Does It Really Get Better? Suicide Attempts In Two Cohorts of Sexual Minority Adolescents Following Massachusetts Marriage Equality

Topic to be Studied: Research has repeatedly demonstrated that, as a group, lesbian, gay, and bisexual high school-aged adolescents (ages12-18) are at heightened risk for suicidality relative to their exclusively heterosexual peers.(1–5) Studies looking to understand the association between sexual orientation and suicidality have predominantly focused on individual- and interpersonal-level determinants, such as depression (6,7) and family/peer victimization and bullying (8–11). Contextual factors, such as same-sex marriage (SSM) legislation in the United States, may also have a strong impact on mental health. SSM bans may serve as a source of acute stress (e.g., denial of access to legal, financial, and social marriage benefits), daily hassles (harassment/bullying), and stigmatizing messages that range from the overt (e.g., anti-marriage equality campaign media) to the subtle (e.g., internalized feelings of 'otherness' and 'invisibility'). Similarly, after same-sex marriage is both legalized and "normalized," daily hassles and stigma associated with being a sexual minority would be expected to diminish.

Evidence from the literature has largely verified this hypothesis among sexual minority adults; same-sex marriage bans have been associated with increased rates of adverse health outcomes among sexual minority adults, including depression, anxiety, (12–15) and substance use, (12,16), both following enactment of legislation (within-state comparisons) and in comparison to states without a ban (cross-state comparisons). Similarly, marriage equality has been associated with increases in feelings of social inclusion, and perceptions of community and political tolerance (17,18). However, to date, no studies have explored the impact of same-sex marriage legalization on the health of sexual minority youth, nor has research to date explored mediating pathways.

In the present study, we address these gaps by exploring suicide attempts in a population-based, representative sample of self-identified lesbian/gay/bisexual (LGB) and heterosexual adolescents within Massachusetts during the 10 years following the state's **legalization of same-sex marriage in 2004** with the state Supreme Court ruling on *Goodridge vs. Dept. of Public Health.*(19) As the first US state to legalize same-sex marriage, Massachusetts (MA) offers a unique setting within which to explore the long-term impact of marriage legislation. We address the following research questions:

Research Question 1 (RQ1): Does the association between sexual identity prior-year suicide attempt vary across cohorts of Massachusetts high school students, as a function of developmental timing of 'exposure' to same-sex marriage (SSM) legalization?

We hypothesize that SSM legalization fundamentally improved the social environment towards sexual minorities, such that the overall association between sexual identity and prior-year suicide attempts will differ based on respondent age at the time SSM was legalized (2004). That is, we expect the association between sexual orientation and suicide attempt will be weaker for respondents for whom SSM legalization occurred prior to adolescence ("pre-adolescence" cohort), than for respondents who were already in adolescence when SSM was legalized ("mid-late adolescence"), as the former cohort will have lived the entirety of their adolescence in the presence of marriage equality.

RQ2: Does the treatment effect of SSM legalization occur by acting on the mediated pathway between sexual identity and suicide attempt that occurs through school bullying?

Firstly, we hypothesize that bullying at school will mediate the association between sexual identity and suicide attempt, such that non-heterosexual identity will be predictive of increased bullying, which will subsequently be predictive of increased risk of prior-year suicide attempt. Subsequently, we hypothesize that SSM legislation will contribute to a more socially tolerant, LGB-friendly environment, by attenuating (i.e. moderating) the mediating association between sexual identity and school-based bullying: We expect that the cohort for whom SSM legalization occurred pre-adolescence will live in a social environment where expressing a non-heterosexual identity is less likely to be associated with increased risk for bullying, which, subsequently, will be observed as less disparity in suicide attempts between LGB and heterosexual youth.

Theoretical Focus: This study is guided both by the *social-ecological model* and *life course theory:* The social-ecological model holds that individual-level health outcomes and behaviors do not occur within a vacuum, but are instead influenced by the interactions between multiple exposures across the multiple social contexts and environments within which an individual lives (20,21). SSM legislation is situated within the most distal level, therefore we test exposure to school bullying as a more proximal mediator.

