RESEARCH ARTICLE

‘At-risk’ or school-based risk?: Testing a model of school-based stressors, coping responses, and academic self-concept for same-sex attracted youth

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This study examined same-sex attracted students’ perceptions of their school climate toward same-sex attraction and their school-based environmental stresses and supports using Margaret Spencer’s Phenomenological Variant of Ecological Systems Theory model. Structural equation modeling was used to examine the relationship between stressors, coping mechanisms, and academic identity formation. Students’ connection to teachers and their school environment had the strongest total impact on their academic self-concept and motivation to learn. Of key import was the indirect impact of students’ perceptions of their school climate on both of these important academic outcomes, through their connection to both their school community and general school environment. Findings highlight the deleterious impact of school-based risk factors, including victimization and curricular silences, on educational outcomes for same-sex attracted youth.

Keywords: Same-sex attraction; adolescence; academic self-concept; school climate; belonging; LGBTQ youth

Research has consistently shown that same-sex attracted (SSA) students are routinely marginalized at secondary school (Bontempo and D’Augelli 2002; Hillier et al. 2010; Kosciw et al. 2010). The bullying, social isolation, and homophobic victimization of SSA students has been associated with their increased truancy, fear of attending school, and diminished educational aspirations (Birkett, Espelage and Koenig 2009; Russell, Seif and Truong 2001; Ullman, 2014). While a number of studies have framed SSA young people as ‘at-risk,’ investigating instances of drug abuse, depression, suicide ideation, and suicide attempts (Marshal et al. 2008; Remadedi et al. 1998; Rivers 2004), fewer studies have examined the influence of a potentially ‘risky’ high school climate, specifically with regards to perceived supports and homophobic victimization, on SSA students’ academic outcomes as a means of assessing the overall equity of these students’ academic experience.

Research into social aspects of the school experience detail the importance of both young persons’ perceived peer acceptance (Wentzel 2005; Wentzel and Caldwell 1997) and perceived teacher expectations (Murdock 1999) to their personal investment and engagement at school. Young persons’ perceptions of whether or not their teachers ‘care’ about them has also been found to predict academic effort and motivation (Wentzel 2009; Wentzel and Caldwell 1997). A growing body of research has focused on the elements of perceived school belonging and attachment for SSA students, illustrating lowered levels of social and academic investment in school (Bos et al. 2008; Galliher, Rostosky, and Hughes 2004; Pearson, Muller, and Wilkinson 2007; Rostosky et al. 2003; Ueno 2005). There is much to gain through the examination of larger trends in how these social relationships are shaped by school climate for SSA youth. Further, understanding how school social connections impact SSA students’ school outcomes.
and academic identity speaks to a larger, fundamental question of SSA students’ entitlement to an equitable school experience. Thus, the central purpose of this paper is to enhance the current understanding of how experiences of school-based victimization and support are linked to the development of academic self-concept for SSA young people.

Conceptual Framework

While a significant amount of theorizing and testing has been conducted surrounding identity formation and the educational experience of racial minority groups, a limited amount of research has been conducted towards the creation of a theoretical model that ‘unpacks’ the school experiences of SSA students. One such model is Margaret Spencer’s (1995) Phenomenological Variant of Ecological Systems Theory (PVEST), originally applied to the educational experiences of African American students (Spencer et al. 2003), which has exciting possibilities in its application to the school contextual experiences of SSA young people. PVEST theory locates identity formation as a member of a marginalised group as a prominent portion of its framework but, unlike existing models applied to sexual identity development of SSA individuals, PVEST seeks to expand on the implications of a marginalised or minority group status, highlighting context and individual difference in response type while drawing attention to outcomes (Spencer et al. 2006). As Spencer and colleagues write (2006, 643), ‘PVEST allows us to conceptualize how the normative processes of development are exacerbated for marginalized youth, and how resilience and vulnerability are manifested as part of the context-linked processes of normal human development.’

The PVEST theory comes from an identity-focused cultural ecological (ICE) perspective, particularly useful when examining the contextualized experiences of traditionally marginalized groups such as SSA persons. Further, the resultant PVEST model is structured in such a manner that individuals’ personal perceptions of an experience or context, as opposed to some ‘objective’ evaluation, are crucial to understanding the actual experience or context (Swanson, Spencer, and Petersen 1998). This aspect of the theory constitutes a phenomenological ingredient of the framework while the remaining parts have evolved from Bronfenbrenner’s (1989) Ecological Systems Theory, which is concerned with the effects of various layers of environmental context on the individuals’ self-appraisal. The current framework has developed out of the need for a more comprehensive method with which to regard risk, coping mechanisms and identity formation and as a move away from more reductive models.

