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Sexual Orientation Change Efforts Do Not Increase Suicide: Correcting a False Research Narrative

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Abstract

Sexual orientation change efforts (SOCEs) signify activities designed to change or reduce homosexual orientation. Recent studies have claimed that such therapies increase suicide risk by showing positive associations between SOCE and lifetime suicidality, without excluding behavior that pre-dated SOCE. In this way, Blosnich et al.'s (2020) recent analysis of a national probability sample of 1518 sexual minority persons concluded that SOCE "may compound or create…suicidal ideation and suicide attempts" but after correcting for pre-existing suicidality, SOCE was not positively associated with any form of suicidality. For suicidal ideation, Blosnich et al. reported an adjusted odds ratio (AOR) of 1.92 (95% CI 1.01–3.64); the corrected AOR was .44 (.20–.94). For suicide planning, Blosnich et al.'s AOR was 1.75 (1.01–3.06); corrected was .60 (.32–1.14). For suicide attempts, Blosnich et al.'s AOR was 1.75 (.99–3.08); corrected was .74 (.36–1.43). Undergoing SOCE after expressing suicidal behavior reduced subsequent suicide attempts from 72 to 80%, compared to those not undergoing SOCE, when SOCE followed a prior expression of suicidal ideation (AOR .17, .05–.55), planning (AOR .13, .04–.45) or intention (AOR .10, .03–.30); however, SOCE following an initial suicide attempt did not significantly reduce further attempts. By violating the principle that a cause cannot occur after an effect, Blosnich et al. misstated the correct conclusion. Experiencing SOCE does not result in higher suicidality, as they claim, and may sharply reduce subsequent suicide attempts. Restrictions on SOCE will not reduce suicidal risk among sexual minorities and may deprive them of an important resource for reducing suicide attempts.

Keywords Sexual orientation · Conversion therapy · Suicide · Sexual orientation change efforts (SOCEs) · Minority stress

Introduction

In the present century, suicide rates have trended downward globally (Roth et al., 2018) but have risen sharply in the USA (Curtin et al., 2016), particularly among younger Americans (Curtin, 2020), including younger sexual minority persons (Meyer et al., 2021). While evidence that sexual orientation is associated with higher completed suicide risk in the USA is mixed (Cochran & Mays, 2011; Erlangsen et al., 2020; Mathy et al., 2011), it is well established that lesbian, gay, and bisexual (LGB) youth are at higher risk than others of related behavior such as thinking about, planning or intending

suicide, as well as suicide attempts (Haas et al., 2010; Hottes et al., 2016; Liu et al., 2020; for a review, see Moagi et al., 2021). In both the general population and among sexual minorities, suicide ideation is the most prevalent form of suicidal behavior, followed by making a plan for committing suicide, declaring or signaling unambiguous intention to commit suicide (as opposed to signaling a need for help), and making a suicide attempt. Although only suicide attempts are directly predictive of completed suicide (Harris & Barraclough, 1997; Kessler et al., 2005; Suominen et al., 2004), suicide prevention focuses on treatment following suicidal thoughts, plans or declarations of intention, which often predate an attempt and are "important in their own right as indicators of extreme psychological distress" (Kessler et al., 2005, p. 2487; van der Feltz-Cornelis et al., 2011).

Some sexual minority persons have attempted to resolve unwanted homosexual attraction, behavior, and/or identity by engaging in programs or interventions ranging from camps, intensive study, and aversion techniques to traditional talk

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therapy, collectively known as sexual orientation change efforts (SOCE), or sometimes "conversion" or "change-allowing" therapies. Most SOCE are pursued in religious contexts, by religious practitioners or for religious reasons, and most persons undergoing SOCE do so as youth or young adults. Shidlo and Schroeder's (2002) qualitative study of 202 SOCE participants found that the large majority (91%) reported undergoing individual psychotherapy (including cognitive/behavioral therapy or psychoanalysis). The average course of treatment consisted of 118 counseling sessions over 26 months; small proportions received (or also received) aversive conditioning (9%), hypnosis (4%), psychotropic medication (2%) or inpatient psychiatric treatment (1%) (p. 250). The reported results of such efforts usually entail partial movement toward less intense or exclusive homosexual fantasy and/or reduced same-sex and increased opposite-sex sexual expression, with small proportions reporting either complete resolution of unwanted sexual orientation elements or movement toward increased homosexual orientation (Bradshaw et al., 2015; Dehlin et al., 2015; Jones & Yarhouse, 2011; Karten & Wade, 2010; Spitzer, 2003; Sullins et al., 2021).

Both the efficacy and ethics of SOCE are contested. Spitzer's prominent 2003 study in this journal reporting change as described in the previous paragraph (Spitzer, 2003) prompted a storm of criticism and debate (Drescher & Zucker, 2006; Peer Commentaries on Spitzer, 2003) and Spitzer's (2012) eventual repudiation of the study. Subsequent studies yielded similar findings, however, as well as evidence of psychological benefit from SOCE (Beckstead & Morrow, 2004; Dehlin et al., 2015; Jones & Yarhouse, 2011; Karten & Wade, 2010; Pela & Sutton, 2021; Sullins, 2022; Sullins et al., 2021). Proponents, citing such reports, argue that persons who want to try to resolve same-sex attractions that trouble them should be free to seek therapy to do so. Those opposed to SOCE insist that the practice is "ineffective and may cause harm to patients and their families who fail to change" (Drescher et al., 2016, p. 7; see also Haldeman, 2022; Blosnich et al., 2020; Flentje et al., 2013), including an increased risk of suicidal behavior (Higbee et al., 2022; Ryan et al., 2020). A range of clinical and scholarly associations have issued cautionary or oppositional statements (Alempijevic et al., 2020; American Psychiatric Association, 2000; American Psychological Association, 2021; National Association of Social Workers, 2015). Legal battles between these positions have resulted in limited legislative restrictions on SOCE in 20 US states, injunctions against such bans in two states, and proposed protective legislation in two more states (Movement Advancement Project, 2020). The 2009 American Psychological Association (APA) Task Force on the topic concluded that the practice of SOCE has "become mired in ideological disputes and competing political agendas" (American Psychological Association, Task Force on Appropriate Therapeutic Responses to Sexual Orientation, 2009, p. 92).

The present study addresses the question of suicidal behavior risk due to SOCE by re-examining recent survey findings purporting to demonstrate increased suicidal behavior among former SOCE participants (Blosnich et al., 2020). The question of SOCE efficacy is not at issue; since minority sexual orientation was a screening criterion for survey participation, the data included only persons for whom, by definition, the stated aims of SOCE were not achieved.

Until recently, claims of elevated suicidal risk from SOCE exposure were based primarily on small-sample qualitative studies (Beckstead & Morrow, 2004; Dehlin et al., 2015; Flentje et al., 2013; Haldeman, 2002, 2012). None of these studies included any measures of suicidality but inferred its presence and scope from narrative comments. The causal connection to SOCE was presumptive and speculative. Dehlin et al. (2015) summarize: "No known study to date has drawn from a representative sample of sufficient size to draw conclusions about the experience of those who have attempted SOCE. Furthermore, no known study to date has provided a comprehensive assessment of basic demographic information, psychosocial well-being, and religiosity, which would be required to understand the effectiveness, benefits, and/or harm caused by SOCE" (p. 96).

Some recent studies have begun to overcome these limitations, employing improved study design, samples, and measures. Salway et al. (2020) analyzed survey questions on SOCE participation and suicidal ideation, estimating subgroup differences in a large non-probability sample ($n = 8,388$) of Canadian sexual minority men. Ryan et al. (2020) reported on similar questions about SOCE experience and suicidal behavior in a retrospective study of 254 sexual minority young adults. Meanley et al. (2020) examined a clinical sample of 1,156 older men with AIDS in four cities, which was roughly representative of urban men who have sex with men (MSMs). Finally, Blosnich et al. (2020) examined a national probability sample of sexual minority persons, gathered via random telephone sampling, which collected extensive measures of the nature and timing of SOCE exposure as well as multiple forms of suicidal ideation, including thinking about, intending, planning, and attempting suicide. All of these efforts improved the state of knowledge by (1) using larger, more objective samples, and for Blosnich et al.'s (2020) study, a national probability sample, (2) asking direct questions rather than inferring from incomplete open-ended comments, and (3) including a comparison group of non-SOCE participants.

