

# Addiction Stigma: Potential Costs and Benefits of Beliefs About the Nature of Addiction

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Globally, there is a devastating rise in substance addiction. The stigma encountered by people with addiction remains a critical barrier to treatment-seeking and recovery. To reduce stigma and highlight the scientific evidence undergirding the etiology of addiction, media campaigns are often designed to shift beliefs to improve public attitudes and encourage treatment-seeking. However, the beliefs that stem from these messages may have hidden costs that impact efforts. Here, we investigated if beliefs about the changeable nature of addiction—a growth mindset—are related to stigma in opposing ways through the interconnected cognitions of attributions and essentialist thinking. In Study 1 ( $N = 294$ ) and Study 2 ( $N = 283$ ), we demonstrated the costs of a growth mindset for stigma via the negative link to genetic explanations and the positive link to blame. Results were mixed for links to essentialism and the potential benefits of a growth mindset for treatment-seeking. We conclude with practical applications.

## Clinical Impact Statement

Two studies demonstrated the potential consequences of beliefs about the nature of substance addiction that can stem from media and health campaigns designed to reduce stigma. A growth mindset, or believing that change is possible, can develop when the focus is on treatment and choice. In the current work, a growth mindset was linked to blame and thus can exacerbate stigma. In one of two studies, a growth mindset was positively linked to treatment-seeking motivation. Understanding the underlying set of allied beliefs that can arise from media and health campaign messaging is important for developing optimal solutions for combating the persistent stigma associated with substance addiction and for promoting treatment.

**Keywords:** addiction, attributions, essentialism, mindset, stigma


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Substance addiction is a significant public health challenge affecting millions of individuals globally and exacting a heavy toll on health and well-being. According to the World Health Organization (2019), an estimated 35 million people worldwide suffer from substance use disorders, underscoring the magnitude of this public health crisis. The costs go well beyond a profound burden on health care systems and economies with ripple effects that impact productivity, employment,

relationships, and more (Derrick & Leonard, 2016; Godleski & Leonard, 2019; Iqbal et al., 2023). Furthermore, addiction perpetuates cycles of poverty and marginalization (Pear et al., 2019; The Centre for Social Justice, 2015). Ultimately, addressing substance addiction requires a concerted evidence-based approach—one grounded in a commitment to promoting compassion, treatment, and recovery (Avery & Avery, 2019).

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Measures and additional online material can be found on the Open Science Framework at <https://osf.io/gyr3a/>.

Considering that experiences and identities impact the authors’ scientific values, the authors contextualize their work with respect to career status, race, and gender (Roberts et al., 2020). Currently, three of the authors are middle-career academics and one is a fourth-year graduate student. Three authors self-identify as White women, and one identifies as a White man.

Jeni L. Burnette took the lead on writing the article, although all authors contributed to the writing. Whitney Becker ran the analyses and wrote the

results with assistance from Jeni L. Burnette and Crystal L. Hoyt. All authors contributed to the design and implementation of the research. Jeni L. Burnette played a lead role in conceptualization, methodology, and writing—original draft and an equal role in writing—review and editing. Crystal L. Hoyt played a lead role in data curation and an equal role in conceptualization, methodology, and writing—review and editing. Whitney Becker played a lead role in formal analysis and project administration and a supporting role in data curation, methodology, and writing—review and editing. Paul A. O’Keefe played a supporting role in conceptualization and writing—review and editing and an equal role in methodology.

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Yet, stigma remains a critical barrier to reaching these goals, exacerbating the costs associated with addiction (Kvaale, Gottdiener, & Haslam, 2013; Richter et al., 2019; Wakeman & Rich, 2018) and negatively impacting health (Major et al., 2018). Considering the profound stigma associated with substance use addiction (Earnshaw, 2020), individuals facing the issue confront two hurdles: They both grapple with the challenges associated with substance use disorder itself, and they endure the devaluation and negative perceptions of others (Corrigan & Watson, 2002; Earnshaw, 2020). People who possess characteristics that might cause others to consider them deficient, unconventional, or otherwise undesirable are said to carry a stigma (Crocker et al., 1998; Goffman, 1963). Stigma consists of a number of interrelated ideas including labeled differences and categories, stereotypes, status and power loss, discrimination, and emotional reactions (e.g., Andersen et al., 2022; Link & Phelan, 2001; Major & O'Brien, 2005). In the current work, we focus on prejudice (e.g., feelings of dislike), stereotyping (e.g., negative and unfair judgments based on perceived group membership), and discriminatory behavior (e.g., social distancing) as the primary outcomes.

Much of substance addiction stigma arises from the misperception that people with addiction can and should make better choices. Media campaigns often seek to modify this narrative and shift beliefs, through both language and images, which can either perpetuate or reduce stigma (Stoltman et al., 2023). Whether providing details about new scientific findings, featuring personal stories, or outlining the benefits of treatment, the media plays a critical role in influencing beliefs about the nature of addiction. Consequently, the rules governing how journalists write about addiction were revised in 2017 to reflect the importance of portraying addiction as a disease (Stoltman et al., 2023). The assumption is that greater awareness of the innate, uncontrollable underpinnings should discourage the perception that people are to blame for their condition, thereby reducing stigma (e.g., Corrigan et al., 2000; Weiner et al., 1988). Although such efforts are well-intentioned, they can come with unintended consequences. Biogenetic-disease-focused messaging can confer mixed blessings (e.g., Haslam & Kvaale, 2015), what has also been termed *asymmetry* (Hoyt et al., 2017) and *double-edged sword effects* (Hoyt et al., 2019). A long line of work in mental health illustrates that disease messaging sometimes reduces stigma by undermining attributions of personal responsibility. However, such messaging can also perpetuate stigma by rooting the cause as something inherent and unchangeable in the person, which predicts greater stigma (Kvaale, Haslam, & Gottdiener, 2013).

