

The Influence of Framing on Clinicians' Judgments of the Biological Basis of Behaviors

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Practicing clinicians frequently think about behaviors both abstractly (i.e., in terms of symptoms, as in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed., *DSM-5*; American Psychiatric Association, 2013) and concretely (i.e., in terms of individual clients, as in *DSM-5 Clinical Cases*; Barnhill, 2013). Does abstract/concrete framing influence clinical judgments about behaviors? Practicing mental health clinicians ($N = 74$) were presented with hallmark symptoms of 6 disorders framed abstractly versus concretely, and provided ratings of their biological and psychological bases (Experiment 1) and the likely effectiveness of medication and psychotherapy in alleviating them (Experiment 2). Clinicians perceived behavioral symptoms in the abstract to be more biologically and less psychologically based than when concretely described, and medication was viewed as more effective for abstractly than concretely described symptoms. These findings suggest a possible basis for miscommunication and misalignment of views between primarily research-oriented and primarily practice-oriented clinicians; furthermore, clinicians may accept new neuroscience research more strongly in the abstract than for individual clients.

Keywords: framing effect, mental disorders, clinical reasoning, judgment

Practicing clinicians routinely consider mental disorders at varying levels of specificity. On one hand, clinicians often learn, describe, or read about them abstractly, in terms of symptoms as listed in official nosologies such as the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013; 4th ed., text revision; *DSM-IV-TR*; American Psychiatric Association, 2000). For example, according to the *DSM*, a delusion is a belief that persists even in the face of contradictory evidence. On the other hand, disorders can also be described concretely, in terms of symptoms as instantiated within a person. Concrete descriptions are generated for individual clients by practicing clinicians themselves, as well as in such training manuals as the *DSM-IV-TR Casebook* (Spitzer, Gibbon, Skodol, Williams, & First, 2002) and *DSM-5 Clinical Cases* (Barnhill, 2013). To give a concrete hypothetical example of a delusion, Jenny believes that her next-door neighbor is her husband, although they have never met.

In professional practice, clinicians interact with individual clients and discuss individual client cases with colleagues, supervi-

sors, and trainees. Similarly, clinical training manuals such as the *Casebook* and *Clinical Cases* provide concrete examples of behaviors, embedded within descriptions of individual hypothetical clients, to help clinicians learn the diagnostic criteria in the *DSM*. In fact, some have even suggested that learning the latest diagnostic criteria may be more effectively and efficiently accomplished by reading *DSM-5 Clinical Cases* than by reading the *DSM-5* itself (Davis, 2014). This practice of creating and widely disseminating such casebooks has been carried out with each new version of the *DSM*. Yet it remains wholly unclear as to whether describing the behavior concretely in discussions and in casebooks might change clinicians' perceptions of important basic implications such as possible causes of the behavior or what treatment is most likely to be effective. To our knowledge, the issue has not previously been raised as to whether thinking about concrete descriptions of clients' behaviors could lead to substantially different clinical judgments than thinking about the same behaviors in the abstract. If true, the practical consequences for clinical training could be quite profound. In this paper, we investigate how the level of abstraction with which behaviors are described—as abstract versus concrete descriptions—affects clinically relevant judgments about mental disorder etiology and treatment.

There are at least two systematic ways in which the abstractness and concreteness of behavior descriptions appear to be operationalized in the *DSM Casebooks* and in informal clinical discussions about cases versus in the *DSMs* themselves. The *DSM Casebooks*, for example, specify behaviors (1) in reference to an individual person (2) with details drawn from the context of the person's life. In contrast, the *DSMs* describe behaviors (1) with reference to a category or group of people (2) across generalized contexts. As it happens, these differences map quite precisely to the *abstract/concrete* distinction examined in depth in moral psychology re-

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search (e.g., Mandelbaum & Ripley, 2012; Nichols & Knobe, 2007; Sinnott-Armstrong, 2008), which operationalizes these constructs in the same manner to ascertain their impact on perceptions of free will (e.g., regarding criminal behaviors). Extrapolating in large part from the moral psychology literature, we derived our hypotheses for the current research as follows.

Specifically, we hypothesized two important effects of abstract/concrete framing on perceptions of the causal bases of behaviors. First, we hypothesized that describing a behavior in more concrete terms would lead to a stronger perceived psychological basis for that behavior than when described in abstract terms. This prediction is derived primarily from a substantial body of work in moral psychology on people's intuitions regarding free will. For example, in one experiment, people who read about a deterministic universe written abstractly felt that those living in this universe were not responsible for their own behaviors. However, when people were told about a specific person living in that deterministic universe, they felt that the individual was responsible for his or her behaviors (Nichols & Knobe, 2007). Follow-up research has shown that people receiving concrete information in this paradigm feel more strongly that the individual's actions were best explained in terms of their psychological basis than do people receiving abstract information (Knobe, 2014; Murray & Nahmias, 2014).

The question driving the current experiments was whether the effect of abstract versus concrete framing extends beyond the domain of free will and determinism, such that concrete framing more generally makes the psychological basis of behaviors more salient than does abstract framing. For instance, when a type of behavior (e.g., "directly stating one's negative opinions") is described within a concrete case (e.g., "Brianna told her son that she expects him to fail at everything in life"), people may make automatic inferences about the agent's psychological states. Because concrete descriptions of behaviors tend to make psychological explanations (e.g., Brianna's motives and emotions) more salient than do abstract descriptions, we anticipated that concrete cases would lead to relatively stronger ascriptions of psychological causation. Thus, the aforementioned findings uncovered in the moral psychology literature for free will judgments could conceivably reflect a broader tendency to attribute more psychological causation to more concretely described behaviors. If so, we would expect to find similar effects of framing on beliefs about the causes of mentally disordered behaviors.

