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Review

Substance use and shame: A systematic and meta-analytic review

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HIGHLIGHTS

- Shame and substance use had no significant association across cross-sectional studies
- Shame was significantly associated with more substance use-related problems across cross-sectional studies
- Shame appears to be both an antecedent and consequence of substance use in certain contexts
- Within-subjects studies and studies identifying moderators of the association between shame and substance use are needed

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ABSTRACT

Shame has been hypothesized to both contribute to and protect against problematic substance use, yet no systematic reviews of these relationships exist. We identified 42 studies of the empirical associations between shame and substance use or substance use-related problems in order to elucidate this relationship. A meta-analysis of 14 samples found no significant association between shame and substance use ($r = 0.00$). A meta-analysis of 18 samples found a significant association between shame and substance use-related problems ($r = 0.16$), an effect size similar to that found in previous meta-analyses of the association between depression and substance use. Samples in treatment for substance use disorders had higher experienced shame than controls. Over longer periods of time (i.e., months to years) shame was not a reliable predictor of substance use. Over shorter periods of time (i.e., hours to days), shame predicted more substance use, though this was qualified by complex interaction effects with shame sometimes appearing to have protective functions. Two studies demonstrated that substance use in particular contexts results in shame. The discussion identifies potential moderators of the relationship between shame and substance use and recommendations future research directions.

1. Introduction

Substance use disorders (SUDs¹) are among the most commonly occurring disorders in America (Merikangas et al., 2010). Of all psychiatric disorders, SUDs are second only to depressive disorders in terms of their contribution to global disability prevalence (Whiteford, Ferrari, Degenhardt, Feigin, & Vos, 2015). Thus, identifying risk factors for the development of SUDs and variables that maintain substance use is of high importance. Both negative reinforcement (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004) and tension-reduction (Cooper, Frone, Russell, & Mudar, 1995) models share the idea that negative affective states cue substance use, which in turn serve to escape or avoid that affective state.

One particular negative affective state, shame, has been theorized to serve a central role in the development and maintenance of SUDs. Both

clinical models (Cook, 1991; Potter-Efron, 2002; Luoma, Hayes, Wiechelt, 2007) and research (e.g., Dearing, Stuewig, & Tangney, 2005; Luoma, Guinther, Lawless DesJardins, & Vilardaga, 2018) have attempted to explain how shame contributes to SUDs. Yet the relationship between shame and SUDs is unclear, with some studies finding a significant positive association between shame and substance use (e.g. Stuewig et al., 2015), others finding a significant negative association between these variables (e.g., Grynberg, de Timary, Van Heuverswijn, & Maurage, 2017), and some finding null associations (e.g. Dodge & Clarke, 2018). A systematic review of the empirical associations between shame and substance use, as well as shame and substance use-related problems, can help clarify whether, and in what contexts, shame is related to these outcomes. Thus, a comprehensive review of data linking shame to substance use, as well as substance use-related problems, is warranted.

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¹ SUD = substance use disorders

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1.1. Two competing views of the functions of shame

Although a uniform and non-controversial view of the functions of shame does not exist, existing literature does describe two ways of understanding its role in regulating behavior. The first, older and more common literature views shame as an overwhelmingly maladaptive emotion that rarely has adaptive functions. A second, more recent literature views shame as being either maladaptive or adaptive, depending upon the context in which it is experienced. Below, we briefly review these two literatures as they relate to substance use.

1.1.1. Shame as maladaptive

According to this perspective, shame involves a negative evaluation of one's self and is often contrasted with guilt, which involves a negative evaluation of one's behavior (Dearing et al., 2005; Gilbert, 1998; Lewis, 1971). Thus, shame tends to motivate social withdrawal and avoidance in an attempt to protect the fragile, bad self. In contrast, guilt tends to motivate people to take adaptive actions to repair perceived harms (Tangney, Stuewig, & Mashek, 2007). This view emerges largely from an individual differences perspective using global self-report measures of shame proneness. Research in this domain shows that a tendency to experience shame across a variety of contexts (i.e. shame proneness) is reliably associated with many negative outcomes across a variety of domains of functioning (Tangney et al., 2007).

In the context of substance use, the maladaptive functions of shame have been most often articulated in cyclical models wherein substance use allows escape from and avoidance of painful feelings of shame, but also leads to behaviors that trigger shame (Dearing et al., 2005; Luoma et al., 2018; Wiechelt, 2007). According to these models, shame could drive the initial development of problematic substance use as a form of avoidance. Growing tolerance would then result in higher levels of consumption that then could lead to shame through various means. For example, failing to pick up one's child from school, losing a job, drinking more than is deemed suitable in one's culture, or getting into an argument with one's spouse as a result of substance use could all be seen as violations of social norms or moral guidelines that could result in shame. The resulting shame could serve as an antecedent for more substance use, thus perpetuating the cycle. Shame could also serve to maintain substance use among those less prone to shame initially who might first use substances because of other reasons (e.g., Koob & Le Moal, 1997). However, as substance use begins to result in moral failures, norm violations, or personal failures, shame may contribute to negative affective that further fuels use.

1.1.2. Functional views of shame

A functional evolutionary view of shame is based upon the idea that emotions evolved because they serve adaptive functions (Cibich, Woodyatt, & Wenzel, 2016; Keltner, 1995; Keltner, Young, & Buswell, 1997). Accordingly, shame evolved to alert individuals to threats to social belongingness, and occurs in response to situations involving failures of competency, or failures to conform to moral guidelines and social norms (Leach & Cidam, 2015). From this perspective, the distinction between shame and guilt is often not as clear as in the previous literature. While acknowledging that shame is often maladaptive, functional evolutionary views can also account for findings showing that shame sometimes motivates constructive approaches to failure in an attempt to repair a positive self-image. For example, shame may motivate cooperative behavior (Declerck, Boone, & Kiyonari, 2014), self-improvement (Lickel, Kushlev, Savalei, Matta, & Schmader, 2014), or prosocial behavior (de Hooge, Breugelmans, & Zeelenberg, 2008). This literature features experimental or laboratory studies of shame in which contextual variables, that affect whether shame has adaptive or maladaptive functions, are manipulated (e.g. de Hooge et al., 2008; Declerck et al., 2014). This literature generally does not consider individual differences in response to shame and tends to study shame experienced at a more mild-to-moderate level. A recent meta-analysis of

laboratory studies of shame showed that the largest moderator of the relationship between shame and positive approach to failure was whether one's failure or social image is perceived as more or less repairable (Leach & Cidam, 2015). Essentially, this literature indicates that if people see a way to repair a more positive sense of self, they will engage in those actions. However, if this option does not appear available, people will revert to patterns of behavior aimed at escaping or avoiding the painful emotion of shame.

Authors have proposed several ways in which shame may serve to mitigate or prevent substance use. For example, some have proposed that shame may be part of a stigmatization process that motivates some people to avoid substance use in the first place or stop substance use once initiated (Satel, 2007). Others have turned to research on interpersonal facilitative functions of shame, wherein expressions of shame are thought to facilitate relational repair in the aftermath of deviations from moral guidelines or social norms (Cibich et al., 2016; Keltner, 1995). Indeed, research has shown that contextually appropriate non-verbal expressions of shame elicit sympathy and cooperation from others (Keltner et al., 1997). Thus, for people who have engaged in behavior that has violated important moral guidelines or social norms as a result of their substance use, the expression of shame might help repair strained social roles that are often damaged when substance use becomes more severe (Luoma, Kohlenberg, Hayes, & Fletcher, 2012). Other data have shown that shame predicts self-change motivation (Lickel et al., 2014), raising the possibility that shame may sometimes contribute to motivation for reducing substance use under certain conditions.