Thus, the links from disease messaging to stigma are often inconsistent and weak. Rather, *underlying beliefs* about the nature of the disorder are more powerful predictors than the messaging itself (Kvaale, Haslam, & Gottdiener, 2013). On the one hand, biogenetic disease messaging suggests addiction is an innate, hard-to-alter condition (promoting a fixed mindset of addiction). On the other hand, messages highlighting the importance of treatment for recovery suggest change is possible (promoting a growth mindset of addiction). Overall, we suggest that understanding the underlying beliefs, or mindsets, that can result from these messages and their relation to addiction stigma is critical for developing the most effective solutions to tackle it.

## Mindset Theory

Mindsets refer to beliefs about the malleable nature of human attributes and fall on a continuum from beliefs in the static,

unchanging nature of attributes (a *fixed mindset*) to beliefs in the potential to change and develop (a *growth mindset*; Dweck, 1999). Mindsets provide a critical meaning framework that guides motivation, attributions, judgments, and expectations (e.g., Dweck et al., 1995; Dweck & Yeager, 2019; Hong et al., 1999; O'Keefe, 2013). For example, mindsets play a role in motivation to pursue more challenging opportunities and in persisting despite obstacles (Dweck & Yeager, 2019). Growth mindsets are also negatively linked to psychological distress, in part, via the value placed on help seeking, such as pursuing treatment (e.g., Burnette, Knouse, et al., 2020). In addition to impacting self-related outcomes, mindsets also shape social perception. For example, individuals with a stronger growth mindset about people are less likely to think stereotypes are true and are more likely to consider social dynamics and environmental influences (e.g., Dweck & Yeager, 2019). However, in understanding how growth mindsets relate to social perception in stigmatized contexts such as obesity or addiction, researchers fail to find a direct relation.

## Double-Edged Sword Model

Rather, growth mindsets of stigmatized attributes relate to stigma via opposing mechanisms, what has been termed the double-edged sword (DES) model and has predominately been examined with regard to obesity (Hoyt & Burnette, 2020). In the current work, we expect a positive indirect link to stigma via onset blame attributions, but a negative indirect link via reduced social essentialist thinking. Furthermore, we examine the impact of a growth mindset on treatment-seeking. Much of the discussion of addiction-related messaging outlines the benefits of genetic and disease-based explanations for undermining stigma by reducing blame, but there is concern that such messaging can also be problematic for perceptions regarding the potential for treatment to be effective (e.g., Acuff et al., 2024; Lewis, 2017). In the current work, we focus on the underlying beliefs about the changeable versus fixed nature of addiction and the impact on not just stigma but also the value placed on treatment.

First, a growth mindset is positively linked to stronger individual responsibility and blame attributions and similarly is negatively related to genetic etiology explanations, which are less blame-inducing (Hoyt & Burnette, 2020). Years of research into attribution theory show that the more people deem others as responsible for their stigmatizing condition, the more it reinforces stigma (Corrigan & Watson, 2002; Crandall & Reser, 2005; Weiner, 1985; Weiner et al., 1988). This tendency to marginalize people when blaming them for the onset of their stigmatizing condition is widespread and spans attributes, from weight to sexual orientation, to mental health to addiction (Corrigan, 2000; Crandall & Reser, 2005; Earnshaw, 2020; Haider-Markel & Joslyn, 2008). Whereas personal blame enhances stigma, attributing traits to genetic origins is associated with perceiving the individual as having little control over it and is thus negatively linked to stigma (Dar-Nimrod & Heine, 2006; Monterosso et al., 2005; Phelan et al., 2011; Plaks et al., 2012). Overall, attributing the onset of a devalued condition to individual responsibility is associated positively with stigma, whereas attributions to genetic origins are associated negatively with stigma. In the current work, we examined onset attributions in three ways, including attributions of personal responsibility and genetic attributions, and we offer a new measure intended to capture "blemishes of character" outlined by Goffman (1963). Growth mindsets of stigmatized attributes, believing in the potential for individuals to change, are associated with stronger onset

attributions for individual responsibility and character-based blame but weaker genetic attributions, which in turn results in a positive indirect effect on stigma. Via blame-centered onset attributions, growth mindsets are positively linked to stigma.

Second, growth mindsets predict whether categories of people with traits, such as addiction, are believed to possess unchanging, inherent, essences, a concept known as *social essentialism* (Rhodes et al., 2012; Rothbart & Taylor, 1992; Ryazanov & Christenfeld, 2018). The more that traits are perceived to be changeable, the less likely people are to believe that the social category of people defined by the trait has a fixed essence (Haslam et al., 2000; Ryazanov & Christenfeld, 2018). This becomes particularly meaningful in contexts where social groups are linked to stigmatized traits. In such cases, social essentialism can reinforce stereotyping, prejudice, and discrimination (Bastian & Haslam, 2006; Hantzi et al., 2019; Howell et al., 2011; Mandalaywala et al., 2019). Thus, by emphasizing the potential for change, growth mindsets can serve to weaken stigma through reduced social essentialist thinking (Hoyt et al., 2017, 2019; Keller, 2005; Pauker et al., 2020). This negative link between growth mindsets and essentialist thinking is replicated across multiple stigmatized contexts from obesity (Hoyt et al., 2019) to mental health (Babji et al., 2023) to poverty (Hoyt et al., 2023).

In summary, the goals of the current work are twofold. First, we seek to conceptually replicate the DES effects of growth mindsets in the context of addiction (e.g., see Hoyt & Burnette, 2020). Second, we also explore the link between mindsets that underlie many health campaigns and treatment-seeking value (e.g., Orvidas et al., 2018; Thomas et al., 2019).

## Study 1

### Method

We received institutional review approval and followed established ethical guidelines. We recruited participants from Prolific. In line with recommendations for online data screening, we utilized multiple methods to improve and assess data quality (Brühlmann et al., 2020). First, participants were required to pass a bot check (reCAPTCHA, i.e., Completely Automated Public Turing test to tell Computers and Humans Apart) and to meet eligibility screeners (see below). Next, participants completed an attention check (they were asked to write the middle number in a sequence in all caps). Failing the bot check, eligibility screener, or attention check resulted in termination of the survey. Finally, participants completed a short-answer question that we reviewed for data quality. Thirteen participants were excluded from analyses.