One might argue that generalizing such claims to the domain of mental disorders may be challenging because some symptoms of mental disorders (e.g., hallucinations) have been explained by modern science mostly in terms of biological mechanisms. It should be noted, however, that the claim we make here is about relative differences between concrete versus abstract descriptions. That is, we claim that concretely describing such behaviors (e.g., John hears a disembodied voice saying that he is useless) would make the behaviors appear *more* psychological (e.g., implying that John has low self-esteem) than when described in the abstract (e.g., a person experiences hallucinations), albeit not necessarily completely psychological.

Second, we further predicted that abstract descriptions of behaviors would make them appear more biologically based than concrete descriptions. Mental health clinicians acquire biological explanations for behavior by far most frequently in abstract form (e.g., see textbooks, journal articles, etc.). When researchers report

new evidence for the genetic bases of schizophrenia, for example, they report data in the aggregate, from which they have extracted abstract principles to advance our understanding of the disorder in general. It is relatively rare to see any exceptions, and these typically appear as an addendum to the main presentation (e.g., the *American Journal of Psychiatry* sometimes embeds case study boxes inside research articles drawing abstract conclusions). In contrast, whereas clinicians also learn about psychological causes in journals, they may learn about them much more frequently via specific cases. For example, clinicians consider psychological explanations in interacting with people in daily life, working with real-life clients, discussing those clients with experienced clinicians and supervisors as part of their training, reading psychological evaluations of individual case studies in practice, and reading case studies in written materials (e.g., as discussed at length in the *DSM-IV-TR Casebook*; Spitzer et al., 2002; and *DSM-5 Clinical Cases*; Barnhill, 2013).

If it is indeed the case that concrete versions would trigger psychological explanations more, whereas abstract versions would trigger biological explanations more, we should expect an inverse relationship between psychological and biological explanations. In fact, although not in the context of abstract versus concrete framing, clinicians have previously been shown to endorse an inverse relationship between judgments of the biological and psychological nature of different disorders (Ahn, Proctor, & Flanagan, 2009; Miresco & Kirmayer, 2006). That is, disorders that clinicians tended to rate as highly biological (e.g., schizophrenia, mental retardation) were simultaneously rated as not very psychological, whereas other disorders that they tended to rate as highly psychological (e.g., narcissistic personality disorder) were rated as not very biological. Although the above findings could simply reflect the state of scientific knowledge regarding the different disorders (e.g., what mechanisms are most commonly examined in the literature), the current studies will enable us to ascertain whether clinicians reasoning about the exact same disordered behavior framed either abstractly or concretely will continue to endorse this inverse relationship.

This latter prediction also follows from empirical work showing that people have a tendency to discount additional explanations for a phenomenon after they have already accepted another explanation for it (McClure, 1998; Morris & Larrick, 1995), and that they furthermore tend to see biology and psychology as competing explanations for behavior (in lay people; Preston, Ritter, & Hepler, 2013). Indeed, evidence suggests that people see biology and psychology as ontologically distinct causal mechanisms rather than merely different levels of analysis (Bloom, 2004). Thus, we expect that supplying more salient psychological explanations will lead people to discount the biological basis of that behavior (Ahn & Bailenson, 1996; Kelley, 1973). That is, to the extent that concrete framing makes a behavior appear more psychologically based, it will also make that behavior appear less biologically based. Across two experiments conducted with practicing mental health clinicians, we tested these two hypotheses—that describing a behavior in more concrete terms would lead to a stronger perceived psychological basis for that behavior than when described in abstract terms, and that abstract descriptions of behavior would make them appear more biologically based than concrete descriptions.

In Experiment 1, we presented clinicians with abstract and concrete versions of the same maladaptive behaviors, and asked them to judge the psychological and biological bases of both versions. On the one hand, clinicians may show an effect of abstract/concrete framing for the reasons discussed earlier. Such results would clearly indicate that clinicians do not perceive manual and casebook descriptions of the same symptoms as having the same causes to the same degree. On the other hand, experienced clinicians are highly familiar with both the *DSM-IV-TR* (American Psychiatric Association, 2000) and the *DSM-IV Casebook* (Spitzer et al., 2002), and have been explicitly trained to identify concrete cases as examples of the corresponding abstract symptoms. These extensive experiences with both abstract and concrete descriptions may inoculate clinicians against effects of framing.

Experiment 2 then tested whether abstract versus concrete framing affects clinicians' judgments of the effectiveness of treatments that may be assumed to have psychological mechanisms of direct action (i.e., psychotherapy) or biological mechanisms of direct action (i.e., medication). Prior work has shown that clinicians believe that medication is more effective for biologically based disorders than psychotherapy, and that psychotherapy is more effective for psychologically based disorders than medication (Ahn et al., 2009). Thus, if the abstract/concrete framing effect were obtained in Experiment 1, it would have downstream consequences for clinicians' perceived effectiveness of these treatments. Specifically, for the exact same symptoms, medication should be seen as relatively more effective when disorder symptoms are described abstractly than concretely, and psychotherapy should be seen as relatively more effective when symptoms are described concretely rather than abstractly.

Experiment 1: Judging the Biological and Psychological Bases of Symptoms

Participants

Recruitment postcards were mailed to practicing mental health clinicians across the United States listed in a public directory (<http://therapists.psychologytoday.com>). A total of 54 clinicians participated for a \$20 Amazon gift certificate. The response rate based on the number of successfully delivered recruitment postcards was 13.7%, which was comparable with that of other published studies of mental health clinicians (e.g., Lebowitz & Ahn, 2014; Rottman, Ahn, Sanislow, & Kim, 2009). Of these, 34 clinicians participated in the main experiment; 12 had MD degrees and 22 had non-MD health professional graduate degrees (i.e., 5 PhDs, 1 PsyD, 3 LCSWs, 13 "other"), and they had been licensed for a mean of 14.7 years ($SD = 9.8$). Sixteen primarily provided both medication and psychotherapy to their clients, 16 provided only psychotherapy, 1 provided only medication, and 1 declined to respond. On average, clinicians reported providing/referring 52.7% of their clients for medication, and 78.2% for psychotherapy. The remaining 20 mental health clinicians completed a pretest of the stimulus materials. For all participants, after giving a complete description of the study, written informed consent was obtained.

