low) in quality.

## The Present Meta-Analysis

Our focus is on the analysis of whether people prefer information that supports pre-existing attitudes, beliefs, and behaviors more than information that challenges pre-existing attitudes, beliefs, and behaviors. Hence, we included studies that measured information selection on the basis of a pre-existing attitude, belief, or behavior. Our search yielded 67 eligible reports of selective exposure, which contained 91 studies incorporating 300 statistically independent groups with a total of just under 8,000 participants. Our synthesis of the selective exposure research had two primary objectives. The first objective was to assess the average magnitude, direction, and variability of selection biases. The second objective was to examine whether moderators related to defense and accuracy motivation (see Figure 1) account for variability in information selection. In general, attempts to defend attitudes, beliefs, or behaviors from attack should accentuate the congeniality bias, whereas attempts to reach accurate conclusions might often attenuate this bias. Other variables were analyzed in an exploratory fashion, including year of publication, source of report, study country, and amount of congenial and uncongenial information available for selection.

## Method

### *Sample of Studies*

To locate studies, we first conducted a computerized search of PsycINFO, Medline, Educational Resources Information Center, Dissertation Abstracts International, Social Science Citation Index, the conference proceedings of the Association for Consumer Research, ComAbstracts (http://www.cios.org), the Foreign Doctoral Dissertations Database of the Center for Research Libraries (http://www.crl.edu), and the databases of the Institute of Psychology Information for the German-Speaking Countries (http://www.zpid.de). The keywords for our search were the following: *selective exposure*, *confirmation bias, congeniality bias, information seeking*, *information avoidance*, *information preference*, *attitude selectivity*, *selective processing*, *post decision changes*, *exposure to information*, *post decision exposure*, *selectivity*, and *information seeking*. Additional keywords included *cognitive dissonance*, *cognitive consistency*, *consonant information*, *dissonant information*, *supportive information*, *nonsupportive information*, *supporting information*, *consistent information*, *inconsistent information*, *decision reversibility*, and *decision irreversibility*.

To supplement these database searches, we examined the reference lists of numerous review articles, chapters, and books discussing selective exposure. In addition, we examined the abstracts of all of the publications by authors of multiple articles on selective exposure. Finally, we contacted researchers to request unpublished data and sent requests to the e-mail lists of the Society for Personality and Social Psychology and the Association for Consumer Research. Our search extended through February 2008.

### *Selection Criteria*

Five criteria determined the selection of studies. These criteria yielded a relatively large set of studies that used a similar methodology.

1. Studies were included if they assessed selective exposure on the basis of prior attitudes, beliefs, and behaviors (including decisions). Studies assessed attitudes and beliefs using self-report rating scales (e.g., agree vs. disagree). Behavior was usually operationalized by (a) a choice made in the session (e.g., choosing to extend a manager's contract; e.g., Frey, 1981b), (b) a self-report of past behavior (e.g., smoking; e.g., Feather, 1962), or (c) a behavior carried out in the experimental session (e.g., playing a computer game; e.g., Betsch et al., 2001). We excluded studies of exposure as a function of mood (e.g., studies of whether people who chronically suffer from a negative mood watch televised news programs less than those who do not suffer from a negative mood; e.g., Anderson, Collins, Schmitt, & Jacobvitz, 1996), psychological disorders (e.g., studies of whether depressed vs. nondepressed people vary in exposure to comedy programs; e.g., Hammen, 1977; Potts & Sanchez, 1994; Raghunathan & Pham, 1999), biological factors (e.g., preferences for different television programs as a function of time of the menstrual cycle; e.g., Meadowcroft & Zillmann, 1987; Potts, Dedmon, & Halford, 1996), demographic variables (e.g., gender differences in reading about achievement-related topics; e.g., Dillman Carpentier, Knobloch, & Zillman, 2003; Knobloch-Westerwick & Hastall, 2006), or personality (e.g., preferences for different types of music as a function of rebelliousness; e.g., Dillman Carpentier et al., 2003).

2. Studies were included if they assessed information selection or preference and were excluded if they pertained to selective interpretation (e.g., Robinson, Keltner, Ward, & Ross, 1995), memory (e.g., Levine & Murphy, 1943), or liking of previously viewed material (e.g., Boden & Baumeister, 1997). Typical assessments of selective exposure compared counts of participants' choices from a list of congenial and uncongenial alternatives (e.g., Fischer, Jonas, Frey, & Schulz-Hardt, 2005; Jonas, Graupmann, & Frey, 2006). In some studies, information selection was assessed by participants' ratings or rankings of their preferences for congenial and uncongenial information (e.g., Brannon, Tagler, & Eagly, 2007; Feather, 1963). Finally, selective exposure was sometimes assessed by the amount of time participants devoted to viewing congenial versus uncongenial information (e.g., Brock & Balloun, 1967; Olson & Zanna, 1979).

3. Studies were included if they arranged choices between congenial and uncongenial information and were excluded if they presented only one-sided information or only neutral information (15 articles; e.g., Behling, 1971; Edeani, 1979; Frey, 1981c; Otis, 1979; Sweeney & Gruber, 1984;

Wellins & McGinnies, 1977). Note that a bias in information selection can only be diagnosed when choices are provided between consonant and dissonant information (Freedman & Sears, 1965). For example, finding that voters who supported Nixon (vs. those who did not) paid less attention to anti-Nixon information does not necessarily imply a congeniality bias if these same voters also pay less attention to the news in general (Sweeney & Gruber, 1984). On the basis of this criterion, we also excluded studies on positive hypothesis testing, which examine whether individuals tend to select more *questions* that are consistent than those that are inconsistent with a prior belief (e.g., Johnston, 1996). For example, research in this tradition might ask participants to test whether someone is an extravert by selecting questions to ask to this person. Some of these questions might confirm the hypothesis (e.g., Do you enjoy parties?), whereas others might disconfirm it (e.g., Do you enjoy spending time alone?). Selecting more confirming than disconfirming questions has been termed *positive hypothesis testing* and is distinguished from the congeniality bias examined in research on selective exposure. Specifically, questions testing a hypothesis can sometimes provide disconfirming answers, thus departing from a direct choice of congenial or uncongenial *information* (Klayman & Ha, 1987).

4. Studies were included if they focused on an individual's information seeking and were excluded if they focused on a group's information seeking (Schulz-Hardt, Frey, Luthgens, & Moscovici, 2000).

5. Finally, studies were excluded if they lacked adequate statistics (e.g., $F$ ratios, frequencies, and $p$ values) for calculating an effect size representing the difference in exposure to congenial and uncongenial information (7 articles; e.g., Donohew, Parker, & McDermott, 1972).

### *Partitioning of Studies, Calculation of Effect Sizes, and Analytical Considerations*

Results were often partitioned into experimental conditions or samples of participants. Whenever possible, effect sizes were computed according to the conceptually important moderators discussed by the researcher even when this partitioning did not reflect our hypothesized moderators (e.g., unlimited vs. limited choices of information to receive; Fischer et al., 2005). This procedure allowed us to analyze the overall sample of effect sizes without assuming equality in effect sizes across the levels of moderators that were of interest to the researcher (see Table 1).[2]

After completing the coding, we calculated effect sizes ($g$) representing selective exposure from means and standard deviations, proportions or frequencies, $F$ ratios, $t$ tests, and correlations. When a report included means (e.g., ratings of interest in the information), we calculated $g$ by subtracting the mean ratings of the uncongenial information from the mean ratings of the congenial information and dividing by the pooled standard deviation. From other documents, $g$ was estimated from $t$ tests or $F$ ratios. For proportions, an odds or an odds ratio was calculated. When there was a mutually exclusive choice between congenial and uncongenial information (i.e., selecting a congenial article meant not selecting an uncongenial article), the odds of selecting congenial information were calculated by dividing the proportion of participants choosing congenial information by the proportion choosing uncongenial information. When there were independent choices of congenial and uncongenial information, we calculated separate odds and then an odds ratio by dividing the odds for congenial information by the odds for uncongenial information. To produce $g$, we divided the log of the odds or the odds ratio by 1.81 (Haddock, Rindskopf, & Shadish, 1998; Hasselblad & Hedges, 1995). All $g$s were converted to $d$s to correct for sample size bias (Hedges & Olkin, 1985). Positive $d$s indicate greater selection of congenial information, negative $d$s indicate greater selection of uncongenial information, and zero indicates the absence of bias.

We used Hedges and Olkin's (1985) procedures to calculate weighted mean effect sizes and effect sizes ($d$) and to estimate a homogeneity statistic ($Q$). $Q$ has a distribution similar to a chi-square with $k - 1$ degrees of freedom, where $k$ is the number of effect sizes, and indicates whether the variance in effect sizes is no greater than sampling error. When a $d$ implied a within-subject comparison (e.g., between mean ratings of congenial and uncongenial information), the correlation between the two measures could be used to calculate the between-subjects variance in the statistic (Morris, 2000). We estimated this correlation ($r = .27$) using procedures suggested by Seignourel and Albarracín (2002) and then calculated the variance of the effect sizes using this

[2] Partitioning studies in this way (vs. partitioning studies only on the basis of moderators of interest) allows a single study to contribute more than one effect size (e.g., each condition or subsample within a study contributes an effect size). Although such subsamples within the studies of a meta-analysis are assumed to be statistically independent (e.g., Lipsey & Wilson, 2001; Raudenbush & Bryk, 2002), some researchers have suggested that subsamples from the same study may share minor statistical dependencies even though the participants are different (see Wolf, 1990). For this reason, we re-analyzed our data after partitioning studies on the basis of the moderators of interest only. Essentially, this procedure involved averaging effect sizes across moderators (not of interest) within a single study to reduce the number of effect sizes coming from that study (potential dependence). Of note, this change in partitioning procedure reduced the number of effect sizes to 211 (i.e., 70% of the original sample of 300). A majority of this decrease in the number of effect sizes (i.e., 89) can be attributed to only six papers (i.e., 40 effect sizes, or 45% of the decrease; Fischer et al., 2005, 2008; Frey, 1982, 1981a, 1981b; Frey & Wicklund, 1978), in which moderators were not directly relevant to our theoretical framework (e.g., limited vs. unlimited searches) or had additional levels of one of our moderator of interest (e.g., high, moderate, or low levels of challenge). This more conservative partitioning procedure did not alter the pattern of our reported results for the moderator analyses.

To directly verify that our liberal partitioning strategy did not reduce the statistical independence of the effect sizes, we estimated the sampling error (see Lipsey & Wilson, 2001) for the effect sizes partitioned on only the moderators of interest (211 effect sizes; conservative partitioning strategy) and then for the effect sizes partitioned on the basis of the moderators used in the studies (300 effect sizes; liberal partitioning strategy). If the sampling error for the 211 effect sizes is larger than the sampling error for the 300 effect sizes, then the liberal (vs. conservative) partitioning procedure may have introduced dependencies in the data. Contrary to this possibility, however, the sampling error estimates were almost identical and thus suggested similar statistical independence. In fact, the sampling error for the sample of 211 (vs. 300) effect sizes was estimated to be slightly smaller (compare $v_\theta = 0.23$ vs. 0.24).

imputed correlation.[3] When *d* implied a between-subjects comparison, we used Hedges and Olkin's (1985) procedures to calculate the between-subjects variance in the statistic.

In the absence of homogeneity, we examined whether our moderators, entered alone and jointly with other moderators, accounted for variability among effect sizes using both fixed-effects and random-effects models.[4,5] In addition, we examined whether the effects of the moderators replicated, using only effect sizes that derived from studies that measured or manipulated the moderator variable of interest. Because these analyses relied on a smaller number of cases, we present only univariate analyses conducted with fixed- and random-effects models. Such analyses ensure that the effects of moderators are not due to uncontrolled differences across studies. We analyzed the effects of the moderators on selective exposure using analysis of variance. In this type of analysis, the inverse of the variance of the effect size being predicted is used as a weight, and the significance of the moderators of interest is determined by examining the significance of the $Q_{B,}$ which is a sums of squares value comparable to an *F* ratio but distributed similarly to a chi-square with $l - 1$ degrees of freedom, where $l$ is the number of levels of the moderator. $Q_B$s were obtained to test for the main and simple effects of the moderator variable on selective exposure.

### *Moderators*

Potential moderators were independently coded by two of the authors with adequate agreement (average kappa = .79; all kappas > .70). Disagreements were resolved by discussion with a third author.

For descriptive purposes, we recorded (a) year of publication; (b) publication form (journal article, unpublished dissertation or thesis, or other unpublished document); (c) participant population (university students, high school students, other, or mixed); (d) country where the study was conducted (United States/Canada, Germany, Australia, or Italy); (e) research setting (laboratory or field); (f) type of issue used in the study (e.g., politics, religion and morality, game play, betting and buying behavior, or personal health and development); (g) artificiality of issue (artificial, e.g., a hypothetical hiring decision, or real, e.g., abortion); (h) breadth of issue (broad, e.g., euthanasia, or narrow, e.g., decision about the guilt of a particular defendant); (i) exposure measure (choice of information to receive, rating of information preference, or ranking of information preference); (j) amount of congenial and uncongenial information offered for selection (number of congenial choices and number of uncongenial choices in the selection array); (k) psychological predictor used in the research (attitude, belief, or behavior); (l) the anonymity of the attitude, belief, and choice (anonymous or not anonymous); and (m) the novelty of the congenial and uncongenial information offered for selection (familiar or novel).