1.2. Objectives of the current review

As research on shame in relation to substance use appears to be accelerating (see Appendix A) and theories on the relationship between shame and substance use conflict, a comprehensive review would be helpful to inform future research. In addition, no comprehensive systematic review of the relationship between shame and substance use exists, to our knowledge. The only other review of empirical findings on the relationship between shame and substance use we found (Rahim & Patton, 2015) reviewed data through January 2012 and included only six articles (four qualitative, two quantitative) related to shame and substance use in youth. The authors concluded that these papers indicated an association between shame and both psychopathology and substance use. The purpose of the current paper is to conduct an evaluative systematic review of all published empirical associations between shame and substance use or substance use-related problems. The review also includes a meta-analysis of all published cross-sectional correlational data of the association between shame and substance use and substance-used related problems. Based on the idea that the negative consequences associated with problematic patterns of substance use will also tend to evoke shame, previous authors have suggested that shame may be more closely related to negative consequences resulting from substance use than level of substance use, per se (Luoma, Guinther, Potter, & Cheslock, 2017). Thus, these two associations are analyzed separately in the meta-analyses.

1.3. Measurement issues

The literature reviewed above highlights the need to examine how shame is defined and measured in its association with substance use. Particularly, cyclical models suggest the need to distinguish between two aspects of shame: 1. a general, trait-like proneness toward shame that might contribute to the initial development of problematic substance use, and 2. current experiences of shame that may directly trigger or maintain substance use. Existing self-report measures can be roughly categorized into two groups, which, in this review, we refer to as *shame proneness* and *experienced shame*. Measures of shame proneness typically present respondents with a range of scenarios that might elicit

shame and ask them to indicate their likely response, some of which are characteristic of shame. These measures capture a global predisposition toward or proneness toward shame, the most common of which is the Test of Self Conscious Affect (TOSCA; Tangney, Dearing, Wagner, & Gramzow, 2000). In contrast, measures of experienced shame ask people to self-identify shame, or present them with various thoughts, feelings, action tendencies, or behaviors associated with shame and ask them to indicate how often they have these experiences. Measures of experienced shame may assess shame in a trait-like manner or, alternatively, they may measure shame in more specific contexts, such as in the present moment, over the last day, or in relation to a particular content area, such as one's body or substance use. The most common measure of experienced shame in this review is the Internalized Shame Scale (ISS; Cook, 1988).

2. Method

2.1. Article retrieval and literature review

The method for this review was based on an adapted version of the PRISMA guidelines for systematic reviews (Liberati et al., 2009). Inclusion criteria were: a) original research published in a peer-reviewed journal, b) quantitative study, and c) assesses shame in relation to substance consumption or substance use-related problems. Exclusion criteria were: a) dissertations, b) qualitative or case studies, c) not reported in English, d) substance use related to self not measured (e.g. study only measured substance use of parents of participants).

PubMed, PsycInfo and Web of Science were searched using the term *shame* in pairwise combination with *substances*, *drink*, *drug*, *drugs*, *alcohol*, *illicit*, *smoke*, *smoking*, and *nicotine*. We identified 1427 records after 763 duplicates were removed, with the last search on March 2nd, 2018 (see supplementary materials for more detailed information). The process of arriving at the final set of papers is outlined in the PRISMA diagram (see Appendix B). The screening process began with one author excluding 766 records with clearly irrelevant titles. Two authors independently reviewed remaining article abstracts and excluded articles if both authors agreed upon exclusion ($n = 316$). For the remainder of the 345 articles, two authors independently reviewed the full text with disagreements resolved by a third rater. Eligibility criteria were not met by 303 articles, leaving a final set of 42 papers, that included 54 samples, for the review.

One author extracted the following data from each paper: sample size, participant information, study type, substance type, shame measure(s), substance use measure(s), results and analyses, article limitations, a subjective quality rating from 1 (low quality) to 5 (high quality), and key results. A second author checked the extracted data with disagreements resolved by discussion. If information relevant to the review was missing, we contacted authors for additional information.

2.2. Meta-analyses

2.2.1. Inclusion criteria

We conducted two separate meta-analyses to quantify the magnitude of correlation between: 1) shame and measures of substance consumption and 2) shame and measures of substance use-related problems or dependence (hereafter referred to as substance use-related problems for simplicity). Only studies that reported correlations between shame and substance use retrospectively, and at the same time point, were included in the meta-analyses. Measures of specific types of shame (e.g., body shame or HIV shame), as opposed to global shame were excluded from analyses because including these studies would likely create undesirable variability in measurement methods. Combining studies that are disparate in their measurement methods is a frequently cited issue in meta-analytic reviews (e.g. Card, 2015; Field & Gillett, 2010; Petticrew & Roberts, 2005), and can result in estimates

that do not reflect the means of any groups. This is particularly true if moderator analyses are not possible, and given our small sample size, we were only able to conduct limited moderation analyses.

2.2.2. Computation and analysis of effect sizes

For studies that contained several Pearson correlations (r s), we first transformed r into Z_{Fisher} (Fisher, 1921) and then calculated the average effect size across all measures of either substance use or substance use-related problems, depending upon the meta-analysis being conducted (Rosenthal, 1991). This method ensured that each study would contribute only one effect size capturing the association between shame and substance consumption and/or one effect size capturing the association between shame and substance use-related problems. For papers which assessed different types of substances (e.g. alcohol and marijuana use), we averaged these associations across substance type. Additional information about the association between substance type and shame can be found in the Supplementary Materials. For papers with multiple samples, we calculated separate average effect sizes for each sample. For studies that reported both TOSCA shame and TOSCA shame after guilt was partialled out (Dearing et al., 2005; Hequembourg & Dearing, 2013; Stuewig, Tangney, Mashek, Forkner, & Dearing, 2009; Tangney, Stuewig, Mashek, & Hastings, 2011; Treeby & Bruno, 2012; Treeby, Rice, Cocker, Peacock, & Bruno, 2018), we only included the latter in the averaged effect sizes as previous research has suggested that partialled TOSCA scores are the more valid measure of shame proneness (e.g. Tangney & Dearing, 2002). The Supplementary Materials have more detail on analyses involving: 1. the TOSCA, including comparisons of unpartialled and partialled TOSCA values. To facilitate interpretation, we transformed Z_{Fisher} back to r after completing statistical operations.

Mean effect sizes across studies were characterized using a weighted average of each Z_{Fisher} and 95% confidence intervals (Hedges & Vevea, 1998). We selected a random-effects model based upon the assumption that our data would have variable population parameters and average effect sizes (Hunter & Schmidt, 2004), and in order to preserve our ability to generalize findings to studies outside of the current meta-analyses (Field & Gillett, 2010; Hedges & Vevea, 1998). Meta-analyses were conducted using SPSS 20 using Field and Gillett's (2010) syntax.

2.2.3. Moderator analyses

We tested three continuous moderating variables: gender (operationalized as the percentage of participants who reported a gender other than man), ethnicity (operationalized as the percentage of White participants) and mean age; and four categorical variables: type of shame measure (i.e. proneness vs. experienced; Luoma et al., 2017) and sample types (i.e. SUD vs. no SUD, college students vs. other, incarcerated vs. not incarcerated) with random effects weighted multiple regression models (Field & Gillett, 2010).

3. Results

Our review begins with meta-analyses assessing the magnitude of relationship between shame and substance consumption and between shame and substance use-related problems. Next, we provide a qualitative review of studies focused on the hypothesized temporal relations between shame and substance use, that is, whether shame precedes substance use, follows substance use, or both. Finally, we offer a synthesis of the findings from studies measuring more specific types of shame.