### Participants

Participants were 18 years or older and residing in the United States. Each participant was compensated \$1.30 for completion of the online survey, which was in line with minimum hourly reward guidelines of £6/\$8 (Denison, 2023). Participants who passed eligibility screeners and data quality checks totaled 294 ( $M_{age} = 41.73$ ,  $SD = 15.07$ ). Because participants could select more than one race/ethnicity, the racial/ethnic composition of the participants is as follows: 192 White/Caucasian, 45 Black/African American, eight Native American/Eskimo, 43 Asian or Pacific Islander, 27 Hispanic/Latinx, six Biracial/Multiracial, and three who chose Other. There were 144

(49.0%) women, 142 (48.3%) men, and eight (2.7%) who did not identify as either.

### Measures

**Mindsets About People With Addiction.** Participants completed a three-item fixed-worded mindset of people with addiction scale (1 = *strongly disagree*, 6 = *strongly agree*) adapted from mindsets of addiction (e.g., Burnette et al., 2019; Sridharan et al., 2019) and alcoholism (Lindgren et al., 2020). We made two important changes. First, instead of beliefs about one's own potential and ability to handle addiction (e.g., Burnette et al., 2019; "I can change my ability to manage my addiction to alcohol or drugs"), we asked about the potential for *other* people to change. Second, the items specifically assessed beliefs about the *person* with addiction. These items tap into the idea that "once an addict, always an addict." An example item includes "No matter how hard they try, people with an addiction can't really change." We recoded so a higher score indicated a stronger growth mindset ( $\alpha = .71$ ). All measures and additional online material are available on the Open Science Framework at <https://osf.io/gyr3a/>.

**Onset Attributions.** To assess onset attributions, we assessed both personal responsibility and attributions. For personal responsibility, we used two items adapted from work related to mental illness (Corrigan & Watson 2002) and used in past DES studies (Burnette et al., 2017). Specifically, we assessed perceptions of controllability and responsibility (1 = *not at all under personal control/not at all responsible*, 9 = *completely under personal control/very much responsible*). These two items were moderately correlated ( $r = .51$ ,  $p < .001$ ), and an exploratory factor analysis (EFA) revealed a Kaiser–Meyer–Olkin of .500. Thus, these items were examined individually (Kaiser, 1974). Second, to examine genetic attributions, participants indicated the degree to which substance addiction is due to genetics, the environment, or personal choice (Schneider et al., 2018), with scores adding to 100% (e.g., 50% genetics, 40% environment, and 10% choice). In the current work, we focused on genetics ( $M = 24.29$ ,  $SD = 18.82$ , range 0–90).<sup>1</sup>

**Social Essentialism.** We adapted a social essentialism measure to addiction (1 = *strongly disagree*, 7 = *strongly agree*; de Vel-Palumbo et al., 2019). Social essentialism entails the belief that social categories, such as addiction, provide information about underlying and distinct and persistent essences. Social essentialist thinking is distinct from mindsets and is often linked in different ways to stigma-related outcomes (e.g., Hoyt & Burnette, 2020). A sample item includes "People either have a disposition for addiction or they do not; those who have it are a distinct type of person." A higher score indicated greater social essentialist thinking ( $\alpha = .74$ ).

**Prejudice.** We measured prejudice using a feeling thermometer scale (Zavala-Rojas, 2014), asking participants how warm or cold they felt about people with a substance use addiction. Ratings of 0–50 degrees meant that the participant did not feel favorable and warm, whereas ratings of 51–100 indicated the participant felt favorable and warm. To match the other stigma-related numbers, we scored so that higher scores represent more negative feelings.

<sup>1</sup> We also assessed 10 additional potential causes, but the measure had poor factor structure and fit and is thus not included in these analyses. The 10 causes and their interrelations can be viewed in the correlation table in the Supplemental Materials, along with the controllability and responsibility items.

**Negative Stereotype Endorsement.** Participants completed a 10-item stereotype measure (1 = *strongly disagree*, 7 = *strongly agree*; Holman, 2015). A sample item included “A person with an addiction would do something violent to others.” Items were coded such that higher numbers represent stronger endorsement of negative biased stereotypes ( $\alpha = .86$ ).

**Discrimination.** Participants also completed a six-item discrimination measure (1 = *strongly disagree*, 7 = *strongly agree*; Holman, 2015). A sample item included “I would be willing to socialize with a person with an addiction.” Items were coded such that higher scores indicated greater discrimination toward individuals with a substance addiction ( $\alpha = .92$ ).

**Treatment Value.** Participants completed a four-item measure of the potential for treatment to be successful and valuable, which we adapted from a health context (1 = *strongly disagree*, 7 = *strongly agree*; Thomas et al., 2019). A sample item included “Treatment is a valuable option for people who are addicted” ( $\alpha = .83$ ).<sup>2</sup>

**Demographics and Experience With Addiction.** Participants reported their age, gender identity, race/ethnicity, and educational attainment. We also asked if participants had struggled with substance addiction and, if so, whether they had ever received treatment for it (0 = *no*, 1 = *yes*). They were also asked whether they had a close friend or family member who had ever struggled with substance addiction (0 = *no*, 1 = *yes*). Twenty-nine (9.5%) participants indicated that they struggle with addiction, and 25 (8.2%) participants indicated they had received treatment for substance addiction. Furthermore, 194 (63.4%) participants indicated they have a close friend or family member who has struggled with substance addiction. These measures were collected for use as covariates to account for the variance attributable to preexisting experiences with substance addiction, and we ran the analyses both with and without the covariates.

## Results

Considering the number of attribution assessments and stigma-related outcomes, we first conducted exploratory correlation analyses to assess which onset attributions were related to both a growth mindset and outcomes. Correlations for all onset attributions with prejudice, stereotypes, and discrimination can be found in additional online material on the Open Science Framework at <https://osf.io/gyr3a/>. Genetic attributions emerged as the primary correlate and are thus included in the overall mediation model testing the DES predictions. For correlations with additional variables that were not the primary focus of this article, see Supplemental Table 1. We used PROCESS Model 4 (Hayes, 2018) with mindsets about people with addiction as the independent variable, onset genetic attributions and social essentialism as the simultaneous mediators, and stigma-related outcomes as the dependent variables (see Table 1 for correlations).