### *Coding of Potential Motivational Moderators*

To examine the motivational determinants of selective exposure, we coded several variables with potential motivational properties (see Figure 1).

*Defense motivation.* In some studies, participants' pre-existing attitudes, beliefs, and behaviors were challenged or supported prior to the information selection by learning that their decision was poor (vs. smart; e.g., Frey, 1982), hearing that their attitude was a minority (vs. majority) position (e.g., Nemeth & Rogers, 1996), and receiving more or less challenging (vs. supporting) information (e.g., Berkowitz, 1965). We coded *challenge or support* received prior to information selection as *challenge* (i.e., more uncongenial than congenial information received), *no challenge or support* (i.e., neither congenial nor uncongenial information received or equal amounts of congenial and uncongenial information received), or *support* (i.e., more congenial than uncongenial information received).

Also, we coded the *quality of the available information* presented for selection as *high* when the presumed source of the information was an expert on the topic (e.g., a scientist) and *low* when the presumed source was a novice or a peer (e.g., in a financial decision, high for an economics professor and low for a 15-year-old student or a passerby on the street; Frey, 1981b). When the source was neither clearly high nor clearly low in expertise (e.g., a newspaper columnist or magazine writer), quality was coded as *moderate.*

We coded participants' *commitment to their pre-existing attitude, belief, or behavior* as *high, moderate,* or *low.* Commitment was high if the participants (a) justified (e.g., Jonas & Frey, 2003a; Schwarz et al., 1980) or anticipated having to justify (Canon, 1964; Janis & Rausch, 1970; Lowin, 1969) an attitude, belief, or behavior to an audience; (b) freely spent a relatively large amount of time or effort on a given behavior (e.g., playing a game; Betsch et al., 2001; smoking; Brock, 1965; writing random numbers, Frey & Wicklund, 1978); (c) engaged in sequential information searches (Jonas, Graupmann, & Fischer, 2003), which are known to enhance commitment to the decision (Jonas, Schulz-Hardt, & Frey, 2001); (d) thought about their own death (Jonas, Greenberg, & Frey, 2003; Lavine, Lodge, & Freitas, 2005), which is known to

(*text continues on page 573*)

[3] Because of a limited number of reports containing the statistics required to compute this correlation, we also calculated the variance of within-subject effect sizes using three different correlations between the preferences for congenial and uncongenial information to reflect extreme correlations ($r$ = .00 and $r$ = .99) and moderate ones ($r$ = .50; see also Albarracín, Gillette, et al., 2005; Albarracín et al., 2003). Notably, the results were very similar across these various correlations, so we present only the ones with the imputed correlation (see also Albarracín et al., 2003, 2005).

[4] Although fixed-effects models are "mixed" models (Raudenbush & Bryk, 2002), we chose to retain traditional meta-analytic terminology.

[5] In the case of a fixed-effects model, one assumes a fixed population effect size and estimates its sampling variance, which is an inverse function of the sample size of each group. As a result, effect sizes generated from larger samples are considered to be more precise estimates of the fixed effect size and hence are weighted more heavily than effect sizes obtained from smaller samples. In contrast, random-effects models assume that effect sizes are sampled from a population of effect sizes. Hence, an effect size results from sampling an effect size at random (from a population of values) in addition to measurement error, which is an inverse function of the sample size. Because random-effects models account for these two sources of error in an effect size, they yield a larger error term and less statistical power than do fixed-effects procedures. However, one of the benefits of the random-effects model (vs. the fixed-effects model) is the ability to generalize its results to a broader universe of studies.

