

Framing Effects and the Folk Psychiatry of Addiction

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Abstract

Clinical disorders are multidimensional phenomena that are important to both clinicians and the lay public, as well as to cognitive scientists interested in understanding how people think and reason about complex domains. To date, however, little work has examined the factors that influence the folk psychiatry of addiction. Participants in the present study read a brief paragraph about addiction pitched at either an abstract or personal level, followed by a series of questions about the causes and treatment of drug addiction. We further manipulated whether addiction was described using a medical or psychological label. Results revealed that liberals and conservatives varied dramatically with respect to their folk psychiatric reasoning, with liberals preferring a more biological/medical view, which is associated increased support for medical interventions, reduced feelings of personal responsibility, and elevated feelings of stigma. Framing addiction using medical labels and at an abstract level pushed people towards this biological view, suggesting that media reports and messaging campaigns may influence how people conceptualize addiction.

Keywords: folk psychiatry; framing, addiction, language, construal, political ideology

Introduction

On February 2, 2014, Oscar award winning actor Phillip Seymour Hoffman suffered an accidental drug overdose in his Manhattan home. Journalists, psychologists, bloggers, and fans immediately went online to express sympathy and sorrow and to try to understand and explain this unexpected tragedy. Writing for Time magazine, David Sheff (2014) lamented:

“[It] wasn’t Hoffman’s fault that he relapsed. It was the fault of a disease that often includes relapse as a symptom and the fault of the ineffective treatment he received... We don’t know what treatments Hoffman received, but it’s unlikely that it was state-of-the-art care rooted in the fact that addiction is a brain disease.”

By describing addiction using medical terms like *brain disease*, Sheff appears to be trying to mitigate the blame directed towards Hoffman and to redirect it instead towards our flawed healthcare system. However, not everyone conceptualized Hoffman’s addiction in these terms. Writing

a few days later for FoxNews.com, Keith Ablow (2014) expressed a very different point of view:

“No quirk of neurochemistry can make you rate getting high as more important than getting your kids through life. Only a disorder of character can do that... Philip Seymour Hoffman never faced and wrestled to the ground whatever demons had him on the run from his own life story.”

Ablow rejects the brain disease construal (his *quirk of neurochemistry*), instead describing addiction as a *disorder of character* that results from a personal failure to defeat one’s (metaphorical) *demons*. This paints addiction not as a biological or medical issue, but as a psychological or behavioral problem; a physical struggle that an individual must be strong-willed enough to overcome.

Taken together, these examples seem to reveal very different beliefs about the nature of drug addiction that have significant implications for how people understand (a) the causes of addiction (e.g., is it biological or psychological in origin?), (b) how we should feel about an individual with an addiction (e.g., how much are they to blame for their problem?), and (c) how the addiction should be treated (e.g., do they need a medical intervention or are they just not trying hard enough?).

Interestingly, the proper way to conceptualize addiction disorders (i.e. are they brain diseases or emergent behavioral phenomena?) is still hotly contested in the clinical literature (see, e.g., Heyman, 2013). Here, however, we consider how this debate plays out amongst members of lay public. In other words, we examine what may be called the *folk psychiatry* (Haslam, 2005) of addiction, as well as the factors that influence how people think about addiction problems.

Investigating how people conceptualize addiction and other clinical disorders is important for cognitive scientists interested in understanding how people represent and reason about complex domains. It is also of vital importance to health professionals and policy makers concerned with promoting effective treatment seeking behavior and reducing the stigma associated with mental disorders.

Recent research has helped illuminate some of the factors that influence how people reason about psychiatric conditions. Consistent with the analysis above, Ahn,

Proctor, & Flanagan (2009) found that mental health professionals conceptualize different disorders along a continuum from the highly biological (e.g., Autism) to the highly non-biological (e.g., adjustment disorders), which is associated with how they understand the causes and preferred treatment options for these conditions (e.g., medical treatments tend to be recommended for disorders on the biological end of the spectrum). This biological/medical continuum is also a key dimension in folk psychiatric reasoning (Haslam, 2005), though in general both clinicians and novices hold less essentialist beliefs about mental disorders as compared to other medical conditions (Ahn, Flanagan, Marsh, & Sanislow, 2006).