Despite these improvements, all four studies also exemplify a serious error which may render their findings invalid: each reports an association of SOCE with suicidality as if the former caused the latter, without

examining the possibility that the suicidality may have preceded recourse to therapy. This problem is not trivial for these studies, since all four call for SOCE to be restricted due to its negative health outcomes, and in particular its invidious effect on suicide risk.

Ryan et al. (2020) did not measure the timing of SOCE relative to suicidality, but the remaining three studies all made use of data that could have addressed this question, but did not do so. The response set for Salway et al.'s (2020) questions pertaining to SOCE exposure and having thought about or attempted suicide ("no; yes, some time ago; yes, last 12 months; yes, both prior to and last 12 months") permitted at least a crude specification of time order, but instead of making use of this information Salway et al. collapsed all "yes" responses to both suicide questions into a single variable indicating "having ever thought about or attempted suicide " (p. 3). Meanley et al. (2020) had access to 32 years of longitudinal data measuring depression and other negative psychosocial health conditions for men at least 40 years old who reported an average age of 24 at the initiation of SOCE therapy. A third of their respondents initiated SOCE after age 34, suggesting that pre-existing psychopathology was a real possibility, yet they did not take steps to address this important potential confounder.

Blosnich et al. (2020) made use of data from the Generations Study, a well-crafted survey of a population-based sample ($N = 1518$) of the sexual minority population in the USA administered by the Williams Institute from 2016 to 2018 (Meyer, 2020). Detailed follow-up questions determined the respondent's age when both SOCE and suicidality were reported, as described further in the Measures section below. Despite the availability of such comprehensive information on the timing of both suicidality and SOCE, Blosnich et al. did not attempt to determine to what extent the former may have preceded the latter.

The present study amends this lack by replicating and then adjusting Blosnich et al.'s (2020) findings to account for suicidality that may have preceded SOCE. The working hypothesis of this analysis is that a substantial portion of suicidal experience occurred prior to undergoing SOCE, thus appropriately moderating some or all of the observed effect of SOCE therapy on suicidality. Depending on the extent of the moderation, this will result in one of three possible outcomes relative to Blosnich et al.'s claim that SOCE "may compound or create…suicidal ideation and suicide attempts" (p. 1028): (1) the positive effect of SOCE on suicidality will be reduced (weak hypothesis outcome); (2) there will no longer be an observed association between SOCE and suicidality, indicating that SOCE has no effect on sexual minority suicide (moderate hypothesis outcome); or (3) the effect of SOCE on suicidality will be negative, indicating that exposure to SOCE significantly reduces suicidality (strong hypothesis outcome).

Method

Participants and Procedure

The data for this study were collected as part of the Williams Institute's Generations Study, an epidemiological study designed to examine the health and well-being of three generational cohorts of non-transgender sexual minority persons in the USA (Meyer, 2020). The cohorts consisted of persons aged 52–59 (Pride Generation) in 2016, whose sexual coming of age took place around the time of the Stonewall riots and the start of the gay liberation movement; persons aged 32–41 years (Visibility Generation) in 2016, whose early life experiences coincided with the beginning of the AIDS epidemic and greater visibility and social acceptance for LGB people; and those aged 18–25 in 2016 (Equality Generation), whose early life experiences were affected by the growing focus on LGB marriage and employment equality. Eligibility was also restricted to the three largest US racial and ethnic groups (Black, Latino, or White, although multi-ethnic identities that included one of these was also included) (Krueger et al., 2020).

Participants were screened by the Gallup Organization using daily random digit dialing (both landline and cell phones) for one year beginning March 2016. Recruitment for Black and Latino participants extended for an additional year, until March 2018. Respondents who identified as "lesbian, gay, or bisexual" but not transgender (who were recruited into a separate companion study) were invited to complete a self-administered online or paper questionnaire, which required 5th grade English proficiency. Calls to 366,640 Americans resulted in a sample of 3,525 eligible participants (1%), of which 1,518 (43%) completed usable interviews. Statistical weighting adjusted for the complex survey sample design, differential non-response, the extended sample of Black and Latino respondents, and known characteristics of the sexual minority population as reflected in prior data collected by Gallup and the US Census. The resulting data are designed to be generalizable to the US population of sexual minority adults and have formed the basis for several prior studies and estimates for this population (Meyer et al., 2021; Nock et al., 2009; Rothblum et al., 2020). More information about the study's methodology and sample characteristics is available online at http://www.generations-study.com and in several published reviews and methodological reports (Krueger et al., 2020; Meyer, 2020; Meyer et al., 2020).

Measures

Measures closely followed those reported by Blosnich et al. (2020). Model covariates included gender identity, with categories of man, woman, and non-binary; sexual identity, with categories of lesbian, gay, bisexual, queer, pansexual, asexual, and other; race and ethnicity, with categories of White, Black, Hispanic, and other; educational attainment, with categories of high school or less, some college, college degree, and more than a college degree; and age in years.

For SOCE participation, respondents were asked, "Did you ever receive treatment from someone who tried to change your sexual orientation?" and if so, their age when such treatment last occurred. The specific type of treatment was not characterized further, although follow-up questions asked whether the treatment was from a religious leader or healthcare professional. Four questions addressed lifetime suicidal behavior: "Did you ever in your life have thoughts of killing yourself?" "Did you ever think about how you might kill yourself (e.g., taking pills, shooting yourself) or work out a plan of how to kill yourself?" and "Did you ever make a suicide attempt (i.e., purposefully hurt yourself with at least some intention to die)?" An additional question on suicide intention was not analyzed in Blosnich et al.'s study. Response options for each question were "No," "Yes, once," and "Yes, more than once." Follow-up questions for the yes responses asked how old the respondent was when they engaged in the behavior or in both the first and most recent of multiple instances of the behavior (Blosnich et al., 2020).

Adverse Childhood Experiences (ACEs)

The ACE score was expressed as the additive index of eight indicators of childhood experiences identified by the Centers for Disease Control and Prevention (CDC) to be negatively related to adult health outcomes: sexual abuse; physical abuse; emotional abuse; substance abuse in the household; intimate partner violence in the household; mental illness in the household; a family member imprisoned; and parental separation or divorce. Three ACEs figured prominently in the analysis. Sexual abuse was measured by three questions: "(Before 18 years of age) How often did anyone at least 5 years older than you, or an adult, ever touch you sexually?", "(Before 18 years of age) How often did anyone at least 5 years older than you, or an adult, try to make you touch them sexually?", and "(Before 18 years of age) How often did anyone at least 5 years older than you, or an adult, force you to have sex?" The response options were "Never," "Once," or "More than once," and responses to the three questions were combined into a single measure of sexual abuse. Mental illness and emotional abuse were assessed by similarly worded questions asking whether before age 18 the respondents had "live[d] with anyone who was depressed, mentally ill, or suicidal," or how often they had been sworn at, insulted or put down. Indicator variables coded one for the presence or zero for the absence of each of these experiences.

Childhood Bully Victimization

Respondents were asked "How often, if ever, were you bullied before you were 18 years old?" The mean of the 4-point response scale (often, sometimes, rarely, never) was reverse coded so that higher scores indicated more frequent childhood bully victimization.

Statistical Analysis

The analysis proceeded in three stages. The first goal was to replicate the findings of Blosnich et al.'s (2020) logistic regression models showing a positive association between SOCE and suicide. This involved reconstructing, as closely as possible, the same variable classifications reported in that study. Second, the models were adjusted to account for the timing of suicidality relative to SOCE. Third, the analysis was extended beyond Blosnich et al.'s models in order to examine the relationship of SOCE and suicidality more fully. The extended models included additional covariates and employed ordered logistic regression to examine repeated instances of suicidal behavior. All analyses used survey weights to allow for generalization to the US population of sexual minority adults, ages 18–27, 32–43, and 50–61. Comparative results using unweighted data are presented in a supplement (Tables S1–S9). All models presented, including those that replicated Blosnich et al.'s findings, were certified for proper model specification using the Pregibon/Tukey goodness of link test (Pregibon, 1980) and for acceptable fit to the data using the Hosmer and Lemeshow goodness of fit procedure for complex sample designs (Archer et al., 2007). Analyses were performed using SPSS 25 and Stata 13 statistical software. As a secondary analysis of pre-existing public data, the present study's methods were certified to be exempt from human subject ethical review under 45 CFR 46.104 by the Catholic University of America Institutional Review Board in ethical certification decision number 21-0016.