Materials

We selected six hallmark symptoms of well-known disorders in the DSM (equally applicable to *DSM-IV-TR*; American Psychiat-

ric Association, 2000; and *DSM-5*; American Psychiatric Association, 2013; see Table 1). For each item, we wrote an abstract version approximating the level of description in the *DSM-IV-TR* (American Psychiatric Association, 2000) and *DSM-5* (American Psychiatric Association, 2013), and a corresponding concrete version detailing behaviors exhibited by a specific person (approximating the level of description in the *DSM-IV-TR Casebook*; Spitzer et al., 2002; and *DSM-5 Clinical Cases*; Barnhill, 2013). To ensure that the abstract materials were abstract and that the concrete materials were concrete in nature, we followed two simple rules: In the concrete versions we listed specific individuals' names and instantiated all behaviors in the context of the person's life for the casebook versions; in the abstract versions, we referred to disorders in general instead of individuals, and described the behaviors without reference to a specific person's life. The two versions were roughly equated for length (total word count of 5,495 for the concrete versions of the items and 5,505 for the abstract versions).

Materials Pretest

We conducted a pretest to document the perceived correspondence between the abstract and concrete versions of each item. Each item was shown on a separate page, and the two versions of each item were presented side by side. We used two different questions and rating scales to achieve our central goal in pretesting the materials. Namely, we needed to verify that the two versions of each item within each pair were perceived to refer to the same behavior or symptom. This goal required pretesting because, for instance, we had to ensure that we had not picked an idiosyncratic example of any given symptom rather than a representative or typical example, which could in turn make the biological or psychological bases of the example seem different from the symptom when described abstractly. Thus, we employed pretesting questions that attempted to measure the representativeness of the exemplars and the goodness of the abstract descriptions.

Specifically, clinicians were asked whether the abstract version of each item was "a good abstract description" of its corresponding concrete version on a scale from 1 (*a very poor description*) to 9 (*a very good description*), or whether the concrete version was "a good example" of the abstract version on a scale from 1 (*a very poor example*) to 9 (*a very good example*). As an attentional check, two filler items not designed to be equivalent were included. Only one participant failed this check, suggesting that most participants understood the pretest questions and paid attention to them. Of the remaining 19 pretest clinicians, 11 judged whether the abstract version was "a good abstract description" of the concrete version, yielding a mean rating of 7.44 ($SD = 0.70$). Eight participants judged whether the concrete version was "a good example" of the abstract version, yielding a mean rating of 8.06 ($SD = 0.50$). Item analyses across both judgments showed that they significantly exceeded the midpoint of 5; $t(11) = 34.87, p < .001, 95\% CI [2.26, 3.18]$.

Procedure

All experiments were programmed using the online survey software *Qualtrics* (Qualtrics Labs, 2005). Participants rated the extent to which each behavior in Table 1 is "psychologically based" and "biologically based" on separate scales from 1 (*not at all*) to 9

Table 1
Stimuli for Experiments 1–2

Item	Text version	
	Concrete	Abstract
Delusional thoughts and behaviors	Jenny has developed the strong belief that the man living next door is her husband; she sometimes follows him when he is driving, and she sends hate mail to his actual wife, though she has never actually met either of them in person.	This disorder is characterized by delusional thoughts and behaviors; it involves coming up with strange beliefs that are contrary to fact and that persist strongly, influencing daily behaviors, despite having no evidence to support them.
Manic beliefs and behaviors	Eric effusively talks about his dozens of highly unrealistic business ideas, which he thinks are guaranteed to make him millions of dollars; he erroneously believes that he is irresistibly attractive to much younger women, and is oblivious to their rejections.	This disorder is characterized by manic beliefs and behaviors; it involves holding extremely positive self-views, which are often completely unfounded in reality, and often talking excitedly about all of these beliefs, despite the fact that they are untrue.
Loss of pleasure	Dan no longer shows interest in most activities, no longer taking pleasure in golfing or long country drives, even though these used to be some of his very favorite weekend activities.	This disorder is characterized by loss of pleasure; it involves feeling a substantially diminished interest in most activities, including activities found enjoyable in the past.
Repetitive, compulsive behaviors	Sarah locks each of her windows three times whenever she leaves her house in order to prevent a burglary, she uses a new bar of soap every time she washes her hands, and she runs a virus scan on her computer every hour, even when her computer is disconnected from the Internet.	This disorder is characterized by repetitive behaviors; it involves feeling compelled to repeatedly engage in behaviors aimed at preventing some dreaded event, even though these behaviors are not a realistic means for preventing what they are intended to prevent.
Feelings of worthlessness/guilt	Chris believes that he is incompetent at his job, despite excellent performance evaluations, and blames himself for his company's recent financial losses that were actually caused by uncontrollable circumstances; when a busy coworker passes by him without engaging in a lengthy conversation, he thinks it is because he is inherently unlikeable.	This disorder is characterized by feelings of worthlessness, with unrealistically negative self-evaluations; it involves an exaggerated sense of guilt and personal responsibility for negative occurrences, and interpreting neutral, day-to-day events as evidence of personal defects, even though these occurrences are not realistic reflections of poor character.
Recurrent nightmares	Mike has nightmares almost every night; he often dreams that he is a passenger on an airplane that is out of control and about to crash, or that he has been kidnapped by a serial killer who is planning to torture him.	This disorder is characterized by frequent nightmares; it involves having terrifying dreams more nights than not, which often portray threats to physical safety and may involve life-threatening situations.

(completely) on the same screen. The order of ratings was counterbalanced; half of the participants always completed the psychological ratings first, and half completed the biological ratings first.

All clinicians rated both the abstract and concrete versions of all six items. Items were ordered so that the abstract and concrete versions of a given item appeared in separate halves of the presentation sequence. For half of the participants, the first half of the experiment presented three of the items as abstract (delusions, loss of pleasure, repetitive behaviors) and the other three as concrete (mania, feelings of worthlessness, recurrent nightmares), and the second half of the experiment presented the opposite version of each item. For the other half of participants, the order of these item groups was reversed. Within each half of the experiment, the six items were presented in a random order, and the two halves were presented contiguously. Finally, all participants reported information about their clinical background and practice.