The model framework examines: risk factors, experienced environmental supports and stressors, coping strategies and emergent identities simultaneously in order to make knowledgeable statements regarding life stage outcomes as visually illustrated in Figure 1. Risk factors (Stage 1) are macro-level elements, such as minority group membership, that may predispose individuals to adverse outcomes by acting as psychosocial stressors. Environmental stresses and supports (Stage 2) are defined as experiences of marginalization and support related to minority-group membership (Spencer et al. 2003). PVEST regards coping methods (Stage 3) as deployed by individuals to resolve dissonance-producing situations and include problem-solving techniques leading to either adaptive or maladaptive solutions (Spencer et al. 2003). These mechanisms can be viewed as personally protective, despite potentially negative ramifications of the attitude. Identities emerge (Stage 4) as the result of the sustained use of reactive coping mechanisms and are predictive of both positive and unfavorable outcomes (Youngblood and Spencer 2002).
The present study
At the time of data collection, this study represented the first nationwide, quantitative study in Australia to examine the impact of school climate with regards to same-sex attraction – here defined as supports and stressors associated with same-sex attraction within the school environment – on school-specific outcomes for SSA youth. Further, this study remains the first of its kind to apply the PVEST framework to a population of sexual, rather than racial, minority youth. A key research objective was to investigate the complex relationship among school climate characteristics, both those regarded as supportive of same-sex attraction as well as marginalizing in nature, and SSA students’ reported school-based social connections, to ascertain which of these have the greatest direct and indirect impact on SSA students’ academic self-concept, as an indication of their academic identity formation.

Methods
Participants
The final sample for SEM analysis (N = 252) included SSA current or former secondary school students, aged 14-19, from across Australia (59% females, n = 135). Of these, nearly 60% were aged 17, 18 or 19 (n = 149). In terms of sexual orientation, 78% of young men identified themselves as gay, while 31% of young women identified themselves as lesbian, with the majority of young women (46%) identifying as bisexual. While a small percentage of the total sample (n = 16; 6%) identified as heterosexual, these young people reported sexual attraction to members of the same sex and were, therefore, kept as participants. Just under 30% of the sample reported attending a religious secondary school (n = 75). Participants not attending school at the time of data collection (61% of the sample, n = 104) were required to have attended a secondary school course no less than one year prior to participation to ensure that their experiences and perceptions of the school experience were current in their memories. Just 3% of the sample (n = 8) identified as Aboriginal or Torres Strait Islander and 17% (n = 44) were first-generation Australians (e.g. both parents had been born outside Australia). All eight major states and territories of Australia were represented and differences between the distribution of the sample and the 14-19 year old population distribution by state/territory was found to be statistically insignificant ($\chi^2 = 3.3, df = 7, p = .85$).

The researcher went beyond the more traditional boundaries of community-based support organizations for lesbian, gay, bisexual, transgender and queer (henceforth: LGBTQ) teenagers, employing a variety of ‘mainstream,’ free-access youth media platforms (e.g. radio, print media, and online listserv advertisements) in an effort to recruit a varied sample of SSA students across Australia in terms of location (urban/rural), age, identification with the LGBTQ community, and ethnicity. Given the critique that males often outnumber the female participants in existing research with same-sex attracted youth (Savin-Williams 2001), purposive sampling was used to
recruit using media sources specifically targeted to a female audience.

**Measures**

The survey instrumentation for this project was located online in an effort to reach a large and varied sample as well as protect participant anonymity. This method of survey delivery is effective for gaining access to larger samples of SSA young people (Mikulsky 2005) and is the current method of choice for researchers working with this cohort given its numerous methodological advantages (e.g., Ellis and High 2004; Hiller et al. 2010; Kosciw et al. 2010; Robinson and Espelage 2011; Schwartzkoff et al. 2003). Participants were self-selected and could complete the survey at their discretion, opting in or out at will. Numerous checks were in place to ensure that false or duplicate submissions were not included in the analysis. Given the sensitive nature of the questioning, parental consent was waived as part of the ethics approval for the project.