Importantly, researchers have found that simple interventions can influence the extent to which people conceive of complex health conditions as biological, which in turn affects other cognitive and behavioral outcomes. Hoyt, Burnette, and Auster-Gussman (2014), for instance, found that when overweight participants read an article that described obesity as a *disease*, they felt less concerned about their weight and were more likely to make unhealthy food choices. This suggests that “medicalizing” a complex health condition like obesity can lead to lowered feelings of responsibility and control over the issue, leading people to expend less effort in dealing with it. Similar manipulations, however, can also lead people to support progressive public policy interventions that help protect obese individuals (Thibodeau, Perko, & Flusberg, under review).

Likewise, biological explanations for depression and generalized anxiety disorder can lead to lowered ascriptions of personal responsibility for these conditions, along with increased prognostic pessimism about their duration and treatment, and a reduction in empathy for individuals with the disorder (Lebowitz & Ahn, 2014; Lebowitz, Ahn, & Nolen-Hoeksema, 2013; Lebowitz, Pyun, & Ahn, 2014). For this reason, and perhaps surprisingly, it seems that medicalizing a mental disorder can actually cause an increase in the stigma associated with that disorder by promoting a more *essentialist* view of the condition

In the present study, we sought to understand how people think and reason about addiction, and what factors might influence how people conceptualize drug addiction in particular. Participants in our study read a brief paragraph about addiction and then responded to a series of questions about the causes of addiction, what individuals with an addiction should do for treatment, and what society as a whole should do to address the issue.

We manipulated two key variables in an attempt to influence folk psychiatric reasoning: language and construal level. For half of our participants, the first sentence of the paragraph described addiction using a medical label (*disease* or *neurological disorder*). For the other half, we used a psychological label (*demon* or *behavioral problem*). Recent research has found that even a one-word linguistic framing manipulation can affect how people reason about a complex domain like crime (Thibodeau & Boroditsky, 2011). Therefore we hypothesized that being exposed to a medical

label would result in a more biologically oriented mental model of addiction.

We also manipulated whether the paragraph was pitched at a relatively abstract level (describing addiction in terms of general symptoms and statistics) or at a more personal level (describing the specific addiction issue and symptoms facing an individual). Research on construal level theory has found that thinking about behavior in a more abstract way leads to greater essentialization (Liberman, Trope, & Stephan, 2007), and therefore we predicted that participants who read the abstract story would also generate a more biologically oriented mental model of addiction.

Finally, we were also interested in particular individual differences that might affect how people conceptualize addiction. For example, research on obesity has found that liberals and those with personal experience with obesity tend to prefer accounts of the condition that attribute less blame to overweight individuals, like biological and environmental explanations (Thibodeau, Perko, & Flusberg, under review). This is consistent with the observation that conservative ideology is characterized by an emphasis on personal responsibility, and members of a stigmatized group are typically motivated to view it as something they do not have full control over (Oliver & Lee, 2005; see also the quotations above). Thus we predicted that liberals and those with a personal experience with addiction would support more biologically oriented models of addiction.

Experiment

Methods

Participants We recruited and paid 813 participants through Amazon’s Mechanical Turk. We used Turk’s exclusion capabilities to ensure that participants lived in the United States and had a good performance record on previous tasks (90% or greater). Data from 64 participants were excluded because they either took the survey more than once (as evidenced by a repeated IP address; $N=17$) or failed our manipulation check ($N=47$), leaving data from 749 participants for analysis.

Participants ranged in age from 18-79 years old ($M = 31.5$, $SD = 10.7$). The political affiliation of participants was skewed liberal, with 41.5%, 43.8% and 14.7% identifying as Democrat, Independent, and Republican, respectively. On a 101-point continuous scale of political ideology (0 = extremely liberal, 100 = extremely conservative), the mean was 38.7 ($SD = 25.4$).

Materials & Procedure The study consisted of a 2 (story type: abstract vs. personal) X 4 (label: demon, behavioral problem, disease, neurological disorder) between-subjects design, yielding 8 individual conditions. It was created using Qualtrics online survey software.