3.1. Meta-analyses

3.1.1. Meta-analysis of association between shame and substance consumption

Overall, 14 effect sizes were calculated for the association between shame and substance consumption. A forest plot of study effect sizes

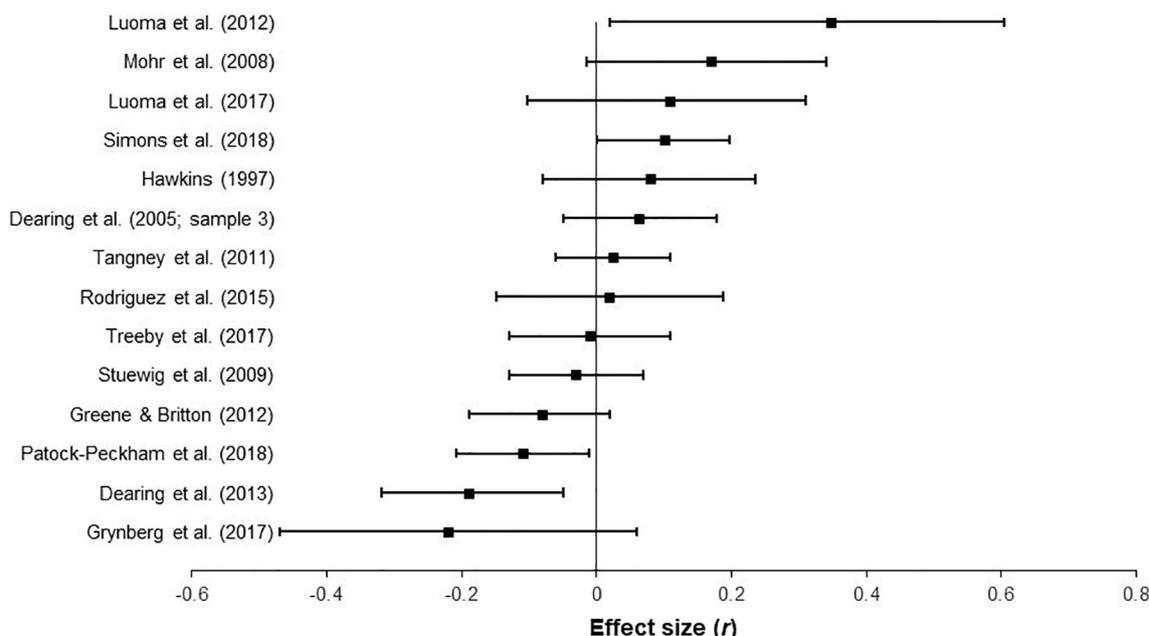


Fig. 1. Forest plot representing mean weighted effect sizes and 95% confidence intervals for associations of shame and substance consumption.

and 95% confidence intervals are displayed in Fig. 1. A total of 3805 people participated in the studies used in the present analyses ($M_{age} = 29.96$, $SD_{age} = 8.04$). Participants' race was reported in 13 studies and gender in all 14 studies; in these studies, 62.61% of participants were White and 47.12% identified as either a woman or gender minority.

The mean weighted effect size for the association between shame and substance consumption across the 14 studies was $r = 0.00$ (95% CI = $[-0.05, 0.06]$), which was not significantly different than zero ($z = 0.13$, $p = .893$). We measured heterogeneity of effect sizes with the Q_w statistic, which tests whether the distribution of effect sizes around the mean is significantly greater than what would be expected from sampling error. A nonsignificant Q test allowed us to reject the hypothesis that significant heterogeneity exists between the sample estimates, $Q_w(13) = 15.51$, $p = .277$. The I^2 value, which describes the percentage of variation across studies that is due to heterogeneity rather than chance, was 16.2%, suggesting a low level of heterogeneity. The funnel plot (Light & Pillemer, 1984; see Appendix C) suggested minimal publication bias in favor of publishing only significant findings; this was reflected in higher variability in effect sizes at smaller sample sizes and effect sizes approximately equally distributed across the range of values.

Of the moderators we assessed, only shame type (proneness vs. experienced measure) was a trending moderator of the association between shame and substance consumption, $\chi^2(1, k = 12) = 3.06$, $p = .080$. Because our random effects models cannot include studies in which both experienced shame and shame proneness were assessed in the same study (i.e., Grynberg et al., 2017; Luoma et al., 2017), we ran two additional models that included either the two shame proneness measures or the two experienced shame measures. These models slightly increased the strength of the effect, with parameters of $\chi^2(1, k = 14) = 3.69$, $p = .055$ and $\chi^2(1, k = 14) = 3.84$, $p = .050$, respectively. The mean association across $k = 9$ studies that only measured shame proneness was not significantly different than zero ($r = -0.05$, 95% CI = $[-0.12, 0.02]$; $z = 1.30$, $p = .195$). Heterogeneity was nonsignificant, $Q_w(8) = 10.96$, $p = .204$ and low ($I^2 = 27.0\%$). The mean association across the $k = 7$ studies that only measured experienced shame was not significantly greater than zero ($r = 0.08$, 95% CI = $[-0.01, 0.17]$; $z = 1.69$, $p = .091$). Heterogeneity was nonsignificant, $Q_w(6) = 5.50$, $p = .481$ and very low ($I^2 = 9.1\%$).

3.1.2. Meta-analysis of association between shame and substance use-related problems

Overall, 18 effect sizes were calculated for the association between shame and substance use-related problems. Forest plots of individual study effect sizes and 95% confidence intervals are displayed in Fig. 2. A total of 5250 people participated in the studies used in the present analyses ($M_{age} = 28.29$, $SD_{age} = 7.47$). Participant race and gender were reported in 17 studies; in these studies, 67.88% of participants were White and 51.59% identified as either a woman or gender minority.

For the association between shame and substance use-related problems, the mean weighted effect size across the 18 studies that was $r = 0.16$ (95% CI = $[0.13, 0.19]$), which was significantly different than zero ($z = 9.60$, $p < .001$). Heterogeneity for the association between shame and substance use-related problems was nonsignificant, $Q_w(17) = 18.27$, $p = .372$. The I^2 value was 7.0%, suggesting a very low level of heterogeneity. We used Rosenthal's (1991) failsafe N to assess the number of additional studies that would be needed to bring statistically significant associations down to the $p = .05$ level. The failsafe N for the association between shame and substance use-related problems was 821. This relatively high number indicates that the association between shame and substance use-related problems is stable and tolerant to null results. The funnel plot (see Appendix D) suggested minimal publication bias in favor of publishing only significant findings; this was reflected in variable effect sizes at small sample sizes and a tall peak converging near the mean effect size computed.

Of the moderators we assessed, only gender (operationalized as the percentage of participants who identified as either a woman or gender minority) moderated the association between shame and substance use-related problems. As the percent of the sample that identified as either a woman or gender minority increased, the association between shame and substance-related problems became stronger, ($\beta = 0.001$, 95% CI = $[0.00, 0.00]$, $SE = 0.00$; $t(14) = 2.21$, $p = .044$). The mean association between shame and substance use-related problems across the $k = 7$ samples with predominantly men was lower ($r = 0.12$; 95% CI = $[0.08, .16]$; $z = 5.35$, $p < .001$; failsafe $n = 61$) than the mean association between shame and substance use-related problems across the $k = 10$ samples with predominantly participants who identified as either a woman or gender minority ($r = 0.20$; 95% CI = $[0.15, 0.24]$; $z = 9.05$, $p < .001$; failsafe $n = 334$). The test of heterogeneity was