Results

Blosnich et al. (2020) reported sociodemographic characteristics of the sample—sexual identity, gender identity, racial identity and educational attainment—by SOCE experience (p. 7). A total of 69.0% (95% CI 57.0–78.8) of those receiving SOCE therapy or efforts did so from a religious leader, "such as a pastor, religious counselor or priest;" 19.2% (95% CI 11.8–29.5) from

a healthcare professional "such as a psychologist or counselor who was not religious-focused;" and 11.9% (95% CI 5.7–23.1) from both. Those experiencing SOCE did so at a young age, 18.2 years (95% CI 16.9–19.3) on average, evenly split among those who underwent SOCE as a minor (49.9%, 95% CI 37.8–62.0), at an average age of 14.5 years (95% CI 13.6–15.4), and as an adult (50.1%, 95% CI 38.0–62.2), at an average age of 21.8 years (95% CI 20.4–23.2). Suicidal morbidity also tended to be expressed (or in cases of multiple instances, to begin to be expressed) at a young mean age, when the respondent was still a minor: 15.8 years (15.4–16.2) for suicidal thoughts; 17.0 years (95% CI 16.5–17.5) for suicide planning; and 17.4 (95% CI 16.7–18.0) years for suicide attempts.

Table 1 reports descriptive statistics for the timing of lifetime suicidal behavior relative to SOCE. Unweighted counts are shown with population-weighted percentages unadjusted for covariates. The lines labeled "Total suicide behavior" follow Blosnich et al.'s categorizations, which included all suicidal behavior regardless of when it occurred. For SOCE participants, three rows partition total suicide behavior by its timing relative to SOCE (before, during, after). The results show that Blosnich et al.'s categories included a substantial amount of suicidal behavior that preceded SOCE therapy. Of the 89 SOCE participants who reported ever having thoughts of suicide, 58 (65%) of them did so before they underwent SOCE. Likewise, almost half of reported suicide planning (49%) and suicide attempts (48%) occurred prior to SOCE. For every type of suicidal behavior, Blosnich et al.'s inclusion of pre-SOCE suicide behavior inflated the prevalence among SOCE participants to a rate higher than that among those who had never undergone SOCE (for example, 84.9% for suicidal ideation with SOCE compared to 73.4% with no SOCE). When only suicidality during or after SOCE is considered, the unadjusted prevalence in the SOCE group was no longer significantly higher than in the non-SOCE group for any form of suicidality, and was significantly lower for suicide ideation and planning.

Most persons who engaged in suicidal behavior reported multiple instances of suicidal thoughts (73.4%, 95% CI 70–77) and planning (63.9%, 95% CI 60–68), and a third reported multiple suicide attempts (34.2%, 95% CI 29–40). The bottom panel of Table 1 documents the relation of repeated suicidal behavior to the experience of SOCE. "Before intervening SOCE" reports behavior expressed before SOCE that recurred during or after SOCE treatment; "During/after SOCE" reports behavior that began following SOCE. Together, these offer crude measures of the propensity of SOCE treatment to curb or instigate suicidal behavior. With the exception of suicide ideation expressed before SOCE, these measures suggest that SOCE treatment may be more effective than its absence both in ameliorating prior and reducing subsequent suicidal behavior. With the exception of suicide ideation before intervening SOCE, less suicidal behavior recurred or began following SOCE than if no SOCE had occurred. Both effects were strongest for the most serious suicidal behavior: suicide attempts. The prevalence of repeated suicide attempts following SOCE (9.8%) was less than one-third the prevalence with no SOCE experience (36.1%).

Table 1 Prevalence of lifetime suicide morbidity by sexual orientation change efforts (SOCEs), in percent: Probability Sample of Sexual Minorities, USA, 2016–2018 ($n = 1518$)

Suicide behavior first occurred	Suicide ideation N (%, S.E.)	Suicide plan N (%, S.E.)	Suicide intention N (%, S.E.)	Suicide attempt N (%, S.E.)
SOCE ($n = 108$)				
Before SOCE	58 (55.0,6.1)	36 (33.2,5.9)	31 (31.3,5.9)	20 (17.8,4.4)
During SOCE	11 (7.7,2.8)	13 (10.6,3.8)	11 (11.9,4.3)	7 (4.0,1.6)
Subtotal Before + During	69 (62.8, 6.0)	49 (43.8, 6.2)	42 (43.2, 6.2)	27 (21.8, 4.7)
After SOCE	20 (22.1,5.2)	24 (28.2,5.8)	17 (21.5,5.5)	15 (15.8,4.6)
Total suicide behavior (first instance)	89 (84.9, 4.1)*	73 (72.0, 5.4)*	59 (65.1, 5.5)*	42 (40.4, 6.0)*
No SOCE ($n = 1410$)				
Total suicide behavior (first instance)	967 (73.4, 1.4)	763 (58.7,1.6)	524 (42.3, 1.7)	323 (26.6, 1.5)
Percent repeated instances/attempts				
Before intervening SOCE	45 (79.4, 6.8)	19 (55.0, 10.6)	15 (46.3, 11.3)	5 (28.1, 12.2)
During/After SOCE	17 (56.5, 11.9)	10 (29.0, 9.6)**	12 (50.3,11.9)	2 (9.8, 7.6)**
No SOCE	691 (73.1, 1.8)	451 (62.1, 2.1)	265 (55.1, 2.6)	104 (36.1, 3.3)

Percents shown are population-weighted. "Before SOCE" occurred at least a year before SOCE occurred; "During SOCE" occurred in the same year as SOCE; "After SOCE" occurred in a year more recent than SOCE. Asterisks report significant difference from the corresponding "No SOCE" category by t-test, $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. Missing data for age at SOCE reduced usable cases by 2

Table 2 Adjusted odds ratios (AORs) for lifetime suicidality by experience of sexual orientation change efforts (SOCE): Probability Sample of Sexual Minorities, USA, 2016–2018 ($N = 1,518$)

	Suicidal ideation AOR or % (95% CI)	Suicide planning AOR or % (95% CI)	Suicide intention AOR or % (95% CI)	Suicide attempt AOR or % (95% CI)
"Experienced SOCE"				
1. Per Blosnich et al.	1.93 (1.02, 3.67)*	1.75 (1.01, 3.06)*	2.50 (1.56, 4.00)****	1.75 (.99, 3.08)
2. Treatment Completion Model	.44 (.20, .94)*	.60 (.32, 1.14)	.86 (.47, 1.57)	.74 (.36, 1.43)
3. Treatment Initiation Model	.72 (.35, 1.50)	.88 (.49, 1.56)	1.38 (.81, 2.34)	.96 (.49, 1.90)
4. Compounding Model	.92 (.52, 1.61)	.86 (.52, 1.42)	.74 (.36, 1.43)	.93 (.50, 1.73)

Odds ratios were estimated from population-weighted logistic regression models. ACEs, age, gender identity, sexual minority identity, race and educational attainment were included in the models but are suppressed in the table. AOR significantly different from unity, by t-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

Table 2 presents adjusted odds ratios (AORs) estimated from logistic regression models which are adjusted, following Blosnich et al., for age, gender identity, sexual minority identity, race/ethnicity, educational attainment, and the number of ACEs. Four models are presented. The AORs for Model 1 (labeled "Per Blosnich et al.") replicate those reported in Table 4 of Blosnich et al.'s study. The AOR for suicide planning was identical to Blosnich et al.'s (both 1.75), as were the covariate coefficients (not shown). The AOR for suicidal ideation differs trivially (Blosnich et al. reported 1.92, the present study estimated 1.93) due to missing data on age at SOCE. The AOR for suicide intention was large, positive and significant; Blosnich et al. did not examine this outcome. The AOR for suicide attempts estimated in the present study (1.75) was midway between two AORs that Blosnich et al. reported according to the severity of injury (1.67 and 1.88). Although Blosnich et al. interpret it causally, Model 1 is only an association model which measures the covariation of SOCE exposure with lifetime suicidality, regardless of when either of these conditions occurred.