Table 1
*All Included Studies, Effect Sizes, and Moderator Values (Levels)*

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adams (1961) | | | | | | | | | | | | | |
| Heard congenial speech | 0.71 | Support | H | H | H | Reversible | H | M | H | H | No goal | No goal | Equal |
| Heard uncongenial speech | 0.55 | Challenge | H | H | H | Reversible | H | M | H | H | No goal | No goal | Equal |
| Berkowitz (1965) | | | | | | | | | | | | | |
| Support | −1.50 | Support | L | L | M | Irreversible | H | M | H | L | No goal | No goal | Equal |
| Moderate dissonance | −0.85 | Challenge | L | L | M | Irreversible | H | M | H | L | No goal | No goal | Equal |
| Strong dissonance | 1.04 | Challenge | L | L | M | Irreversible | H | M | L | L | No goal | No goal | Equal |
| Betsch et al. (2001) | | | | | | | | | | | | | |
| Strong routine, familiar task | 1.04 | No | M | M | H | Reversible | L | M | H | L | H | H | Equal |
| Weak routine, familiar task | 0.61 | No | M | M | M | Reversible | L | M | H | L | H | H | Equal |
| Strong routine, new task | −0.28 | No | M | M | H | Reversible | L | M | M | L | H | H | Equal |
| Weak routine, new task | 0.46 | No | M | M | M | Reversible | L | M | M | L | H | H | Equal |
| Bosotti (1984) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Low-quality information | 0.40 | No | L | L | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| High-quality information | 0.38 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Study 2 | | | | | | | | | | | | | |
| Low-quality information | −0.26 | No | L | L | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| High-quality information | 0.70 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Brannon et al. (2007) | | | | | | | | | | | | | |
| Study 1a | 0.72 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Study 1b | 0.73 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Study 2 | 0.49 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Brechan (2002) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| High confidence | 1.72 | No | M | M | M | Irreversible | H | M | H | L | No goal | No goal | Equal |
| Low confidence | 1.07 | No | M | M | M | Irreversible | H | M | L | L | No goal | No goal | Equal |
| Study 2 | | | | | | | | | | | | | |
| High confidence | 1.79 | No | M | M | M | Irreversible | H | M | H | L | No goal | No goal | Equal |
| Low confidence | 0.99 | No | M | M | M | Irreversible | H | M | L | L | No goal | No goal | Equal |
| Brock (1965) | | | | | | | | | | | | | |
| Low commitment, smoker | 0.53 | No | M | M | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Low commitment, nonsmoker | 0.01 | No | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| High commitment, smoker | 3.32 | No | M | M | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| High commitment, nonsmoker | 2.24 | No | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Brock et al. (1970) | | | | | | | | | | | | | |
| New information, high commitment | 0.81 | No | H | H | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| New information, less commitment | −0.09 | No | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Old information, high commitment | −0.17 | No | H | H | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Old information, less commitment | 0.30 | No | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brock & Balloun (1967) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Smoker | 0.74 | No | H | H | H | Irreversible | L | M | M | H | H | H | Equal |
| Nonsmoker | 0.18 | No | H | H | M | Irreversible | L | M | M | L | H | H | Equal |
| Study 2 | | | | | | | | | | | | | |
| Smoker | 0.86 | No | H | H | H | Irreversible | L | M | M | H | H | H | Equal |
| Nonsmoker | 0.11 | No | H | H | M | Irreversible | L | M | M | L | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Smoker | 0.99 | No | H | H | H | Irreversible | L | M | M | H | H | H | Equal |
| Nonsmoker | −0.06 | No | H | H | M | Irreversible | L | M | M | L | H | H | Equal |
| Study 4 | | | | | | | | | | | | | |
| Smoker | 1.21 | No | H | H | H | Irreversible | L | M | M | H | H | H | Equal |
| Nonsmoker | 0.42 | No | H | H | M | Irreversible | L | M | M | L | H | H | Equal |
| Brodbeck (1956) | | | | | | | | | | | | | |
| Challenge, decrease in confidence | −0.37 | Challenge | L | L | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| Challenge, no decrease in confidence | −0.70 | Challenge | L | L | M | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Support | −0.97 | Support | L | L | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Canon (1964) | | | | | | | | | | | | | |
| Debate goal, high confidence | −0.55 | No | M | M | H | Irreversible | L | M | H | L | H | H | Uncongenial |
| Debate goal, low confidence | 0.23 | No | M | M | H | Irreversible | L | M | L | L | H | H | Uncongenial |
| Expression goal, high confidence | 0.32 | No | M | M | H | Irreversible | L | M | H | L | H | H | Congenial. |
| Expression goal, low confidence | 1.14 | No | M | M | H | Irreversible | L | M | L | L | H | H | Congenial |
| Canon & Matthews (1972) | | | | | | | | | | | | | |
| Nonsmoker, low concern for health | 0.16 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Nonsmoker, high concern for health | 0.52 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Smoker, low concern for health | −0.06 | No | H | H | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Smoker, high concern for health | 0.89 | No | H | H | H | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Clarke & James (1967) | | | | | | | | | | | | | |
| Expect debate | 0.47 | No | M | M | M | Irreversible | H | M | M | L | H | H | Uncongenial |
| Expect discussion | 0.31 | No | M | M | M | Irreversible | H | M | M | L | H | H | Equal |
| Cotton & Hieser (1980) | | | | | | | | | | | | | |
| Low choice | 1.04 | No | M | M | M | Reversible | H | M | H | L | No goal | No goal | Equal |
| High choice | 0.17 | No | M | M | L | Reversible | H | M | H | L | No goal | No goal | Equal |
| Ehrlich et al. (1957) | | | | | | | | | | | | | |
| New car owners | 0.95 | No | M | M | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Old car owners | 0.63 | No | M | M | H | Irreversible | L | M | H | H | No goal | No goal | Equal |
| Feather (1962) | | | | | | | | | | | | | |
| Smoker, congenial beliefs | −0.78 | No | M | M | H | Irreversible | L | M | H | H | No goal | No goal | Equal |
| Smoker, uncongenial beliefs | 0.39 | No | M | M | H | Irreversible | L | M | L | H | No goal | No goal | Equal |
| Nonsmoker, uncongenial beliefs | −0.39 | No | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Nonsmoker, congenial beliefs | 0.26 | No | M | M | M | Irreversible | L | M | H | L | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feather (1963) | | | | | | | | | | | | | |
| Smoker | 0.06 | No | M | M | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Nonsmoker | −0.12 | No | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Feather (1969) | | | | | | | | | | | | | |
| High dogmatism, old information | 1.22 | No | H | H | M | Irreversible | H | H | M | L | No goal | No goal | Equal |
| High dogmatism, new information | 1.40 | No | H | H | M | Irreversible | H | H | M | L | No goal | No goal | Equal |
| Low dogmatism, old information | 0.41 | No | H | H | M | Irreversible | H | L | M | L | No goal | No goal | Equal |
| Low dogmatism, new information | 0.18 | No | H | H | M | Irreversible | H | L | M | L | No goal | No goal | Equal |
| Fischer et al. (2005) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| No restrictions | −0.20 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Lower limit restrictions | −0.07 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Upper limit restrictions | 1.00 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Specific restrictions | 1.65 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Study 2 | | | | | | | | | | | | | |
| Restricted, no scarcity cue | 2.43 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Restricted, scarcity cue | 1.61 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Unrestricted, no scarcity cue | 0.66 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Unrestricted, scarcity cue | 1.77 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Restricted, load | −0.34 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Restricted, no load | 2.22 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Unrestricted, no load | −0.01 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Unrestricted, load | 0.08 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Study 4 | | | | | | | | | | | | | |
| Restricted, before | 0.55 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Restricted, after | 0.71 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Unrestricted, before | −0.07 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Unrestricted, after | 0.08 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Fischer et al. (2008) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Two pieces of information | −0.39 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Ten pieces of information | 0.46 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Study 2 | | | | | | | | | | | | | |
| Two pieces of information | −0.29 | No | M | M | H | Reversible | H | M | M | H | H | H | Equal |
| Four pieces of information | 0.65 | No | M | M | H | Reversible | H | M | M | H | H | H | Equal |
| Ten pieces of information | 0.85 | No | M | M | H | Reversible | H | M | M | H | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Two pieces of information with content cues | −0.41 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Ten pieces of information with content cues | 1.06 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Two pieces of information, no content cues | −0.31 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Ten pieces of information, no content cues | −0.01 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Study 4 | | | | | | | | | | | | | |
| Two pieces of information, no focus | −0.44 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Ten pieces of information, no focus | 0.78 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Two pieces of information, quality focus | 0.48 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Ten pieces of information, quality focus | 0.68 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Two pieces of information, direction focus | −1.29 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Ten pieces of information, direction focus | −0.20 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Freedman (1965a) | | | | | | | | | | | | | |
| Positive interview | −1.49 | No | H | H | M | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Negative interview | −1.44 | No | H | H | M | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Freedman (1965b) | | | | | | | | | | | | | |
| Low confidence, expression goal | 0.35 | No | M | M | H | Irreversible | L | M | L | L | H | H | Congenial |
| Low confidence, debate goal | −0.29 | No | M | M | H | Irreversible | L | M | L | L | H | H | Uncongenial |
| Low confidence, no goal | 0.04 | No | M | M | M | Irreversible | L | M | L | L | No goal | No goal | Equal |
| High confidence, expression goal | 0.34 | No | M | M | H | Irreversible | L | M | H | L | H | H | Congenial |
| High confidence, debate goal | −0.27 | No | M | M | H | Irreversible | L | M | H | L | H | H | Uncongenial |
| High confidence, no goal | 0.04 | No | M | M | M | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Frey (1981a)[a] | | | | | | | | | | | | | |
| Information costs, 7 | 0.14 | No | M | M | M | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information costs, 15 | 0.72 | No | M | M | M | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information costs, 25 | 0.64 | No | M | M | H | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information costs, 33 | 0.62 | No | M | M | H | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information free, 7 | 0.22 | No | M | M | M | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information free, 15 | 0.78 | No | M | M | M | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information free, 25 | −0.25 | No | M | M | H | Reversible | H | M | L | L | No goal | No goal | Equal |
| Information free, 33 | −0.18 | No | M | M | H | Reversible | H | M | L | L | No goal | No goal | Equal |
| Frey (1981b) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| High-quality congenial, high-quality uncongenial | 0.50 | No | H | H | H | Irreversible | L | M | M | L | H | L | Congenial |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low-quality congenial, high-quality uncongenial | −0.07 | No | L | H | H | Irreversible | L | M | M | L | L | L | Equal |
| High-quality congenial, low-quality uncongenial | 0.23 | No | H | L | H | Irreversible | L | M | M | L | H | L | Congenial |
| Low-quality congenial, low-quality uncongenial | 0.07 | No | L | L | H | Irreversible | L | M | M | L | L | L | Equal |
| Study 2 | | | | | | | | | | | | | |
| High-quality congenial, high-quality uncongenial | 0.58 | No | H | H | M | Irreversible | H | M | M | H | H | H | Equal |
| Low-quality congenial, high-quality uncongenial | −0.01 | No | L | H | M | Irreversible | H | M | M | H | H | H | Equal |
| High-quality congenial, low-quality uncongenial | 0.69 | No | H | L | M | Irreversible | H | M | M | H | H | H | Equal |
| Low-quality congenial, low-quality uncongenial | 0.24 | No | L | L | M | Irreversible | H | M | M | H | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Unlimited, no information | 0.40 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Unlimited, uncongenial information | 0.54 | Challenge | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Unlimited, congenial information | −0.23 | Support | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Unlimited, both congenial and uncongenial information | 0.21 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Limited, no information | 0.91 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Limited, uncongenial information | 0.44 | Challenge | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Limited, congenial information | −0.04 | Support | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Limited, both congenial and uncongenial information | 0.36 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Frey (1982) | | | | | | | | | | | | | |
| High gain | 0.74 | Support | M | M | H | Reversible | L | M | H | H | H | H | Equal |
| Moderate gain | 0.76 | Support | M | M | H | Reversible | L | M | H | H | H | H | Equal |
| Low gain | 1.26 | Support | M | M | H | Reversible | L | M | H | H | H | H | Equal |
| Low loss | 0.72 | Challenge | M | M | H | Reversible | L | M | L | H | H | H | Equal |
| Moderate loss | −0.18 | Challenge | M | M | H | Reversible | L | M | L | H | H | H | Equal |
| High loss | −0.72 | Challenge | M | M | H | Reversible | L | M | L | H | H | H | Equal |
| Frey & Rosch (1984) | | | | | | | | | | | | | |
| Reversible, old information | 0.72 | No | H | H | L | Reversible | L | M | M | L | L | L | Equal |
| Reversible, new information | 0.15 | No | H | H | L | Reversible | L | M | M | L | H | H | Equal |
| Irreversible, old information | 0.73 | No | H | H | H | Irreversible | L | M | M | L | L | L | Equal |
| Irreversible, new information | 1.19 | No | H | H | H | Irreversible | L | M | M | L | H | H | Equal |
| Frey & Stahlberg (1986; Study 1) | | | | | | | | | | | | | |
| Congenial information | 0.18 | Support | H | H | H | Irreversible | H | M | H | L | No goal | No goal | Equal |
| No information | 0.65 | No | H | H | H | Irreversible | H | M | M | L | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frey et al. (1986) | | | | | | | | | | | | | |
| High anxiety, low score | 1.32 | No | H | H | H | Reversible | H | H | L | L | No goal | No goal | Equal |
| High anxiety, high score | −0.07 | No | H | H | H | Reversible | H | H | L | L | No goal | No goal | Equal |
| Low anxiety, low score | 0.50 | No | H | H | H | Reversible | H | H | H | L | No goal | No goal | Equal |
| Low anxiety, high score | 0.31 | No | H | H | H | Reversible | H | H | H | L | No goal | No goal | Equal |
| Frey & Wicklund (1978) | | | | | | | | | | | | | |
| No choice, restricted search | −0.07 | No | H | H | L | Irreversible | L | M | L | L | No goal | No goal | Equal |
| No choice, restricted search | 0.47 | No | H | H | L | Irreversible | L | M | L | L | No goal | No goal | Equal |
| No choice, unrestricted search | 0.14 | No | H | H | L | Irreversible | L | M | L | L | No goal | No goal | Equal |
| No choice, restricted search | −0.40 | No | H | H | L | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Choice, restricted search | 0.72 | No | H | H | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Choice, restricted search | 1.53 | No | H | H | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Choice, unrestricted search | 0.50 | No | H | H | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Choice, restricted search | 0.60 | No | H | H | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Hillis & Crano (1973) | | | | | | | | | | | | | |
| Strong pro-choice attitude, pro-choice talk | 1.12 | No | H | H | H | Irreversible | H | M | H | L | H | L | Congenial |
| Pro-choice attitude, pro-choice talk | 0.83 | No | H | H | M | Irreversible | H | M | M | L | H | L | Congenial |
| Strong pro-life attitude, pro-choice talk | −0.51 | No | H | H | H | Irreversible | H | M | H | L | L | H | Uncongenial |
| Pro-life attitude, pro-choice talk | 0.00 | No | H | H | M | Irreversible | H | M | M | L | L | H | Uncongenial |
| Strong pro-life attitude, pro-life talk | 0.73 | No | H | H | H | Irreversible | H | M | H | L | H | L | Congenial |
| Pro-life attitude, pro-life talk | 0.73 | No | H | H | M | Irreversible | H | M | M | L | H | L | Congenial |
| Strong pro-choice attitude, pro-life talk | −1.26 | No | H | H | H | Irreversible | H | M | H | L | L | H | Uncongenial |
| Pro-choice attitude, pro-life talk | −1.26 | No | H | H | M | Irreversible | H | M | M | L | L | H | Uncongenial |
| Holton & Pyszczynski (1989) | | | | | | | | | | | | | |
| Study 1 | 1.30 | No | H | H | H | Reversible | H | M | M | L | No goal | No goal | Equal |
| Janis & Rausch (1970) | | | | | | | | | | | | | |
| Refused to sign quickly | −0.70 | No | M | M | M | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Refused to sign | −0.74 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Might sign | 0.30 | No | M | M | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| Have signed | −0.14 | No | M | M | H | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Jecker (1964) | | | | | | | | | | | | | |
| Moderate commitment | 0.54 | No | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Low commitment | 0.10 | No | H | H | L | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Jonas & Frey (2003a) | | | | | | | | | | | | | |
| German Mark | −0.25 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Euro | 0.35 | No | H | H | L | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Jonas & Frey (2003b) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Personal, friendly atmosphere | 0.24 | No | H | H | H | Reversible | L | M | M | L | H | H | Equal |
| Personal, business atmosphere | 0.63 | No | H | H | H | Reversible | L | M | M | L | H | H | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advisor, friendly atmosphere | −0.08 | No | H | H | H | Reversible | L | M | M | H | H | H | Equal |
| Advisor, business atmosphere | 0.10 | No | H | H | H | Reversible | L | M | M | H | H | H | Equal |
| Study 2 | | | | | | | | | | | | | |
| Personal | 0.36 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Advisor | −0.13 | No | H | H | M | Reversible | L | M | M | H | H | H | Equal |
| Jonas, Frey, et al. (2001) | | | | | | | | | | | | | |
| Support, verbal justification | 0.35 | Support | H | H | H | Reversible | L | M | H | L | H | H | Equal |
| Challenge, verbal justification | 0.11 | Challenge | H | H | H | Reversible | L | M | L | L | H | H | Equal |
| Support and challenge, verbal justification | 0.40 | No | H | H | H | Reversible | L | M | M | L | H | H | Equal |
| Support, no verbal justification | −0.19 | Support | H | H | M | Reversible | L | M | H | L | H | H | Equal |
| Challenge, no verbal justification | 0.32 | Challenge | H | H | M | Reversible | L | M | L | L | H | H | Equal |
| Support and challenge, no verbal justification | −1.16 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Jonas, Graupmann, & Fischer (2003) | | | | | | | | | | | | | |
| Low party awareness, low relevance | 0.57 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Low party awareness, high relevance | 2.18 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| High party awareness, low relevance | 0.50 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| High party awareness, high relevance | 0.82 | No | H | H | H | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Jonas et al. (2006) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Positive mood | −0.01 | No | H | H | H | Reversible | L | M | H | L | H | H | Equal |
| Negative mood | 0.85 | No | H | H | H | Reversible | L | M | L | L | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Positive mood | 0.26 | No | H | H | H | Reversible | L | M | H | L | H | H | Equal |
| Neutral mood | 0.64 | No | H | H | H | Reversible | L | M | M | L | H | H | Equal |
| Negative mood | 0.89 | No | H | H | H | Reversible | L | M | L | L | H | H | Equal |
| Jonas, Greenberg, et al. (2003) | | | | | | | | | | | | | |
| Mortality salience, worldview issue | 1.50 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Control, worldview issue | 0.73 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Mortality salience, fictitious issue | −0.02 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Control, fictitious issue | 0.28 | No | H | H | M | Reversible | L | M | M | L | H | H | Equal |
| Jonas, Schulz-Hardt, & Frey (2001) | | | | | | | | | | | | | |
| Sequential | 2.56 | No | H | H | H | Reversible | H | M | M | H | No goal | No goal | Equal |
| Simultaneous | 1.28 | No | H | H | M | Reversible | H | M | M | H | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jonas et al. (2005) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Decision maker for self | 2.24 | No | M | M | M | Reversible | L | M | M | H | H | H | Equal |
| Advisor as recommender (nonbinding) | 0.76 | No | M | M | M | Reversible | L | M | M | H | H | H | Equal |
| Advisor as decision maker (binding) | 2.76 | No | M | M | H | Reversible | L | M | M | H | H | H | Equal |
| Study 2 | | | | | | | | | | | | | |
| No meeting, recommendation | 0.78 | No | M | M | M | Reversible | L | M | M | H | H | H | Equal |
| Meeting, recommendation | 0.84 | No | M | M | H | Reversible | L | M | M | H | H | H | Equal |
| No meeting, decision maker | −0.81 | No | M | M | M | Reversible | L | M | M | H | H | H | Equal |
| Meeting, decision maker | 1.14 | No | M | M | H | Reversible | L | M | M | H | H | H | Equal |
| Jonas, Schulz-Hardt, Frey, & Thelen (2001) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Simultaneous search | 0.40 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Sequential search | 1.25 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Study 2 | | | | | | | | | | | | | |
| Simultaneous–simultaneous focus | 0.56 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Simultaneous–sequential focus | 0.40 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Sequential–simultaneous focus | 0.90 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Sequential–sequential focus | 1.84 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Study 3 | | | | | | | | | | | | | |
| Sequential search | 0.91 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Study 4 | | | | | | | | | | | | | |
| Sequential–control focus | 1.40 | No | H | H | H | Reversible | H | M | M | H | H | H | Equal |
| Simultaneous–control focus | 0.43 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Sequential–information focus | 0.46 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Simultaneous–information focus | 0.50 | No | H | H | M | Reversible | H | M | M | H | H | H | Equal |
| Kleck & Wheaton (1967) | | | | | | | | | | | | | |
| Study 1 | 0.47 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Lavine et al. (2005) | | | | | | | | | | | | | |
| Control, high authoritarianism | 0.15 | No | M | M | M | Irreversible | H | H | M | L | No goal | No goal | Equal |
| Control, low authoritarianism | 0.06 | No | M | M | M | Irreversible | H | L | M | L | No goal | No goal | Equal |
| Mortality salience, high authoritarianism | 0.74 | No | M | M | H | Irreversible | H | H | M | L | No goal | No goal | Equal |
| Mortality salience, low authoritarianism | 0.00 | No | M | M | H | Irreversible | H | L | M | L | No goal | No goal | Equal |
| Lavoie & Thompson (1972) | | | | | | | | | | | | | |
| Study 1 | 0.20 | No | M | M | M | Irreversible | H | M | M | L | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lowe & Steiner (1968) | | | | | | | | | | | | | |
| Reversible, consequences | −0.44 | No | M | M | L | Reversible | L | M | M | H | H | H | Equal |
| Reversible, no consequences | −0.25 | No | M | M | L | Reversible | L | M | M | L | H | H | Equal |
| Irreversible, consequences | −0.53 | No | M | M | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Irreversible, no consequences | 0.28 | No | M | M | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Lowin (1969) | | | | | | | | | | | | | |
| High-quality information, high confidence | 0.52 | No | H | H | H | Irreversible | L | M | H | L | No goal | No goal | Equal |
| High-quality information, low confidence | 0.64 | No | H | H | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Low-quality information, high confidence | −0.50 | No | L | L | H | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Low-quality information, low confidence | −0.18 | No | L | L | H | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Lundgren & Prislin (1998) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Accuracy motive | −0.18 | No | L | L | M | Reversible | L | M | M | L | H | H | Equal |
| Impression motive | −0.51 | No | L | L | M | Reversible | L | M | M | L | L | H | Uncongenial |
| Defense motive | 0.42 | No | L | L | M | Reversible | L | M | M | H | H | L | Congenial |
| Control | −0.26 | No | L | L | M | Reversible | L | M | M | L | No goal | No goal | Equal |
| Study 2 | | | | | | | | | | | | | |
| Impression and accuracy motive | 0.16 | No | L | L | M | Reversible | L | M | M | H | H | H | Uncongenial |
| Defense and accuracy motive | 1.24 | No | L | L | M | Reversible | L | M | M | H | H | H | Congenial |
| Defense and impression motive | 0.26 | No | L | L | M | Reversible | L | M | M | H | H | H | Equal |
| Maccoby et al. (1961) | | | | | | | | | | | | | |
| Support | 0.83 | Support | L | L | M | Reversible | H | M | M | L | H | H | Equal |
| Challenge | 0.75 | Challenge | L | L | M | Reversible | H | M | M | L | H | H | Equal |
| McFarland & Warren (1992) | | | | | | | | | | | | | |
| Fundamentalist Christians | 1.54 | No | H | H | H | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Micucci (1972) | | | | | | | | | | | | | |
| Low self-esteem | 1.04 | No | M | M | M | Irreversible | H | M | L | L | No goal | No goal | Equal |
| Moderate self-esteem | −0.29 | No | M | M | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| High self-esteem | −0.30 | No | M | M | M | Irreversible | H | M | H | L | No goal | No goal | Equal |
| Miller (1977) | | | | | | | | | | | | | |
| Immediate | 0.17 | No | M | M | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| 4 min | −0.57 | No | M | M | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| 12 min | 0.82 | No | M | M | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| Nemeth & Rogers (1996) | | | | | | | | | | | | | |
| High relevance, majority dissent | 0.43 | Challenge | M | M | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| High relevance, minority dissent | 0.00 | Support | M | M | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Low relevance, majority dissent | 0.77 | Challenge | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Low relevance, minority dissent | 0.30 | Support | M | M | M | Irreversible | L | M | M | L | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Olson & Zanna (1979) | | | | | | | | | | | | | |
| Repressors, choice | 0.83 | No | N/A | N/A | M | Irreversible | L | H | M | L | No goal | No goal | Equal |
| Repressors, liking | 0.05 | No | N/A | N/A | M | Irreversible | L | H | M | L | No goal | No goal | Equal |
| Sensitizers, choice | −0.21 | No | N/A | N/A | M | Irreversible | L | L | M | L | No goal | No goal | Equal |
| Sensitizers, liking | 0.16 | No | N/A | N/A | M | Irreversible | L | L | M | L | No goal | No goal | Equal |
| Pyszczynski et al. (1985) | | | | | | | | | | | | | |
| Study 1 | 1.06 | No | H | H | H | Reversible | H | M | M | L | No goal | No goal | Equal |
| Study 2 | 1.20 | No | H | H | H | Reversible | H | M | M | L | No goal | No goal | Equal |
| Rhine (1967) | | | | | | | | | | | | | |
| Zero to one contradiction | −0.61 | No | H | H | H | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Two contradictions | 0.29 | Challenge | H | H | H | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Three contradictions | 0.37 | Challenge | H | H | H | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Four contradictions | 0.36 | Challenge | H | H | H | Irreversible | H | M | L | H | No goal | No goal | Equal |
| Five to six contradictions | 0.86 | Challenge | H | H | H | Irreversible | H | M | L | H | No goal | No goal | Equal |
| No contradictions | 0.35 | No | H | H | H | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Rosen (1961) | | | | | | | | | | | | | |
| Objective, high relevance | 0.65 | No | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Objective, low relevance | 0.42 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Essay, high relevance | 0.87 | No | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Essay, low relevance | 0.28 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Rosenbaum & McGinnies (1973) | | | | | | | | | | | | | |
| Study 1 | 0.50 | No | H | H | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Schulman (1971) | | | | | | | | | | | | | |
| High primary support, low secondary support | 0.37 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| High primary support, high secondary support | 0.41 | No | M | M | M | Irreversible | H | M | H | H | No goal | No goal | Equal |
| Moderate primary support, low secondary support | 0.41 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Moderate primary support, high secondary support | 0.72 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Low primary support, low secondary support | 0.81 | No | M | M | M | Irreversible | H | M | L | H | No goal | No goal | Equal |
| Low primary support, high secondary support | 0.70 | No | M | M | M | Irreversible | H | M | M | H | No goal | No goal | Equal |
| Schulz-Hardt et al. (2000) | | | | | | | | | | | | | |
| Study 1 | 1.01 | No | H | H | H | Irreversible | L | M | M | L | H | H | Equal |
| Schwarz et al. (1980) | | | | | | | | | | | | | |
| Supportive essay, one-sided support | 0.25 | Support | H | H | H | Irreversible | L | M | H | H | No goal | No goal | Equal |
| Supportive essay, two-sided support | −0.52 | Support | H | H | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Supportive essay, one-sided challenge | 1.58 | Challenge | H | H | H | Irreversible | L | M | L | H | No goal | No goal | Equal |
| Supportive essay, two-sided challenge | 0.79 | Challenge | H | H | H | Irreversible | L | M | M | H | No goal | No goal | Equal |
| No essay, one-sided support | 0.64 | Support | H | H | M | Irreversible | L | M | H | H | No goal | No goal | Equal |
| No essay, two-sided support | −0.38 | Support | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |