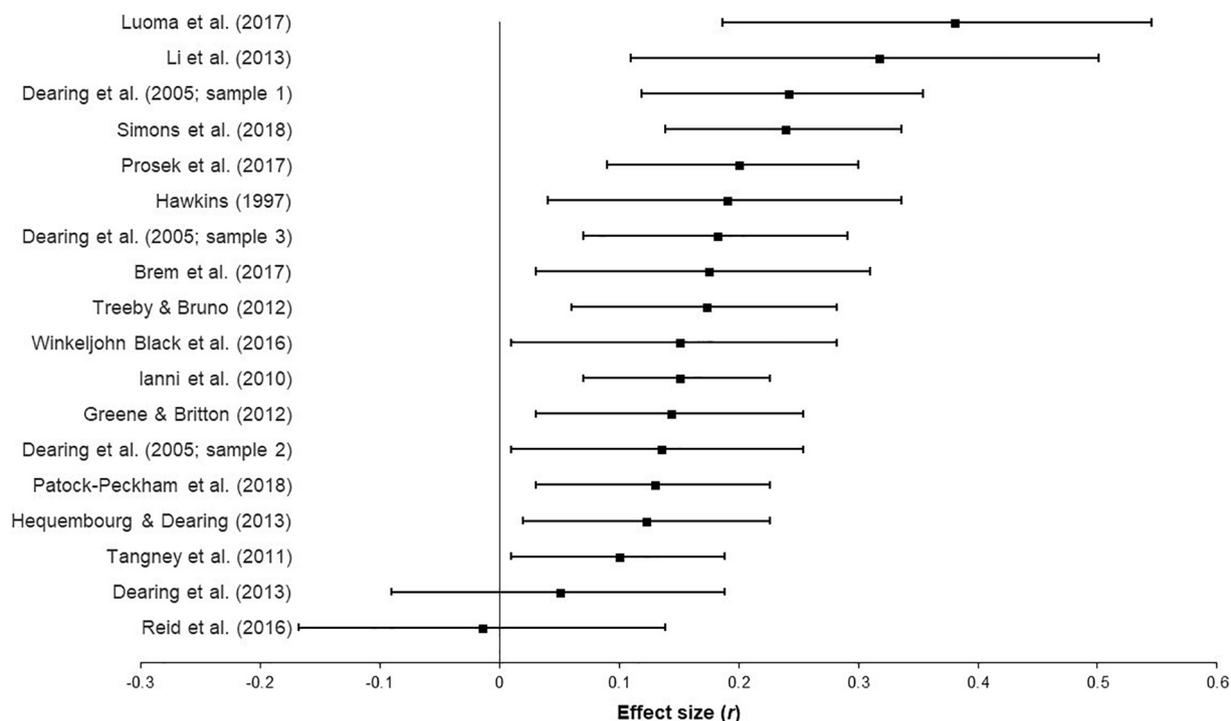


Fig. 2. Forest plot representing mean weighted effect sizes and 95% confidence intervals for associations of shame and substance use-related problems.

nonsignificant for both samples, $Q_w(6) = 6.01, p = .422, I^2 = 1.7\%$, and $Q_w(9) = 9.11, p = .427, I^2 = 1.2\%$, respectively. Mean sample age, percentage of White participants, type of shame measure and sample type did not significantly moderate results ($ps > 0.220$).

3.2. Qualitative synthesis

We next summarize the remainder of the studies. First, we discuss between group studies comparing non-SUD to treatment-seeking SUD samples since this further informs whether shame is associated with more problematic patterns of use. We then review studies that investigate temporal relationships between shame and substance use of the sort theorized in cyclical models of shame and substance use. Finally, we examine the relationship between substance use and specific, as opposed to global, types of shame.

3.2.1. Between group studies comparing SUD to control samples

Five studies examined whether SUD samples report higher levels of shame than non-SUD samples. Two studies found that samples of people in treatment for SUD reported higher levels of experienced shame compared to established norms based on college students (Meehan et al., 1996; O'Connor, Berry, Inaba, Weiss, & Morrison, 1994). In another study, the authors coded shame from interviews in which participants discussed their lives. The authors found that the sample of people in SUD treatment had higher level of coded shame than a sample of unemployed people and a sample of college students (Viney, Westbrook, & Preston, 1985). A 14-day ecological momentary assessment study compared people in treatment who had both SUDs and a history of childhood abuse and/or neglect to two community samples screened for the absence of Axis I disorders, one of which also had experienced childhood abuse and neglect (Holl et al., 2017). The SUD sample reported experiencing more shame across the 14 days than the two control samples. A fifth cross-sectional study compared 25 inpatients diagnosed with severe alcohol use disorder who were screened negative for any concurrent disorders to 25 healthy controls who were screened negative for any history of SUD or psychiatric disorders. Participants with alcohol dependence did not significantly differ from

controls in their levels of shame proneness and did not differ in experienced shame after controlling for depression (Grynberg et al., 2017). However, using the published groups means and standard deviations, we conducted a *t*-test that showed a trend toward experienced shame being higher in the alcohol dependent group, $t(49) = 1.89, p = .07$.

3.2.2. Shame predicting subsequent substance use over an extended period

In this section, we review three prospective studies that found higher shame predicted higher subsequent substance use and three studies that found higher shame predicted lower subsequent use. The aim of this section is to understand whether shame is a risk or protective factor for changes in substance use, including the development of problematic patterns of substance use, over more extended periods of time.

The first study found that shame predicted higher subsequent substance use (Stuewig et al., 2015). Shame proneness, assessed in 5th grade, predicted the development of risky behaviors, assessed when participants were between the ages of 18 and 21 ($N = 258$). Childhood shame proneness significantly predicted drinking at an earlier age, using a greater variety of drugs, ever using heroin, using other drugs, using a greater number of illegal drugs, and driving under the influence. Shame proneness also trended toward predicting ever: drinking alcohol, using stimulants and using hallucinogens. These analyses remained significant when controlling for socioeconomic status and 5th grade teacher ratings of student aggression, with the exception of driving under the influence which became a statistical trend. Shame proneness did not significantly predict cigarette use, number of alcoholic drinks, ever using marijuana, ever using depressants, or ever using inhalants.

The second study (Randles & Tracy, 2013) was one of only two studies in this review measuring shame via a means other than self-report. In this study, 105 newly sober people (average sobriety = 2.5 months), recruited from alcoholics anonymous, completed a baseline assessment and follow-up four months later. At baseline, participants' nonverbal shame behaviors (chest narrowed and shoulders slumped) were coded from the first 10 s of a video-recorded interview of them describing the last time they drank and felt badly about it.

Nonverbal shame displays, but not self-reported state shame, significantly predicted an increased likelihood of relapsing over the next four months. Nonverbal shame was a significant predictor, even after controlling for demographic variables, alcohol dependence, affect, shame proneness, and self-esteem. For people who relapsed, nonverbal shame also predicted the quantity of alcohol subsequently consumed.

A third study (Boudrez, 2009) of 124 people enrolled in a smoking cessation program found that higher levels of experienced shame (assessed via a personality inventory at pre-treatment) predicted fewer smoke-free days after treatment and more relapse 8 years later.

The first study (Dearing, Witkiewitz, Connors, & Walitzer, 2013) associating shame with lower drinking over time was a prospective study of factors that may influence the course of drinking among 206 people with hazardous levels of drinking that had not been in treatment in the year prior to the start of the study. Assessments were conducted every six months for two years, for a total of five assessments. Shame proneness at baseline predicted a lower percentage of heavy drinking days at every assessment point, including baseline (reported above).

A second study (Luoma et al., 2012) associating shame with lower substance use included analyses of change processes during a randomized trial involving an intervention based on acceptance and commitment therapy (ACT) that targeted shame among people in treatment for SUD. In this study, 134 clients at a residential SUD treatment center were randomized to either six hours of ACT plus treatment as usual (ACT+TAU) or to TAU. At the 4-month follow-up, participants reported their drug or alcohol over the previous 13-weeks and were scored as being or not being alcohol and drug free each week. Neither those in the ACT arm of the trial nor those in the TAU arm demonstrated a correlation between shame at post-treatment and substance use at follow-up. However, greater decreases in shame from pre- to post-treatment predicted a significantly higher number of weeks in which participants reported using a substance at follow-up in both the TAU arm, $r(31) = -0.41$, $p = .02$, and ACT arm, $r(31) = -0.36$, $p = .04$, indicating that rapid reductions in shame early in treatment predicted poorer treatment response.

The third study (Tangney et al., 2016) examined factors that predicted changes in pre-to-post incarceration substance use among 305 inmates. Most inmates decreased their substance use over the duration of the study. Shame proneness was unrelated to changes in most substance use variables (such as alcohol frequency and dependence, hard drug frequency and dependence and marijuana dependence). However, higher shame proneness during incarceration predicted a greater decrease in the frequency of marijuana use after incarceration (Tangney et al., 2016).