Results and Discussion

In both experiments, the results did not differ by any of the counterbalancing factors, so these will not be discussed further. All analyses in both experiments were two-tailed and conducted at the $\alpha = .05$ level, and paired comparisons were Bonferroni-corrected.

We predicted that the perceived causal bases of the behaviors would be influenced by abstract versus concrete framing. Indeed, a 2 (Cause: Biological, Psychological) \times 2 (Framing: Abstract, Concrete) repeated measures analysis of variance (ANOVA) on participants' mean judgments across items revealed an interaction of Cause and Framing, $F(1, 33) = 23.96$; $MSE = 0.52$; $p < .001$; $\eta_p^2 = .42$ (Figure 1). Clinicians judged items to be significantly less psychologically based when presented abstractly ($M = 4.55$; $SD = 1.61$) than when presented concretely ($M = 5.15$; $SD = 1.42$; $t(33) = 4.78$; $p < .001$; $\eta_p^2 = .41$; 95% CI [0.35, 0.87]), and significantly more biologically based when presented abstractly ($M = 5.98$; $SD = 1.42$) than when presented concretely ($M = 5.36$; $SD = 1.30$; $t(33) = 4.77$; $p < .001$; $\eta_p^2 = .41$; 95% CI [0.35, 0.86]).¹ (See also Appendix for analyses treating both participants and items as random factors.)

¹ This interaction also held up considering only the first judgments made, with cause as a between-subjects variable, $F(1, 32) = 29.38$, $p < .001$, $\eta_p^2 = .48$, addressing a potential concern that the results are merely due to participants' reversing their responses to the second judgment made for each item.

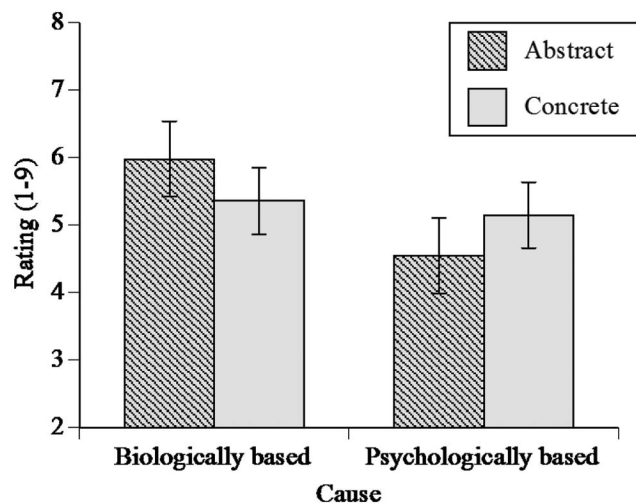


Figure 1. Clinicians' (Experiment 1) judgments of the biological and psychological bases of disorder symptoms. Bars depict 95% confidence intervals corrected for within-subjects comparison (Cousineau, 2005; Morey, 2008).

This framing effect yielded a strongly negative correlation between the perceived psychological and biological bases of the behaviors. In fact, negative correlation coefficients were found for all 34 participants (average $r = -.94$ across items). This pattern also held across items (averaging across participants), $r(10) = -.98$; $p < .001$.²

Finally, we examined whether this framing effect is limited to clinicians without (presumably science-oriented) medical training. Grouping participants based on whether they received medical degrees or not, we conducted a 2 (Training: MD, non-MD) \times 2 (Cause: Biological, Psychological) \times 2 (Framing: Abstract, Concrete) mixed-model ANOVA. Most critically, this analysis revealed no three-way interaction ($p = .479$; $\eta_p^2 < .02$); that is, MDs were no less susceptible to the framing effect than non-MDs (see Table 2). There was just one two-way interaction involving training, and no other interaction or main effect of training (all p values $\geq .313$). Specifically, there was an interaction of cause (biological; psychological) and training (MD, non-MD; $F(1, 32) = 13.16$; $p < .001$; $\eta_p^2 = .29$). Paired-sample t tests showed that MDs endorsed biological causes ($M = 6.63$; $SD = 0.71$) more strongly overall than psychological causes ($M = 3.92$; $SD = 1.04$; $t(11) = 5.95$; $p < .001$; 95% CI [1.70, 3.70]). In contrast, there was no evidence that non-MD clinicians rated biological causes ($M = 5.15$; $SD = 1.27$) and psychological causes ($M = 5.36$; $SD = 1.44$) differently overall ($p = .701$; 95% CI [-1.32, 0.91]). Again, however, the presence of this two-way interaction does not indicate that such an overall difference would influence the key finding of the interaction of cause and framing; there is still no evidence that the critical interaction of cause and framing was moderated by training.

Experiment 2: Judgments of Treatment Effectiveness

In Experiment 2, we asked whether abstract versus concrete framing influences not only judgments about the causes of disorder symptoms, but also practical judgments about the efficacies of

common treatment types. In line with Experiment 1, we hypothesized that medication would be seen as more effective for the abstract than for the concrete version of the same item, and vice versa for psychotherapy. Such findings would suggest that effects of framing extend into practical clinical judgments, potentially even playing a role in influencing what treatments are recommended.

Participants

Forty practicing, licensed mental health clinicians who did not participate in Experiment 1 were recruited and compensated in the same way as in Experiment 1. The response rate was 12.5%. Twenty-two had MD degrees and 18 had non-MD graduate degrees (i.e., 3 PhDs, 2 PsyDs, 5 LCSWs, 8 "Other") and had been licensed for a mean of 14.3 years ($SD = 12.9$). Twenty-two primarily provided both medication and psychotherapy, 16 provided only psychotherapy, 1 provided only medication, and 1 declined to respond. On average, clinicians reported providing/referring 59.9% of their own clients for medication, and 86.7% for psychotherapy. After a complete description of the study to the subjects, written informed consent was obtained.