Participants first read a brief paragraph that discussed the issue of addiction in one of two ways. For half of the participants, the paragraph was pitched at a more abstract level, using statistics drawn from the CDC website

(www.cdc.gov) to demonstrate that the issue is important and widespread. For the other half of participants, the paragraph was pitched at a personal level and described an individual named John dealing with addiction, detailing many of the the same symptoms included in the abstract paragraph as they played out in his life.

For both story types, the first sentence of the paragraph framed addiction using one of four labels: *demon*, *behavioral problem*, *disease*, and *neurological disorder*. We considered *demon* and *behavioral problem* to be “psychological” labels that treat addiction as person-level phenomenon and ascribe relatively more blame to the addict. We considered *disease* and *neurological disorder* to be “medical” labels that treat addiction as a sub-personal, biologically based phenomenon and ascribe relatively less blame to the addict¹ (see Appendix for full paragraph texts).

After participants read the paragraph, they responded to a series of target and demographics questions. First, they were asked, “How should someone deal with drug addiction?” They had to rank order their top three choices from a list of seven options (presented in a randomized order) by dragging their choices into a response box. The options included: “seek medical treatment” (coded as a *medical* response in our analysis), “seek therapy”, “join a support group like Narcotics Anonymous” (both coded as *psychological* responses), “learn self-discipline”, “spend (more) time with friends and family”, and “see a local spiritual figure” (coded as *informal* responses).

Second, they were asked: “What should we as a society do to deal with the rising rates of drug addiction?” and again rank ordered their top three choices from a list of options. The options included “improve education”, “work against drug stigma by raising awareness” (both coded as *education* responses), “reduce economic inequality”, “legalize drugs”, “harsher punishments and/or more police enforcement for drug offenses” (all coded as *policy* responses), “improve genetic testing / modification / engineering techniques”, and “better mental health services” (both coded as *healthcare* responses).

Third, they were asked: “Why do people become addicted to drugs?” and again rank ordered their top three choices from a list of options. The options included: “physical or chemical abnormality in the brain”, “it is in their genes” (both coded as *biological* responses), “bad parenting”, “living in a bad neighborhood”, “social pressures” (coded as *social* responses), “self-medication”, “lack of self discipline

¹ Data from a norming study supported these intuitions: 125 naïve participants filled out a survey on their first day of an Introduction to Psychology course where they rated each label (using a 0-100% scale) on the extent to which a person experiencing such an issue is generally *responsible* for the current state of their lives. Paired-sample t-tests revealed no difference in responsibility ratings for *demon* ($M = 57.0$, $SD = 29.5$) and *behavioral problem* ($M = 55.3$, $SD = 28.7$; $p = .66$), but both of these labels yielded reliably higher responsibility ratings than *disease* ($M = 33.9$, $SD = 28.3$) and *neurological disorder* ($M = 25.1$, $SD = 28.9$; p 's < .001).

or character”, and “poor life decisions” (coded as *individual* responses).

Next, participants used a slider bar ranging from 0 (not at all responsible) to 100 (completely responsible) to indicate “How responsible for the current state of their lives are those who are experiencing drug addiction?” After this they rank ordered eight different issues based on how much stigma they associated with each one. The issues included obesity, anorexia, autism, cigarette smoking, drug addiction, adultery, dropping out of school, and depression.

Finally, they completed a brief set of demographics questions, as well as a manipulation check question (multiple-choice with three response options) to ensure they were paying attention when they read the original paragraph. For those who read the abstract paragraph, the manipulation check required them to indicate in which year the addiction statistics in the paragraph had been published (correct response: 2011). For those who read the personal paragraph, they had to indicate why John started using drugs (correct response: because his friends were into them). The demographics questions included age, political affiliation, a continuous measure of political ideology registered on a 101-point sliding scale ranging from 0 (very liberal) to 100 (very conservative), and a free response to the question: “have you or any of your friends or family experienced drug addiction? If so, what was done about it?” (These responses were coded as “yes”, “no”, and “N/A” for the purpose of our analyses).

Results & Discussion.

Because our sample was skewed towards Democrats and Independents, to analyze potential main effects of political beliefs on folk psychiatric reasoning we used a median split on our continuous measure of political ideology to create “liberal” and “conservative” groups consisting of roughly equal numbers of participants ($N = 385$ and $N = 364$, respectively)².

For the three questions in which participants rank-ordered their top three choices, we only present analyses for the top choice for each question (using the coding scheme described above).