Models 2 through 4 present true treatment models, which conceive of SOCE as an intervention which may initiate or aggravate suicidality in those who experience it. Models 2 and 3 impose a standard treatment and response analysis, comparing the risk of becoming suicidal after being exposed to SOCE with the risk of becoming suicidal in the absence of SOCE exposure. Since respondents were asked for dates only by year, we cannot know whether suicidal behavior expressed in the same year as SOCE exposure occurred before or after SOCE began, so Models 2 and 3 express disparate assumptions on this point. Model 2 ("Treatment Completion") assumes that same-year suicidality all occurred before SOCE participation, and is thus considered pre-existing suicidality. This model controls for the existence of suicidality that pre-existed the completion of SOCE participation, but does not address the possibility that, in addition to suicidal behavior resulting from the completion of SOCE therapy, suicidal behavior may also have been caused by the experience of

SOCE. Model 3 ("Treatment Initiation") examines this latter possibility, expressing the assumption that same-year suicidality all occurred after SOCE began and may thus be a result of the SOCE experience. This assumption is a more restrictive test of the possibility of SOCE-induced suicidality, as indicated by the higher predicted AORs for Model 3 for all four outcomes. With one exception, the estimated AORs for both Models 2 and 3 were not significantly different than unity for any outcome, indicating that sexual minority persons were at no greater risk of initiating any of these forms of suicidality following or during SOCE than were those who had not experienced SOCE. The exception is the Model 2 AOR for suicide ideation (0.44, 95% CI 0.20-0.94), which was significantly lower than one, indicating that, after accounting for pre-existing suicide ideation both before and during SOCE therapy, the risk of suicidal thoughts following SOCE therapy was significantly reduced by more than half.

Adjusting for suicidal behavior that pre-dates treatment addresses the possibility that SOCE may have created suicidality where there was none before, but not the possibility that SOCE may have compounded suicidality that was initially expressed prior to SOCE. Model 4 ("Treatment Compounding") addresses this question. This model compares the risk of expressing any suicidality following SOCE, regardless of when the suicidality in question may have begun, with the risk of ever expressing suicidality for persons never exposed to SOCE. This imposes an even more extreme test of SOCE causation, which posits that only persons who did not express suicidality following SOCE can be considered not to have been suicidal due to SOCE, whether or not they expressed suicidality prior to SOCE. Even by this very restrictive standard, none of the suicidal measures were positively associated with SOCE, as indicated by non-significant model AORs ranging from 0.86 to 0.93.

Preliminary investigation revealed that predicted outcomes were strongly different for those who had experienced SOCE as a minor (under age 18) than as an adult (age 18 years or over). Table 3 reports the results for the treatment initiation

Table 3 Adjusted odds ratios (AORs) for suicidality after experiencing SOCE as a minor ($n=43$) or an adult ($n=63$): Probability Sample of Sexual Minorities, USA, 2016–2018 ($N=1,518$)

Models	Suicidal ideation AOR or % (95% CI)	Suicide planning AOR or % (95% CI)	Suicide intention AOR or % (95% CI)	Suicide attempt AOR or % (95% CI)
Treatment initiation model				
SOCE as a minor (under 18)	1.04 (.36, 3.03)	1.12 (.50, 2.53)	2.66 (1.25, 5.68)*	1.73 (.75, 3.99)
SOCE as an adult (18 or older)	.30 (.09, 1.01)	.56 (.24, 1.31)	.51 (.22, 1.14)	.19 (.06, .66)*

Odds ratios were estimated from population-weighted logistic regression models. Reference category is "no SOCE". ACEs, age, gender identity, sexual minority identity, race and educational attainment were included in the models but are suppressed in the table. AOR significantly different from unity, by t-test: *$p<.05$; **$p<.01$; ***$p<.001$; ****$p<.0001$

model (Model 3 in Table 2). The two groups by age at the time of SOCE sharply and consistently partition the AORs shown in Table 2 into higher (or less reduced) odds of post-SOCE suicidal expression for those exposed as minors and lower (or more reduced) odds for those exposed as adults. According to the model shown in Table 3, minors, but not adults, were 2.7 times more likely to express suicidal intentions following SOCE, while adults, but not minors, were over 5 times less likely to attempt suicide following SOCE. Adults may also have been less likely to have thoughts of suicide after SOCE ($p=.053$ for this AOR of 0.30).

To clarify these results further, the present study attempted to examine some pertinent distinctions and predictors in the relation of SOCE and suicidal expression. This required improving the precision of some elements of the predictive model presented by Blosnich et al., after correcting for the absence of adjustment for pre-existing suicidality. Table 1 notes that a majority of those who reported suicidal behavior other than suicide attempts reported doing so more than once; up to four instances of each suicidal behavior was recorded in the data file. Blosnich et al. collapsed these multiple instances of suicidal behavior into indicator variables signifying only that the respondent had ever engaged in the respective behavior. Persons who reported multiple suicide attempts, for example, were coded the same as those who reported only a single attempt. To capture this additional variation, the four suicidality measures were disaggregated into variables reporting both single and multiple instances of suicidal behavior. These ordinal outcomes required the use of ordered logistic regression. This method permitted the conditions of SOCE prior to any suicidality (the compounding model) and SOCE intervening between prior and posterior suicidal expressions (the treatment models) to be included, with some restrictions, in a single model. Table 4 compares for each outcome the model AOR resulting from the inclusion of repeated suicidality with that of the treatment (initiation) model. For all four suicidal outcomes, including repeated suicidality results in reduced AOR estimates, suggesting

that part of the difference in the odds of suicidality between SOCE and non-SOCE participants may be attributed to the fact that SOCE participants were less likely to engage in repeated suicidal behavior.

To control for childhood conditions that predict suicidality, Blosnich et al. (2020) included the summary index of indicator variables for 8 ACEs which are known to negatively affect later life outcomes. However, as they reported (p. 1027), not all of the ACEs were related to suicide and/or SOCE treatment. The present study examined the contribution of each ACE measure to model fit, as indicated by the likelihood-ratio Chi-square test, which compares models with and without the variable to see if the former explains the variation in the data more fully or accurately than the latter. For each suicidal outcome, only 3 of the 8 ACEs significantly improved the fit of the model predicting suicidality conditioned by SOCE: emotional abuse, household mental illness, and sexual abuse. After including these three ACEs, the difference chi-square for the model also including all of the remaining five ACEs ranged from 2.71–10.18, yielding p-values (with 5 degrees of freedom) of 0.0703-0.7749 (see Table S7). The summary index of all 8 ACEs was therefore replaced with one including only the three significant ACEs. This resulted in modest further reductions in the predicted AOR for SOCE exposure, as Table 4 shows, suggesting that SOCE participants may vary from other sexual minorities in their exposure to the three significant ACEs predicting suicidal expression among sexual minorities. An additional measure of childhood distress, bully victimization, which also improved both model fit and the prediction of differences due to SOCE, was also included in the improved model.

Table 5 presents the prevalence by SOCE exposure and zero-order AORs for suicide attempts for the predictor variables in the improved model. In addition to improving model fit, the summary index of the three significant ACEs was much more strongly associated with suicide attempts, at an AOR of 2.0, than was the sum of all 8 ACEs, at 1.3.

Table 4 Adjusted odds ratios (AORs) for lifetime suicidality by experience of sexual orientation change efforts (SOCE), showing the effect of model improvements: Probability Sample of Sexual Minorities, USA, 2016–2018 (N = 1,518)

	Suicidal ideation AOR or % (95% CI)	Suicide planning AOR or % (95% CI)	Suicide intention AOR or % (95% CI)	Suicide attempt AOR or % (95% CI)
"Experienced SOCE"				
Per Blosnich et al.	1.93 (1.02, 3.67)*	1.75 (1.01, 3.06)*	2.50 (1.56, 4.00)****	1.75 (.99, 3.08)
Accounting for suicidality prior to SOCE	.72 (.35, 1.50)	.88 (.49, 1.56)	1.38 (.81, 2.34)	.96 (.49, 1.90)
Accounting for repeated suicidality	.66 (.35, 1.24)	.61 (.38, .98)*	1.25 (.75, 2.09)	.83 (.46, 1.51)
Including only significant ACEs	.62 (.33, 1.17)	.58 (.36, .92)*	1.15 (.68, 1.94)	.75 (.43, 1.31)

Odds ratios were estimated from population-weighted logistic regression models. ACEs, age, gender identity, sexual minority identity, race and educational attainment were included in the models but are suppressed in the table. AOR significantly different from unity, by *t*-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

Each of the three component ACEs strongly and significantly predicted suicide attempts. All the predictors except household mental illness varied significantly by SOCE participation. The significance *p*-value of the unweighted difference for "All SOCE" for this variable was 0.053.