In addition to original items created for this project, the survey included scales sourced from pre-existing instruments (Victoria’s Department of Education, Employment and Training ‘Secondary School Questionnaire’ [DEET 2000] and the ‘Academic Self-Description Questionnaire II’ [Marsh 1990]) and was informed by the research work of the Gay, Lesbian, Straight Education Network (GLSEN), from which the items addressing verbal homophobia were adapted (e.g. GLSEN’s 2001 “Local School Climate Survey” [Kosciw and Cullen 2002]). The survey underwent a rigorous piloting process, including both anonymous online completion with a representative group of young people (N = 23) as well as a face-to-face, verbal piloting session with a cohort of three young people who verbalized questions and issues throughout completion.

Nine key variables, both observed and latent, were included in the SEM model to investigate the relationships under study (see Table 1).

Table 1. PVEST stages and associated variables

<table>
<thead>
<tr>
<th>PVEST Stage:</th>
<th>Variables Under Investigation:</th>
</tr>
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<tbody>
<tr>
<td>Stage 1 “Risk Factors”</td>
<td>1. Sex (Male/Female); 2. Disclosure (of Same-sex Attraction)</td>
</tr>
<tr>
<td>Stage 2 “Net Environmental Stresses &amp; Supports”</td>
<td>1. Reported Verbal Homophobia; 2. Frequency of Positivity re: Same-Sex Attraction; 3. Self-Esteem (internal support); 4. Connection/Sense of Safety with Peers</td>
</tr>
<tr>
<td>Stage 3 “Reactive Coping Methods”</td>
<td>1. Connection to Teachers &amp; School Environment; 2. Motivation to Learn</td>
</tr>
<tr>
<td>Stage 4 “Emergent Identities”</td>
<td>1. Academic Self-Concept</td>
</tr>
</tbody>
</table>

**Sex:** Participants’ sex was measured as a dichotomous variable for the purposes of the SEM model. Research with SSA teens and young adults consistently shows males to be subject to stricter notions of gender norms and greater levels of victimization and brutality within the school context (Brown and Tappan 2008; Bontempo and D’Augelli 2002; D’Augelli, Pilkington, and Hershberger 2002; D’Augelli et al. 2006). Accordingly, sex, specifically identifying as male,
was regarded a potential risk factor in line with stage one of the PVEST model.

**Disclosure of same-sex attraction:** Participants’ disclosure of their sexuality to various members of the school community, including school staff members, peers within the general school community, and closest friends, was measured as an index ranging from 0 (no disclosure) to 6 (full disclosure, or ‘out’ as same-sex attracted). Disclosure was used here as a proxy measure for participants’ overall visibility as being same-sex attracted. Young persons’ non-disclosure could function both as a protective factor in the sense that it might limit targeted or personalized harassment (Smith 1998; Town 1996) as well as a risk factor by contributing to a sense of social isolation and anxiety about discovery (Savin-Williams and Cohen 1996; Smith 1998). Further, given the large body of research work that has shown ‘out’ or ‘presumed gay/lesbian’ young people to be far more likely to be targeted for school-based victimization (Bontempo and D’Augelli 2002; Robinson and Espelage 2011; Robinson, Espelage and Rivers 2013), this variable was viewed as a school-based social risk factor and aligned with stage one of Spencer’s PVEST model.

**Verbal homophobia:** Participants’ reported exposure to school-based verbal homophobia was measured through a series of four consecutive, contingency questions, with either yes/no or Likert scale responses. These items took the participant down a line of questioning which began with screening for occurrence (i.e., Had participants heard students use derogatory terms to describe same-sex attracted persons?), moved to frequency (i.e., If so, how often?), then to frequency of teacher presence when derogatory terms were used and finally frequency of teacher intervention in these instances. Responses to these four questions were summed to create a Verbal Homophobia Index for each participant, with a possible range of 3 (high frequency of verbal homophobia/low teacher intervention) to 15 (student had never heard homophobic language while at school). Due to its association with decreased academic outcomes and sense of connection with the school environment (Kosciw et al. 2013; Kosciw et al. 2010; Murdock and Bolch 2005; Ullman and McGraw 2014), exposure to homophobic, derogatory language was viewed as an environmental stressor in line with stage two of the PVEST model.

**Frequency of positivity regarding same-sex attraction:** Participants’ reported frequency of school-based positivity surrounding same-sex attraction was measured by a single item using a 5-point Likert scale (low of 1; high of 5). This item read, ‘How often are students or staff members at your secondary school openly positive about homosexuality/bisexuality or supportive of homosexual issues or people?’ Given the links between positively perceived environments with regards to same-sex attraction and SSA students’ diminished truancy behaviors, increased sense of safety at school, and lowered school-based victimization (Kosciw et al. 2013; Kosciw et al. 2010), this variable was regarded as an environmental support in line with stage two of the PVEST model.