Treatment We analyzed responses to the question “How should someone deal with addiction?” in two ways. First, we conducted a series of chi-square tests of independence to test for main effects of the story type (abstract or personal), label type (medical or psychological), political ideology (median split), and personal experience on treatment suggestions. Second, we ran a series of logistic regression models that allowed us to test for interactions between the experimental manipulations and individual difference variables on medical treatment.

² Since these groups were also skewed slightly liberal (median = 39), it is likely that we are underestimating the effects of political ideology on folk psychiatric reasoning in our analyses.

The first chi-square test of independence revealed that people who read the abstract paragraph were more likely to choose medical treatments, while those who read the personal paragraph were relatively more likely to choose psychological treatments, $\chi^2(2) = 12.98, p = .002$. This is consistent with the notion that concrete, personal construals shift attention to the psychological aspects of a condition, while abstract construals highlight more enduring patterns that may best be captured by biological models. We also found that conservatives were more likely suggest informal treatment options while liberals were more likely to suggest medical treatments, $\chi^2(2) = 22.62, p < .001$, which is consistent with the notion that the medicalization of certain clinical disorders, which downplays personal responsibility, has more support amongst liberals. We did not find a difference in treatment suggestions by label, $\chi^2(2) = 2.29, p = .32$, or personal experience, $\chi^2(2) = 0.36, p = .84$.

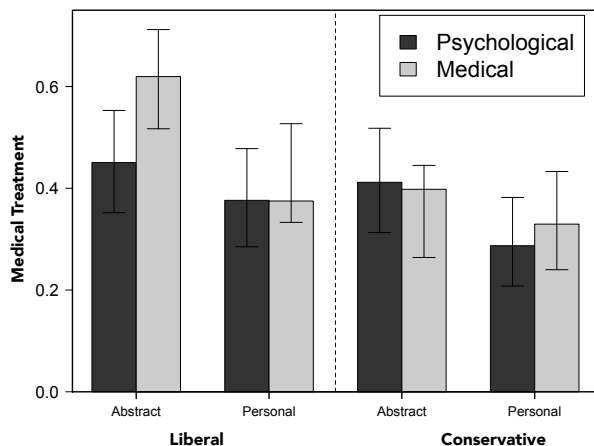


Figure 1. Proportion of participants who suggested a medical treatment as their top choice by story type, label type, and ideology. Error bars denote 95% confidence intervals of the proportions

The logistic regression tested what factors made people likely to suggest a *medical* treatment as their top choice (versus any of the other treatment options). We included predictors for story type, label type, ideology, and experience as main effects as well as tests of interactions between these variables. The resultant model revealed main effects of the story type, $\beta = .481, SE = .202, p = .017$, and the label type, $\beta = .572, SE = .291, p = .049$: the abstract story and medical labels were associated with more medical treatment suggestions. The model also revealed an interaction between ideology and label, $\beta = .654, SE = .291, p = .025$: liberals were more likely to suggest a medical treatment when they read a medical label (50%) than when they read a psychological label (43%), whereas conservatives were equally likely to suggest a medical treatment regardless of whether they read a medical (35%) or psychological label (33%). Finally, the model revealed a 3-way interaction between ideology, story type, and label type, $\beta = .481, SE = .202, p = .017$. As illustrated in Figure 1, liberal participants who read an abstract description of

depression that was framed with a medical label were especially likely to suggest a medical treatment. No other main effects or interactions were statistically significant.

Society Solutions We conducted a similar series of analyses on responses to the question “How should society deal with addiction?” Three separate chi-square tests of independence revealed no effects of the story type, $\chi^2(2) = 3.77, p = .152$, label type, $\chi^2(2) = 4.28, p = .12$, or personal experience, $\chi^2(2) = 2.21, p = .33$. However, we did find an effect of political ideology, $\chi^2(2) = 10.29, p = .006$: liberals were more likely to suggest healthcare-based solutions, while conservatives were more likely to suggest education-based strategies. This is consistent with the results of the previous question, suggesting that liberals are more likely to prefer a medical or biological view of addiction.