Table 6 presents the improved model results. The "All SOCE" AORs for this model were lower for all four outcomes than the corresponding AORs in the treatment initiation model (Table 2), which added to Blosnich et al.'s models only a control for pre-existing suicidality. This provides a crude confirmation that the improved model actually did improve measurement. The ratio of the SOCE odds ratios for the improved model with the treatment initiation model (Table 2), respectively, predicting suicide ideation,

Table 5 Population prevalence of childhood predictors of suicidality, by SOCE participation as a minor (n = 43) or an adult (n = 63): Probability Sample of Sexual Minorities, USA, 2016–2018 (N = 1,518)

Variable (range)	No SOCE Mean (95% CI)	All SOCE Mean (95% CI)	SOCE as adult Mean (95% CI)	SOCE as minor Mean (95% CI)	Suicide Attempts AOR (95% CI, p)
Sum of ACEs (0–8)	3.27 (3.13, 3.41)	4.18 (3.58, 4.78)**	3.92 (2.94, 4.90)	4.51 (3.77, 5.26)**	1.32 (1.23, 1.41), < .001
Emotional abuse (0,1)	.69 (.66, .72)	.83 (.74, .92)*	.76 (.62, .90)	.92 (.84, 1.00)****	2.93 (2.06, 4.18), < .001
Parent mental illness (0,1)	.46 (.43, .49)	.54 (.42, .66)	.53 (.37, .69)	.59 (.42, .66)	2.71 (2.00, 3.68), < .001
Sexual abuse (0,1)	.35 (.32, .38)	.58 (.46, .70)***	.56 (.40, .73)*	.59 (.41, .76)**	2.03 (1.48, 2.77), < .001
Sum of above 3 ACEs (0–3)	1.50 (1.44, 1.56)	1.95 (1.71, 2.18)***	1.86 (1.50, 2.21)	2.10 (1.79, 2.40)***	2.00 (1.70, 2.34), < .001
Childhood Bully Victimization (0–1)	2.92 (2.85, 2.99)	3.13 (2.87, 3.39)	2.95 (2.55, 3.35)	3.33 (3.01, 3.64)*	1.65 (1.40, 1.94), < .001

Odds ratios were estimated from population-weighted ordered logistic regression models adjusted for age, gender identity, sexual minority identity, race and educational attainment. Different from "No SOCE" by F-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

Table 6 Adjusted odds ratios (AORs) for suicidality after experiencing SOCE as a minor (n = 43) or an adult (n = 63), showing improved model results: Probability Sample of Sexual Minorities, USA, 2016–2018 (N = 1,518)

Models	Suicidal ideation AOR or % (95% CI)	Suicide planning AOR or % (95% CI)	Suicide intention AOR or % (95% CI)	Suicide attempt AOR or % (95% CI)
All SOCE	.55 (.31, .998)*	.53 (.33, .84)**	1.10 (.65, 1.87)	.69 (.38, 1.23)
SOCE as minor	.63 (.29, 1.34)	.56 (.32, 1.00)*	1.52 (.75, 3.07)	.98 (.51, 1.88)
SOCE as adult	.39 (.19, .81)*	.38 (.21, .68)**	.53 (.29, .98)*	.24 (.10, .57)**
Three ACEs	1.55 (1.34, 1.80)****	1.64 (1.42, 1.89)****	1.62 (1.40, 1.87)****	1.82 (1.54, 2.16)****
Childhood bully victimization	1.68 (1.47, 1.91)****	1.41 (1.24, 1.61)****	1.43 (1.23, 1.66)****	1.42 (1.20, 1.68)****

Odds ratios were estimated from population-weighted ordered logistic regression models. Reference category for SOCE is "no SOCE". The following variables were included in the model but are suppressed in the table: prior suicidal behavior, age, gender identity, sexual minority identity, race and educational attainment. AOR significantly different from unity, by *t*-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

planning, intention, and attempts was 0.76, 0.60, 0.80, and 0.72, suggesting that roughly a quarter of the SOCE-related suicidality reported in the treatment initiation model can be accounted for by the measurement improvements included in the improved model.

In the improved model, compared to persons not experiencing SOCE, suicidal expression was significantly reduced for adults following SOCE for each of the four outcomes examined. Suicide planning was also reduced for those undergoing SOCE as minors. Overall, sexual minorities were only about half as likely to engage in thoughts or plans of suicide following SOCE as those who had not experienced SOCE. The strongest effect of SOCE was on suicide attempts among adults, who were less than one-fourth as likely to attempt suicide following SOCE as were adults who had not undergone SOCE. For all four outcomes, the AORs for "All SOCE" were reduced from those shown in the bottom row of Table 4. The difference was due to the use in the Table 6 models of a summary measure for household mental illness, emotional abuse, and sexual abuse, and the inclusion of bully victimization.

Table 7 disaggregates the three significant ACE suicide predictors in order to examine their relative strength. For all outcomes, household mental illness predicted suicide behavior most strongly, followed by emotional abuse, and then by sexual abuse, which was the weakest predictor of the three. Persons who experienced household mental illness were about twice as likely to engage in suicidal behavior. All three ACEs predicted suicide attempts a little more strongly than the other three suicidal behaviors. This effect was especially pronounced for sexual abuse, which was significantly associated with suicide intentions and attempts but not with suicidal ideation or planning. On the other hand, having been bullied as a child was a little more strongly associated with thoughts of suicide than with any of the other less frequent suicidal behaviors.

Table 8 Adjusted odds ratios (AORs) predicting SOCE participation as a minor ($n=43$) or an adult ($n=63$): Probability Sample of Sexual Minorities, USA, 2016–2018 ($N=1,518$)

	SOCE as minor	SOCE as adult
ACE: Emotional Abuse	3.34 (1.15, 9.71)*	1.24 (.59, 2.60)
ACE: Mental Illness	1.33 (.65, 2.74)	1.42 (.73, 2.79)
ACE: Sexual Abuse	2.41 (1.17, 4.97)*	1.88 (1.05, 3.36)*
Bully Victimization	1.34 (.83, 2.14)	.99 (.68, 1.44)
Sex (ref = female)	2.66 (1.25, 5.64)*	1.32 (.69, 2.51)
Current age	.97 (.94, 1.00)*	1.04 (1.01, 1.06)**

Odds ratios were estimated from population-weighted logistic regression models. The following variable was included in the model but is suppressed in the table: race. AOR significantly different from unity, by t-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

Table 8 presents the direct associations of the improved model predictors with SOCE participation as a minor or an adult. Those who had experienced SOCE as a minor were more likely to be male, to have experienced emotional or sexual abuse, and to have undergone SOCE more recently. Those who had undergone SOCE as an adult were also more likely to have been sexually abused but to have undergone SOCE less recently.