Materials and Procedure

The materials and procedure were the same as in Experiment 1, except that instead of judging the biological and psychological bases of each item, participants judged to what extent they believed psychotherapy and medication, respectively, would be an effective treatment. Judgments were made on separate scales from 1 (*not at all*) to 9 (*completely*). Participants were told that psychotherapy refers to "treatment by psychological means, involving repeated verbal interactions between a clinician and a client" and that medication refers to "treatment by psychiatric, psychoactive, or psychotropic drugs" (Ahn et al., 2009).

Results and Discussion

Our key prediction was that the perceived relative effectiveness of medication and psychotherapy would be affected by abstract versus concrete framing. A 2 (Treatment: Medication, Psychotherapy) \times 2 (Framing: Abstract, Concrete) repeated measures ANOVA revealed the predicted interaction of treatment and framing, $F(1, 39) = 27.16$; $MSE = 0.26$; $p < .001$; $\eta_p^2 = .41$. An interaction of similar magnitude was obtained for the first judgments made by each participant, $F(1, 38) = 20.58$; $p < .001$; $\eta_p^2 = .35$. (See also Appendix for analyses treating both participants and items as random factors.)

As hypothesized, practicing clinicians judged medication to be significantly more effective when items were presented abstractly ($M = 6.58$; $SD = 0.91$) than when presented concretely ($M = 5.82$; $SD = 1.14$; $t(39) = 7.06$; $p < .001$; $\eta_p^2 = .56$; 95% CI [0.54, 0.98]; Figure 2). Judgments of the effectiveness of psychotherapy did not significantly differ by abstract ($M = 6.30$; $SD = 1.35$) versus concrete framing ($M = 6.38$; $SD = 1.35$; $p = .460$; $\eta_p^2 =$

² These results also held up using only the first judgment made by each participant ($N = 19$ for biological judgments and $N = 15$ for psychological judgments), $r(10) = -.89$; $p < .001$.

Table 2
Experiment 1 Mean Ratings by Type of Clinical Training

	Rating			
	Biological: abstract	Biological: concrete	Psychological: abstract	Psychological: concrete
Clinicians with MD degrees	7.0 [6.4, 7.6]	6.3 [5.8, 6.8]	3.5 [2.9, 4.1]	4.3 [3.8, 4.8]
Clinicians with non-MD degrees	5.4 [4.8, 6.1]	4.9 [4.3, 5.5]	5.1 [4.4, 5.8]	5.6 [5.0, 6.2]

Note. 95% confidence intervals (Cousineau, 2005; Morey, 2008) are in brackets.

.01; 95% CI [-0.12, 0.26]). This null effect in the psychotherapy judgments may be attributed in part to the fact that every clinician in our sample except one practices psychotherapy themselves, and 40% said they do not use medication at all, suggesting that these clinicians generally consider psychotherapy to be something of a default treatment in practice. This general preference seems likely to have masked any framing effect for psychotherapy judgments. Indeed, Lebowitz and Ahn (2014) found that clinicians' ratings of perceived treatment effectiveness of psychotherapy were greater than 4.5 on a 7-point scale in all mental disorders except for schizophrenia, one of the most biologically construed mental disorders. Given this general endorsement of psychotherapy by clinicians, it is possible that mere framing, which is a very subtle manipulation, might not have been strong enough to affect the judgments of psychotherapy effectiveness. Overall, abstract versus concrete framing seems to be influential in judgments of medication but not psychotherapy effectiveness.

Nonetheless, as in Experiment 1, 85% of clinicians gave negatively correlated ratings of the effectiveness of psychotherapy and medication (average correlation coefficient of $-.43$). This pattern held across items, $r(10) = -.64$, $p = .012$, and using only the first judgment made by each participant, $r(10) = -.68$, $p = .007$. Thus,

to the extent that clinicians see medication as more effective, psychotherapy is seen as less effective.

As in Experiment 1, a 2 (Training: MD, non-MD) \times 2 (Treatment: Medication, Psychotherapy) \times 2 (Framing: Abstract, Concrete) ANOVA revealed no three-way interaction ($p = .837$; $\eta_p^2 < .01$; see Table 3). Therefore, clinicians' susceptibility to the framing effect seems unaffected by formal medical training.

General Discussion

Our findings provide new evidence that abstract/concrete framing yields differences in practicing clinicians' perceptions of the biological and psychological bases of behaviors. Contrary to the implicit assumption that reading nosology casebooks and having informal discussions about specific client cases are forms of training essentially equivalent to learning about symptoms in the abstract, the current research indicates that such differences in presentation (i.e., concrete vs. abstract framing) may yield relative differences in causal attributions of symptoms. Moreover, clinicians were influenced by framing in judging the effectiveness of psychopharmacological treatments for symptoms. Having completed a medical degree, which requires background education in the basic sciences, including biology and chemistry, did not mitigate these effects of framing; clinicians with and without MDs were affected by framing to a comparable degree across both experiments.

Our experiments have important implications for understanding how clinicians explain disorders and decide between different kinds of treatments (e.g., psychotherapy; medication) when thinking about disorders in the abstract versus concrete cases of clients. Clinicians may tend to think in the abstract when they are conducting and reading experimental and quasiexperimental research (e.g., clinical trials), reading textbooks, the *DSM* or *ICD*, or discussing disorders per se. Clinicians may tend to think in concrete terms when conducting and reading case studies and qualitative research, reading casebooks, discussing clients, and when they are interacting one-on-one with clients. The current results suggest that different kinds of symptom causes and treatment options may look more or less plausible depending on whether clinicians reason in the abstract or within concrete cases. One limitation of the current research is that it cannot determine which context, abstract or concrete, is more valid, making it difficult to conclude what would constitute a rational approach. Nonetheless, the current findings suggest that we should be mindful about the potential tendency to be swayed by framing. Another possible limitation is that we used artificial vignettes to depict the concrete cases; they are certainly no more artificial than what one finds in