Then we conducted a logistic regression to test what factors made people likely to suggest that society focus on *healthcare*. The model revealed a marginal main effect of story type, $\beta = .489, SE = .286, p = .088$: participants who read a personal narrative were somewhat more likely to suggest that society focus on healthcare. The model also revealed a significant interaction between the story and label types, $\beta = -.961, SE = .410, p = .019$: people who read a personal narrative with a medical label were actually less likely to suggest that society focus on healthcare. Consistent with our findings for the previous question, this suggests that in a personal context, medical labels do not shift people towards a biological view of addiction (and may in fact have the opposite effect in some cases).

Causes of Addiction Next, we analyzed responses to the question “Why do people become addicted to drugs?” and found no main effects of story type, $\chi^2(2) = 2.31, p = .315$ or label type, $\chi^2(2) = .68, p = .71$. However we did find that liberals were more likely to suggest biological causes, while conservatives were more likely to suggest individual causes, again consistent with the findings for the first two questions, $\chi^2(2) = 6.43, p = .04$. In addition, we found that people with personal experience with addiction were more likely to point to biological causes, while people with no personal experience were more likely to point to social causes, $\chi^2(2) = 10.34, p < .006$. This is consistent with research showing that people with a stigmatized condition (e.g., obesity) are more likely to view that condition as caused by biological factors (Thibodeau, Perko, & Flusberg, under review).

A logistic regression was fit to predict what factors led people to identify *biological* causes of addiction as their top choice (compared to any of the other options). It revealed a significant main effect of story type, $\beta = 1.040, SE = .485, p = .032$: people who read the personal narrative were more likely to identify biological causes of addiction. We also found an interaction between ideology and experience, $\beta = -1.570, SE = .578, p = .007$: conservatives with personal experience of addiction were less likely to emphasize biological causes. Finally, the model revealed a three-way interaction between personal experience, ideology, and the

label type, $\beta = 1.596$, $SE = .705$, $p = .024$. As illustrated in Figure 2, this interaction was driven by liberals lacking experience with addiction, who were especially likely to think that the condition resulted from a biological influence when presented with the medical label.

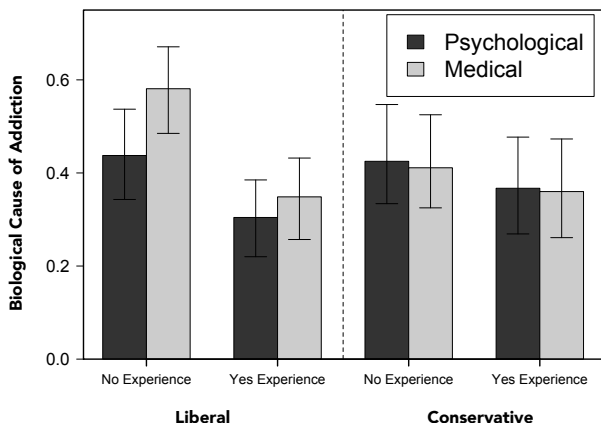


Figure 2. Proportion of participants who believe that addiction is caused by biological factors shown by label type, whether or not the participant reported personal experience with addiction, and ideology. Error bars denote 95% confidence intervals of the proportions.

Stigma We examined participants' choice of the most stigmatized condition by coding whether they put addiction first or not. Participants who read the personal story were marginally more likely to think that addiction was the most stigmatized condition, $\chi^2(1) = 2.72$, $p = .099$. There was no main effect of the label type on stigma, $\chi^2(1) = 2.01$, $p = .16$. However, liberals in our sample were more likely to view addiction as the most stigmatized condition, $\chi^2(1) = 6.48$, $p = .01$. This is consistent with the notion that liberals are more likely to have biological or medicalized view of addiction, which previous research has shown to be associated with greater stigma and lower feelings of empathy. In addition, we found that people without any personal experience with addiction were less likely to view addiction as stigmatized, $\chi^2(1) = 4.42$, $p = .036$. This suggests that people who have either experienced addiction themselves or know someone who has are more aware of the stigma associated with the condition.