Suicidal behavior, as noted above, can be progressive, leading from less to more serious forms before resulting in a suicide attempt. In the Generations data, less frequent forms were strongly nested inside more frequent ones. Almost all of those who reported making a suicide plan (97.6%, 95% CI 96.3, 98.5) or declaring intent (98.3%, 95% CI 96.4–99.3) also reported thinking of suicide. The proportion of suicidal behaviors that were followed by a suicide attempt rose from 36% for suicidal ideation (36.4, 95% CI 32.9, 40.2) to 44% (43.5, 95% CI 39.4, 47.7) for suicide planning to 58% (57.8, 95% CI 52.9, 62.7) for suicide intention. Of those reporting suicide attempts, 99% (98.5, 95% CI 96.6, 99.3)

Table 7 Adjusted odds ratios (AORs) for suicidality after experiencing SOCE as a minor ($n=43$) or an adult ($n=63$), showing the effect of individual ACEs: Probability Sample of Sexual Minorities, USA, 2016–2018 ($N=1,518$)

Models	Suicidal ideation AOR or % (95% CI)	Suicide planning AOR or % (95% CI)	Suicide intention AOR or % (95% CI)	Suicide attempt AOR or % (95% CI)
All SOCE	.60 (.33, 1.10)	.56 (.35, .90)*	1.23 (.66, 1.92)	.70 (.39, 1.27)
SOCE as minor	.68 (.32, 1.45)	.59 (.33, 1.06)	1.56 (.77, 3.17)	1.01 (.53, 1.93)
SOCE as adult	.41 (.19, .86)*	.40 (.22, .72)**	.53 (.29, .99)*	.25 (.10, .57)**
ACE: Emotional Abuse	1.68 (1.26, 2.25)****	1.69 (1.25, 2.29)**	1.57 (1.15, 2.14)**	1.75 (1.19, 2.59)**
ACE: Mental Illness	2.06 (1.57, 2.70)****	2.04 (1.56, 2.67)****	1.87 (1.40, 2.48)****	2.22 (1.60, 3.07)****
ACE: Sexual Abuse	1.00 (.75, 1.34)	1.22 (.91, 1.61)	1.42 (1.06, 1.90)*	1.52 (1.09, 2.12)*
Childhood bully victimization	1.68 (1.47, 1.93)****	1.41 (1.23, 1.61)****	1.43 (1.24, 1.66)****	1.42 (1.20, 1.69)****

Odds ratios were estimated from population-weighted ordered logistic regression models. Reference category for SOCE is "no SOCE". The following variables were included in the model but are suppressed in the table: pre-existing suicidality, age, gender identity, sexual minority identity, race and educational attainment. AOR significantly different from unity, by t-test: *$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$

also reported thinking of suicide, 94% (93.9, 95% CI 90.5, 96.3) making a suicide plan, and 92% (91.9, 95% CI 87.6, 94.8) declaring suicidal intent beforehand. Since suicide attempts most strongly predict completed suicide (Harris & Barraclough, 1997; Suominen et al., 2004), a primary goal of prevention is to reduce the number of attempts following ideation, planning or declaration of intention. (Turecki & Brent, 2016).

Table 9 presents findings for the relation of SOCE to suicidal progression, showing the AOR for suicide attempts following an initial expression of suicidal behavior that conditioned on the presence or absence of intervening SOCE treatment. The results indicate that SOCE experience was associated with a very strong reduction in the risk of a suicide attempt following suicide ideation, planning or intention, but not following a suicide attempt prior to SOCE. Following initial thoughts of suicide, those not receiving SOCE therapy were almost six times as likely (5.9, the inverse of the AOR of 0.17 shown) to attempt suicide as were those exposed to SOCE. The corresponding elevation in the risk of a suicide attempt in the absence of intervening SOCE was similarly large following initial suicide planning (4.3) or intention (12.5). After an initial suicide attempt, however, SOCE participation was not associated with any difference in the risk of a subsequent attempt.

Partitioning the results by age, shown in the second and third rows of Table 9, reveals that most of the reduction in suicide attempt risk following SOCE was confined to those undergoing SOCE as adults rather than as minors. Adults undergoing subsequent SOCE after suicidal thoughts, plans or attempts were far less likely to attempt suicide, compared to adults who did not undergo SOCE. Stating the inverse for ease of interpretation, Table 9 reports that following initial thoughts of suicide, adults who did not receive subsequent SOCE therapy were over 16 times more likely to attempt suicide than were those who had undergone SOCE, and over 33 times more likely to attempt suicide following the making of a suicide plan or the declaration of a suicide intention. On the other hand, minors who experienced SOCE following

suicidal thoughts, plans or intentions did not experience significant reductions in the risk of suicide attempts, and neither minors nor adults undergoing SOCE after a suicide attempt were less susceptible to a further attempt than were those who did not undergo SOCE.

Discussion

A fundamental principle of the scientific method is that temporal precedence, in which the cause precedes the effect in time, is necessary to establish a real-world (nomothetic or efficient) cause-effect relationship (Babbie, 2012, p. 92; Hausman, 1998; Hume, 1748, sec. VII). For this reason, one of the earliest lessons learned by any student of modern statistics is that "correlation alone is not causation." To complete the causal inference, one must also establish which of two or more correlated elements came first, and in observational data, eliminate other possible causes.

Blosnich et al.'s (2020) study of SOCE and suicidality offers a cautionary example of the harm that can result when this principle is ignored. In their analytic claim that "sexual minorities who experienced SOCE reported a higher prevalence of suicidal ideation and attempts than did sexual minorities who did not experience SOCE" (p. 1024), over half (55%, unweighted) of the cases they report as having "experienced SOCE" actually consisted of persons who expressed suicidality before ever experiencing SOCE treatment. Most of the suicidality did not follow SOCE in time but preceded it. Consequently, Blosnich et al. falsely concluded that SOCE treatment has an "insidious association with suicide risk" and that it "may compound or create … suicidal ideation and suicide attempts." We might call this the fallacy of association.

Correcting Blosnich et al.'s analysis for time order revealed substantially different results in the present study. After controlling for pre-existing conditions, there no longer remained any positive association of SOCE with suicidality in the Generations data (moderate hypothesis outcome). Where

Table 9 Adjusted odds ratios (AORs) of suicide attempts following previous suicidality (suicidal ideation, planning, intention or previous suicide attempt) by experience of intervening SOCE as minor ($N=43$) or adult ($N=63$): Probability Sample of Sexual Minorities, USA, 2016–2018 ($N=1,518$)

Suicide attempts following	Suicidal ideation ($N=1026$) AOR (95% CI)	Suicide planning ($N=792$) AOR (95% CI)	Suicide intention ($N=556$) AOR (95% CI)	Suicide attempt ($N=336$) AOR (95% CI)
All SOCE	.17 (.05, .55)**	.13 (.04, .45)**	.10 (.03, .30)****	.55 (.15, 2.05)
SOCE as minor	.36 (.32, 1.86)	.52 (.10, 2.78)	.30 (.07, 1.31)	1.18 (.21, 6.81)
SOCE as adult	.06 (.01, .30)**	.04 (.00, .34)**	.04 (.01, .21)****	.68 (.15, 3.12)

AORs and percentages estimated from population-weighted ordered logistic regression models adjusted for ACEs, bullying victimization, age, gender identity, sexual minority identity, race, and educational attainment. Covariates are suppressed in the table. AOR significantly different from unity, by t-test: $*p<.05$; $**p<.01$; $***p<.001$; $****p<.0001$

there was a significant association, suicidality following SOCE was reduced, not increased. For adults undergoing SOCE, the overall odds of suicide ideation were reduced by over two-thirds (AOR of 0.30) and suicide attempts were reduced by four-fifths (AOR of 0.19) in Blosnich et al.'s own models, adjusted only for prior suicidality and age differences.

Modest improvements in measurement revealed that adults undergoing SOCE therapy experienced significant collective reductions in risk of all forms of suicidal behavior (strong hypothesis outcome). Such persons were from half to three-quarters less likely (AORs of 0.53 to 0.24) to engage in suicidal behavior following SOCE than were comparable persons who had not undergone SOCE. Importantly, adults who underwent SOCE therapy after initial expressions of suicidal behavior also experienced sizable reductions in the risk of a subsequent suicide attempt. When followed by SOCE treatment, adult suicide ideation, planning or intention was 17 to 25 times less likely to lead to a suicide attempt. Similar strong reductions in suicide risk were not observed for those undergoing SOCE as minors (with one exception: suicide planning). However (again with one exception: suicide intentions among those undergoing SOCE as minors), under no conditions examined in this study was SOCE associated with an increase in suicidality.