The decision to focus on an exclusively adolescent population was driven by *life course theory*, which holds that current health and well-being is determined not just by immediate circumstance, but rather is a result of a lifetime of accumulated exposures and experiences.(22) Underlying this theory is the acknowledgement that adolescence is a critical period of social, cognitive, and emotional development wherein lifelong health behaviors and beliefs are formed. Following, though SSM may be legally inaccessible to adolescents due to their age, should marriage legislation positively impact the social environment, it could have a substantial impact on both current and future health and development. In addition, life course theory offers a good lens through which to examine structural exposures such as SSM legislation, as the theory holds that between-birth cohort differences may result due to differential exposure to social or political 'turning points' that can fundamentally alter future life trajectories (22). As such, we chose to measure the impact of SSM legislation by comparing outcomes across two birth cohorts of adolescent respondents, based on the age respondents were at the time of marriage legalization (see below for further details). In doing so, we hold that it is not just exposure to marriage equality, but rather the *timing* of exposure to marriage equality (and its subsequent effect on the social-ecological environment) that impacts health and well-being.

Data: For the present analysis, we pooled data from the 2005, 2007, 2009, 2011, and 2013 waves of the high school Massachusetts Youth Risk Behavior Survey (YRBS), a US national, biannual, school-based, risk behavior survey of adolescents in grades 9-12 (aged 12-18), administered at the state and/or district level. Multiple waves of the MA YRBS were used to have a sufficient sample size for analysis. Massachusetts has continuously incorporated questions on sexual orientation into their statewide version of the Youth Risk Behavior Surveillance survey (YRBS), allowing for assessment of study questions among a representative, rather than convenience-sample, of adolescents. The final sample included 14,431 respondents with valid responses on all analytical variables.

Research Measures

Outcome: Past year Suicide Attempt. Dichotomized as *Never* [Referent] vs. *1+ time*, reflecting self-report of number of suicide attempts in the 12 months prior to the survey. Approximately 13% of respondents (n=2,785) who refused to answer were dropped from analysis.

Explanatory Variable: Self-reported Sexual Orientation Identity. Respondents were asked *"Which of the following best describes you? Heterosexual (straight); Gay or lesbian; Bisexual; Not Sure"* Respondents who listed 'Not Sure' (2.2%, n=465) were not included for analysis. 'Gay or lesbian' and 'Bisexual' were collapsed into a single category, resulting in a dichotomized variable: *Heterosexual* [Referent] vs. *Lesbian, gay, or bisexual (LGB).*

Same-Sex Marriage (SSM) Legalization (timing of exposure to SSM legalization). To assess if the association between sexual orientation and suicide attempt differed as a function of SSM marriage legalization, it was modeled as an exogenous shock, operationalized as a function of time. Respondents were stratified into two cohorts, based on their age/developmental status at the time of marriage legalization in 2004: Those who were 12 years of age or older in 2004, hereafter referred to as '*Mid/late Adolescence' (*2005-2009 waves; referent,) and those who were under 12 at the time of legislation enactment, '*Pre Adolescence'* (2011-2013 waves).

Mediator: In-School Bullying. Dichotomized *No* [Referent]/*Yes*, reflecting self-reports of being bullied at school in the 12 months prior to the survey.

Confounders. Female *Sex* (Dichotomized Male [Referent] vs. Female); *Current Grade in School* (Continuous, range = 9^{th}-12^{th} grade); *Race/Ethnicity* (Dummy-coded as 'Non-Hispanic White' [Referent]; 'Hispanic' [includes Multiple race-Hispanic ethnicity]; 'Non-Hispanic Black'; 'Non-Hispanic Other [includes American Indian/Alaskan Native; Native Hawaiian/other Pacific Islander; multiple race-Non-Hispanic]).