A logistic regression revealed a marginal main effect of story type, $\beta = .484$, $SE = .281$, $p = .085$, and a significant main effect of personal experience, $\beta = .942$, $SE = .313$, $p = .003$: people who read the personal narrative were marginally more likely to think that addiction was associated with an acute stigma; people with experience of addiction were significantly more likely to think that addiction was associated with an acute stigma. The model also revealed an interaction between the label type and personal experience, $\beta = -.865$, $SE = .436$, $p = .047$: people with personal experience with addiction who received the medical label were less likely to view addiction as stigmatized. This suggests that among those already aware of the stigma of addiction due to personal experience, being

exposed to a label that seems to ameliorate personal blame for the condition can actually help reduce beliefs about the degree of stigma associated with the condition.

Responsibility Ratings Finally, to assess what factors affected ratings of how responsible for their current situation someone with an addiction is, we fit a 2 (story type: abstract vs. personal) X 2 (label style: medical vs. psychological) ANOVA with the continuous measure of political ideology included as a covariate. There was no main effect of story type, $F(1, 744) = .84$, $p = .36$, nor was there an interaction between story type and label style, $F(1, 744) = 1.58$, $p = .21$. However, there was a marginal main effect of label framing, as participants exposed to a psychological label ($M = 72.3$, $SD = 21.8$) rated individuals with addiction as slightly more responsible for the state of their life compared to those exposed to a medical label ($M = 69.3$, $SD = 22.3$), $F(1, 744) = 2.86$, $p = .09$. In addition, there was a significant effect of political ideology, as more conservative participants gave higher responsibility ratings, consistent with a conservative worldview, $F(1, 744) = 44.7$, $p < .001$.

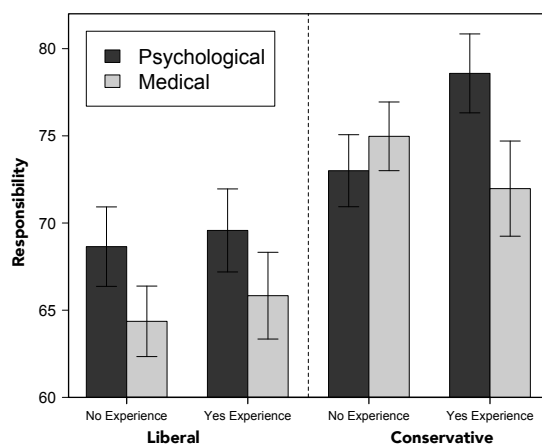


Figure 3. Ratings of personal responsibility for addiction – shown by label type, whether or not the participant reported personal experience with addiction, and ideology. Error bars denote standard errors of the means.

General Discussion

The results of this study help shed light on the factors that influence the folk psychiatry of addiction, even as they raise important questions for future research.

We found support for our hypothesis that political ideology and personal experience can impact the folk psychiatry of addiction in significant, specific ways. Across the board, conservatives in our sample viewed addicts as more responsible for the current state of their lives, and preferred non-biological explanations and treatment options. As predicted, personal experience with the condition tended to push people towards a more liberal viewpoint, which was also associated with a greater perception of stigma attached to the condition. These findings are consistent with related work (e.g., Thibodeau, Perko, & Flusberg, under review)

and raise important questions about the relationship between factors like political orientation and reasoning about complex health conditions, which may have substantial real-world implications.

We also found that framing addiction in an abstract way (as compared to in a personal narrative) and using a medical (as opposed to psychological) label led people to adopt a more biological/medical model of the condition. However, these effects were nuanced and interacted with other variables in key ways. For example, the abstract framing led participants to support more medical treatments and fewer psychological treatments for the condition, thought it did not directly affect suggestions for what society should do about the issue or beliefs about what causes addiction. Medical labels also led to more support for medical treatments, but this effect was strongest for liberals who read an abstract narrative. Similarly, medical labels led only liberals with no personal experience with addiction to support more biological causes of the condition; otherwise, it seemed not to have much of an effect on views of the nature of the addiction. This suggests that simple framing manipulations may only impact folk psychiatric beliefs for certain people under certain task conditions.

Taken together, the results of the present study provide important information for health professionals, policy makers, and others who wish to use written or spoken materials to educate the public about the causes and treatment of addiction. Though additional research is required to better understand the relationship between linguistic and construal level framing and individual difference factors, this work indicates that media reports and messaging campaigns may be effective in shaping how people think and reason about drug addiction.