**Remaining constructs:** Principal component analysis (PCA) was used to create the five remaining latent variables under model investigation (‘Self-Esteem,’ ‘Connection/Sense of Safety with Peers,’ ‘Connection to Teachers and School Environment,’ ‘Motivation to Learn,’ and ‘Academic Self-Concept’), which were sourced from pre-existing instruments (DEET 2000; Marsh 1990). These five variables, consisting of 32 questions, were measured using either a 5-point or 8-point Likert scale (low of 1; high of 5 or 8, respectively) and resulting Cronbach’s
reliability (alpha, α) scores ranged from 0.85 – 0.91 as illustrated in Table 2. Averages were calculated for the five constructs to create participants’ overall scores for each.

Table 2. Internal consistency reliability analysis

<table>
<thead>
<tr>
<th>Construct Name</th>
<th>Number of Items (n)</th>
<th>Cronbach’s Alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Esteem1</td>
<td>5</td>
<td>.91</td>
</tr>
<tr>
<td>Connection/Sense of Safety with Peers1</td>
<td>8</td>
<td>.88</td>
</tr>
<tr>
<td>Connection to Teachers and School1</td>
<td>9</td>
<td>.91</td>
</tr>
<tr>
<td>Motivation to Learn1</td>
<td>4</td>
<td>.85</td>
</tr>
<tr>
<td>Academic Self-Concept2</td>
<td>6</td>
<td>.90</td>
</tr>
</tbody>
</table>

1 Sourced from the “Feelings about yourself and school” subsection of the state of Victoria’s (Australia) Department of Education, Employment and Training “Secondary School Questionnaire” (DEET, 2000); 2 “General Academic Self-Concept Scale” items sourced from the Academic Self-Description Questionnaire II (“ASDQII,” Marsh, 1990).

**Self-esteem:** Five items measured participants’ self-esteem, which has been previously found to influence SSA young person’s ‘susceptibility’ to victimization by protecting them against distress (Rosario et al. 2001). Accordingly, self-esteem was viewed as an internal support within stage two of the PVEST model. Sample items from this measure include: ‘On the whole I am satisfied with myself’ and ‘I feel that I have a number of good qualities.’ Answers ranged from 1 (strongly disagree) to 5 (strongly agree).

**Connection to- and sense of safety with peers:** Eight items, initially sourced as two separate constructs (‘connectedness to peers’ and ‘safety at school’), factored together to create a single construct representing participants’ connection to their peers and overall sense of safety within the school environment. Peer relationships in the school setting, including friendships and peer group rejection, are seen to impact a host of psychological and school-related outcomes, including anxiety and depression, as well as school attitudes and school avoidance behaviors for all students (Ladd, Herald-Brown, and Kochel 2009). Perceptions of overall personal safety within the school environment undoubtedly function as an important stressor or support for any young person. As such, this construct functions as part of stage two of the PVEST model. Sample items from this measure include, ‘I don’t feel lost at this school’ and ‘I have not been teased recently at my school.’ Answers ranged from 1 (strongly disagree) to 5 (strongly agree).

**Connection to teachers and school:** Nine items, initially sourced as two separate constructs (‘connectedness to teachers’ and ‘connectedness to school’), factored together to create a single construct representing participants’ connection to both their teachers and sense of connection and ‘place’ within the general school environment. This construct is linked to stage 3 of the PVEST model as a reactive coping strategy, whereby the young person ‘takes stock’ of their school environment and perceives themselves as either linked to both (1) the adults within that environment and (2) the process and purpose of attending school or perceives themselves as excluded from it. Given the relationship between stages 3 and 4 within the PVEST model, it is worthwhile to note that recent research (Kosciw et al. 2013; Kosciw et al. 2010) has linked larger numbers of school staff reported to be supportive of same-sex attraction to SSA students’ increased reported grade point average, clarifying the ties from students’ sense of connection to staff and their academic outcomes. Sample items from this measure include, ‘At this school there is a teacher who cares about me’ and ‘I look forward to going to school.’ Answers ranged
from 1 (strongly disagree) to 5 (strongly agree).