(*table continues*)

Table 1 (*continued*)

| Report and condition | *d* | Challenge or support | Quality congenial | Quality uncongenial | Commitment | Reversibility | Value relevance | Closed-mindedness | Confidence | Outcome relevance | Utility congenial | Utility uncongenial | Relative utility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No essay, one-sided challenge | 0.20 | Challenge | H | H | M | Irreversible | L | M | L | H | No goal | No goal | Equal |
| No essay, two-sided challenge | −0.08 | Challenge | H | H | M | Irreversible | L | M | M | H | No goal | No goal | Equal |
| Sears (1965) | | | | | | | | | | | | | |
| Old information | −0.64 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| New information | −0.50 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Sears (1966) | | | | | | | | | | | | | |
| No summation | −0.18 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Agrees with summation | −0.40 | Support | H | H | M | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Disagrees with summation | 0.53 | Challenge | H | H | M | Irreversible | L | M | L | L | No goal | No goal | Equal |
| Two opposed summations | −0.03 | No | H | H | M | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Sears & Freedman (1963) | | | | | | | | | | | | | |
| Low commitment, expression goal | 0.35 | No | H | H | L | Reversible | L | M | M | L | H | H | Congenial |
| Low commitment, No goal | 0.35 | No | H | H | L | Reversible | L | M | M | L | No goal | No goal | Equal |
| High commitment, expression goal | 0.11 | No | H | H | H | Irreversible | L | M | M | L | H | H | Congenial |
| High commitment, No goal | 0.17 | No | H | H | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Sears & Freedman (1965) | | | | | | | | | | | | | |
| Convict, new information | −1.00 | No | H | H | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Acquit, new information | 0.06 | No | H | H | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Convict old information | −0.31 | No | H | H | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Acquit, old information | −0.02 | No | H | H | H | Irreversible | L | M | M | L | No goal | No goal | Equal |
| Smith et al. (2007) | | | | | | | | | | | | | |
| Study 1 | | | | | | | | | | | | | |
| Expression goal | 0.87 | No | M | M | H | Irreversible | H | M | M | L | H | H | Congenial |
| No goal | 0.21 | No | M | M | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Study 2 | | | | | | | | | | | | | |
| Expression goal, time pressure | 0.99 | No | M | M | H | Irreversible | H | M | M | L | H | H | Congenial |
| Expression goal, no time pressure | 0.26 | No | M | M | H | Irreversible | H | M | M | L | H | H | Congenial |
| No goal, time pressure | 0.33 | No | M | M | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| No goal, no time pressure | 0.15 | No | M | M | M | Irreversible | H | M | M | L | No goal | No goal | Equal |
| Thayer (1969) | | | | | | | | | | | | | |
| High confidence | 0.07 | No | M | M | M | Irreversible | L | M | H | L | No goal | No goal | Equal |
| Low confidence | 0.36 | No | M | M | M | Irreversible | L | M | L | L | No goal | No goal | Equal |

*Note.* H = high; L = low; M = moderate; no = no challenge or support.

[a] In the Frey (1981a) study, participants received fictitious IQ scores that were 7, 15, 25, or 33 points less than their own predicted score (e.g., if a participant was in the "7" condition and predicted his or her IQ as 100, the participant would learn that she or he had received an IQ score of 93). Thus, the numbers reflect a discrepancy in points between a predicted score and a bogus-feedback score.

enhance commitment to attitudes, beliefs, and behaviors that are tied to worldviews (review by Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004); or (e) reported that they held their attitude or belief with high commitment (Jonas & Frey, 2003b; Rhine, 1967) or viewed the belief as relevant to their self-worth (e.g., intelligence; Frey & Stahlberg, 1986; sociability, Holton & Pyszczynski, 1989). Commitment to a pre-existing attitude, belief, or behavior was low when the participants *freely* engaged in attitude-inconsistent behavior (Cotton & Hieser, 1980), did not freely choose their behavior, attitude, or beliefs (e.g., behavior was assigned; Frey & Wicklund, 1978), or indicated a low amount of commitment to the choice (Jonas & Frey, 2003b). When commitment was not clearly high or low, it was coded as moderate. In addition, we coded for the *reversibility* of participants' reported attitudes, beliefs, or behaviors by noting whether, at the time of information selection, participants believed that they could (reversible) or could not (irreversible) change their attitudes, beliefs, or behaviors at a later time in the experiment (e.g., Frey & Rosch, 1984).

We also coded the *value relevance* of the issue. Value relevance was high if the issue was judged to be connected to the participants' enduring values (e.g., abortion, euthanasia, how to raise children); otherwise value relevance was low (e.g., a specific hiring decision, choosing among gifts). We also coded, whenever possible, participants' *closed-mindedness* as *high* or *low*, as assessed by Rokeach's (1960) Dogmatism Scale, Altemeyer's (1996) Right Wing Authoritarianism Scale, and the Repression–Sensitization Scale (Byrne, 1964). If the sample was not partitioned on closed-mindedness, this variable was coded as moderate.[6] Participants' *confidence in their attitude, belief, or behavior* was registered as *high, moderate,* or *low.* Confidence was high (low) if participants reported high (low) confidence in their attitude, belief, or behavior (e.g., Adams, 1961; Berkowitz, 1965; Brechan, 2002; Brodbeck, 1956); reported beliefs that were consistent (inconsistent) with their behavior (Feather, 1962); received bogus positive (negative) feedback about their ability to form accurate attitudes, beliefs, or decisions (e.g., Thayer, 1969); were placed in a positive (negative) mood state after forming a decision (Jonas et al., 2006);[7] were provided with positive (negative) self-relevant feedback (Micucci, 1972), or possessed low (high) dispositional levels of anxiety (Frey et al., 1986). Without a confidence manipulation or partitioning of the sample, confidence was coded as moderate.

*Accuracy motivation.* We coded *outcome relevance* of the topic as *high* if the issue could have foreseeable effects on participants' outcomes in the near future (e.g., a choice of a gift, use of a type of exam, career choice) or distant future (e.g., developing cancer from smoking); otherwise, outcome relevance was coded as *low*. For example, manipulations of outcome relevance had participants select potential dates assuming that they would (high outcomes relevance) or would not (low outcome relevance) actually date the person (Lowe & Steiner, 1968).