As shown in Figure 1 (see figure for statistics), a stronger growth mindset of addiction was negatively related to onset genetic attributions and to social essentialism. Onset genetic attributions were negatively related to prejudice, stereotypes, and discrimination, whereas social essentialism was positively related to prejudice, stereotypes, and discrimination. For prejudice, stereotypes, and discrimination, there was a significant *positive* indirect effect of a stronger growth mindset of addiction via the link to onset genetic attributions and a significant *negative* indirect effect of a stronger growth mindset of addiction via

the link to social essentialism.<sup>3</sup> See Supplemental Figure S1 to view the model with covariates included.

Finally, a growth mindset was significantly and positively related to the perceived value of seeking treatment for addiction,  $r(292) = .35$ ,  $p < .001$ .

## Discussion

Overall, we conceptually replicated findings from past work on the DES model of growth mindsets in stigmatized contexts. Namely, a stronger growth mindset about a person with addiction was indirectly and *positively* linked to stigma-related outcomes via the negative link to onset genetic attributions, which are negatively related to stigma. A growth mindset about a person with addiction was also indirectly and *negatively* linked to stigma via the negative link to social essentialist thinking, which was positively related to stigma. Additionally, these mindsets were positively linked to the value placed on treatment-seeking for future recovery.

However, it is critical to note the exploratory nature of Study 1 and to replicate findings addressing limitations. Specifically, we focused on three measurement-related issues. First, we included a longer mindset measure that addressed a couple of potential issues. For example, in Study 2, we included both fixed- and growth-phrased items, as recent work (Grüning et al., 2024) suggests that fixed and growth mindsets may be distinct with different implications for outcomes. We also note that, in Study 1, our measure focused on people with the stigmatized attribute (namely, addiction). In Study 2, we added items about the attribute itself and we conducted an EFA to examine factor structure. Second, in Study 2, we again included genetic attributions but used a new assessment to try and replicate effects. Additionally, we created a new measure of onset blame that focused on attributions of character flaws (e.g., bad choices). Third, we omitted measures with poor reliability in Study 1 (e.g., beliefs about effort), and we omitted the single-item feeling thermometer assessment, instead focusing on stereotyping and discrimination.

## Study 2

In Study 2, we sought to replicate exploratory findings in Study 1 using better measurements of mindsets about the nature of addiction and onset attributions.

## Method

We received institutional review approval and followed established ethical guidelines. In line with recent recommendations for online data screening, we utilized multiple methods to both improve and assess data quality (Brühlmann et al., 2020) and included additional online data quality checks (e.g., Johnson et al., 2024). We excluded four participants for failing bot or attention checks, four people for

<sup>2</sup> Additionally, we used a four-item measure that assessed the potential for people to improve generally with effort, without mention of treatment. We recoded such that higher scores indicate beliefs in the potential for improvement ( $\alpha = .52$ ). Due to low reliability, this scale was not used in analyses. We also included an evaluation of different treatment options, but that goes beyond the scope of the current work. For transparency, descriptives and correlations for these other assessments can be viewed in the Supplemental Materials.

<sup>3</sup> Additionally, we ran these mediation models with covariates related to participants' personal experience with addiction. Statistical significance did not change with covariates in the model.

**Table 1**  
*Studies 1 and 2 Means, Standard Deviations, and Correlations Among Variables*

Study no.	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
Study 1									
1. Mindset about people with addiction	4.50	0.98	—						
2. Onset genetic attributions	24.29	18.82	-.14*	—					
3. Essentialism	4.24	0.97	-.34***	.26***	—				
4. Prejudice	46.16	22.58	-.10	-.29***	.11	—			
5. Stereotype endorsement	4.27	0.98	-.06	-.34***	.16**	.62***	—		
6. Discrimination	4.14	1.40	-.03	-.32***	.13*	.74***	.68***	—	
7. Treatment value	5.62	0.98	.35***	.03	-.03	-.16**	-.20***	-.16**	—
Study 2									
1. Mindset of addiction	4.14	1.20	—						
2. Onset genetic attributions	4.07	1.55	-.37***	—					
3. Onset character blame	3.67	1.38	.48***	-.36***	—				
4. Essentialism	4.18	0.89	-.09	.38***	.07	—			
5. Stereotype endorsement	3.88	0.93	.18***	-.08	.39***	.24***	—		
6. Discrimination	3.85	1.30	.22***	-.22***	.42	.06	.70***	—	
7. Treatment value	5.61	0.95	.05	.01	-.16***	-.02	-.22***	-.13*	—

\*  $p = .05$  (two-tailed). \*\*  $p = .01$  (two-tailed). \*\*\*  $p = .001$  (two-tailed).

taking the survey more than once, six people whose self-reported age and gender did not match their reported age or gender on the Prolific platform, and three participants without a Prolific ID. Overall, we excluded 17 participants.<sup>4</sup>

### Participants

Similar to Study 1, we recruited participants residing in the United States who were at least 18 years old using Prolific and paid them \$1.25, again meeting the minimum hourly reward guidelines of £6/\$8 (Denison, 2023). The total number of participants who passed eligibility, screeners, and data quality checks was 283 ( $M_{\text{age}} = 40.08$ ,  $SD = 14.41$ ). Race/ethnicity was assessed using the same method as Study 1: 211 (74.6%) White/Caucasian, 34 (12%) Black/African American, four (1.4%) Native American/Eskimo, 23 (8.1%) Asian or Pacific Islander, 35 (12.4%) Hispanic/Latinx, and nine (3.2%) Bi/Multiracial. The study also included 141 (49.8%) women, 137 (48.4%) men, and five (1.8%) identifying otherwise.