The cause of the SOCE-related reduction in suicide risk cannot be determined from these cross-sectional data, and any consideration of the question is necessarily speculative. Four adverse childhood conditions—household mental illness, emotional abuse, sexual abuse, and bully victimization—predicted about a tenth of the variation in sexual minority suicidal behavior and were more prevalent among persons who subsequently participated in SOCE. Minors undergoing SOCE were over three times as likely to have suffered emotional abuse as were those who did not undergo SOCE as a minor. They were also much more likely to be male. The same distinctions are not true for those who underwent SOCE as an adult. These differences may help account for the weaker observed association of SOCE with reductions in suicidality among those who were minors rather than adults at the time they experienced SOCE. The possible persistence of higher rates of declaration of suicidal intentions among minors, but not adults, undergoing SOCE may account, in part, for the prevalence of anecdotal declarations of post-SOCE suicidality by persons, predominantly males, who were exposed as minors. Together, these findings suggest that differential exposure to childhood conditions that are associated with suicidality may account for about a quarter of the overall association of SOCE with suicidality. These findings are only preliminary and beyond the scope of this study. Further study of these effects, apart from the question of SOCE therapy, may be of value for better understanding the precipitating influences on suicidal behavior among sexual minorities.

One thing that cannot be the cause of reduced SOCE-related suicidality in this study, however, is successful SOCE therapy. Since those who may have attained the goal of SOCE—to adopt heterosexual identity, orientation or sexual function—were systematically screened from the survey sample used in this study, it cannot be the case that the reduction in suicidality was related to resolving distress due to unwanted homosexual orientation. Since other studies have found that those experiencing successful SOCE outcomes tend to report more positive psychological benefits (Dehlin et al., 2015; Lefevor et al., 2019; Shidlo & Schroeder, 2002; Sullins et al., 2021), it is possible that the findings of the present paper understate the beneficial effect of SOCE treatment on suicidality and affect. Blosnich et al.'s (2020) study, and many other studies in this area, acknowledge this limitation. Alternatively, the suicidal participants who subsequently underwent SOCE in this sample may have felt more confirmed in or accepting of their homosexual or other minority sexual orientation by their unsuccessful SOCE experience (Dehlin et al., 2015), resulting in diminished suicidality.

Robust research supports the proposition that therapy that supports client self-determination promotes higher efficacy and lower harm than practices that impose the therapist's values on the client (Israel et al., 2008; Michalak et al., 2004; Moore et al., 2021; Ng et al., 2012; Ryan & Deci, 2000). Israel's review of LGBT client reports, for example, concluded that "therapists who supported client autonomy and accommodated client needs were more helpful than those who did not," finding that almost a third (31%) of unhelpful therapy situations "were characterized by therapists imposing their values, judgment, or decisions on clients." (Israel et al., 2008, p. 300) In the present context, this suggests that clients who may seek therapy to help retain and enjoy same-sex attractions and those who may do so to try to change or manage them in some other way should both be able to find support for their respective goals. While abundant research has explored the problem of clients facing antigay bias, almost none has examined the similar problem of clients facing anti-ex-gay bias. Further research that includes both persons for whom SOCE was unsuccessful and persons for whom SOCE may have been successful would add greatly to our understanding of the full effects of these practices in therapy.

Reduced suicide risk following SOCE may also be due to unobserved factors, such as childhood family solidarity or high religiousness, that may be related both to the propensity to seek SOCE therapy and to lower risk of suicidality. Sexual minority persons who have recourse to therapy following suicidal behavior may also enjoy higher overall social support or less social isolation, factors which are known to reduce

suicide risk (Turecki & Brent, 2016). Therapy-seeking by adults in distress may select for qualities of resilience or resourcefulness that also inhibit suicide behavior. In this case those undergoing other forms of therapy such as gay affirming therapy would likely experience similar reductions in suicide risk.

Surprisingly, given the multiplicity of claims about suicidal outcomes following SOCE, none of the randomized efficacy studies of gay affirming or neutral therapy identified in the most recent review (O'Shaughnessy & Speir, 2018) have assessed outcome suicidality, either ignoring the question altogether (Fals-Stewart et al., 2009; Pachankis et al., 2015; Parsons et al., 2014) or excluding from the study sample persons with prior suicidality (Carrico et al., 2006; Reback & Shoptaw, 2014; Shoptaw et al., 2008) or with current or past psychopathology that likely included suicidality (Antoni et al., 2000; Carrico et al., 2005; Gayner et al., 2012; Shoptaw et al., 2005). More recently, a well-designed study by Pachankis and colleagues examined outcomes following a gay affirming minority stress reduction intervention targeting women with unhealthy depression, alcohol use and suicidal behavior. The study found, however, that the treatment "was associated with only small reductions in minority stress processes and did not affect suicidality" (Pachankis et al., 2020). Although future research may well find such an effect, at this time there is no evidence to support the claim that gay-affirming therapy leads to reductions in suicide risk such as the present study has found following SOCE.

The possibility of a selection effect for reduced suicidality following SOCE is supported by the fact that, in the present study, adults, for whom SOCE treatment was more effective in reducing suicidality, also experienced more suicidality prior to SOCE. The proportion (S.E.) of each suicidal behavior that was expressed prior to undergoing SOCE therapy among those participating in SOCE as adults (compare to Table 1) was: ideation, 77% (7.5); planning, 66% (9.5); and attempt, 78% (10.0). This suggests that these adults may have disproportionately selected into SOCE treatment following suicidal behavior. If this was the case, then by ignoring time order Blosnich et al. (2020) may have simply reversed the direction of causation. For sexual minority adults, experiencing SOCE did not lead to higher suicidality, but experiencing suicidality may have led to higher SOCE participation. As a recent clinical study of SOCE therapy outcomes has observed, rather than demonstrating that "professional psychological [SOCE therapy] instigates suicide…[t]he [Blosnich 2020] study instead seems to communicate that individuals who experience distress are more likely to seek assistance" (Pela & Sutton, 2021).

The findings of this paper are consistent with at least two other studies that have examined the timing of suicidal morbidities relative to the SOCE experience. Beckstead and

Morrow (2004), for example, found that "at least" 20 (40%) the 50 SOCE participants in their study reported experiencing significant suicidal ideation before therapy; three (6%) reported attempting suicide. At least 8 (16%) participants reported no further suicidal ideation after therapy. This qualitative account documents that suicidality was generally high in this population prior to undergoing SOCE, although prevalence is difficult to infer further.

Shidlo and Schroeder (2002) reported that, of 202 total participants, 59 (29%) reported a history of suicide attempts, but only 11 (5.4%) had attempted suicide after conversion therapy. Twenty-five participants (12.4%) had attempted suicide prior to conversion therapy; of these, 22 (88%) did not re-attempt suicide following conversion therapy. Twenty-three (11.4%) participants reported a suicide attempt during conversion therapy, of which 20 (87%) also did not re-attempt after therapy. Altogether, 88% of clients in Shidlo and Schroeder's sample who were suicidal before or during conversion therapy did not subsequently exhibit further suicidality, and only 5 persons (2.5% of total participants) without a previous history of suicidal attempts initiated such behavior following conversion therapy (p. 254).

Unfortunately, recourse to the fallacy of association is hardly unique to Blosnich et al.'s (2020) study. Despite presenting only global associations between SOCE and negative psychosocial conditions, Meanley et al. (2020) nonetheless incorrectly concluded: "These findings support classifying conversion therapy as a sexual minority stressor that contributes to psychosocial health inequality." Although they addressed a number of limitations in their study design that precluded attributing causality to SOCE, and were studying older adults using decades of longitudinal data, they never considered the extent to which poor psychosocial health may have predated SOCE.

Ryan et al. (2020) measured recent suicide ideation and lifetime suicide attempts with no attempt to determine how much of these behaviors may have predated SOCE. Nonetheless, they concluded negatively that "attempts to change sexual orientation during adolescence were associated with elevated…suicidal behavior" (p. 164). Like Blosnich et al., their use of the fallacy of association was expressed in an equivocal use of the term "experienced SOCE" in which suicidality that may have been expressed prior to SOCE was attributed to the effect of SOCE treatment (p. 166).