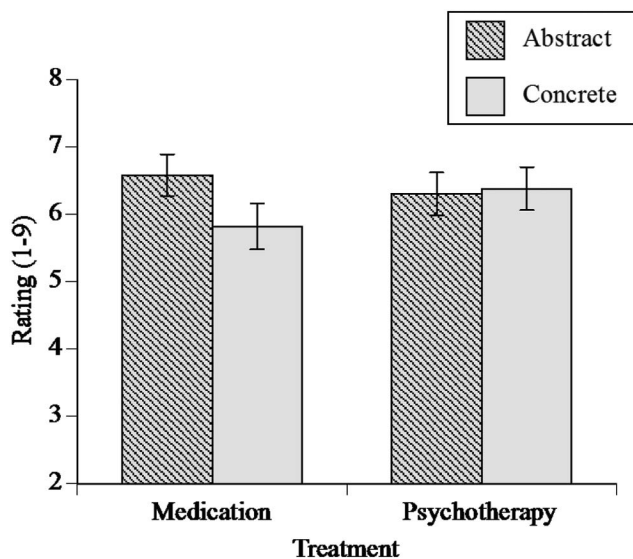


Figure 2. Clinicians' (Experiment 2) judgments of treatment effectiveness. Bars depict 95% confidence intervals corrected for within-subjects comparison (Cousineau, 2005; Morey, 2008).

Table 3
Experiment 2 Mean Ratings by Type of Clinical Training

	Rating			
	Medication: abstract	Medication: concrete	Psychotherapy: abstract	Psychotherapy: concrete
Clinicians with MD degrees	6.6 [6.2, 6.9]	5.9 [5.5, 6.3]	6.5 [6.1, 6.8]	6.7 [6.3, 7.1]
Clinicians with non-MD degrees	6.6 [6.1, 7.1]	5.7 [5.1, 6.3]	6.1 [5.5, 6.7]	6.0 [5.4, 6.5]

Note. 95% confidence intervals (Cousineau, 2005; Morey, 2008) are in brackets.

clinical casebooks, but of course they do not represent the full range of formats in which clinicians can receive information about clients. Yet employing a controlled, experimental method enabled us to draw cause–effect conclusions about the influence of framing on judgments. Moreover, even stronger influences of framing might be expected to emerge when comparing reasoning abstractly about behaviors to reasoning about one’s own clients. This is because inferences to psychological states (e.g., feelings, motivations, desires, etc.) may be stronger with actual clients, masking biological bases of behaviors even more strongly. Future studies conducted in which clinicians receive information about clients in the formats in which they encounter it in clinical sessions would further increase the practical scope of this work.

Finally, although all of the critical effects and interactions were characterized by moderately strong effect sizes ranging from $\eta_p^2 = .41$ to $.56$, the relative differences between means was not extremely large. It is not clear exactly how such differences on each scale would map to, say, clinicians’ real-time decision making, and this is an important question that remains for future work to examine. It is interesting to note that when clinicians actually interact with their clients, they are typically presented with a much larger amount of concrete information than we presented in the current study, including facial expressions, gestures and mannerisms, and much more detailed accounts of their symptoms, background, and history. Thus, the framing effects found in the current study may, in fact, be even more pronounced in real life.

In the current work, we suggest some key ways in which the *DSMs* and *DSM Casebooks* may systematically differ, yet which seem not to have been previously considered in their creation and dissemination. The relative influences of specifying a person by name and of specifying detail within the context of the person’s life on clinical judgments should be teased apart in future work. To uncover additional differences with the potential to influence clinical judgment, we also conducted post hoc item analyses of the abstract versus concrete texts using the Linguistic Inquiry and Word Count (LIWC) software (Pennebaker, Booth, & Francis, 2007). These suggested that the abstract cases contained a higher proportion of longer words (i.e., more than six letters long; $M = 0.44$; $SD = .04$) than did the concrete cases ($M = 0.24$; $SD = .10$; $t(10) = 4.56$; $p = .001$; 95% CI [0.10, 0.30]). In addition, the abstract versions of items contained a lower percentage of words referring to social processes ($M = 0.07$; $SD = 0.02$) than did the concrete versions ($M = 0.18$; $SD = .10$; $t(10) = -2.53$; $p = .030$; 95% CI [−0.21, −0.01]), and a higher percentage of words referring to cognitive processes ($M = 0.22$; $SD = 0.06$) than did the concrete versions ($M = 0.14$; $SD = .02$; $t(10) = 3.10$; $p = .011$; 95% CI [0.02, 0.14]). (Also of note is the null finding that percentages of emotion words—positive and negative—did not differ

between the two versions; p values $\geq .338$.) These additional factors may be viewed as possible consequences of abstract manual versus concrete casebook framing and should be made clear to clinical trainees and educators, as well as systematically studied in future research for their possible influence on clinical judgments. Such work may also be important for writers of future case studies and casebooks to keep in mind, especially if these sources are intended for training purposes.

There are a number of potential situations in which the framing effect could directly and indirectly influence clinical practice. First, the pace and quantity of research conducted to uncover biological underpinnings of psychopathology have been rapidly increasing. Our findings suggest that even when practicing clinicians accept and adopt biological findings in the abstract, they may be less accepting of them when faced with real, individualized cases. Given that such differences could potentially even influence decisions about psychopharmacological treatment recommendations, clinicians should be made aware of this possible tendency. Clinical faculty members will also need to be cognizant of the ramifications of using concrete cases, as opposed to abstract principles, when training new clinicians about biological bases of behaviors.

In addition, the framing effect we have uncovered suggests one potential source of miscommunication between practicing clinicians and clients. Practicing clinicians deal with numerous individualized cases, but they are likely to have much more experience thinking about disorders in the abstract than do their clients. Thus, when explaining the biological bases of a client’s disorder or proposing medication as a treatment plan to the client, practicing clinicians should consider discussing the disorder in the abstract rather than in terms of the client’s specific situation.