We coded the *utility of the available information* presented for selection as *high* or *low* for fulfilling an experimental goal. Utility was *high* if the available information was high or moderate in quality and novel and could facilitate accomplishing an immediate goal in the session (e.g., deciding whether to extend the contract of a manager or writing an essay to justify their beliefs, attitudes, or behaviors) or *low* if it was of low quality and familiar and could not facilitate accomplishing an immediate goal. When no such goal was present, utility was coded as *no goal.* We also coded the *relative utility* of the available congenial and uncongenial information presented for selection (*congenial more useful; equally useful; uncongenial more useful*). Conditions were coded as equally useful when there was no immediate goal in the session or the congenial and uncongenial information were judged equally likely to facilitate or hinder goal attainment. For example, the congenial and uncongenial information would be equally useful for preparing to select among gifts (Jonas, Schulz-Hardt, & Frey, 2005). However, uncongenial information would be more useful for preparing to debate (e.g., Canon, 1964) or to write an uncongenial essay (Hillis & Crano, 1973). Congenial information would be more useful for planning to discuss one's opinion (Canon, 1964; Smith, Fabrigar, Powell, & Estrada, 2007) or to defend one's attitudes, beliefs, or behaviors (Frey, 1981b; Lundgren, & Prislin, 1998).

## Results

### *Distribution of Effect Sizes*

Our effect sizes are displayed in the stem-and-leaf plot in Figure 2. We first analyzed the distribution of effect sizes to check for potential biases in the study retrieval or publication. To estimate potential study retrieval and publication biases, we examined the funnel plot of effect sizes (see Figure 3) and the normality of the distribution under examination (see Figure 4). For Figure 3, if no bias is present, the plot should take the form of a funnel centered on the mean effect size, with smaller variability as the sample size increases. Instead, in the presence of publication bias, there is a distortion in the shape of the funnel. If the true effect size is zero and there is bias, the plot has a hollow middle. If the true effect size is not zero, the plot tends to be asymmetrical, having a large and empty section where the estimates from studies with small sample sizes and small effect sizes would be located in the absence of bias. Following these guidelines, an examination of the plot in Figure 3 suggests no retrieval or publication bias.

In addition to examining the funnel plot, we used the normal-quantile plot method to uncover evidence of bias (Wang & Bushman, 1999). In a normal-quantile plot, the observed values of a variable are plotted against the expected values given normality. If the sample of effect sizes is from a normal distribution, data points cluster around the diagonal; if the sample of effect sizes is biased by publication practices or eligibility criteria, data points deviate from the diagonal (Wang & Bushman, 1999). As can be seen from Figure 4, the standardized effect sizes followed a straight line and generally fell within the 95% confidence intervals of the normality line.

[6] In addition to comparing the congeniality bias across three groups of closed-mindedness, we compared only groups coded as high and low (see Table 5).

[7] Past research indicates a fairly direct relation of confidence to positive and negative affect (see Erber, 1991; Forgas & Moylan, 1987; E. Johnson & Tversky, 1983; Salovey & Birnbaum, 1989). Hence, we coded positive mood as high confidence and negative mood as low confidence. Eliminating these conditions did not alter our results.

| | |
|---|---|
| 3.3 | 2 |
| 3.2 | |
| 3.1 | |
| 3.0 | |
| 2.9 | |
| 2.8 | |
| 2.7 | 6 |
| 2.6 | |
| 2.5 | 6 |
| 2.4 | 3 |
| 2.3 | |
| 2.2 | 244 |
| 2.1 | 8 |
| 2.0 | |
| 1.9 | |
| 1.8 | 4 |
| 1.7 | 279 |
| 1.6 | 15 |
| 1.5 | 0348 |
| 1.4 | 00 |
| 1.3 | 02 |
| 1.2 | 1224568 |
| 1.1 | 2449 |
| 1.0 | 011444467 |
| 0.9 | 0115999 |
| 0.8 | 1122333455667799 |
| 0.7 | 00112222223333444566788889 |
| 0.6 | 012334444555689 |
| 0.5 | 00000022333445678 |
| 0.4 | 00011222334566677789 |
| 0.3 | 000112234555566667789 |
| 0.2 | 001123344566668889 |
| 0.1 | 00011144555666777888 |
| 0.0 | 01445666778 |
| -0.0 | 111122346677777889 |
| -0.1 | 2347888889 |
| -0.2 | 00135556678999 |
| -0.3 | 01147899 |
| -0.4 | 00144 |
| -0.5 | 00112357 |
| -0.6 | 14 |
| -0.7 | 00248 |
| -0.8 | 15 |
| -0.9 | 7 |
| -1.0 | 0 |
| -1.1 | 6 |
| -1.2 | 69 |
| -1.3 | |
| -1.4 | 49 |
| -1.5 | 0 |

*Figure 2.* Stem-and-leaf plot of effect sizes (*d*s).

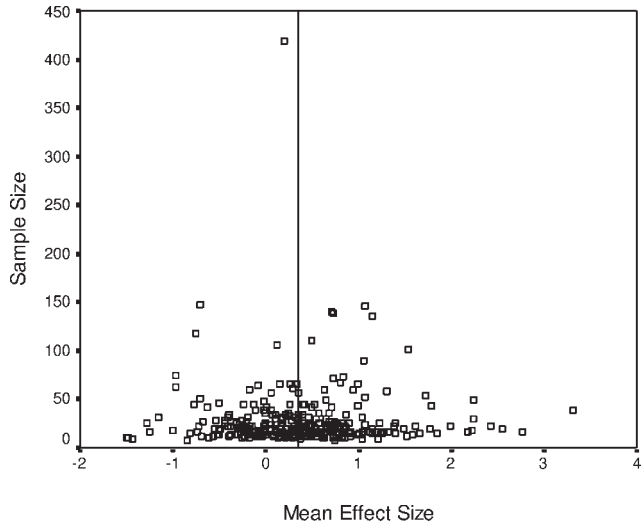


*Figure 3.* This funnel plot presents mean effect sizes on the *y*-axis and sample sizes on the *x*-axis; a symmetric and inverted funnel shape suggests no publication bias.

### *Study Characteristics*

Prior to testing our hypotheses, we examined some descriptive characteristics of the samples in our meta-analysis. As shown in Table 2, samples generally (a) were published in earlier decades, (b) appeared in journals, (c) included college students as participants, (d) took place in the United States or Canada, and (e) with the exception of a minority of field studies, took place in the laboratory. In terms of the issues, conditions generally included

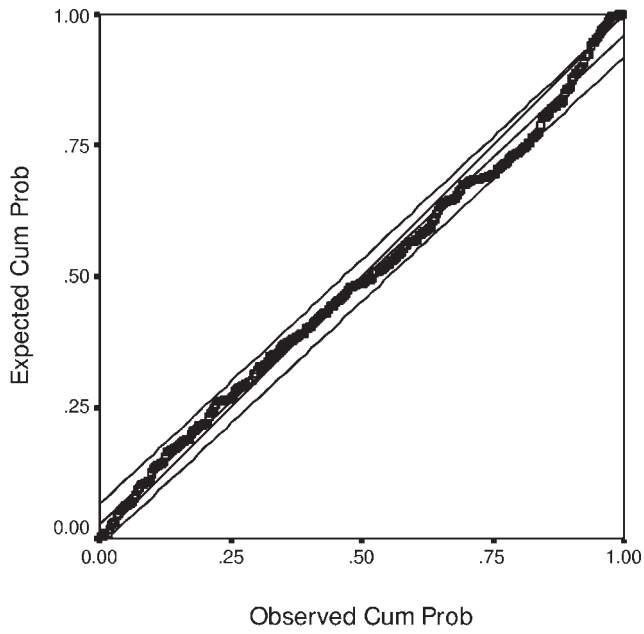


*Figure 4.* Normal quantile plot. The line on the diagonal indicates normality; the lines around the diagonal represent the 95% confidence interval around the normality line.

Table 2
*Distribution of Descriptive Moderators*

| Variable | Value |
|---|---|
| Median publication year | 1981 |
| Publication form | |
| Journal article | 279 (93%) |
| Unpublished document | 8 (3%) |
| Dissertation or master's thesis | 7 (2%) |
| Book chapter | 6 (2%) |
| Participant population | |
| University students | 252 (84%) |
| High school students | 35 (12%) |
| Other or mixed | 13 (4%) |
| Country where study was conducted | |
| United States and Canada | 147 (49%) |
| Germany | 139 (46%) |
| Australia | 10 (3%) |
| Italy | 4 (1%) |
| Research setting | |
| Laboratory | 257 (86%) |
| Field | 43 (14%) |
| Issue type | |
| Politics | 72 (24%) |
| Organization and business administration | 70 (23%) |
| Personal development, personal health, self-related | 69 (23%) |
| Religion and values | 51 (17%) |
| Buying behavior, game play, or betting | 38 (13%) |
| Artificiality of issue | |
| Real | 219 (73%) |
| Artificial or bogus | 81 (27%) |
| Generality of issue | |
| Specific | 169 (56%) |
| General | 131 (44%) |
| Exposure measure | |
| Choice of information to receive | 197 (66%) |
| Rating of information preference | 85 (28%) |
| Ranking of information preference | 18 (6%) |
| Modal amount of congenial information offered | 2 |
| Modal amount of uncongenial information offered | 2 |
| Predictor | |
| Behavior | 194 (65%) |
| Attitude | 63 (21%) |
| Belief | 43 (14%) |
| Anonymity of attitude, belief, or behavior | |
| Not anonymous | 224 (75%) |
| Anonymous | 76 (25%) |
| Novelty of congenial and uncongenial information | |
| Familiar | 13 (4%) |
| Novel | 287 (96%) |

*Note.* Unless otherwise specified, values are number of conditions or samples, with percentages in parentheses.

issues that were (a) political (e.g., scandals, campaign issues, war); (b) real (e.g., abortion) rather than artificial (e.g., a bogus hiring decision); and (c) specific in scope (e.g., extending the contract of a particular manager) rather than general (e.g., euthanasia). Choices of information to receive were most frequently assessed and most often made between two pieces of congenial information and two pieces of uncongenial information. Information choices were most often predicted from measures of prior behaviors and measures that were not anonymous in the experimental setting. The congenial and uncongenial information offered for selection was most often novel rather than familiar.

The distributions of other important descriptive characteristics appear in the third column of Table 3. For moderators relevant to defense motivation, typically (a) challenge or support of the pre-existing attitudes, beliefs, or behaviors was absent; (b) quality of the available congenial and uncongenial information for selection was high (vs. moderate or low); (c) commitment to the pre-existing attitude, belief, or behavior was moderate (vs. high or low); (d) reversibility of the pre-existing attitude, belief, or behavior was absent (irreversible vs. present, reversible); (e) value relevance of the issues was low (vs. high); (f) closed-mindedness was high or low in the samples in which it was assessed; and (g) confidence in the pre-existing attitudes, beliefs, or behaviors was moderate (vs. low or high). For moderators relevant to accuracy motivation, a majority of the conditions pertained to issues that (a) were not outcome relevant and (b) did not provide an immediate goal in the session. In the conditions that did provide a goal, the available information presented for selection was generally high (vs. low) in utility. The correlations between the defense motivation and accuracy motivation moderators appear in Table 4. As one might expect, the quality of the congenial and uncongenial information were highly intercorrelated, and the utility of the congenial and uncongenial information were also highly intercorrelated. Although many of the other correlations were weak or nonsignificant, we used multiple-regression procedures to determine the independent contribution of each moderator.

### *Average Exposure Effect Size and Between-Effects Variability*

We first obtained a weighted-mean average of information preferences and tested for variability among effect sizes. The average effect was $d = 0.36$ (95% confidence interval [*CI*] = 0.34, 0.39) according to fixed-effects analysis, indicating a moderate congeniality bias, and $d = 0.38$ (95% *CI* = 0.32, 0.44) according to the random-effects analysis, indicating a moderate congeniality bias as well. Both of these average effects were statistically different from zero, $Q(299) = 611.57$, $p < .001$, for the fixed-effects analysis and $Q(299) = 132.02$, $p < .001$, for the random-effects analysis, and were heterogeneous, $Q(299) = 1{,}354.55$, $p < .001$, for the fixed-effects analysis and $Q(299) = 372.45$, $p < .001$, for the random-effects analysis. Notably, the mean unweighted effect size of 0.38 was similar to both of these estimates.

### *Moderator Analyses*

Because there was a large amount of variability between effect sizes, we tested whether our moderators accounted for a significant amount of this variability. Generally, the results from fixed- and random-effects models converged. Thus, we focus on the fixed-effects models, which are more powerful, and are summarized in columns four and five of Table 3 (but see the sixth and seventh column of Table 3 for random-effects results). Table 3 presents analyses of all conditions, which provide the most complete description of our synthesis. Table 5 presents analyses using only the effect sizes for which the levels of the moderator varied within a study; these analyses protect against different levels of a moderator being spuriously confounded with study characteristics. Therefore, the Table 3 analyses included all samples, whereas the Table 5 analyses relied on studies with manipulations or partitioning based on a particular moderator. Importantly, the patterns of cell means were generally similar across these two types of analyses.