Analysis Plan: To test RQ1, the 'treatment effect' of timing of exposure to SSM legalization, we used a difference-in-difference approach: an interaction term was constructed from the product of '*timing of exposure to SSM legislation*' (mid-late adolescence [referent] vs. pre-adolescence) and '*sexual orientation identity*'(Heterosexual [referent] vs. LGB), interpretable as a test of moderation/statistically significant difference of the main effect of sexual orientation on the outcome of prior-year suicide attempt, across the two *'timing of exposure'* cohorts. Logistic regression models were then fit with the main effects, as well as with (Model 4) and without (Model 3) the interaction term included, to assess significance of the treatment effect. To test RQ2, the moderation effect of SSM legalization on the mediated effect of school bullying, multiple-group structural equation models (SEM), grouped/stratified by post-marriage legislation cohort, were fit, to compute the conditional indirect effect of bullying on the association between sexual orientation and suicide attempt, and compare across the two post-marriage legislation cohorts.

Preliminary Findings: A total of 14,431 respondents were included for analysis. The sample was evenly split between male and female respondents, and across the four high school grades; approximately 73% of the sample self-identified as Non-Hispanic White. Overall, 5.7% (n=816) of the sample self-identified as lesbian, gay, or bisexual, 6.1% (n=869) reported having attempted suicide at least once in the preceding year, and 19.4% (n=2,790) reported having been bullied at school at least once. Sexual orientation was predictive of both suicide attempts and bullying. Over 27% (n=221) of LGB respondents, compared with less than 5% of heterosexual respondents, attempted suicide in the prior year, and 37% LGB (vs. 18% heterosexual**)** respondents reported having been bullied at school (see Table 1).

Results from the difference-in-difference estimation models are depicted in Table 2. As expected, there was a strong, significant, positive association between sexual orientation and suicide attempts; after adjusting for demographic covariate (M2), LGB adolescents across the entire sample had odds of prior-year suicide attempt 7.5 times that of their Heterosexual counterparts. In the final difference-in-difference model, timing of marriage legalization emerged as a significant moderator of the association between sexual orientation and suicide (OR: 1.69; 95% CI: [1.09, 2.60]), however this was in the opposite direction from hypothesized—that is, the magnitude of effect strengthened across the two cohorts, such that there were more suicide attempts among LGB adolescents (relative to Heterosexual) in the cohort who was pre-adolescent at the time of SSM legislation enactment, rather than the cohort who was in mid-late adolescence.

This finding was replicated in the moderated-mediation SEM models (Table 3), which found that the total effect of sexual orientation on suicide attempt was greater in magnitude in the pre-adolescence than mid-late adolescence cohorts (β:0.27; 95% CI: [0.19, 0.34] vs β:0.20; 95% CI: [.16, .25], respectively). Bullying emerged as a weak mediator in both cohorts, albeit less so in the mid-late adolescent cohort. However, post-estimation calculations (not-depicted) found that the indirect effect measures were not significantly different across the two cohorts.

Discussion: Preliminary results indicate a significant difference on the overall association between sexual orientation and suicide attempt across the two post-marriage legislation cohorts, however the association occurred in the opposite direction from hypothesized, and did not appear to act through the intermediary mechanism of the school climate (operationalized as school-based bullying). These results are surprising, given that studies from the adult literature have consistently observed links between marriage legislation and health among LGB adults pre- and post- SSM legislation, (14,15,18,23–26). It is not immediately clear why our results did not conform to our hypotheses.

One potential explanation may be related to changes over time in willingness to disclose a non-heterosexual identity, as we found that the proportion of respondents self-identifying as LGB increased over time. As such, increases in the association between sexual orientation and suicide attempt in the '*pre-adolescence'* 2011 and 2013 waves may be a result of more people outwardly identifying as LGB who in prior years, would have identified as straight, downwardly biasing effect measures from earlier cohorts. A more disheartening explanation may be that marriage equality does not appear to have the same social benefit for adolescents as it does for adults, and in fact, may have a potentially negative impact. Following, while increased rates of self-identification as LGB may be due to sexual minority adolescents *expecting* a tolerant environment, when such an

environment is not found to exist (as evidenced by little change between the two birth cohorts in bullying rates), this dissonance may lead to increased distress, and subsequent risk of suicide attempt. This finding suggests that although SSM legislation may have tangible benefits for adults, such as 'relationship legitimization' which Fingerhurt and Maisel (2010) found was able to buffer against encountered discrimination, it hasn't necessarily translated to changes in adolescent peer environments, necessitating additional programs and policies specifically targeted at improving the social environment for sexual minority adolescents.