### Measures

**Mindsets of Addiction.** Participants completed an extended mindsets of addiction measure (12 items) that incorporated both fixed- and growth-phrased items and included items that tapped into beliefs about the nature of people with addiction and the nature of the attribute itself (1 = *strongly disagree*, 6 = *strongly agree*; see Table 2). To examine this new measure, we conducted an exploratory factor analysis using maximum likelihood because we expected items to be correlated (e.g., Meichsner et al., 2016) and used promax rotation. We relied on the following a priori criteria for item retention (Carpenter, 2018). Namely, we kept only items that clearly loaded onto a single factor ( $>.40$ ; Ford et al., 1986), had communalities that were  $\geq .40$ , and had no significant cross-loadings. We only kept factors that had three or more items meeting these criteria. Using a simple eigenvalue-greater-than-1 rule resulted in three potential factors. However, Factors 2 and 3 had fewer than three items that met the inclusion criteria and those factors explained limited variance (approximately 10% each and eigenvalues just above one). The first factor had an eigenvalue of 6.04, explaining

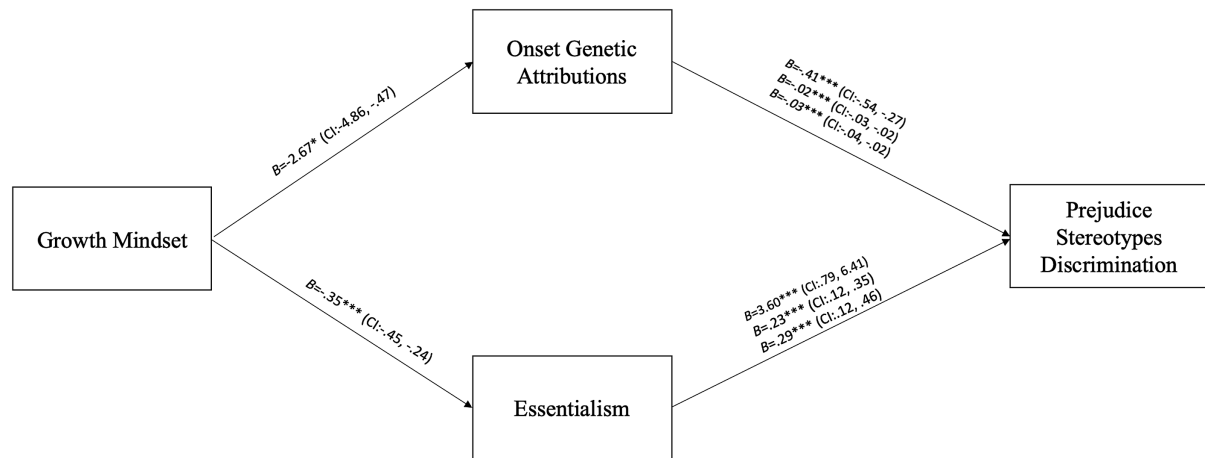
50.32% of the variance. Eliminating items with communalities less than .40 and items that cross-loaded (see Table 2) resulted in three items focused on the potential to change the attribute. An example item is “No matter who a person is, they can change their addiction a lot.” We used this factor, with higher scores representing a stronger growth mindset of addiction ( $\alpha = .92$ ).

**Onset Attributions.** Participants responded on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). We assessed genetic onset attributions with a single item: “A person’s addiction is caused by their genes.” We added a blame attribution measure that reflected “blemishes of character” by adapting existing measures (e.g., Beliefs About Obese Persons Scale; Allison et al., 1991; Gudjonsson & Singh, 1989; Rudski, 2016) and combining these with our own assessments that sought to capture common judgments related to moral and personal failings regarding the onset of substance addiction. Namely, we submitted the following definition of blame to artificial intelligence (ChatGPT-4), “the preconception of blame and responsibility that is placed on a person in a negative event” along with a sample item, “People with substance use addiction are entirely to blame,” and asked it to create a measure of attributions of blame for people with substance addiction. It generated items such as “Most people with substance use addiction cause their problem by making bad choices,” “Substance use addiction reflects a lack of moral responsibility on the part of the individual,” and “In most cases, people with substance use addiction are at fault” (see Supplemental Materials). We included 12 items from the different sources (1 = *strongly disagree*, 7 = *strongly agree*). We ran an EFA to assess whether the items loaded onto one factor, had communalities and loadings greater than .40, and generally met best practices for creating one overall scale (e.g., Nunnally, 1978; Raykov & Marcoulides, 2011). EFA analyses revealed a single factor, with loadings from .74 to .85, explaining 67.68% of the variance. A higher mean score indicated stronger character-based blame attributions ( $\alpha = .96$ , see Table 2).<sup>5</sup>

<sup>4</sup> Results are similar regardless of whether these participants are included in analyses.

<sup>5</sup> We also assessed other potential onset etiologies, such as personal choice; however, those were not the focus of the current work. See Supplemental Materials for all additional variables assessed and related findings.

**Figure 1**  
Study 1 Mediation Model



**Indirect Effects to Prejudice, Stereotypes, and Discrimination:**

Via onset genetic attributions:  $B=1.09$ , 95% CI [.20, 2.09]/ $B=-.06$ , 95% CI [.01, .10]/ $B=.07$ , 95% CI [.02, .13]  
Via essentialism:  $B=-1.25$ , 95% CI [-2.51, -.21]/ $B=-.08$ , 95% CI [-.14, -.03]/ $B=-.10$ , 95% CI [-.18, -.03]  
Total indirect effect:  $B=-.16$ , 95% CI [-1.62, 1.22]/ $B=-.03$ , 95% CI [-.10, .04]/ $B=-.03$ , 95% CI [-.12, .06]

**Total and Direct Effects to Prejudice, Stereotypes, and Discrimination:**

Total Effect:  $B=-2.42$ , 95% CI [-5.07, .23]/ $B=-.07$ , 95% CI [-.18, .04]/ $B=-.05$ , 95% CI [-.22, .11]  
Direct Effect:  $B=2.25$ , 95% CI [-4.93, .43]/ $B=-.04$ , 95% CI [-.15, .07]/ $B=-.03$ , 95% CI [-.19, .14]

*Note.* Path values linking mediators to outcomes are presented from top to bottom: prejudice, stereotype endorsement, and discrimination. Effect values are presented from left to right: stereotype endorsement, prejudice, and discrimination. CI = confidence interval.

\*  $p = .05$  (two-tailed). \*\*\*  $p = .001$  (two-tailed).