Salway et al. (2020), who alleged strong psychological harm from SOCE solely based on global associations, reported: "We are unable to know whether SOCE preceded the psychosocial health outcomes identified by participants…" This is not true: their measures segregated earlier SOCE exposure ("prior to 12 months ago") and recent suicidality ("in the last 12 months"), which would have

given them a direct measure of the amount of suicidality that followed SOCE. Moreover, since in their sample 22% of those exposed to SOCE reported having been exposed within the past 12 months, and they reported suicidality in terms of lifetime prevalence, it is likely that a substantial proportion of the reported suicidality preceded SOCE exposure. Salway et al. (2020) continued by speculating that "reverse causation is unlikely given that the major drivers of seeking SOCE correspond to environmental attitudes—for example, family religiosity—rather than intraindividual factors" (p. 507). These comments exemplify the logical fallacy of begging the question, that is, assuming what one is trying to prove; in this case, assuming away the possibility that parents, regardless of their religiosity, might be more likely to seek therapy for a child who is suicidal, and characterizing SOCE participants as "survivors" (pp. 502, 507) even while conceding that suicidal ideation may have preceded SOCE. On the basis of such specious findings, Salway et al. proposed "eradicating" SOCE by amending the Canadian criminal code (p. 507).

A disturbing feature of this research is that, at least for some, including Blosnich et al.'s (2020) study, the choice to ignore time order in attributing causation was not inadvertent but intentional. Salway et al. (2020) simply rejected the problem of the fallacy of association as unimportant: "Even if loneliness, depression, anxiety, or suicidal ideation preceded SOCE attendance, the history of these factors minimally suggests that SOCE survivors should be assessed for any current, ongoing mental health struggles" (p. 4). Blosnich et al. similarly dismissed an editorial letter's objection that "the attribution of increased suicidality to SOCE is quite speculative without a control for pre-SOCE suicidality" (Rosik et al., 2021) with the confused declaration that the possibility "that those in the sexual orientation change efforts (SOCE) group may have been more distressed than their counterparts at the outset…does not contradict our conclusion in that people who experienced SOCE…had a greater prevalence of suicidal behavior than their counterparts" (Blosnich et al., 2021). Blosnich et al. are simply mistaken: as the evidence in the present paper shows, controlling for pre-SOCE suicidality emphatically contradicts their conclusion. Neither Salway et al. (2020) nor Blosnich et al. (2020) seem to recognize that to account for pre-existing conditions does not merely propose an alternative interpretation for the same empirical conclusions (which both studies characterize as "reverse causation"), it results in quite different empirical conclusions. They seem unaware, or perhaps they disagree, that to assume that an effect can precede a cause is not merely a theoretical disagreement that challenges their conclusions but is a logical fallacy that invalidates them altogether.

The four recent studies employing the fallacy of association discussed above, by Salway et al. (2020), Blosnich et al. (2020), Ryan et al. (2020), and Meanley et al. (2020), comprise the most frequently cited population

evidence for the conclusion that SOCE therapy increases the risk of suicidal behavior. In its 2009 review of the literature the APA concluded that there was insufficient evidence to determine that SOCE was harmful (American Psychological Association, Task Force on Appropriate Therapeutic Responses to Sexual Orientation, 2009), calling for caution but not prohibition of SOCE therapy. By 2021 the APA issued a resolution which clearly stated that SOCE "puts individuals at significant risk of harm" ("APA Resolution") (American Psychological Association, 2021) and resolved to support policies and laws that "oppose, prohibit or aim to reduce SOCE". To support the stronger, definite conclusion that SOCE generated suicidal harm, the APA Resolution cited Ryan et al. (2020) five times and Blosnich et al. (2020) three times (American Psychological Association, 2021, pp. 5 & 6). The APA Resolution was followed by the publication in early 2022 of an edited volume titled "The Case Against Conversion Therapy: Evidence, Ethics, Alternatives" (Haldeman, 2022), which set forth in greater detail the evidence that led to this change in policy. In the volume, Judith Glassgold, the chair of the APA Task Force that produced the 2009 statement, reviewed the evidence for harm from SOCE published since that time (Glassgold, 2022). In support of the claim that "SOCE has a significant association with suicide risk" (Glassgold, 2022, p. 34), Glassgold cited only three studies: Blosnich et al. (2020), Salway et al. (2020), and Meanley et al. (2020). Glassgold noted that Blosnich et al. (2020) used a nationally representative sample and reported its findings in detail (Glassgold, 2022, p. 33).

Likewise, the 2021 review of SOCE research by a team of scholars at Coventry University led by Adam Jowett, commissioned by the British National Equalities Office pursuant to the consultation on a proposed SOCE ban in that country, cited Salway et al. (2020), Blosnich et al. (2020), and Ryan et al. (2020) as "stronger evidence from subsequently published studies [since the 2009 APA review] that have comparison groups of LGBT people who have not undergone conversion therapy and demonstrate … [that] exposure to sexual orientation change efforts is consistently associated with higher likelihood of suicidal thoughts and suicide attempts compared to LGB people who have not undergone conversion therapy." Like Glassgold, Jowett et al. (2021) cited Blosnich et al.'s (2020) findings of increased suicidal odds in detail, with the note that "[p]articular strengths of this study include its random (probability-based) sample" (p. 45).

Jowett et al.'s (2021) review exemplifies the problem with reliance on research that employs the fallacy of association. Jowett et al. (2021) cautioned against "making *causal* interpretations from [associational] studies. For instance, an alternative explanation could be that LGBT people with mental health problems are more likely to seek out conversion therapy" (p. 45, emphasis in original). They then continued: "However, one study controlled for adverse

childhood experiences (e.g., physical or sexual abuse) that are also associated with suicidal thoughts (Blosnich et al., 2020). Meanwhile, another study found that associations with negative health outcomes were markedly stronger for those who had experienced both parental attempts to change their sexual orientation and conversion therapy from a therapist or religious counsellor compared to those who had experienced just one of these (Ryan et al., 2018)" (p. 45, citations in original). Here Jowett et al. misinterpreted (understandably, given the equivocal language of the studies themselves) the pre-existing negative or adverse health associations reported in these studies to be outcomes following SOCE, and thus incorrectly concluded: "On the basis of this evidence, alternative explanations for this finding are less plausible than the conclusion that conversion therapy has a negative impact on mental health." The corrective evidence presented in the current study suggests that this conclusion should be reversed.

At least one prominent scholar of sexual minorities has recognized the disabling problem presented by ignoring the fallacy of association. Bailey (2020) has recently criticized much of the research on sexual minorities for presenting evidence "exclusively in the form of associations" which ignores the possibility that "the increased prevalence of mental health problems in [non-heterosexual] persons is, at least in part, the cause, rather than the effect, of increased self-reported experiences of stigmatization, prejudice, and discrimination." As a result, he concluded that "minority stress research has not generated findings uniquely explicable by the model, and it has ignored the model's serious limitations." Bailey reiterated his concern from an earlier review that "it would be a shame—most of all for gay men and lesbians whose mental health is at stake—if sociopolitical concerns prevented researchers from conscientious consideration of any reasonable hypothesis" (Bailey, 1999).

Conclusion

Thirteen years ago, the APA Task Force on sexual orientation therapies recognized the problem of bias in the use of evidence in this controversial area of study. One of the best responses to the misleading use of evidence shown by Blosnich et al. (2020) and other studies employing fallacies of association may be to recall and affirm some of the Task Force's pertinent recommendations:

1. "Actively oppose the distortion and selective use of scientific data about homosexuality by individuals and organizations seeking to influence public policy and public opinion and take a leadership role in responding to such distortions.…

2. Encourage advocacy groups, elected officials, policymakers, religious leaders, and other organizations to seek accurate information and avoid promulgating inaccurate information about sexual minorities" (American Psychological Association, Task Force on Appropriate Therapeutic Responses to Sexual Orientation, 2009, p. 92).

The consequences of flawed inference are not merely theoretical, however. By ignoring time order, Blosnich et al. (2020) have mistakenly attributed causation to what may be, in part, a cure of suicidal distress, with potentially harmful consequences for sexual minority persons. Imagine a study that finds that most persons using anti-hypertension medication have also previously had high blood pressure, thereby concluding that persons "exposed" to high blood pressure medication were much more likely to experience hypertension, and recommending that high blood pressure medications therefore be banned. This imagined study would have used the same flawed logic as Blosnich et al.'s (2020) study, with invidious consequences for persons suffering from hypertension.

After accounting for pre-existing suicidal behavior, sexual minorities who underwent SOCE treatment were not at higher risk of suicidality. Indeed, some of them may have been placed at much lower suicidal risk. Judicial or legislative restrictions on SOCE participation could deprive sexual minorities of an effective resource for reducing suicidality, thereby putting them at substantially higher suicide risk.

Declarations

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