Finally, as suggested by the weak mediating effect of bullying, there is the chance that this measure is not sufficient on its own to accurately capture the school and/or social climate. This potential limitation is particularly salient for the present study which, though it benefits from its use of the large, representative YRBS dataset, is restricted by the data's lack of nuanced measures of minority stress, as well as specific assessments of how respondents feel about SSM legalization. Further research is needed, such as qualitative studies, and/or quantitative assessments which construct measures of the social environment across multiple 'big' data sets (e.g. the General Social Survey of social opinion, or the School Health Profile survey of school climate/resources), before definitive conclusions can be drawn.

TABLES

Table 1—Distribution of Key Variables by Sexual Orientation Identity and Timing of Exposure to Same-Sex Marriage Legislation, Pooled Massachusetts Youth Risk Behavior Surveillance, 2005-2013

	Mid-Late Adolescence (2005-09)		**Pre-Adolescence (2011-13)**		**TOTAL**	
	LGB	**Heterosexual**	**LGB**	**Heterosexual**	**LGB**	**Heterosexual**
	% (n)	*% (n)*	*% (n)*	*% (n)*	*% (n)*	*% (n)*
Sexual Identity	5.0 (395)	95.0 (7274)	6.3 (421)	93.7 (6341)	5.7 (816)	94.3 (13,615)
1+ Suicide attempt	25.8 (104)	5.4 (391)	30.6 (117)	4.1 (257)	27.1 (221)	4.8 (648)
Bullying at school	40.9 (159)	20.1 (1459)	35.4 (142)	16.4 (1030)	36.9 (301)	18.3 (2,489)
TOTAL, *n*	7,669		6,762		14,431	

LGB=Lesbian, Gay, Bisexual sexual orientation identity

Table 2—Difference-in-Difference Estimation (Odds Ratios and 95% Confidence Intervals) of the Association Between Sexual Orientation Identity and Prior-Year Suicide Attempt, as a Function of Timing of Exposure to Same-Sex Marriage Legislation; Pooled Massachusetts Youth Risk Behavior Surveillance, 2005-2013

	Model 1	**Model 2[1]**	**Model 3[1]**	**Model 4[1]**
	OR (95% CI)	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*
Sexual Orientation Identity	7.98 (6.42, 9.97)	7.53 (5.99, 9.48)	7.64 (6.10, 9.56)	5.78 (4.38, 7.63)
Timing of Legislation			0.83 (0.68, 1.02)	0.74 (0.61, 0.91)
Sexual Orientation* Timing of Legislation				1.69 (1.09, 2.60)

*SMS=Sexual Minority Status***;** *OR=Odds Ratio; CI= Confidence Interval*
All results weighted to account for YRBS survey weights and two-stage/clustered sampling design.
[1]M2, M3, and M4 adjusted for biological sex, race/ethnicity, and grade in school;

Table 3— Direct and Indirect Effect of Sexual Orientation Identity on Prior-Year Suicide Attempt, as Mediated by School-Based Bullying and Moderated by Timing of Exposure to Same-Sex Marriage Legislation;
Pooled Massachusetts Youth Risk Behavior Surveillance, 2005-2013

	Direct Effect	**Indirect Effect**	**Total Effect**	**Percent of Total Effect Mediated**
	β (95% CI)	*β (95% CI)*	*β (95% CI)*	
Mid-Late Adolescence (2005-2009)	.192*** (.144, .239)	.012*** (.008, .017)	.204*** (.158, .250)	6.03%
Pre Adolescence (2011-2013)	.254*** (.180, .327)	.011*** (.006, .017)	.265*** (.190, .340)	4.30%

β =regression Beta Coefficient; CI= Confidence Interval ** p<.05; **p<.01; ***p<.001*
All models adjusted for biological sex, race/ethnicity, and grade in school

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