References

- Ablow, K. (February 6, 2014). Drug dealers didn't kill Philip Seymour Hoffman – Hoffman did. *FoxNews.com Opinion*. Retrieved from <http://www.foxnews.com/opinion/2014/02/06/drug-dealers-didnt-kill-philip-seymour-hoffman-hoffman-did/>
- Ahn, W. K., Flanagan, E. H., Marsh, J. K., & Sanislow, C. A. (2006). Beliefs about essences and the reality of mental disorders. *Psychological Science*, 17(9), 759-766.
- 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(2), 147-182.
- Haslam, N. (2005). Dimensions of Folk Psychiatry. *Review of General Psychology*, 9(1), 35.
- Heyman, G. M. (2013). Addiction: An Emergent Consequence of Elementary Choice Principles. *Inquiry*, 56(5), 428-445.
- Hoyt, C.L., Burnette, J.L., & Auster-Gussman, L. (2014). "Obesity Is a Disease": Examining the Self-Regulatory Impact of This Public-Health Message. *Psychological Science*, 25, 997-1002.
- Lebowitz, M. S., & Ahn, W. K. (2014). Effects of biological explanations for mental disorders on clinicians' empathy. *Proceedings of the National Academy of Sciences*, 111(50), 17786-17790.
- Lebowitz, M. S., Ahn, W. K., & Nolen-Hoeksema, S. (2013). Fixable or fate? Perceptions of the biology of depression. *Journal of consulting and clinical psychology*, 81(3), 518.
- Lebowitz, M. S., Pyun, J. J., & Ahn, W. K. (2014). Biological explanations of generalized anxiety disorder: Effects on beliefs about prognosis and responsibility. *Psychiatric Services*, 65(4), 498-503.
- Lieberman, N., Trope, Y., & Stephan, E. (2007). Psychological distance. *Social psychology: Handbook of basic principles*, 2, 353-383.
- Oliver, J. E., & Lee, T. (2005). Public opinion and the politics of obesity in America. *Journal of Health Politics, Policy and Law*, 30(5), 923-954.
- Sheff, D. (February 2, 2014). How Philip Seymour Hoffman Could Have Been Saved. *Time Opinion*. Retrieved from <http://ideas.time.com/2014/02/02/how-philip-seymour-hoffman-could-have-been-saved/>
- Thibodeau, P.H., & Boroditsky, L. (2011). Metaphors we think with: The role of metaphor in reasoning. *PLoS ONE*, 6(2): e16782.
- Thibodeau, P.H., Perko, V. L., & Flusberg, S. J. (under review). The relationship between narrative classification of obesity and support for public policy interventions.

Appendix

Abstract Paragraph: Drug addiction is a [demon / behavioral problem / disease / neurological disorder] that many Americans are dealing with. According to statistics published in 2011, about 8% of Americans age 12 or older need help for substance dependence. This is not just a teenage phase, however. There are more illicit drug users age 26 or older than there are between the ages of 12 and 25. Using drugs often causes a decline in work performance as well as a reduction in health and quality of relationships. Sometimes, drug use can mask symptoms of or even cause other health problems. In fact, prolonged drug use is associated with many serious consequences, including suppressed immune function. Socially unacceptable actions are common among drug addicts. These include lying to friends and family and voluntary isolation, which may help keep loved ones in the dark about the addiction. Surprisingly, only about 11% of those needing help for drug addiction actually receive it. Unfortunately, more people are experiencing drug addiction now than at any time in the past 50 years.

Personal Paragraph: John is dealing with the [demon / behavioral problem / disease / neurological disorder] known as drug addiction. He started using drugs casually a few years ago when he was in college since all his friends were into it. Last year, his girlfriend broke up with him and he was passed over for a promotion at work, and his drug use escalated to a daily routine. John now regularly skips outings with friends and family, preferring to stay home alone where no one will see him getting high. John is currently facing real financial problems and struggling to pay his rent because he is spending so much of his income on drugs. He does not feel like he can ask his family or friends for help since he does not want them to know about his drug use. He did try to quit once on his own, but it was too difficult and he went back to using almost immediately. He doesn't think there is anyone who understands or who even wants to help him, which makes him feel guilty and alone. Meanwhile, his work, relationships, and health are suffering. He would really like to get back to the way things used to be but he does not know what to do.