Similarly, the framing effect can be a potential source of misalignment of views between different clinicians; in particular, between clinicians who are researchers studying disorders who are not in clinical practice and clinicians who are exclusively engaged in practice. The former may spend more time thinking about disorders in the abstract than about individual clients; the latter may experience the reverse. Consequently, the two groups, on average, might reasonably be expected, given the current findings, to exhibit different views overall on the causes and effectiveness of treatments for disorders. Additional research may determine whether this is the case.

While the current study found that abstract versus concrete framing affected the perceived acceptability of biological versus psychological causes, it is interesting to speculate upon the possibility that the reverse also holds. That is, upon learning that a mental disorder is biologically based, clinicians may generally perceive mental disorder

more abstractly. Subsequently, they may feel more psychological distance from people with that mental disorder. This process may at least partially explain recent findings in which biological explanations of mental disorders tend to increase people's desire to keep their social distance from patients with mental disorders (Bag, Yilmaz, & Kirpinar, 2006; Grausgruber, Meise, Katschnig, Schöny, & Fleischhacker, 2007; Martin, Pescosolido, Olafsdottir, & McLeod, 2007; but see Jorm & Griffiths, 2008). Indeed, clinicians' empathy toward hypothetical patients was reduced given biological explanations than psychosocial explanations for their symptoms (Lebowitz & Ahn, 2014). In some cases, clinicians even exhibit discriminatory behavior toward people with mental health problems, showing reluctance to support a mental health project in their own neighborhood (Wilmoth, Silver, & Severy, 1987) or to work alongside people with a severe mental disorder (Lawrie et al., 1998). Given the current findings, a possible measure that can be taken to counteract any such stigma is to highlight the psychological bases of mental disorders. This may help people to perceive the case as much more concrete, subsequently reducing their desire for social distance from the person.

Given the current findings, future work should also be conducted to explore whether abstract presentations of symptoms, relative to concrete ones, can inadvertently trigger the dehumanization effects that have been previously documented for a wide range of social categories (Harris & Fiske, 2006; Haslam, 2006; Loughnan & Haslam, 2007). Prior work has extensively examined how certain social categories (e.g., children) tend to be dehumanized systematically by likening them to animals (e.g., they may be denied uniquely human traits such as high intelligence and morality), while other categories (e.g., businesspeople) are instead dehumanized by likening them to automata (e.g., they may be denied fundamental attributes of human nature such as emotionality and flexibility; Haslam, 2006). To the extent that the salience of psychological traits in general aligns with the accessibility of uniquely human and/or human nature attributes, we might expect to see a parallel effect of abstract/concrete framing on the tendency to dehumanize those with mental disorders. Indeed, Haque and Waytz (2012) hypothesized that making an effort to individuate medical patients (and providers) may reduce dehumanization effects. Additional work can determine whether or not this is the case.

References

- Ahn, W. K., & Bailenson, J. (1996). Causal attribution as a search for underlying mechanisms: An explanation of the conjunction fallacy and the discounting principle. *Cognitive Psychology*, *31*, 82–123. <http://dx.doi.org/10.1006/cogp.1996.0013>
- Ahn, W. K., Proctor, C. C., & Flanagan, E. H. (2009). Mental health clinicians' beliefs about the biological, psychological, and environmental bases of mental disorders. *Cognitive Science*, *33*, 147–182. <http://dx.doi.org/10.1111/j.1551-6709.2009.01008.x>
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Bag, B., Yilmaz, S., & Kirpinar, I. (2006). Factors influencing social distance from people with schizophrenia. *International Journal of Clinical Practice*, *60*, 289–294. <http://dx.doi.org/10.1111/j.1368-5031.2006.00743.x>
- Barnhill, J. W. (Ed.). (2013). *DSM-5 clinical cases*. Washington, DC: American Psychiatric Publishing. <http://dx.doi.org/10.1176/appi.books.9781585624836>
- Bloom, P. (2004). *Descartes' baby: How the science of child development explains what makes us human*. New York, NY: Basic Books.
- Cousineau, D. (2005). Confidence intervals in within-subject designs: A simpler solution to Loftus and Masson's method. *Tutorials in Quantitative Methods for Psychology*, *1*, 42–45.
- Davis, R. A. (2014). DSM-5 clinical cases. *The American Journal of Psychiatry*, *171*, 586–587. <http://dx.doi.org/10.1176/appi.ajp.2014.14020214>
- Grausgruber, A., Meise, U., Katschnig, H., Schöny, W., & Fleischhacker, W. W. (2007). Patterns of social distance towards people suffering from schizophrenia in Austria: A comparison between the general public, relatives and mental health staff. *Acta Psychiatrica Scandinavica*, *115*, 310–319. <http://dx.doi.org/10.1111/j.1600-0447.2006.00882.x>
- Haque, O. S., & Waytz, A. (2012). Dehumanization in medicine: Causes, solutions, and functions. *Perspectives on Psychological Science*, *7*, 176–186. <http://dx.doi.org/10.1177/1745691611429706>
- Harris, L. T., & Fiske, S. T. (2006). Dehumanizing the lowest of the low: Neuroimaging responses to extreme out-groups. *Psychological Science*, *17*, 847–853. <http://dx.doi.org/10.1111/j.1467-9280.2006.01793.x>
- Haslam, N. (2006). Dehumanization: An integrative review. *Personality and Social Psychology Review*, *10*, 252–264. http://dx.doi.org/10.1207/s15327957pspr1003_4
- Jorm, A. F., & Griffiths, K. M. (2008). The public's stigmatizing attitudes towards people with mental disorders: How important are biomedical conceptualizations? *Acta Psychiatrica Scandinavica*, *118*, 315–321. <http://dx.doi.org/10.1111/j.1600-0447.2008.01251.x>
- Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist*, *28*, 107–128. <http://dx.doi.org/10.1037/h0034225>
- Knobe, J. (2014). Free will and the scientific vision. In E. Machery & E. O'Neill (Eds.), *Current controversies in experimental philosophy* (pp. 69–85). New York, NY: Routledge. <http://dx.doi.org/10.1093/acprof:osobl/9780199927418.001.0001>
- Lawrie, S. M., Martin, K., McNeill, G., Drife, J., Chrystie, P., Reid, A., . . . Ball, J. (1998). General practitioners' attitudes to psychiatric and medical illness. *Psychological Medicine*, *28*, 1463–1467. <http://dx.doi.org/10.1017/S0033291798007004>
- Lebowitz, M. S., & Ahn, W. K. (2014). Effects of biological explanations for mental disorders on clinicians' empathy. *Proceedings of the National Academy of Sciences of the United States of America*, *111*, 17786–17790. <http://dx.doi.org/10.1073/pnas.1414058111>
- Loughnan, S., & Haslam, N. (2007). Animals and androids: Implicit associations between social categories and nonhumans. *Psychological Science*, *18*, 116–121. <http://dx.doi.org/10.1111/j.1467-9280.2007.01858.x>
- Mandelbaum, E., & Ripley, D. (2012). Explaining the abstract/concrete paradoxes in moral psychology: The NBAR hypothesis. *Review of Philosophy and Psychology*, *3*, 351–368. <http://dx.doi.org/10.1007/s13164-012-0106-3>
- Martin, J. K., Pescosolido, B. A., Olafsdottir, S., & McLeod, J. D. (2007). The construction of fear: Americans' preferences for social distance from children and adolescents with mental health problems. *Journal of Health and Social Behavior*, *48*, 50–67. <http://dx.doi.org/10.1177/002214650704800104>
- McClure, J. (1998). Discounting causes of behavior: Are two reasons better than one? *Journal of Personality and Social Psychology*, *74*, 7–20. <http://dx.doi.org/10.1037/0022-3514.74.1.7>
- Miresco, M. J., & Kirmayer, L. J. (2006). The persistence of mind-brain dualism in psychiatric reasoning about clinical scenarios. *The American Journal of Psychiatry*, *163*, 913–918. <http://dx.doi.org/10.1176/appi.ajp.163.5.913>
- Morey, R. D. (2008). Confidence intervals from normalized data: A correction to Cousineau (2005). *Reason*, *4*, 61–64.
- Morris, M. W., & Larrick, R. P. (1995). When one cause casts doubt on another: A normative analysis of discounting in causal attribution. *Psy-*