Motivation to learn: Four items measured participants’ motivation to learn, viewed as another reactive coping strategy in line with stage 3 of the PVEST model. These items measured students’ attitudinal disposition toward completing school tasks and the perceived importance of doing so. Actively devaluing a task was considered here as a potential agentic response to a school environment which potentially posed physical or emotional risk to the student, with the converse also being potentially true. This notion finds support in the literature, as school social processes, including alienation and peer rejection, have been linked to motivation to learn and overall academic effort (Bandura et al. 1996; Wentzel and Caldwell 1997). Sample items include, ‘Doing well in my school is extremely important to me’ and ‘I try very hard at school.’ Answers ranged from 1 (strongly disagree) to 5 (strongly agree).

Academic self-concept: Six items from the general (e.g. non-domain specific) academic self-concept scale of the ‘Academic Self-Description Questionnaire II (ASDQ II)’ (Marsh 1990) were used to assess participants’ sense of connection to the academic domain as a proxy measure for actual academic achievement (Byrne and Worth-Gavin 1996). This construct, positioned as stage 4 of the PVEST model, measures students’ perceptions of their academic ability, as both general self-evaluation and in comparison to others. Academic self-concept is positioned as the key variable of interest – the ‘outcome’ side of a causal flow of risk factors, environmental stresses, and coping strategies for SSA students. Sample items include, ‘Work in most school subjects is easy for me’ and ‘Compared to others my age, I am good at most school subjects.’ Answers ranged from 1 (definitely false) to 8 (definitely true).

Data analysis
Structural equation modeling (SEM) was used to test the pre-specified PVEST model. This technique was chosen primarily for its ability to specify both the direct and indirect effects of the exogenous variables on the endogenous variable. This was particularly useful for a model of academic identity formation, given the obviously complex layers of influence on adolescents’ academic self-concept. All models used the maximum likelihood method of estimating model parameters as well as post hoc bootstrapping to correct for multivariate non-normality. Estimates of the standard error of variables were restricted to a 95% confidence interval. A range of model fit statistics were used to evaluate overall model fit, as per the seminal work of Hu and Bentler (1999). Each of these statistics, alongside their associated cut-off indices for ‘good’ fit, is presented below in Table 4.

Results
Descriptive statistics and correlations (using Spearman’s rank correlation, rho [ρ]) can be seen in Table 3. With regards to social and psychological factors, the higher the students’ reported self-esteem, the stronger both their sense of connection and safety with their peers (ρ = 0.40, p < 0.01) and their sense of connection to their teachers and their school environment (ρ = 0.59, p < 0.01). The two school climate variables, the Verbal Homophobia Index and reported frequency of positivity regarding same-sex attraction, were also strongly and positively correlated with the two measures of belonging and attachment, as can be seen in Table 3. Clear links were seen between students’ sense of belonging and their academic self-concept; the higher their reported
connection to teachers and school and their sense of connection and safety with peers, the higher their reported academic self-concept (ρ = 0.65 and 0.48, respectively; p < 0.01). It is worth noting the modest, yet significant links between academic self-concept and the school climate variables: reported positivity regarding same-sex attraction (ρ = .21, p < 0.01) and the Verbal Homophobias Index (ρ = 0.15, p < 0.05).

Table 3. Means, standard deviations and correlation coefficients (Spearman’s ρ)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Stand. Dev.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Disclosure</td>
<td>2.68</td>
<td>2.22</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sex</td>
<td>0.59</td>
<td>0.54</td>
<td>-0.17**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Self-Esteem</td>
<td>0.72</td>
<td>0.19</td>
<td>0.20**</td>
<td>-0.19**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Connection/Sense of Safety with Peers</td>
<td>0.65</td>
<td>0.19</td>
<td>-0.03</td>
<td>0.03</td>
<td>0.40**</td>
<td>1.00</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5. Connection to Teachers and School</td>
<td>0.68</td>
<td>0.16</td>
<td>0.11</td>
<td>-0.21**</td>
<td>0.59**</td>
<td>0.57**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Frequency Positivity re: SSA</td>
<td>0.49</td>
<td>0.23</td>
<td>0.22**</td>
<td>-0.10</td>
<td>0.32**</td>
<td>0.41**</td>
<td>0.48**</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Verbal Homophobia Index</td>
<td>6.05</td>
<td>3.00</td>
<td>-0.10</td>
<td>0.13*</td>
<td>0.16*</td>
<td>0.43**</td>
<td>0.37**</td>
<td>0.26**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>8. Motivation to Learn</td>
<td>0.76</td>
<td>0.17</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.34**</td>
<td>0.25**</td>
<td>0.45**</td>
<td>0.15*</td>
<td>0.10</td>
<td>1.00</td>
</tr>
<tr>
<td>9. Academic Self-Concept</td>
<td>0.70</td>
<td>0.18</td>
<td>0.03</td>
<td>-0.18**</td>
<td>0.48**</td>
<td>0.65**</td>
<td>0.21**</td>
<td>0.15*</td>
<td>0.51**</td>
<td></td>
</tr>
</tbody>
</table>