3.2.3. Shame and substance use over a brief time period

In this section, we summarize studies that examined whether shame is associated with substance use over a shorter temporal window, such as hours or days, as these studies are most relevant to whether shame is a direct antecedent of substance use or is involved in maintaining problematic patterns of substance use. Four studies examined whether shame is associated with substance use within short time periods. Two daily diary studies assessed whether shame assessed during the day predicted drinking that evening. A third study using ecological momentary assessment examined whether shame was associated with reports of using drugs or alcohol to manage the emotion at that same point in time. A prospective study examined whether shame following a drinking event predicted alcohol consumption over the subsequent week.

The first study (Mohr, Brannan, Mohr, Armeli, & Tennen, 2008) asked 118 undergraduate drinkers to complete daily surveys of their daytime mood and evening alcohol consumption for 21 days. Daily variability in ashamed mood (assessed via a single item) predicted subsequent drinking at home that evening, but not away from home. Overall, positive moods buffered the relationship between shame and drinking. On days where participants had higher levels of positive

mood, the association between ashamed mood and drinking at home was no longer significant. On a between-subjects level, feeling ashamed (averaged across the 21 days) correlated with drinking at home ($r = 0.21$, $p < .05$) but not away from home ($r = 0.12$, $p > .05$).

Another daily diary study (Luoma et al., 2018) of 70 light-to-heavy community drinkers examined the association between day-to-day fluctuations in ashamed mood and evening drinking over the course of 21 days. Between-subject analyses showed that levels of shame during the day predicted solitary drinking that evening, but not social drinking. Analyses of daily variation in ashamed mood showed that higher daily ashamed mood predicted increased quantity of alcohol consumed that evening, but this finding was strongly qualified by a cross-level interaction. For those individuals who experienced above average levels of shame (i.e. high shame individuals), on days where shame was higher than average for that person, they were less likely to drink, but drank more alcohol when they did drink. On days when shame was lower than average for that person, high shame individuals were less likely to drink, but drank less than typical if they did drink. For low shame individuals, on days where shame was higher than average for that person, they were more likely to start drinking alone, but tended to consume less alcohol than typical on these days. Conversely, on low shame days, low shame individuals were less likely to begin consuming alcohol in a solitary context but tended to consume more alcohol alone once they began drinking. Findings persisted even after controlling for daily variability in overall negative affect, suggesting the findings may be specific to shame.

An ecological momentary assessment study (Holl et al., 2017) explored the relationship between shame and substance use over 14 days among 55 people in treatment for SUD with a history childhood abuse/neglect ($N = 55$) and a community sample of people screened for the absence of any Axis I disorder, either with ($N = 53$) and without ($N = 43$) a history childhood abuse/neglect. For all groups, higher levels of shame over the two hours previous to receiving an automated assessment call were associated with reported use of substances to manage that emotion during that period. Moderation analyses showed that trauma/SUD participants responded to shame with higher levels of substance use than the other two groups. While substance use went up some from low to high shame in the trauma/SUD group, the association between shame and substance use went up much faster as shame increased in the trauma community sample. Thus, the trauma/SUD group appeared to use substances to cope with shame regardless of the intensities of shame experienced, whereas the non-SUD groups tended to use substances only a high level in reaction to more intense experiences of shame.

Study four from Giguere, Lalonde, and Taylor (2014) had 152 college students first complete a baseline assessment, and then complete a survey the next time they drank alcohol. Participants also reported their drinking over the subsequent seven days. Shame following the initial drinking event predicted a marginally significant increase in alcohol consumption over the next seven days.

3.2.4. Shame as a consequence of substance use

This section focuses on studies that may inform when shame is a consequence of substance use. Three studies examined whether substance use, measured at a single time point, predicted shame at a later time point. All studies assessed alcohol use, two with college student samples and one with a community sample.

In a daily diary study of 70 community drinkers, Luoma et al. (2018; discussed above) found that the previous night's total or solitary drinking did not predict shame the next day. However, they did find a trend toward a cross level interaction relating the previous night's social drinking to shame the next day. Specifically, people who tended to drink more in social contexts felt more shame when they drank more than usual, whereas people who tended to drink less in social contexts felt less shame when they drank more than usual.

Giguere et al. (2014) conducted four studies to examine the links

between shame, group identification, norm transgressions and alcohol use in undergraduate drinkers. In the first three studies, participants were randomly assigned to recall a time in which they drank more, about the same, or less than their university peers. Across all three studies, the authors found that participants who were weakly, as opposed to strongly, identified with peers reported more shame related to times when they drank more than they perceived was normal for their peers (i.e., a norm transgression), even when controlling for feelings of guilt. State shame was relatively low when participants reported a time when they drank similarly to or less than their peers. In Study 4, already partially reviewed above, participants reported the next time they drank alcohol after a baseline assessment. For those participants who had weaker group identification with their peers, drinking more than their peers at this event was associated with more subsequent shame, whereas normative or lower levels of drinking did not predict increased shame.

One additional study had nonsignificant results. In this study, 371 college students reported their levels of heavy drinking over the previous thirty days and then, a month later, rated two items assessing how much guilt and shame they were experiencing. These two items were summed into a combined shame/guilt scale. Heavy drinking assessed at Time 1 did not predict shame/guilt a month later (Dodge & Clarke, 2018).

3.2.5. Specific types of shame and substance use

All of the studies reviewed above assess shame as a global phenomenon, without asking participants whether it could be attributed to a particular cause. This section reviews the handful of studies that examine the relationship between shame attributed to particular aspects of ones' identity or in response to specific situations and substance use.

Four studies examined the association between body shame and substance use. A cross-sectional study of a diverse sample of 1547 women presenting at family planning clinics found that body shame was associated with more binge drinking over the past month after controlling for demographic variables. In addition, body shame interacted with body surveillance (regularly monitoring the appearance of one's body); higher levels of body surveillance slightly diminished the effect of shame on binge drinking. Body shame did not predict drinking frequency, nor sex after drinking (Littleton, Radecki Breitkopf, & Berenson, 2005). A study of 289 undergraduate women found that body shame was associated with self-reported problems with alcohol, but not frequency of smoking or problems related to drug use (Carr & Szymanski, 2010). A study of motivations for cigarette smoking in 146 undergraduate women found that, compared to people who never smoked or who had quit smoking, current smokers reported greater body shame, and body shame significantly predicted smoking cigarettes in order to control appetite and weight (Fiessel & Lafreniere, 2006). A longitudinal study of 141 undergraduate women found that trait body shame measured at baseline was not related to number of cigarettes smoked per day at baseline or three months later (Lamont, 2015).

Four studies assessed the relationship between shame (in reaction to other aspects of identity) and substance use. One study included 716 customers of pharmacies registered to sell non-prescription syringes in heavy, drug-active neighborhoods. In this study, baseline HIV-related shame was related to lower likelihood of being a person who uses injected drugs (Rivera et al., 2015). A study of 369 women who had recently been victimized by a partner found that shame related to aggression toward their partner was unrelated to drug and alcohol use problems (Wang & Maxwell, 2015). A third study focused on the effects of shame resulting from reading racist tweets. In this study, 211 Asian Twitter users living in the United States were randomly assigned to read anti-Asian tweets, anti-Asian retweets, or nonracist tweets (control; Lee-Won, Lee, Song, & Borghetti, 2015). Shame in reaction to racist messages was not related to past frequency of alcohol consumption. Finally, a study of 83 Filipino Americans using methamphetamines found that greater shame related to substance use predicted lower frequency of

methamphetamine use in the preceding 30 days, but not frequency of methamphetamine use before sex in the preceding 30 days. These relationships held after controlling for gender, age, country of birth, employment status, psychological control, depression and support from family and friends (Nemoto, Operario, & Soma, 2002).