**Social Essentialism.** We used the same measure from Study 1 ( $\alpha = .72$ ).

**Negative Stereotype Endorsement and Discrimination.** We used the same stereotype endorsement ( $\alpha = .84$ ) and discrimination ( $\alpha = .90$ ) measures as Study 1.

**Treatment Value.** We used the same measure as Study 1 ( $\alpha = .84$ ).

**Demographics and Experience With Addiction.** We assessed age, gender, race/ethnicity, and socioeconomic status. We also measured personal experience with addiction using the same three questions from Study 1 and added a question about having a job where participants interact with people with substance addiction. Fifty-five (19.4%) participants indicated they personally struggle with substance addiction, 39 (13.8%) indicated they have received treatment for substance addiction, 185 (65.4%) indicated they have a close friend or family member who has struggled with substance addiction, and 39 (13.8%) indicated they have a job in which they interact with people with substance addictions.<sup>6</sup>

## Results

See Table 1 for correlations among variables included in the models. For correlations with additional onset attributions that were not the focus of the current work, please see Supplemental Table 2. Additionally, for correlations among individual mindset scale items and outcomes in Study 2, please see Supplemental Table 3. We used Hayes' PROCESS Model 4 (Hayes, 2018) to run four models, one for each of the two assessments of onset attributions and for each stigma outcome. In all models, addiction mindsets are the predictor and onset attributions as well as essentialism are parallel mediators (see Figures 2 and 3).

In the first model, we used *onset genetic* attributions as the mediator and *stereotypes* as the outcome. A stronger growth mindset was negatively related to onset genetic attributions but not significantly related to social essentialism. Onset genetic attributions were negatively related to stereotypes, whereas social essentialism was positively related. There was a significant positive indirect effect of a growth mindset on stereotype endorsement via onset genetic attributions but no significant indirect effect via essentialism. There was no significant indirect total effect, but there were significant positive total and direct effects (see Figure 2).

In the second model, *onset genetic* attributions are again the mediator, but *discrimination* is the outcome. Onset genetic attributions were negatively related to discrimination, whereas social essentialism was positively related. There was a significant positive indirect effect of a growth mindset on discrimination via onset genetic attributions, but again no significant indirect effect via essentialism. There was a significant and positive indirect total effect for discrimination and a significant positive total effect and direct effects (see Figure 2).

In the third model, we changed the onset attribution measure from genetics to *character blame*, with *stereotype* endorsement as the outcome. A stronger growth mindset of addiction was positively related to onset character blame but not essentialism. Onset character blame and essentialism were positively related to stereotype endorsement. There was a significant positive indirect effect of a growth mindset of addiction on stereotype endorsement via character blame

<sup>6</sup> There was a significant and negative relation between a growth mindset of addiction and one's personal experience with substance addiction. This finding mirrors related work that finds that people who reported attention-deficit/hyperactivity disorder had a weaker growth mindset of self-regulation, which may be due to their experience with attention-deficit/hyperactivity disorder (Burnette, Babij, et al., 2020).

**Table 2**  
Factor Analysis of the Mindset Measure in Study 2

Item	Factor loading		
	1	2	3
1. No matter who a person is, they can change their addiction a lot.	0.885		
2. A person can always greatly change how addicted they are.	0.853		
3. No matter how much of an addiction a person has, they can always change it quite a bit.	0.965		
4. Addiction is something in a person's nature that can be changed.	0.514 <sup>a</sup>		
5. Addiction is a changeable part of a person's personality.	0.557 <sup>b</sup>		-0.352
6. Being a person with an addiction is a changing part of who someone is.	0.429 <sup>a</sup>		
7. A person can have an addiction, and they really can't do much to change it.		0.976	
8. A person's addiction is something about them that they can't change very much.		0.974	
9. A person can learn to manage their addiction, but they can't really change the intensity of the addiction.		0.368 <sup>a</sup>	
10. Addiction is something in a person's nature that can't be changed.			0.499
11. Addiction is part of a person's personality.			0.736 <sup>a</sup>
12. Being a person with an addiction is an unchangeable part of who someone is.			0.855
Eigenvalue	6.04	1.30	1.28
% of total variance	50.32	10.85	10.31
Total variance	50.32	61.16	71.47

<sup>a</sup> Indicates items with communalities less than 0.40 and thus not included. <sup>b</sup> Indicates items with cross-loadings.

but no significant indirect effect via essentialism. Moreover, there was a significant indirect total effect and a significant positive total effect, but no significant direct effect (see Figure 3).

In the fourth model, we again used *character blame* as the mediator, with *discrimination* as the outcome. Onset character blame was positively related to discrimination, but essentialism was not significantly related to discrimination. There was a significant and positive indirect effect of growth mindset of addiction on discrimination via onset blame attributions but no significant indirect effect via essentialism. Moreover, there was a significant indirect total effect and a significant positive total effect, but no significant direct effect (see Figure 3).<sup>7</sup> To view the models with covariates, see Supplemental Figures 2 and 3.

Finally, unlike Study 1, a growth mindset was not significantly correlated with treatment value,  $r(283) = .05, p = .454$ .

## Discussion

Interestingly, in this second study, a growth mindset of addiction mostly had costs. For example, a growth mindset was negatively linked to genetic explanations and positively linked to character blame, and via these mechanisms indirectly and positively related to stigma, including both stereotype endorsement and discrimination. Yet, a growth mindset failed to predict social essentialism and thus had no negative indirect link to stigma outcomes. Rather, we saw a

positive total effect of a growth mindset on stigma-related outcomes. Additionally, a growth mindset was not positively related to treatment value. Overall, we replicated the costs of a growth mindset but failed to replicate links to beneficial outcomes.