N = 252; *p < 0.05; **p < 0.01, 2-tailed test

NB: For the variable Sex, boys were coded as 0 and girls were coded as 1

**SEM model testing**

Model specification began by testing the original, generic PVST theoretical model, with each variable regarded as having a direct path to each variable in the subsequent model stage, and exclusive of within-stage paths (Figure 2). Estimation of this first model as the initial step in model testing showed further interpretation to be of little use as several of the fit indices, both absolute and incremental, were found to be well outside the range of “good” model fit (see Table 4).

Figure 2. PVST generic theoretical model
Respecifying the model took in to account 1) literature by Spencer and colleagues that allows for within-stage relationships to exist despite them not being graphically specified in the original PVEST theoretical model and 2) room for direct relationships between constructs in stages not directly next to one another when these linkages were supported in the literature. With this in mind, a more specific theoretical model was tested that allowed for five additional paths between variables within the same PVEST stage and one additional path directly connecting two variables not sequentially located next to one another in the generic model. These additional paths were supported by a review of the bivariate relationships, an examination of modification indices, and a review of the relevant literature. Non-significant paths were removed in order to create a more parsimonious model. The resulting model (Figure 3) had excellent overall model fit as evaluated using the Bollen-Stine chi-square ($\chi^2 = 27.29; p = 0.158$) as well as seven different measures of absolute and incremental model fit (Table 4).

The numbers associated with each path of influence represent the predictive ability of each variable on the other, measured as standardized regression (Beta) weights, with the standard error in parenthesis next to these weights. The relative strength of the predictive ability of each path of influence can be interpreted according to which regression weights are higher or lower. Further, the bold number to the upper right corner of the variables in stages 2-4 of the model represent the percentage of total explained variance ($R^2$) within each variable as explained by variables with both direct and indirect influence.

Figure 3. More parsimonious PVEST model

NB: Chi-square = 27.29; Bollen-Stine $p = .158$, df = 19
Table 4. Fit indices for tested models

<table>
<thead>
<tr>
<th>Test Indices</th>
<th>Descriptive Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit Indices</td>
<td>χ²</td>
</tr>
<tr>
<td></td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>PVEST Generic Theoretical Model</td>
<td>Bollen-Stine</td>
</tr>
<tr>
<td>More Parsimonious PVEST Model</td>
<td>Bollen-Stine</td>
</tr>
</tbody>
</table>

Note: From left to right: χ² = chi-square; SRMR = Standardised Root Mean Square Residual; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; TLI = Tucker Lewis Index; IFI = Incremental Fit Index; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index.

The final model explained 40% of the total variance ($R^2$) of SSA students’ academic self-concept, the final endogenous variable and key variable of interest here. An examination of the model and the standardized total effects (Table 5) revealed that students’ connection to their teachers and general school environment had the greatest impact on this variable (standardized total effect $\beta = 0.46$), both directly as well as through its indirect impact via students’ motivation to learn. Students’ reported levels of self-esteem (standardized total effect $\beta = 0.38$) had the second largest total impact on their academic self-concept, followed by their reported connection to and sense of safety with their school peers (standardized total effect $\beta = 0.31$). The two variables representative of students’ school climate with regards to same-sex attraction (e.g. positivity and verbal homophobia) also had an impact on students’ academic self-concept, together indirectly accounting for approximately 8% of its model-explained variance.