4. Discussion

This systematic review aimed to synthesize all published studies examining empirical relationships between shame and substance consumption, and shame and substance use-related problems or dependence. The association (or lack thereof) between shame and substance use and substance use-related problems was complicated as it involved multiple types of studies, moderators, measures and populations with varying levels of substance use. Below, we discuss themes across studies, as well as potential mechanisms and moderators for future study.

4.1. Cross-sectional associations between shame and substance use

Our first meta-analysis found that people who report higher levels of shame, on average, do not consume more drugs and alcohol than those experiencing lower levels of shame, with an average weighted association of $r = 0.00$. In other words, people who report higher levels of shame, at a trait level, do not appear to use substances at a higher frequency than people who report lower levels of shame. As 11 of these studies assessed alcohol use and five assessed other substances, this association is most representative of the association between shame and alcohol use. Additionally, this association is most representative of people who would not qualify for a diagnosis of SUD. From the perspective of clinical (Dearing et al., 2005; Lewis, 1971; Tangney et al., 2007) and cyclical models of shame (Dearing et al., 2005; Luoma et al., 2018; Weichelt, 2007), which view shame as solely maladaptive, this finding is unexpected.

While the most straightforward interpretation of the above results is that shame bears no relation to substance use, the more sophisticated study designs discussed in more detail below suggest that simple between-subjects models fail to take into account moderators that may determine when shame promotes versus inhibits substance use. If shame sometimes promotes and other times inhibits substance use, averaging associations from all studies could yield an observed effect near zero. The idea that shame can both lead to avoidance-based behaviors and also motivate self-improvement is in line with functional accounts of shame and a recent meta-analysis (Leach & Cidam, 2015) showing that shame is linked to constructive approach when one's failure or social image is perceived as repairable, while it is linked to avoidance when it is not. Unfortunately, no currently reviewed study has tested this hypothesis. Regardless, this null result points to the importance of more complex study designs that can identify the conditions under which shame may be linked to more or less substance use.

In interpreting the lack of between-subject associations between shame and substance use, it is important to note that results are based on a relatively small set of 14 samples including 3805 individuals, leaving open the possibility that this estimate may be skewed by a small number of influential studies. A wide variety of samples were included (SUD patients, incarcerated people, community drinkers, students, smokers and a mixed sample of people with and without a SUD), making it extremely unlikely that statistical power would be adequate to detect group-based moderation effects. Another consideration is that the association observed is more characteristic of the relationship between shame and alcohol use in non-SUD samples, leaving open the possibility that a stronger association between shame and substance use may exist with certain drugs or in certain populations, but not others; for example, shame might show stronger effects in populations that are more highly stigmatized (such as SUD samples in treatment). In line with a functional view of shame, these individuals may perceive fewer routes to repair their shame-related failure or social image.

Despite the small set of studies we reviewed, we identified one potential moderator of the association between shame and substance consumption: type of shame measure. Moderation analyses showed a trend toward experienced shame being slightly positively associated with substance consumption and proneness being slightly negatively associated with substance consumption. However, neither type of measure resulted in estimates significantly different than zero. Theoretically, it is possible that the overall zero association between shame and substance consumption is due to the averaging the positive association with experienced shame together with the negative association with shame proneness. However, given that the finding was a statistical trend and the relatively small sample of studies included, this interpretation should be considered speculative. At a theoretical level, one interpretation of the different associations between these two measures of shame and substance use is based on the idea that shame may be a consequence of high levels of substance use. If higher levels of use regularly resulted in shame, then experienced shame would be expected to be higher in those individuals. However, shame proneness, which is thought to measure a more general and enduring dispositional tendency to experience shame across a range of situations, would not be expected to be affected by current levels of substance use. The result would be that experienced shame would be correlated with substance use in cross-sectional analyses, while shame proneness would not.

4.2. Cross-sectional associations between shame and substance-related problems

The meta-analysis of 18 samples correlating shame with problems resulting from substance use found a small, but reliably different from zero, overall correlation of $r = 0.16$. This value is similar to that found in meta-analyses of the association between depression and substance use, which found average correlations of $r = 0.14$ between depression and cocaine frequency/impairment (Conner, Pinquart, & Holbrook, 2008), $r = 0.15$ between measures of depression and alcohol related impairment/frequency (Malouff, Thorsteinsson, Rooke, & Schutte, 2007), and $r = 0.21$ for depression and alcohol related frequency/impairment (Conner, Pinquart, & Gamble, 2009). In interpreting these effect sizes, it is important to keep in mind that effect sizes were not adjusted for reliability of the measures, making them inherently conservative. Also, the most commonly used measure of substance use problems, the AUDIT (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), includes items on frequency of use, possibly attenuating the relationship between substance use-related problems and shame.

The 18 samples included a mixed SUD and clinical sample, one sample of people with SUDs, eight student samples, two samples of community adults (one of which had hazardous drinking levels), two incarcerated samples, one sample of hypersexual men, one sample of LGBTQ smokers, a sample of LGBTQ young adults, and one sample of injection drug users from Vietnam. Ten of the samples only assessed alcohol use, two assessed alcohol and other substances, and six assessed non-alcohol drug use. Thus, this correlation is most characteristic of student samples and problems related to alcohol use leaving open the possibility that shame may be more strongly associated with substance use-related problems among particular populations or other substances.

These results are consistent with the idea that shame is a consequence of problematic patterns of substance use that result in perceived moral failures, norm violations, or failures of personal competence (Dearing et al., 2005; Gilbert, 1998; Lewis, 1971; Luoma et al., 2018; Tangney et al., 2007; Wiechelt, 2007). Indeed, common measures of substance use-related problems, such as the Alcohol Use Disorders Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993), include items that specifically assess perceived failures, for example, “how often during the last year have you failed to do what was expected to you because of your drinking?” This finding is also consistent with the cyclical models of addiction, which would expect that more problematic forms of substance use would be associated with

higher levels of shame.

Even with the relatively small number of studies, one moderator of the relationship between shame and problems resulting from substance use was identified. Meta-regression analyses showed that as the percentage of participants who identified as either a woman or gender minority increased, the association between shame and substance-related problems strengthened. In other words, women and gender minorities (when combined into one group) showed a stronger association between shame and substance use-related problems than men. There was not enough data to separate gender minority participants from women, so it seems likely that this effect largely relates to cis-gender men and women. Perhaps some of the reasons for this difference may be that women (and perhaps gender minorities) may be more profoundly affected by the stigma related to substance use than men (McHugh, Votaw, Sugarman, & Greenfield, in press). At least one study (O'Connor et al., 1994) found that women in treatment for SUD evidenced more shame than men in treatment for SUD, which may indicate that shame has a more important influence on their substance use than men. This finding adds to the growing body of literature on differences between men and women in relation to SUD (McHugh, Votaw, Sugarman, & Greenfield, 2018).

Four studies that compared SUD treatment samples to samples of people without SUD also provided support for the idea that shame is associated with more problematic patterns of substance use; these studies found that SUD samples had consistently higher levels of experienced shame. The one study that measured shame proneness (Grynberg et al., 2017) found no significant difference between those who are in treatment for SUDs and those who are not. However, that study was only powered to find large effects, an unlikely result given our meta-analysis. It should also be noted that the alcohol dependent sample in the study excluded anyone with any other psychiatric disorder besides SUD. It's likely that this exclusion criteria restricted the range of shame experienced in the sample, as shame correlates with a wide range of psychiatric disorders and the majority of people diagnosed with SUD have at least one co-occurring disorder. Additionally, those seeking treatment have even higher rates of comorbidity (Grant et al., 2004). Together, the five studies reviewed confirm that people in treatment for SUD typically experience heightened levels of shame. At least two sources for heightened shame among people in SUD treatment seem likely. First, shame is likely to result from the kinds of problems that would typically trigger the need for treatment, which often involve perceived moral failures, norm violations, and failures of personal competence. Second, the process of entering treatment itself can instigate a stigmatization process which can heighten shame (Corrigan, 2004; Luoma et al., 2007).