Table 3
*Moderator Analyses for All Included Studies*

| Moderator and level | *d* | *k* | Fixed-effect $Q_B$ | Fixed-adjusted effect $Q_B$ | Random-effect $Q_B$ | Random-adjusted effect $Q_B$ |
|---|---|---|---|---|---|---|
| Challenge or support | | | 14.72*** | 10.44** | 3.32 | 3.15 |
| Challenge | $0.27_a$ | 24 | | | | |
| No challenge or support | $0.38_a$ | 257 | | | | |
| Support | $0.16_b$ | 19 | | | | |
| Quality of available congenial information | | | 43.82*** | 38.32*** | 10.41** | 7.14* |
| High | $0.41_a$ | 173 | | | | |
| Moderate | $0.37_a$ | 100 | | | | |
| Low | $0.00_b$ | 23 | | | | |
| Quality of available uncongenial information | | | 26.23*** | | 7.64* | |
| High | $0.40_a$ | 173 | | | | |
| Moderate | $0.37_a$ | 100 | | | | |
| Low | $0.01_b$ | 23 | | | | |
| Commitment to the attitude, belief, or behavior | | | 19.99*** | 25.06*** | 6.66* | 6.87* |
| High | $0.42_a$ | 117 | | | | |
| Reversibility of the attitude, belief, or behavior | | | 0.06 | 1.62 | 4.35* | 0.75 |
| Reversible | $0.37_a$ | 114 | | | | |
| Irreversible | $0.36_a$ | 186 | | | | |
| Value relevance | | | 84.15*** | 67.63*** | 11.87*** | 10.19** |
| High | $0.51_a$ | 120 | | | | |
| Low | $0.24_b$ | 180 | | | | |
| Closed-mindedness | | | 17.85*** | 17.94*** | 4.05 | 3.48 |
| High | $0.69_a$ | 6 | | | | |
| Moderate | $0.36_b$ | 288 | | | | |
| Low | $0.11_c$ | 6 | | | | |
| Confidence in attitude, belief, or behavior | | | 11.40** | 14.40*** | 4.73† | 4.54 |
| High | $0.23_a$ | 36 | | | | |
| Moderate | $0.37_b$ | 224 | | | | |
| Low | $0.45_b$ | 40 | | | | |
| Outcome relevance | | | 1.65 | 1.19 | 4.52* | 0.94 |
| High | $0.39_a$ | 102 | | | | |
| Low | $0.35_a$ | 198 | | | | |
| Utility of congenial information | | | 31.59*** | 0.47 | 12.19** | 0.84 |
| High | $0.36_a$ | 123 | | | | |
| No goal | $0.39_a$ | 168 | | | | |
| Low | $-0.16_c$ | 9 | | | | |
| Utility of uncongenial information | | | 8.87** | | 1.26 | |
| High | $0.31_a$ | 121 | | | | |
| No goal | $0.39_b$ | 168 | | | | |
| Low | $0.51_b$ | 11 | | | | |
| Relative utility | | | 100.83*** | 66.92*** | 26.74*** | 17.05*** |
| Congenial more useful | $0.54_a$ | 17 | | | | |
| Both equally useful | $0.38_b$ | 272 | | | | |
| Uncongenial more useful | $-0.39_c$ | 11 | | | | |

*Note.* $d$ = weighted mean effect size; $k$ = number of cases; $Q_B$ = homogeneity statistic distributed as a chi-square value, with degrees of freedom equal to the number of moderator levels minus one. Effect sizes (*d*s) were estimated with a fixed- and random-effects model. For $d$, positive numbers indicate approach to congenial information, whereas negative numbers indicate approach to uncongenial information. The fixed- and random-effect $Q_B$ values reflect the between-groups effect of the moderator when entered independently into the respective model. To determine the significance of simple effects, we used a one-tailed criterion when a directional hypothesis was assessed; otherwise, a two-tailed criterion was used. Those *d*s within columns not sharing subscripts were significantly different from each other at $p < .05$ when entered independently into the fixed-effects model. The fixed- and random-adjusted effect $Q_B$ was estimated with the respective model, with all (nonredundant) moderators in this table entered simultaneously into a regression equation.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

### *Defense Motivation*

Six of seven of our findings provided at least partial support for the hypothesis that defense motivation enhances the congeniality bias (see Figure 1). First, as anticipated, the congeniality bias was smaller when there was support rather than no challenge or support of the pre-existing attitude, belief, or behavior prior to information selection. However, the congeniality bias was not larger when there was a challenge rather than no challenge or support prior to information selection. Second, as predicted, the congeniality bias was larger when the uncongenial or congenial information available for selection was high or moderate in quality (vs. low), although the high and moderate levels did not differ from one another. Third, as anticipated, the congeniality bias was larger for samples with high versus moderate commitment to an attitude, belief, or behavior and smaller for samples with low versus moderate commitment. Fourth, the congeniality bias was larger when the value rele-

Table 4
*Intercorrelations Between Moderators*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Challenge or support | — | −.01 | −.01 | .02 | −.04 | .05 | .00 | −.02 | .06 | −.03 | −.03 | .00 |
| 2. Quality congenial | | — | .96** | .03 | .08 | −.16** | .00 | .01 | −.08 | .09 | .07 | −.01 |
| 3. Quality uncongenial | | | — | .03 | .08 | −.16** | .00 | .01 | −.08 | .06 | .07 | .02 |
| 4. Commitment | | | | — | .02 | .02 | .00 | .08 | .13* | .08 | .05 | −.07 |
| 5. Reversibility | | | | | — | −.04 | .00 | −.01 | .09 | .57** | .58** | .03 |
| 6. Value relevance | | | | | | — | .00 | .01 | .16** | −.19** | −.17** | .01 |
| 7. Closed-mindedness | | | | | | | — | .00 | .00 | .00 | .00 | .00 |
| 8. Confidence | | | | | | | | — | .02 | .06 | .06 | .00 |
| 9. Outcome relevance | | | | | | | | | — | .12* | .12* | .03 |
| 10. Utility congenial | | | | | | | | | | — | .81** | −.25** |
| 11. Utility uncongenial | | | | | | | | | | | — | .16** |
| 12. Relative utility | | | | | | | | | | | | — |

*Note.* Entries are Spearman's correlation coefficients. Levels of the moderators were coded as follows: challenge or support (1 = support, 2 = no challenge or support, 3 = challenge); quality congenial and uncongenial (1 = low, 2 = moderate, 3 = high); commitment (1 = low, 2 = moderate, 3 = high); reversibility (1 = irreversible, 2 = reversible); value relevance (1 = low, 2 = high); closed-mindedness (1 = low, 2 = moderate, 3 = high); confidence (1 = low, 2 = moderate, 3 = high); outcome relevance (1 = low, 2 = high); utility congenial and uncongenial (1 = low, 2 = moderate, 3 = high); and relative utility (1 = congenial more useful; 2 = both equally useful; 3 = uncongenial more useful).
* $p < .05$. ** $p < .01$.

vance of the issue was high versus low. Fifth, as expected, the congeniality bias was larger for samples high (vs. moderate) in closed-mindedness and smaller for samples low (vs. moderate) in closed-mindedness. Sixth, the congeniality bias was smaller among samples with high (vs. moderate or low) confidence in the attitude, belief, or behavior. Although many of the findings supported the hypothesis that defense motivation enhanced the congeniality bias, one finding did not. Specifically, although the fixed-effects analysis showed that the congeniality bias was not influenced by whether the attitude, belief, or behavior was reversible, the random-effects analysis showed that the congeniality bias was larger when the attitude, belief, or behavior was reversible (vs. irreversible; $d = 0.47$ vs. 0.32).

### *Accuracy Motivation*

Most of our major findings were consistent with the hypothesis that accuracy motivation can guide information selection (see Figure 1). First, as anticipated, the congeniality bias was larger when the congenial information was highly useful relative to when it was not useful or when there was no experimental goal. In fact, an *un*congeniality bias appeared when the congenial information was not useful. Second, the congeniality bias was smaller when the uncongenial information was high rather than low in utility or when there was no goal. Third, as hypothesized, the congeniality bias was larger when the congenial information was more useful than the uncongenial information rather than when they were equally useful. In addition, the congeniality bias was smaller (and reversed) when the uncongenial information was more useful than the congenial information rather than when they were equally useful. Two findings were inconsistent with the hypothesis that accuracy motivation guides exposure decisions. First, although the fixed-effects analysis showed that the congeniality bias was not influenced by the outcome relevance of the issue, the random-effects analysis showed that the congeniality bias was larger when issues were high in outcome relevance (vs. low; $d = 0.48$ vs. 0.33). Second, the congeniality bias was larger when the uncongenial information was high or moderate in quality rather than low in quality. This latter finding, as mentioned earlier, supports defense motivation predictions more than accuracy motivation predictions.

### *Defense Motivation Versus Accuracy Motivation: Relative Contributions*

To examine the relative influence of defense and accuracy motivations on the congeniality bias, we entered all seven nonredundant defense motivation moderators (i.e., challenge or support, quality of available congenial information, commitment, reversibility, value relevance, closed-mindedness, confidence) and the two accuracy motivation moderators (i.e., relative utility, outcome relevance) into a hierarchical regression analysis. Prior to entering these variables, we dummy coded them with $l - 1$ dummy codes for each variable, where $l$ represents the number of levels in the moderator. For example, challenge or support had two dummy codes. One dummy code represented a comparison between challenge and the other two groups (1 = *challenge*; 0 = *support and no challenge or support*), and the other dummy code represented a comparison between support and the other two groups (1 =*support*; 0 = *challenge and no challenge or support*). Note that when these two dummy codes were entered into a regression equation simultaneously, they completely accounted for the effect of the variable on congeniality (for more on dummy coding, see Keith, 2006).

The congeniality bias was predicted with a hierarchical-regression analysis, with the defense motivation moderators entered in the first step and the accuracy motivation moderators entered in the second step. This analysis revealed that the defense motivation moderators alone accounted for a significant amount of variance (13%; $Q_R = 179.64$, $p < .001$). Importantly, adding the accuracy motivation moderators accounted for an additional 7% of the variance, which was significant ($Q_R = 90.61$, $p <$

Table 5
*Moderator Analyses for Studies With Variability in the Levels of Moderators*

| Moderator and level | *d* | *k* | Fixed-effect $Q_B$ | Random-effect $Q_B$ |
|---|---|---|---|---|
| Challenge or support | | | 2.21 | 1.07 |
| Challenge | $0.27_a$ | 24 | | |
| No challenge or support | $0.15_a$ | 11 | | |
| Support | $0.16_a$ | 19 | | |
| Quality of congenial information | | | $24.14^{***}$ | $4.49^{*}$ |
| High | $0.55_a$ | 8 | | |
| Low | $-0.01_b$ | 8 | | |
| Quality of uncongenial information | | | $4.53^{*}$ | 1.33 |
| High | $0.38_a$ | 8 | | |
| Low | $0.13_b$ | 8 | | |
| Commitment to the attitude, belief, or behavior | | | $21.80^{***}$ | $7.97^{*}$ |
| High | $0.43_a$ | 54 | | |
| Moderate | $0.24_b$ | 57 | | |
| Low | $0.15_b$ | 9 | | |
| Reversibility of the attitude, belief, or behavior | | | 0.41 | 0.24 |
| Reversible | $0.10_a$ | 6 | | |
| Irreversible | $0.18_a$ | 6 | | |
| Value relevance | | | $10.58^{**}$ | $4.24^{*}$ |
| High | $0.80_a$ | 6 | | |
| Low | $0.33_b$ | 6 | | |
| Closed-mindedness | | | $17.82^{***}$ | $4.02^{*}$ |
| High | $0.69_a$ | 6 | | |
| Low | $0.11_b$ | 6 | | |
| Confidence in attitude, belief, or behavior | | | $18.87^{**}$ | $5.82^{\dagger}$ |
| High | $0.19_a$ | 30 | | |
| Moderate | $0.29_a$ | 16 | | |
| Low | $0.53_b$ | 20 | | |
| Outcome relevance | | | 0.67 | 1.58 |
| High | $0.22_a$ | 25 | | |
| Low | $0.28_a$ | 23 | | |
| Utility of congenial information | | | $21.82^{***}$ | $6.68^{*}$ |
| High | $0.32_a$ | 21 | | |
| No goal | $0.13_b$ | 10 | | |
| Low | $-0.17_c$ | 9 | | |
| Utility of uncongenial information | | | $25.59^{***}$ | $9.25^{**}$ |
| High | $0.13_a$ | 19 | | |
| No goal | $0.13_a$ | 10 | | |
| Low | $0.74_b$ | 7 | | |
| Relative utility | | | $92.48^{***}$ | $23.48^{***}$ |
| Congenial more useful | $0.54_a$ | 17 | | |
| Both equally useful | $0.19_b$ | 13 | | |
| Uncongenial more useful | $-0.39_c$ | 11 | | |

*Note.* $d$ = weighted mean effect size; $k$ = number of cases; $Q_B$ = homogeneity statistic distributed as a chi-square value, with degrees of freedom equal to moderator levels minus one. Effect sizes (*d*s) were estimated with a fixed- and random-effects model. For *d,* positive numbers indicate approach to congenial information, whereas negative numbers indicate approach to uncongenial information. The random-effects $Q_B$ reflects the between-groups effect of the moderator when entered independently into the random-effects model. The fixed-effects $Q_B$ reflects the between-groups effect of the moderator when entered independently into the fixed-effects model. To determine the significance of simple effects, we used a one-tailed criterion when a directional hypothesis was assessed; otherwise, a two-tailed criterion was used. Those *d*s within columns not sharing subscripts are significantly different from each other at $p < .05$ according to the fixed-effects model.
$^{\dagger} p < .10$. $^{*} p < .05$. $^{**} p < .01$. $^{***} p < .001$.