- chological Review*, 102, 331–355. <http://dx.doi.org/10.1037/0033-295X.102.2.331>
- Murray, D., & Nahmias, E. (2014). Explaining away incompatibilist intuitions. *Philosophy and Phenomenological Research*, 88, 434–467. <http://dx.doi.org/10.1111/j.1933-1592.2012.00609.x>
- Nichols, S., & Knobe, J. (2007). Moral responsibility and determinism: The cognitive science of folk intuitions. *Noûs*, 41, 663–685. <http://dx.doi.org/10.1111/j.1468-0068.2007.00666.x>
- Pennebaker, J. W., Booth, R. J., & Francis, M. E. (2007). Linguistic Inquiry and Word Count: LIWC [Computer software]. Austin, TX: LIWC.net.
- Preston, J. L., Ritter, R. S., & Hepler, J. (2013). Neuroscience and the soul: Competing explanations for the human experience. *Cognition*, 127, 31–37. <http://dx.doi.org/10.1016/j.cognition.2012.12.003>
- Qualtrics Labs. (2005). *Qualtrics Labs* (Version 39660) [Computer software]. Provo, UT: Author.
- Rottman, B. M., Ahn, W. K., Sanislow, C. A., & Kim, N. S. (2009). Can clinicians recognize *DSM-IV* personality disorders from five-factor model descriptions of patient cases? *The American Journal of Psychiatry*, 166, 427–433. <http://dx.doi.org/10.1176/appi.ajp.2008.08070972>
- Sinnott-Armstrong, W. (2008). Abstract + concrete = paradox. In J. Knobe and S. Nichols (Eds.), *Experimental philosophy* (pp. 209–230). Oxford: Oxford University Press.
- Spitzer, R. L., Gibbon, M., Skodol, A. E., Williams, J. B. W., & First, M. B. (2002). *DSM-IV-TR casebook: A learning companion to the diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: American Psychiatric Association. <http://dx.doi.org/10.1176/appi.books.9781585622665>
- Wilmoth, G. H., Silver, S., & Severy, L. J. (1987). Receptivity and planned change: Community attitudes and deinstitutionalization. *Journal of Applied Psychology*, 72, 138–145. <http://dx.doi.org/10.1037/0021-9010.72.1.138>

Appendix

Linear Mixed-Effect Regression Analyses

To supplement the standard analyses of variance reported in the manuscript, we also ran a linear mixed-effect regression in each study in order to account for random effects, which were fully specified in each model for participant and item. Each model included fixed effects of cause (or treatment), framing, and their interaction. Two-level categorical predictors were sum-coded. To unpack significant interaction effects, we also examined paired comparisons by conducting additional mixed-effect regression models on psychological and biological ratings separately. In keeping with current conventions, *t*-values equal to or exceeding 2.0 were treated as significant.

Overall, the results were generally very consistent with those reported in the standard ANOVAs in the manuscript. In Experiment 1, the key interaction remained significant in clinicians ($t =$

2.29; $B = 0.30$), as did the paired comparisons, broken down between biological ($t = 2.34$; $B = 0.31$) and psychological ($t = -2.30$; $B = -0.30$) ratings. Similarly, in Experiment 2, the key interaction was significant ($t = 3.61$; $B = 0.21$), as was the paired comparison conducted on the Medication data ($t = 2.08$; $B = 0.38$). (As expected, just as in the regular ANOVA, the psychotherapy ratings paired comparison was not significant; $t = -0.65$; $B = -0.04$.) Overall, then, the mixed effect regression results remained very similar to those found with standard ANOVAs, as reported in the main text.

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