4.3. Evidence for shame as an antecedent of substance use

In order to assess whether shame is an antecedent for substance use, as proposed in cyclical models of shame and substance use, more sophisticated designs that assess relationships over time and within-person are needed. If shame is associated with substance use in some contexts, but not others, then these types of studies are important in identifying potential moderators.

When studies examined whether shame predicted substance use months or years later, results were mixed. Three studies reported that shame predicted higher subsequent substance use. Two studies reported at least some findings in which shame predicted lower subsequent substance use. Finally, a third study reporting that reductions in shame during treatment were associated with more substance use at follow up. When considering these studies, it's important to note that five of the six studies assessed alcohol consumption, whereas only one assessed cigarette use and only two assessed other drugs. Thus, these results are most characteristic of shame predicting subsequent alcohol use. None of these studies included assessments of substance use-related consequences, which might be more reliably predicted by shame as shown

in the second meta-analysis on the relationship between shame and substance use-related problems.

The most straightforward interpretation of these findings is that they reflect the same lack of association between shame and substance use documented in the meta-analysis of cross-sectional studies and therefore run counter to cyclical models of shame. However, *de Hooge et al.'s (2008)* concept and findings related to differential effects of “endogenous” versus “exogenous” shame might point to potential moderators for when shame might promote versus inhibit substance use. In this view, endogenous shame “is relevant for the decision at hand” (p. 933) and thereby more likely to motivate reparative action, compared to exogenous shame which is not relevant to the current situation and thereby more likely to motivate avoidance. Using this lens, shame resulting from substance use would be more relevant to the decision to cut back or stop use and therefore might be more likely to motivate reduced use. The samples where shame was associated with higher subsequent use (e.g., fifth graders, people sober for 2.5 months, smokers in treatment) may have been experiencing less shame directly attributable to substance use compared to the samples where shame was associated with lower subsequent use (e.g., a residential treatment sample, hazardous drinkers, and an incarcerated sample). On the other hand, the *Randles and Tracy (2013)* found that nonverbal shame predicted an increased likelihood of relapse. In this study, nonverbal shame was assessed in reaction to a prompt to talk about a negative incidence of drinking, suggesting that the shame that was elicited may have been linked to substance use. Since shame due to substance use might motivate attempts to cut back on use, those samples with higher proportions of this type of shame might be more likely to decrease substance use in response to shame. On the other hand, those samples whose shame came mostly from other sources would tend to use substances in order to avoid shame. Indeed, the only study that did ask participants about shame specifically due to their substance use found that it predicted less methamphetamine use (*Nemoto et al., 2002*).

Another set of studies examined whether shame serves as a more temporally proximal risk factor for drinking. These studies examined whether fluctuations in state shame predicted substance use at the same point in time, or over a defined subsequent interval (e.g., the next few hours or days). Ultimately, a full understanding of any relationships between shame and substance use behavior can only be understood by examining both within- and between-person variations in shame and substance use. A number of authors have discussed the conceptual and empirical importance of disentangling between- and within-subject relations (e.g., *Wang & Maxwell, 2015*), which can be different in both magnitude and direction. For example, it is possible that within-subject fluctuations in shame could predict substance use at each time point without between-subject differences in shame predicting substance use. This could occur if the effects of shame on substance use were quadratic: for example, if the association between shame and use was positive from low-to-mid levels of shame and attenuated, or even became negative, from mid-to-high levels of shame. This kind of a quadratic effect would be likely to show that for people with low trait shame, increased shame relative to their relatively low baseline could be associated with more substance use at a given time point, whereas for people with high trait shame, increased shame relative to their relatively high baseline could be associated with less substance use at a given time point. The main take away is that within-subject associations are possible even in the absence of between-subject associations.

All four of the studies examining associations between shame and substance use within a more constrained time period found positive relationships between state shame and alcohol consumption for at least some of their samples. The samples that showed a positive relationship between state shame and substance use were two samples of college students (*Giguere et al., 2014; Mohr et al., 2008*), community drinkers (*Luoma et al., 2018*) who were low in shame, and a sample of healthy community controls (*Holl et al., 2017*). The trauma/SUD sample reported substance use that was high across all levels of shame and only

slightly increased as shame increased. The main exception was the high shame community sample, which actually reported less frequent alcohol consumption at higher levels of shame (relative to their average levels). In this study, it is important to note that these relationships were found only with solitary drinking.

The average levels of shame in these samples may contribute to these differing relationships. The samples who were probably experiencing relatively low levels of shame, on average, found that state fluctuations in shame were positively associated with substance use. In contrast, the samples who were probably experiencing relatively high levels of shame (i.e., the high shame community sample and the trauma/SUD sample) either showed an attenuated or negative relationship between shame and substance use. Several factors could contribute to these differences. As already mentioned, one possibility is that the relationship between shame and substance use is quadratic, such that shame is negatively associated with substance use at higher levels of shame, while it is positively associated with substance use at lower levels of shame. Another possibility are issues related to restricted ranges, with those either on the low or the high end of the shame spectrum having relatively restricted or skewed responses in terms of shame or substance use, thus biasing results.

Studies of within-person fluctuations in shame also highlight the importance of social context. As shame is a social emotion that is thought to have evolved to regulate our membership in groups (*Gilbert, 2003*), it stands to reason that the social context of substance use may be particularly relevant. It is now well-established that the variables affecting alcohol consumption (and perhaps other substance use) are different in social contexts than in solitary contexts (*Sayette, 2017*). Indeed, the two studies which differentiated between social versus solitary drinking (*Giguere et al., 2014; Luoma et al., 2018*) only found relationships between shame and substance use in solitary drinking contexts. This makes sense given that shame elicits social withdrawal concurrently with avoidance. Taken together, these two studies provide some evidence supporting the theory that shame may be a more reliable trigger of solitary substance use (particularly alcohol use) than of social substance use. These results point to another possible moderator of the (lack of) association found between shame and substance use found in the meta-analysis—whether substance use was solitary or social. Perhaps shame serves mainly to shift substance use from social to solitary contexts, rather than strongly affecting overall levels of substance use.

4.4. Evidence for shame as a consequence of substance use

Longitudinal studies that could inform whether shame is a consequence of substance use were sparse, with only three papers, including five studies, assessing whether substance use measured at one time point predicted shame at a later time point. Two papers found that that substance use can result in shame, but only under certain contexts. In a series of studies, *Giguere et al. (2014)* showed that college students who less strongly identified with their peer groups experienced more shame after occasions wherein they consumed more alcohol than their peers. In contrast, those who strongly identified with their peers did not experience shame after drinking, even after drinking more than their peers. One possible interpretation of these results is that the less strongly affiliated students were outsiders who experienced others as rejecting or ostracizing them, and thus tended to imagine others disapproving of them in reaction to transgressive events. Imagining other's disapproval and rejection in response to transgressive events has been shown to elicit shame in prior studies (e.g., *Smith, Webster, Parrott, & Eyre, 2002*).

This interpretation of *Giguere et al. (2014)* might also help explain the results of *Luoma et al. (2018)*, who found a cross-level interaction (between and within subject interaction) wherein social drinking, but not solitary drinking, predicted shame the following day. Specifically, people who usually drank more in social contexts felt more shame when they drank more than usual, whereas people who usually drank less in

social contexts felt less shame when they drank more than usual. It is possible that group norms are more salient in social drinking contexts. Perhaps only heavier drinkers exceeded these group norms on heavier drinking days. In this way, excessive social drinking among heavier drinkers may have been more likely to elicit social emotions than excessive solitary drinking.