Table 5. Standardized total effects, more parsimonious model

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<tr>
<td></td>
<td>0.00</td>
<td>0.23</td>
<td>0.07</td>
<td>0.16</td>
<td>0.01</td>
<td>0.00</td>
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</tr>
<tr>
<td>1.</td>
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<td>0.07</td>
<td>0.42</td>
<td>0.21</td>
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<td>0.07</td>
<td>0.12</td>
</tr>
<tr>
<td>2.</td>
<td>-</td>
<td>-</td>
<td>0.31</td>
<td>0.18</td>
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<td>0.20</td>
<td>0.24</td>
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<tr>
<td>3.</td>
<td>-</td>
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<td>0.13</td>
<td>0.46</td>
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<td>4.</td>
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<td>0.43</td>
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<td>0.31</td>
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<td>5.</td>
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<td>7.</td>
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<td>0.17</td>
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</table>

Students’ sense of safety and connection to their peers had a greater impact on their academic self-concept than their reported motivation to learn, despite the direct path between the latter pair (standardized total effects $\beta = 0.31$ and 0.17, respectively) and, of the four variables impacting students’ safety/peer connection, positivity surrounding same-sex attraction and students’ verbal homophobia index had the greatest impact (standardised total effects $\beta = 0.42$ and 0.31, respectively). Twenty-six percent of the variance within students’ sense of safety and
their connection to their peers was explained by positivity about homosexuality and students’ reports of verbal homophobia, as well as by participants’ sex and their level of disclosure of their sexuality to the school community. It is worth highlighting that students’ perceptions of the frequency with which their school community members are positive about homosexuality had its strongest impact on their sense of connection to their teachers and their school (standardized total effect $\beta = 0.43$), especially given the influence of students’ sense of connection to teachers and their school on their academic self-concept as discussed above.

Discussion
The above path coefficients (Figure 3) illustrate that both SSA students’ self-esteem as well as their sense of connection to their teachers and school have the greatest direct impact on their academic self-concept, in line with similar research with the mainstream adolescent population (Byrne and Worth-Gavin 1996; Wentzel 1997; Wentzel 2009). However, a closer examination of the findings reveals that SSA students’ experiences of homophobic harassment at school, as well as their experiences of teacher and student-initiated positivity regarding same-sex attraction were also related to whether or not these students felt academically successful, albeit indirectly. In addition, perceived school climate also affected both students’ connection to their peers/sense of safety while at school as well as their self-esteem, both of which went on to directly influence students’ connection to their teachers and school.

This finding supports the hypothesis that SSA students’ academic identity, as measured here by their academic self-concept, is unequivocally and directly related to their sense of connection to their teachers and their school environment in general. Academic self-concept is also indirectly affected by students’ reports of homophobia at school as well as their experiences of teacher and student-initiated positivity regarding same-sex attraction, which impact their sense of connection to members of the school community and their sense of safety while at school. These outcomes echo scores of qualitative evidence supporting the relationship between school environment, perceptions of school safety and community connection and academic identity/outcomes for SSA students (Flowers and Buston 2001; Gray 1999; Town 1996). These findings are useful in that while the relationship between students’ academic self-concept and their sense of connection to their school community is well established, here we can see that, for SSA students, their perceptions of tolerance/homophobia in the school environment also impact their academic self-concept.

Given the impact of this sense of teacher/school connection for SSA students, these findings take on greater significance for the importance of positive school climate for SSA students. It appears then that, due to their strong influence on academic self-concept, understanding how both (a) self-esteem and (b) students’ connection to their teachers and school are impacted by students’ perceptions of their school climate and relationships with their classmates is fundamental to explaining differences in academic outcomes for SSA students in Australia’s secondary schools.

Conclusions

Limitations
The current study addressed previous sampling critiques associated with SSA youth, including the use of multiple measures of sexuality as well as recruiting widely through ‘mainstream’
youth sources, rather than relying on those targeted specifically for SSA youth. Nevertheless, the fact that the sample was self-selecting means that the findings cannot be responsibly generalized. Having said that, without an accurate sampling frame of SSA young people, it can be argued that obtaining a random sample of this population is impossible.

Further, since the measurement instrument was presented online, only SSA young people with access to a computer with Internet connectivity were able to participate. In the year of data collection (2005), 93% of Australian 15-17 year olds reported using the Internet and 80% reported accessing the Internet from home (Australian Bureau of Statistics [ABS], 2006). Nevertheless, the survey’s online location does mean that SSA young people further marginalized by homelessness or low income may not have been represented in this sample.