.001). Thus, it seems that both of these variables may have contributed to selective exposure, but as the moderate-sized congeniality bias ($d = 0.36$) implies, defense motivation had a greater influence. Indeed, when we entered the accuracy motivation moderators in the first step and defense motivation moderators in the second step (i.e., reversed the order of entry), results were similar (accuracy accounted for 8% and defense accounted for 13% of the variance). Note that the individual effects of the moderators in this analysis are presented in the fifth column of Table 3.

### *Supplementary Analyses and Analyses of Descriptive Moderators*

In comparing the analyses of the studies that varied the levels of the moderator (Table 5) with the analyses of all conditions (Table 3), we find a large amount of agreement. As can be gleaned from Table 5, the patterns of cell means were comparable for all nine of the moderator analyses that were significant according to both analyses. The quality of congenial and uncongenial information, commitment, value relevance, closed-mindedness, confidence, the

utility of the congenial and uncongenial information, and the relative utility of the available information were all significant moderators.

Table 6 contains analyses for the descriptive moderators. Of the 16 descriptive moderators, 12 were significant predictors of information selection. The year the paper was published and the amount of congenial and uncongenial pieces of information in the selection array were each positively correlated with congeniality scores. In addition, congeniality biases were generally larger when reported in dissertations and theses, when the study concerned religion and values or politics, when the issues were real and general, when belief (vs. attitudes and behaviors) was the predictor, when participants ranked the information, and when the samples were not composed entirely of college and high school students. Possible interpretations of these findings appear in the General Discussion.

## General Discussion

People's attitudes and behaviors are often inappropriate and inaccurate, as is the case when investors make a poor investment decision, physicians misdiagnose patients, and children persist in their belief in Santa Claus. Although information relevant to these attitudes and behaviors can provide opportunities for change, our review demonstrates biases in what information is selected for reception. People are almost two times (*odds ratio* = 1.92, based on $d = 0.36$) more likely to select information congenial rather than uncongenial to their pre-existing attitudes, beliefs, and behaviors. The moderate size of the bias is perhaps not surprising given that selective exposure is responsive to motivations that can occasionally exert opposing influences on selection preferences. As our analyses have shown, variables associated with defense motivation (e.g., commitment, value relevance, confidence, and challenge or support) uniformly increased the selection of congenial information. In contrast, information utility, a moderator associated with the accuracy motivation, increased or decreased the preference for congenial information, depending on whether the congenial or uncongenial information possessed a utility advantage. Selecting congenial information can facilitate feeling validated about one's view or even maintaining stable views of the world but may reduce accuracy and flexibility. Hence, the occasionally opposing influences of defense and accuracy motivation create a balance between defending prior views and obtaining realistic views of an object or issue.

### *Motivational Factors*

Several theorists have proposed that accuracy and defense motivations guide human behavior (e.g., Chaiken et al., 1996; Jonas et al., 2005; Katz, 1960; Smith, Bruner, & White, 1956; Wyer & Albarracín, 2005). People are presumed to want to believe in the accuracy of their views (a result of defense motivation) but also to attain views that are rooted in external reality (a result of accuracy motivation; for broader theories, see Baumeister, 2005; Schlenker, 1980). Consistent with this notion of human motivation (see Figure 1), our meta-analysis confirmed that exposure decisions are guided by defense and accuracy motivation.

#### *Defense Motivation*

The majority of our findings showed that a congeniality bias increases as a function of factors that presumably increase defense motivation. As expected, the congeniality bias was positively correlated with information quality, commitment, value relevance, and closed-mindedness but was negatively correlated with confidence in or support given to one's pre-existing attitude, belief, or behavior. Although the majority of our findings suggested that defense motivation affects selective exposure, one finding did not. In particular, we predicted that irreversible decisions would promote a greater congeniality bias because people experience greater affective attachment to their irreversible decisions than to their reversible ones (Kiesler, 1971; Schlenker, 1980). Although a fixed-effects analysis revealed that the ability to reverse a pre-existing attitude, belief, or behavior had no effect on the congeniality bias, a random-effects analysis showed that the congeniality bias was larger when prior attitudes, beliefs, or behaviors could be reversed.

Another possible interpretation of the reversibility effect is that the ability to change one's position may enhance the experience of cognitive dissonance by prompting a consideration of reasons to change the position. For example, the possibility for change may automatically direct attention to why the unchosen position might be better than the chosen position. Consequently, dissonance arousal may be greater and congeniality more pronounced under reversible-decision conditions. Alternatively, the perceived ability to change one's position may enhance attempts to crystallize and defend this position (Dewey, 1938; Kruglanski, 1990; Lewin, 1951; Pierce, 1877; Tajfel, 1969). Yet another possibility is that the perceived ability to change a decision enhances the congeniality bias by directly improving memory for the contents (e.g., beliefs) and decision-making strategies (e.g., congenial information searches) associated with that incomplete decision (Zeigarnik, 1927). Future work may disentangle these possibilities, perhaps as a function of individual differences in variables such as closed-mindedness (e.g., need for cognitive closure) and through assessments of memory. At present, the accumulated data are insufficient to explore these issues further.

#### *Accuracy Motivation*

Our meta-analysis revealed that participants selected information that best suited the goal they were pursuing in the session. Studies showed that selection favored congenial information when the congenial information was useful but favored uncongenial information when the uncongenial information was useful. Less supportive of the role of accuracy motivation in selective exposure were associations involving information quality and outcome relevance. The expected preference for high-quality congenial information was present, even though the expected preference for high-quality uncongenial information was absent. Importantly, this pattern was entirely consistent with the role of defense motivation but was only partially consistent with the role of accuracy motivation. In addition, contrary to the possibility that outcome relevance negatively correlates with the congeniality bias, the random-effects analysis showed that the correlation was positive. However, closer inspection revealed that outcome relevance was correlated with value relevance ($r_s = .16$, $p = .005$; see Table 4). In an analysis controlling for value relevance, outcome relevance no longer had a significant effect on congeniality ($p > .10$).

Table 6
*Descriptive Moderator Analyses*

| Moderator and level | Statistic | *k* | Fixed-effect $Q_B$ | Fixed-effect adjusted $Q_B$ | Random-effect $Q_B$ |
|---|---|---|---|---|---|
| | *B* | | | | |
| Publication year (Median = 1981) | 0.20 | 300 | 53.24*** | 13.67** | 14.74*** |
| Amount of congenial information (Mode = 2) | 0.08 | 284 | 7.70** | 4.65* | 6.37* |
| Amount of uncongenial information (Mode = 2) | 0.08 | 284 | 7.96** | 5.25* | 6.49* |
| | *d* | | | | |
| Publication form | | | 53.63*** | 47.66*** | 6.69 |
| Journal article | $0.35_a$ | 279 | | | |
| Book chapter | $0.25_a$ | 6 | | | |
| Dissertation or master's thesis | $1.00_b$ | 7 | | | |
| Unpublished document | $0.28_a$ | 8 | | | |
| Country where study was conducted | | | 0.51 | 2.09 | 4.59 |
| United States and Canada | $0.37_a$ | 147 | | | |
| Germany | $0.37_a$ | 139 | | | |
| Australia | $0.34_a$ | 10 | | | |
| Italy | $0.29_a$ | 4 | | | |
| Research setting | | | 0.01 | 0.33 | 0.06 |
| Laboratory | $0.36_a$ | 257 | | | |
| Field | $0.36_a$ | 43 | | | |
| Issue type | | | 50.38*** | 4.67 | 12.59** |
| Politics | $0.46_a$ | 72 | | | |
| Organization and business administration | $0.20_b$ | 70 | | | |
| Personal development, personal, health, self-related issues | $0.36_c$ | 69 | | | |
| Religion, and values | $0.48_a$ | 51 | | | |
| Buying behavior, game play, or betting | $0.27_{bc}$ | 38 | | | |
| Artificiality of issue | | | 8.61** | 0.41 | 0.12 |
| Real | $0.39_a$ | 219 | | | |
| Artificial or bogus | $0.28_b$ | 81 | | | |
| Generality of issue | | | 84.34*** | 10.96*** | 14.49*** |
| Specific | $0.23_a$ | 169 | | | |
| General | $0.50_b$ | 131 | | | |
| Predictor | | | 34.41*** | 11.43** | 0.39 |
| Behavior | $0.29_a$ | 194 | | | |
| Attitude | $0.42_b$ | 63 | | | |
| Belief | $0.53_c$ | 43 | | | |
| Exposure measure: Choice of information to receive | | | 12.32*** | 1.23 | 4.29* |
| Yes | $0.41_a$ | 186 | | | |
| No | $0.30_b$ | 114 | | | |
| Exposure measure: Rating of preferences | | | 25.00*** | 33.56*** | 12.24*** |
| Yes | $0.26_a$ | 85 | | | |
| No | $0.42_b$ | 215 | | | |
| Exposure measure: Ranking of preferences | | | 6.10* | 15.54*** | 1.99 |
| Yes | $0.51_a$ | 18 | | | |
| No | $0.35_b$ | 282 | | | |
| Participant population | | | 21.83*** | 26.69*** | 5.81† |
| University students | $0.35_a$ | 252 | | | |
| High school students | $0.35_a$ | 35 | | | |
| Other or mixed | $0.66_b$ | 13 | | | |
| Anonymity of attitude, belief, or behavior | | | 16.08*** | 0.03 | 1.72 |
| Not anonymous | $0.32_a$ | 224 | | | |
| Anonymous | $0.45_b$ | 76 | | | |
| Novelty of congenial and uncongenial information | | | 0.54 | 0.07 | 0.44 |
| Familiar | 0.31 | 13 | | | |
| Novel | 0.37 | 287 | | | |

*Note*. $B$ = slope; $d$ = weighted mean effect size; $k$ = number of cases; $Q_B$ = homogeneity statistic distributed as a chi-square value, with degrees of freedom equal to one minus the levels of the moderator. Effect sizes (*d*s) were estimated with a fixed- and random-effects model. For *d,* positive numbers indicate approach to congenial information, whereas negative numbers indicate approach to uncongenial information. The fixed effect (random-effect) $Q_B$ reflects the between-groups effect of the variable when entered independently into the fixed effects (random-effects) model. We estimated the fixed-adjusted-effect $Q_B$ using the respective model, with all (nonredundant) defense and accuracy moderators entered simultaneously into a regression equation. To determine the significance of simple effects, we used a two-tailed criterion. Those *d*s within columns not sharing subscripts are significantly different from each other at $p < .05$ according to the fixed-effect model.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

### *Effects of Descriptive Variables*

Some of the effects of the descriptive variables on the congeniality bias (see Table 6) might reflect defense and accuracy motivation. For example, the findings that congeniality biases are enhanced for general issues, real issues, and belief-relevant topics may reflect enhanced defensiveness in these conditions. Real and belief-relevant issues are also more value relevant, so value relevance should be responsible for these associations. Indeed, in analyses controlling for value relevance, neither variable significantly predicted the congeniality bias ($ps > .10$). Why general rather than specific issues (e.g., capital punishment vs. the guilt of a defendant) enhance the congeniality bias is less clear but might reflect the fact that general issues bring to mind many specific beliefs, attitudes, and behaviors. If so, disagreement on general issues may arouse more cognitive conflict than disagreement on specific issues.

Still other findings may support a cognitive mechanism affecting the congeniality bias. For example, the positive association between congeniality and the number of pieces of congenial and uncongenial information in the selection array might suggest that larger arrays make prior attitudes and behaviors more accessible as a basis for the selection. Alternatively, larger arrays may create a cognitive load and hence promote tendencies to rely on heuristics that promote congenial selections (e.g., "if it is (un)congenial, then it is probably (un)reliable"). We also found that congeniality biases were greater when information preferences were measured by rankings as opposed to ratings or *yes*/*no* selections. Perhaps ranking methods require more thought about the information and thereby aid retrieval of past views. Alternatively, ranking methods may force direct comparisons among the information in the array and therefore better highlight the congeniality or uncongeniality of each piece of information. Further, the finding that student samples exhibited a smaller congeniality bias than did nonstudent or mixed samples may be due to more mature individuals' practice with selective exposure. Student samples are ordinarily younger than nonstudent samples and therefore have less experience with the selective exposure process and less developed views (Sears, 1986).