In contrast, the study that did not find a significant association between substance use and subsequent shame (Dodge & Clarke, 2018) assessed whether heavy drinking, in general, predicted shame a month later. In addition, a significant weakness of this study was that it summed an item measuring shame with an item measuring guilt, making it an impure measure of shame. Also, shame/guilt was measured thirty days after assessing the level of heavy drinking, rather than in reaction to a discrete drinking event, making the results more representative of drinking predicting increased shame/guilt over extended periods of time, rather than discrete drinking events predicting shame/guilt. In sum, these results are supportive of the idea that drinking, in certain contexts, can elicit shame over a shorter time period. The relationship between other drugs and subsequent shame was not assessed in any study.

4.5. Specific types of shame and substance use

A total of eight studies measured shame attributed to particular aspects of ones' identity or shame in response to specific situations. The most common topic was body shame, examined in four studies. Other studies examined shame related to aggression against an intimate partner, shame related to racist tweets, HIV related shame. One study assessed shame that participants indicated had stemmed directly from substance use (Nemoto et al., 2002) and was the only study in this review to do so. Conforming with meta-analytic findings, shame was weakly or inconsistently associated with substance use, per se. Body shame was more consistently associated with higher substance use than were other types of shame, but this was only based on a small sample of four studies, thus awaiting more replication.

4.6. Treatment and prevention implications

Results from our review suggest that shame may be important to address in treatment. Studies consistently found that levels of shame were elevated in SUD samples. Furthermore, our meta-analytic results show that shame is associated with substance use-related problems at a magnitude similar to the association between depression and substance use found in previous meta-analyses. Furthermore, these results indicate that shame can be both a protective and a risk factor for substance use, depending upon the context. For example, within-subject associations between shame and substance use over time suggest that, for people generally high in shame, increased state shame may serve to suppress substance use. For these people, risk for elevated substance use may actually be higher when state shame is relatively lower. Indeed, at least two studies of treatments that actively targeted shame found higher post-treatment shame in active treatment groups compared to TAU (i.e., Luoma et al., 2012; Malouf, Youman, Stuewig, Witt, & Tangney, 2017). Mediation analyses in Luoma et al. (2012) even suggested that the higher levels of shame in the group that received a treatment directly targeting shame may have even facilitated positive treatment effects.

It is possible that an accepting atmosphere is key in enabling people to translate shame into positive behavioral change rather than avoidance. Shame (which may increase awareness of a shortcoming), coupled with an accepting atmosphere (which may reduce defensiveness or a negative global appraisal of the self) could allow positive change to take place. This idea is in line with self-affirmation theory, which proposes that people seek to maintain a positive sense of self in which they view themselves as good, moral, and effective (Sherman & Cohen, 2006), a view that shame threatens. Indeed, in one study researchers found that

a shame/guilt inducing stimuli led White people to support Black programs, but only if they also participated in a self-affirmation exercise (Harvey & Oswald, 2000). Thus, under certain conditions, shame may motivate actions that can restore a positive sense of self (Leach & Cidam, 2015). In addition, cultural perceptions of shame could influence whether or not shame is constructive. For example, in some collectivistic cultures, the relational function of shame (i.e. maintaining social harmony) may prove more adaptive (Bedford & Hwang, 2003), with shame being a more common, and potentially less isolating, emotion (Cole, Bruschi, & Tamang, 2002).

In relation to prevention, the above findings provide limited evidence that shame may contribute to the development of SUDs. Longitudinal studies with better controls and larger samples are sorely needed, particularly ones that include potential moderators of the relationship between shame and subsequent substance use.

4.7. Limitations

A number of limitations of the above literature are important to note. The majority of the samples in the review (52.7%) focused only on alcohol, with 43.7% investigating illicit drug use, and 9.1% only cigarette use. This raises the possibility that results may differ across samples, especially samples using illicit drugs, which transgress societal norms (i.e., laws). In addition, most of the studies reviewed above measured shame as a global phenomenon versus an emotion directly attributable to substance use. This is important to note because shame relevant to the current situation (i.e., shame resulting from substance use) may have different effects than shame from other sources (de Hooge et al., 2008). A large number of different measures of shame were included in this review. These measures diverged strongly in their conceptualization of shame. In addition, method variance was substantial, with different types of self-report used as well as observational and transcript coding schemes. The effect of these various methods of measuring shame depends largely on more studies using each method so that they can be compared. Additionally, the small number of studies included as well as the relatively large number of moderator analyses means that all tests of moderation and between-study heterogeneity should be interested with caution. Simulation studies have shown that statistical metrics such as Q tests and I² estimates are extremely unreliable for meta-analyses with fewer than twenty studies (Huedo-Medina, Sanchez-Meca, Marin-Martinez, & Botella, 2006). Finally, studies that might elucidate potential mechanisms linking shame and substance use were beyond the scope of this review.

4.8. Recommendations for future research

The overall pattern of results indicates that the association between shame and substance use, per se, is weak and that models which hold that shame is invariably maladaptive need revision. Rather than continuing to examine whether shame is associated with substance use at an overall level, future studies should investigate potential moderators of this relationship. One potential moderator is the perceived controllability of the failure which elicited shame, which has been shown in a meta-analysis to moderate the association between shame and constructive approach tendencies (Leach & Cidam, 2015). Another potential moderator is the source of shame. Shame resulting from substance use itself might be more likely to motivate attempts to reduce substance use than shame resulting from other sources. This may be particularly true if substance use is perceived as controllable (another potential moderator). For example, those who see their substance use as changeable and who perceive their shame as a direct consequence of their substance use may be motivated to change their use in the service of restoring a more positive sense of self, either in their eyes or the eyes of others. In contrast, those who see their substance use as unchangeable or who attribute their shame to sources other than their substance use may be less likely to try to change their substance use as a way to

restore a more positive sense of self.

While preliminary research suggests that the social context of consumption (e.g., peer group membership) and the violation of peer group norms are important, more research is needed to fully understand the contexts in which substance use results in shame. To accomplish this, future studies should directly measure other transgressive behaviors that could elicit shame, such as damaging relationships via drinking, neglecting obligations, or failing to manage one's health.

Methodological improvements are needed. Correlational studies are inadequate to characterize the dynamic relationships between emotion, cognition, social context, and substance use posited in cyclical models of shame and substance use. Prospective designs, daily process, or ecological momentary assessment approaches that allow for the characterization of within-person associations over time are needed. Experimental designs are needed to directly manipulate relevant variables and help identify potentially modifiable targets for intervention. In addition, researchers should carefully consider whether measures of shame proneness or experienced shame are more appropriate to their hypotheses and select measures accordingly. Nonverbal measures of shame should also be considered (e.g., Randles & Tracy, 2013) and novel measures of shame resulting from substance use would be useful. Given that two studies above linked shame to solitary, but not social drinking, future studies should consider this distinction.

As general negative affectivity has been shown to be associated with problematic use (Cheetham, Allen, Yücel, & Lubman, 2010), it would be helpful if future studies included measures of neuroticism or trait affectivity to control for the strong association between shame and negative affect. Studies should consider the literature relating to shame and guilt and carefully select measurement strategies that address how shame overlaps with guilt (Tangney et al., 2000). Finally, as instability in affect predicts substance use (Mohr, Arpin, & McCabe, 2015), variability in shame over time might be useful to study in predicting substance use.

4.9. Conclusion

This qualitative review and meta-analysis summarized the available research associating shame with substance use. Shame was reliably associated with substance use-related problems. However, the association between shame and substance use, per se, was complicated and appeared to depend on various moderating factors. Overall, data were more supportive of functional models of shame that hold that shame can have both adaptive and maladaptive functions, compared to models of shame that view shame as nearly always maladaptive. Given that shame is elevated in SUD samples and associated with substance related problems at a level similar to depression, more research is needed on the associations between shame and substance use in order to inform prevention and treatment efforts.

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Contributors

CC, JK, & JL collaborated on literature search and selection of final manuscripts. Summaries of studies were created by CC and JL. First draft of manuscript was created by CC and JL. Meta-analyses were conducted by CC. All authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest

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Appendix A. Supplementary data

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