One question that arises is as follows: Can the failed replication be related to changes in the mindset measure? To explore this possibility, we used the two fixed-phrased items about the nature of the attribute from Factor 2 and the two fixed-phrased items about the nature of the person with the attribute from Factor 3 to explore links to essentialism and treatment value. We used the two items for each factor that met the inclusion criterion noted above. When using only fixed-phrased attribute-focused items (Factor 2), recoded so that higher scores reflected a stronger growth mindset, we replicated the negative link to essentialism,  $r(283) = -.20, p < .001$ , and the positive link to treatment value,  $r(283) = .20, p < .001$ . When using fixed-phrased items focused on the person with the attribute (Factor 3; e.g., "Addiction is something in a person's nature that can't be changed"), also recoded so that higher scores reflected a stronger growth mindset, we replicated the negative link to social essentialism,  $r(283) = -.42, p < .001$ , but not the link to treatment value,  $r(283) = .05, p = .388$ .<sup>8</sup> Based on the work presented here, it seems crucial to focus on the underlying nature of a person, rather than the attribute itself, when considering essentialism. However, for treatment purposes, focusing on the attribute may be more relevant. This is in line with new research showing that fixed is not the opposite of growth and phrasing matters for predicting outcomes (Grüning et al., 2024). Overall, more work is needed to understand measurement-related findings before conclusions are drawn.

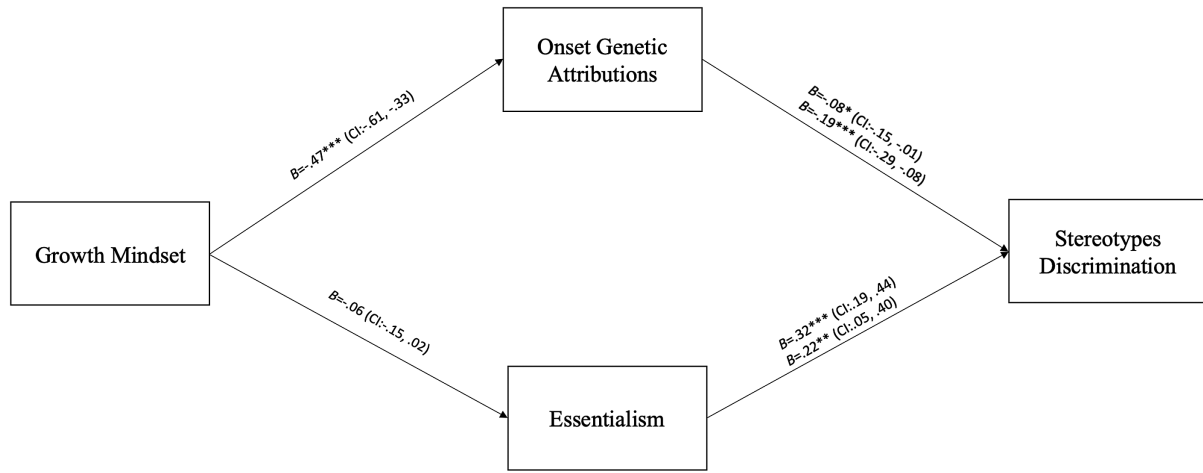
## General Discussion

The current work sought to understand how underlying beliefs tied to common addiction messaging may have iatrogenic effects. Antistigma campaigns that focus on education often offer growth messages around encouraging treatment (National Academies of Sciences, Engineering, and Medicine, 2016). For example, the Ad Council, Centers for Disease Control and Prevention, and National Council for Mental Wellbeing launched a campaign showcasing stories of addiction recovery designed to inspire hope—implying that recovery and change are attainable (The Ad Council, 2023). Additionally, researchers have recently called for greater emphasis on the role of personal choice and environmental influence in order to effectively treat addiction (Acuff et al., 2024). This perspective does not suggest that the etiology is a moral failing, yet it seeks to avoid too much emphasis on uncontrollable components. Based on our findings, messages that emphasize treatment or choice may be problematic in terms of fostering beliefs that can exacerbate stigma. Namely, in the current work, we find that a stronger growth mindset of addiction related to more blame of people with an addiction and besmirchment of their character, which was positively linked to stigma. We find these costs across both studies. However, findings were more mixed for the potential benefits of growth mindsets and depended, in part, on the wording of the measure. Overall, we highlight the critical consideration

<sup>7</sup> We ran the mediation models, entering experience with addiction measures as covariates. Figures depicting these results can be found in Supplemental Materials.

<sup>8</sup> For correlations among all items in the mindset measure in Study 2 and outcomes, see Supplemental Materials.

**Figure 2**  
Study 2 Mediation Model With Onset Genetic Attributions for Stereotypes and Discrimination Outcomes



**Indirect Effects to Stereotypes and Discrimination:**

Via onset attributions:  $B = .04$ , 95% CI [.00, .08]/ $B = .09$ , 95% CI [.03, .15]  
 Via essentialism:  $B = -.02$ , 95% CI [-.06, .01]/ $B = -.01$ , 95% CI [-.05, .01]  
 Total indirect effect:  $B = -.02$ , 95% CI [-.03, .07]/ $B = .07$ , 95% CI [.02, .13]

**Total and Direct Effects to Stereotypes and Discrimination:**

Total Effect:  $B = .14$ , 95% CI [.05, .23]/ $B = .24$ , 95% CI [.12, .36]  
 Direct Effect:  $B = .12$ , 95% CI [.03, .21]/ $B = .17$ , 95% CI [.04, .30]

*Note.* Path values linking mediators to outcomes are presented from top to bottom: stereotype endorsement and discrimination. Effect values are presented from left to right: stereotype endorsement and discrimination. CI = confidence interval.