Additional findings may reflect publication practices or methodological changes over time. For example, the congeniality bias was larger in unpublished reports as opposed to published reports. Perhaps the controversial history of selective exposure led journal editors to publish various types of findings, including null ones (see review by Freedman & Sears, 1965). Moreover, the positive correlation between report year and congeniality may reflect improved methodologies through the years. Researchers now possess more refined experimental methods and a better grasp of the competing causes of information selection that must be controlled when studying this issue.

### *Our Review in the Context of the Past Reviews*

More than 2 decades have passed since Frey's (1986) and Cotton's (1985) influential reviews of selective exposure. Guided at least in part by these reviews, many new research reports with innovative methods have emerged since 1986. This accumulation of new data created an ideal opportunity for a review that quantifies the congeniality bias and determines its variability. In doing so, this meta-analysis yielded some conclusions that support the earlier reviews and some that do not.

Our study strongly supported the earlier conclusion that defense motivation enhances the congeniality bias (Cotton, 1985; Frey, 1986). Some of our findings, however, were not obtained in past reviews. For example, past reviews concluded that attitudinal confidence and congeniality are unrelated (Cotton, 1985; Freedman & Sears, 1965), but our results suggested that congeniality is weaker at high (vs. low or moderate) levels of confidence. Moreover, whereas Frey (1986) concluded that congeniality is stronger when decisions are irreversible than reversible (Frey, 1986), our results revealed that congeniality is stronger when decisions are reversible. Yet, Frey's conclusion was based on only two studies (Frey, 1981c; Frey & Rosch, 1984), the first of which presented only congenial information.

In addition to exploring defense motivation, which was the theoretical foundation for the reviews by Cotton (1985) and Frey (1986), our analysis highlighted the critical role of accuracy motivation. Our conclusions on accuracy motivation are reminiscent of Freedman and Sears's (1965) view that although attitudinal selectivity can occur, utility may be a more important guide for information choices. Consistent with this notion, our study showed a moderate-size *un*congeniality bias when the uncongenial information was clearly of higher utility than the congenial information. Our estimates suggested that both defense and accuracy motivations predict exposure decisions but, as the mean effect size signals a predominance of congeniality, defense is a stronger predictor.

Our review has greatly amplified understanding of the variability of selective exposure effects. Whereas past reviews have analyzed effects of moderators only within individual studies, our study examined their effects both between and within studies. Moreover, by coding all studies on all moderators, our conclusions regarding moderators are based on far more information than prior reviews. The new moderators we introduced also proved to be important. For example, we assessed the effect of value relevance on selective exposure and found greater congeniality for high (vs. low) value-relevant topics. All in all, our review advances the selective exposure literature well beyond past reviews.

## *Future Directions*

### *Congeniality at Other Stages of Information Processing*

Past research has examined whether congeniality biases exist at all stages of information processing—exposure, interpretation, and memory. To date, however, only congeniality biases at exposure and memory have been estimated meta-analytically. In this regard, the current review estimated the congeniality bias at exposure to be moderate in size ($d = 0.36$) and influenced by accuracy and defense motivations. In contrast, the congeniality bias in memory was smaller ($d = 0.23$, albeit artificially increased by methodological problems that were prevalent in earlier studies) and was also moderated by accuracy and defense motivations (Eagly et al., 1999). The variance of the overall size of congeniality bias across these two stages is interesting and might suggest that the strength of defense motivation and accuracy motivation varies accordingly. Therefore, to obtain a clearer picture of congeniality biases, future research should explore the size and variability of the bias at information interpretation (Bargh, 1999; Bruner, 1957; Darley & Gross, 1983; Duncan, 1976; Hastorf & Cantril, 1954; Lord, Ross, & Lepper, 1979).

### *Cognitive Factors in Selective Exposure*

Although motivational mechanisms appear to underlie selective exposure, cognitive mechanisms are also likely to be critical. For example, the congeniality bias might increase along with people's ability to retrieve past attitudes, beliefs, and behaviors (e.g., attitude accessibility). Attitudes, beliefs, and past behaviors may automatically influence information selection by making the selections consistent with the retrieved attitude, belief, or behavior (e.g., Chen & Bargh, 1999; Greenwald, McGhee, & Schwartz, 1998). In addition, the ability to retrieve these tendencies may make congenial information easier to process than uncongenial information and hence more attractive (Winkielman & Cacioppo, 2001). Such considerations were not amenable to testing within this meta-analysis, and they are prime candidates for future research. For example, studying the development of selective exposure may show that older children (who have greater resources to recall prior attitudes and behaviors) show an enhanced congeniality bias compared with younger children. In addition, examining factors that affect attitude retrieval may show that factors that impede retrieval of prior attitudes (e.g., distraction) decrease the congeniality bias.

### *Impression Motivation and Selective Exposure*

The kind of information that people select can convey preferences and other personal attributes, leading them to attempt to strategically manage their selections to establish a desired identity. In our meta-analysis, a tendency toward trying to appear unbiased was revealed by a weaker congeniality bias when attitudes, behaviors, and beliefs were not anonymous relative to when they were anonymous (see Table 6). Nonetheless, future research should investigate self-presentation issues in greater depth. For example, the presence of an audience may affect selective exposure by affecting the perceived desirability of appearing receptive versus resolute (Schlenker, 1980, 1985, 2003; see Jonas et al., 2005). In addition to manifesting strategic forms of impression management, people may select information to develop (or maintain) relationships and create a shared reality with likeable others (Higgins, 1992). For example, to maintain a relationship with an attractive group, an individual may select information consistent with its views (Lundgren & Prislin, 1998). In contrast, in order to cut ties from an unattractive group, an individual may select information inconsistent with its views.

### *Controlled and Automatic Processes Underlying Selective Exposure*

A critical consideration for changing and alerting individuals about biases in information selection is whether the selective exposure process is controlled or automatic (e.g., Fiske & Taylor, 1991; Shiffrin & Schneider, 1977). Yet, little research has addressed this question to date. On the one hand, people may make a conscious decision to select congenial information. In this case, the process of selecting information is effortful and intentional, and it occurs with conscious awareness and may be intentionally interrupted. On the other hand, people may reduce dissonance without conscious awareness or intention. In a dramatic demonstration of this fact, patients who suffered from anterograde amnesia (i.e., a condition that prevents the formation of new memories) re-ranked a piece of artwork more positively when they had previously chosen it than when they had not (Lieberman, Ochsner, Gilbert, & Schacter, 2001, Study 1). By the same token, then, defense motivation (and possibly accuracy motivation) may be elicited automatically after retrieving an attitude or making a decision. In this situation, the effects of prior attitudes, beliefs, or behaviors on exposure could be effortless, unintentional, devoid of awareness, and uncontrollable.

To our knowledge, only Fischer et al. (2005, Study 3) have studied the automatic nature of selective exposure. In their study, participants were asked to decide whether to extend the contract of a fictitious manager and then were offered additional information about the manager in either distracting (cognitive load) or nondistracting (control) conditions. The congeniality bias was smaller (and nonsignificantly reversed) in the cognitive-load condition than in the control condition, suggesting a controlled process. Importantly, however, information selection may be more or less automatic depending on the nature of the pursued goals. Defense motivation may be easily satisfied by selecting congenial information, whereas accuracy motivation may require complex procedures that involve conscious monitoring. For example, satisfying defense motivation may require monitoring the direction and quality of the information in relation to a prior attitude, belief, or behavior. In contrast, satisfying accuracy motivation may require monitoring the direction and quality of the information as well as attending to and correcting for any systematic biases in exposure (e.g., Harkness, DeBono, & Borgida, 1985; McAllister, Mitchell, & Beach, 1979; Tetlock, 1983; Tetlock & Kim, 1987). Given these possibilities, future research might explore the automatic and controlled processes that influence information selection.

### *Increasing (or Decreasing) Exposure Through Goal Accomplishment*

The motivation to defend an attitude may lead to seeking more congenial than uncongenial information until defense motivation is satisfied, at which point this motive may become deactivated or inhibited (Zeigarnik, 1927). As a result, if defense or accuracy motivation is satisfied by means of behaviors other than selective exposure (e.g., self-affirmation; Steele, 1988), effects on exposure may be attenuated or possibly reversed. Performing mathematical calculations correctly, for example, may increase the congeniality bias if this behavior satisfies accuracy motivation. This prediction is counterintuitive because the calculations could potentially activate accuracy-related procedures, thus enhancing rather than reducing accuracy.

Another issue deserving of future research is whether satisfaction of defense or accuracy motivation in one information-search domain affects future information selection in other domains. For example, allowing an individual to satisfy defense motivation by selecting and reading congenial information on abortion may result in less defensiveness when selecting information on euthanasia. Such a possibility has important implications for daily life because people often search for information about more than one issue.

### *Practical Implications of Our Meta-Analysis*

Although our study implemented a correlational method to assess the effects of various factors on the congeniality bias and hence possesses the weaknesses associated with this method, it is unlikely that unidentified differences across the studies and conditions could completely account for the effects of the moderators on the congeniality bias. For example, we found that the effects of the moderators generally replicated using only effect sizes from studies that measured or manipulated the moderator variable of interest. In addition, multiple regression analyses showed that the effects of the moderators generally remained significant even after controlling for the other moderators. Moreover, we used various measures of the motivational processes that were of interest (see Figure 1), and the alternate measures generally had the same effect on the congeniality bias.

### *Health-Promotion Intervention Planning*

Selective exposure can have implications for the health and well-being of a society. For example, a recent meta-analysis of intervention acceptance and attrition found that about a quarter of eligible participants turned down an opportunity to participate in an HIV-prevention program (Noguchi, Albarracín, Durantini, & Glasman, 2007). Even more unfortunate, people who rarely wear condoms and hence are most in need of prevention programs were more likely to turn down these programs than people who consistently wear condoms (Noguchi et al., 2007). Presumably, individuals in need of intervention programs are more likely to avoid them because they anticipate that the programs will challenge their behavior.

Despite this resistance, there may be several strategies for increasing participation among an unwilling audience. Individuals may be motivated to attend such programs when the intervention is perceived as facilitating the attainment of valued goals. For example, people may have an inherent need to help others, especially their children (Baumeister, 2005; Maslow, 1968) but not be aware of how this goal can be facilitated by taking part in an HIV-intervention program. If a program is framed as facilitating the ability to provide important knowledge that can be transmitted to one's children and family, people may participate to that end. This approach seems plausible given our finding that people seek *un*congenial information when the information facilitates achieving a current goal (i.e., helping others in this case). Furthermore, prevention programs may increase acceptance rates by minimizing cues that can trigger defense motivation. For example, people may be more willing to participate in a program called a "health discussion group" than an "HIV intervention group" or an "HIV counseling group." By implying an intention to produce change, such words as *intervention* and *counseling* may automatically strengthen defense motivation and increase tendencies to avoid the program (Albarracín, Durantini, Earl, Gunnoe, & Leeper, 2008).

### *Democracy and Selective Exposure*

Individual choice rather than governmental choice of information is characteristic of a democracy. Moreover, democracies rely on the ability of citizens to access a range of available information and make intelligent choices on the basis of this information. Despite having relatively few governmental restrictions on information, citizens may select certain newspapers, televised-news programs, radio programs, and magazines that suit their political ideology. A 2004 survey by The Pew Research Center for the People & the Press (2006) found that Republicans are about 1.5 times more likely to report watching Fox News regularly than are Democrats (34% for Republicans and 20% of Democrats). In contrast, Democrats are 1.5 times more likely to report watching CNN regularly than Republicans (28% of Democrats vs. 19% of Republicans). Even more striking, Republicans are approximately five times more likely than Democrats to report watching "The O'Reilly Factor" regularly and are seven times more likely to report listening to "Rush Limbaugh" regularly.

Our review found a stronger congeniality bias for political issues than for other issues ($d = 0.46$; see Table 6). Moreover, our review suggests strategies for increasing exposure to uncongenial political information among citizens. Individuals should be motivated to seek uncongenial political information when this information best suits their goals. For example, a strong motivation to debate an issue (vs. express one's view) may promote a search for uncongenial information with the objective of providing counterarguments against it (e.g., Albarracín & Mitchell, 2004; Canon, 1964; see also Smith et al., 2007). In addition, citizens might be led to seek uncongenial information if political discussion is framed as an opportunity to build rapport (vs. establish interpersonal distance) with uncongenial audiences (see Lundgren & Prislin, 1998). These important issues deserve future research attention.

## Closing Note

Although information selection could potentially proceed solely under the influence of either the motivation to feel validated or the motivation to gain an accurate understanding of reality, our review suggests that both motivations are important. It seems likely that these often antagonistic tendencies may compensate for the potential dangers of seeking only self-validating or accurate information. Whereas defense motivation facilitates psychological stability and personal validation, accuracy motivation promotes accurate perceptions of reality. Given current evidence, however, it appears that tendencies toward congeniality prevail.

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