The current project included path modelling using a mixture of directly observed and composite variables. The use of the five composite variables was considered preferable given that a full structural equation model would have added too many parameters to the model estimation (i.e., every measured item associated with each of the five indices), affecting the stability of parameter estimates and fit indexes (e.g., Holmes-Smith and Rowe 1994). Accordingly, the robustness of the model itself would have been compromised, more so given the relatively small sample size for the modelling portion of the analysis (N = 252). However, using this alternative is not without measurement problems. The unit-weight addition of the indicator variables assumes that each indicator variable is either measured without error or that the error variances for each variable are equal (Holmes-Smith and Rowe 1994). As such, measurement error of the latent variables was not included within the executed path model, which could have potentially inflated the effect scores. As an alternative approach, in future analysis with this model, the one-factor congeneric approach is recommended, whereby each item is allowed to fit to the latent construct in varying degrees (e.g., see Holmes-Smith and Rowe 1994). Measurement error can then be calculated from this model and included within the subsequent path model.

Suggestions for further research

Although the final sample size for the current project was adequate for the execution of the (adapted) PVEST theoretical model as a SEM model, it did not allow for an investigation of model fit by subgroup. Prior research with SSA young people (Bontempo and D'Augelli 2002; D'Augelli et al. 2002; Hillier et al. 1998) has shown that SSA males report higher levels of harassment within the school context when compared to SSA females. As such, an investigation of model fit for each of these subgroups would be of interest. Likewise, studies have found that students with attractions to both sexes, when compared to students with exclusively same-sex attractions, have lowered academic outcomes and a less well-developed sense of connection to the school community (Galliher, Rostosky, and Hughes 2004; Murdock and Bolch 2005; Robinson and Espelage 2011). Differences in model fit for these two groups would provide greater clues as to how students’ personal sexual identity label is related to their school community connection and other school-related outcomes. Given additional recent research which has found differences in school outcomes for rural as opposed to urban samples of SSA students (Galliher, Rostosky, and Hughes 2004), examining model differences for these two subgroups would also provide useful insights into these differences.

Participants who identified as outside the gender binary (e.g. neither male nor female) were able to select an alternative gender option. However, given the small number of participants who
selected this option, these six students were excluded from the model sample. Given findings from prior research showing that same-sex attracted young people who identify as ‘genderqueer’ or gender nonconforming report more negative school experiences (Robinson and Espelage 2011) including increased school difficulties and less adult and peer support (Hiller et al. 2010), it would be useful for future projects of this nature to consider oversampling for transgender, gender nonconforming, and gender questioning young people to gain a better understanding of the experiences of this group of students.

**Recommendations for practice**

Rather than SSA students being themselves ‘at-risk,’ findings from the current project support the notion that school-based homophobic victimization, alongside limited or zero intervention from school staff and whole-school silences around LGBTQ-inclusive topics, constitute powerful environmental stressors (e.g. school-based risk factors) for SSA students. Accordingly, findings support the current push in most Western countries for curricular visibility and mandated inclusion of content related to same-sex attraction, particularly in an effort to support zero-tolerance strategies around homophobia and transphobia, potent school-based risk factors for SSA. Such curricular content, which is shown here to function as an environmental support, should include not only material on same-sex attraction and associated historical and legal topics, relevant to many key learning areas within the both the primary and secondary school curriculum, but also content specific to the study of gender as a social phenomenon, in an effort to help young people understand and articulate the ways in which assumptions around gender and sexual orientation can impact adolescents’ peer relationships, sense of school belonging, and academic behaviours. Clear, mandated inclusions would go a long way towards clarifying the often muddied and conflicted messages teachers receive about acknowledging same-sex attraction within the curriculum (Ullman and Ferfolja, forthcoming).

These results further support the revision of school policies in an effort to clarify anti-discrimination around sexual orientation and gender expression and support teachers in their efforts to reduce homophobic and transphobic victimisation. Revised school policies which specifically protect same-sex attracted and gender atypical students and allow for honest and open discussion about homophobia and transphobia across both primary and secondary school contexts are another essential environmental support for SSA young people. Pre-service and in-service teacher training by sensitive experts in the field would be a crucial prerequisite for thorough, normalising policy enactment of this nature and would, no doubt, scaffold SSA students’ establishment of caring, trusting relationships with their teachers.

The most salient finding of the current project is the strength of the overall impact of curricular visibility of LGBTQ topics on SSA students’ sense of connection to their teachers and school environment. Given the influence of this sense of connection to teachers on students’ academic self-concept, a relationship well documented in mainstream youth research (Wentzel 2009) and supported in the current model, these findings underscore the need for SSA young people to have access to school staff members who are knowledgeable, administratively-supported, and unafraid to normalise LGBTQ subjectivities.
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