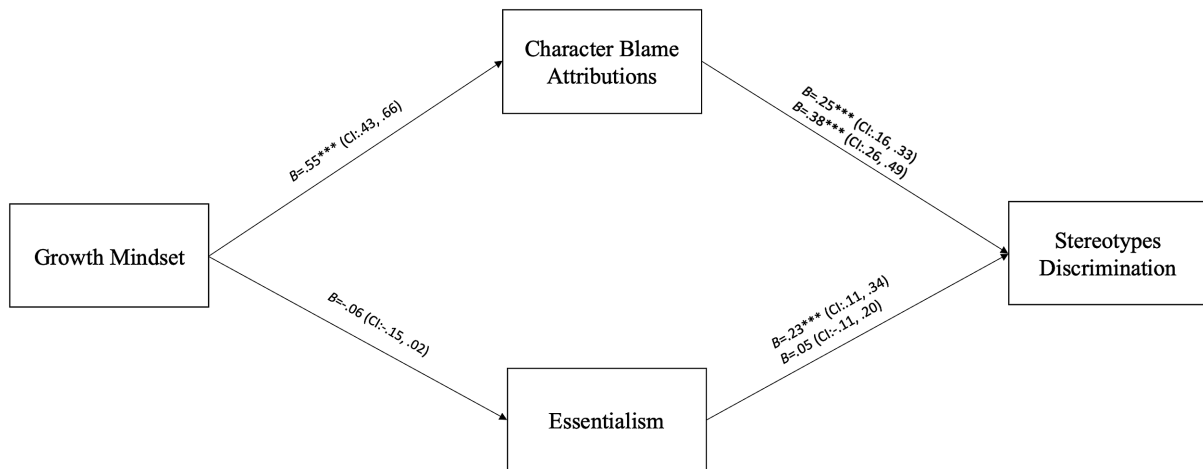
\*  $p = .05$  (two-tailed). \*\*  $p = .01$  (two-tailed). \*\*\*  $p = .001$  (two-tailed).

of the underlying beliefs that addiction messaging may convey as well as the need for greater precision in assessing these beliefs.

In the context of addiction, messages that can help to alleviate the character-based blame while not undermining agency may be

fruitful for reducing prejudice. What might these messages be? As Lewis (2017) noted, disease messaging is no better than choice models as they incorrectly pathologize not just the brain but also the person—that is, they can exacerbate essentialist thinking. Rather,

**Figure 3**  
Study 2 Mediation Model With Character-Blame Attributions and Stereotypes and Discrimination Outcomes



**Indirect Effects to Stereotypes and Discrimination:**

Via onset attributions:  $B = .13$ , 95% CI [.08, .20]/ $B = .21$ , 95% CI [.13, .29]  
 Via essentialism:  $B = -.01$ , 95% CI [-.05, .01]/ $B = -.003$ , 95% CI [-.03, .01]  
 Total indirect effect:  $B = .12$ , 95% CI [.05, .19]/ $B = .20$ , 95% CI [.12, .29]

**Total and Direct Effects to Stereotypes and Discrimination:**

Total Effect:  $B = .14$ , 95% CI [.05, .23]/ $B = .24$ , 95% CI [.12, .36]  
 Direct Effect:  $B = .02$ , 95% CI [-.08, .11]/ $B = .04$ , 95% CI [-.10, .17]

*Note.* Path values linking mediators to outcomes are presented from top to bottom: stereotype endorsement and discrimination. Effect values are presented from left to right: stereotype endorsement and discrimination. CI = confidence interval.

\*\*\*  $p = .001$  (two-tailed).



Lewis (2017) suggested a message that stresses how addiction can be overcome through learning, development, and personal growth is preferred. Pickard's (2017) work builds on this learning approach, proposing a model of responsibility without blame, which is a fairly strong growth-mindset message as it emphasizes the crucial role of choice, growth, and self-understanding. Indeed, responsibility without blame is a growth message that outlines how people are not to blame for the onset of the problem but can play a role in the offset—this differentiation is a critical component of the DES model and is referred to as compensatory messaging in the growth mindset literature (e.g., Burnette et al., 2017). Overall, we aimed to highlight the nuanced effects of powerful beliefs that stem from different addiction messaging. However, it is critical to note that we do not provide causal evidence and this work is exploratory in nature. Thus, additional replications, especially experimental designs, are needed.

### Theoretical Implications

In addition to the practical applications, the findings also have theoretical implications. Namely, we replicated past work in some ways but not others. For example, in Study 1 (and Study 2 using fixed-phrased items), we replicated the phenomenon that believing in the changeable, rather than fixed, nature of stigmatized characteristics can paradoxically both amplify and mitigate prejudice in the domain of addiction. This DES effect has also been documented outside of the mindset literature in domains ranging from mental illness (Haslam & Kvaale, 2015) to criminal behavior (Aspinwall et al., 2012).

However, we failed to replicate other findings. First, there was no correlation between a growth mindset and onset responsibility or controllability in Study 1—these are two items used in past DES work (e.g., see Hoyt & Burnette, 2020). This may be explained, in part, by more recent work that highlights the importance of further parsing onset blame and considering the critical role of controllability in conjunction with character and moral “failings,” rather than focusing on responsibility alone (Babij et al., 2023). Our measure in Study 2 better captures this and replicates the growth mindset to blame path in the DES model. Future work should continue to test this type of blame and should integrate it with ideas related to the “responsibility without blame” model of addiction (e.g., Pickard, 2017). That is, character blame is likely a better focus for the costs of growth mindsets than are attributions of responsibility or accountability.

Second, our findings were mixed for links between a growth mindset and essentialism as well as treatment value. Namely, we saw these links in Study 1 but we failed to replicate these benefits in Study 2 using growth-worded items. Overall, more work is needed on mindset measurement. Some of this work is underway. For example, a recent article has found over 140 contexts in which mindsets have been used and this work reviews measurement strategies (Kyler & Moscicki, 2024). Another systematic review outlines the discrepancies in measurement in the literature and calls for more work to outline best measurement practices (Combette & Kelemen, 2024).

### Limitations and Future Directions

Despite practical and theoretical implications, the current research is not without limitations. Among them, the studies were correlational, which confines claims about the causal role of addiction mindsets. The current work was also exploratory, relied on self-reports, and employed newly developed measures. Moreover, because our studies

dealt with the potentially sensitive topic of addiction, implicit measures of prejudice may be useful in future work to avoid possible social desirability or demand effects. Overall, future work would benefit from the use of preregistered experiments with more objective or behavioral outcome measures.

A major goal of our work was to understand the power of beliefs that underlie media messaging related to addiction. Overall, findings highlight how messages related to change, choice, and treatment can have iatrogenic effects. In addition to the potential practical implications, this work, albeit inadvertently, also highlighted the need for more research on mindset measurement. We hope the initial theorizing and findings provide a platform for additional research that explores how addiction messaging may impact powerful belief systems.

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