

# Measuring students' sense of connectedness with school

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## Abstract

The current emphasis on performance outcomes in schools has threatened to eclipse the importance of social connectedness as an antecedent to student success. Presented is an instrument designed to measure student sense of connectedness with school based on relevant dimensions provided in the literature: student sense of belonging, engagement, expected learning, and trust. Drawing on data from over 3,000 US students from six high schools, exploratory factor analysis yielded six latent factors based on 31 of 46 original items: students' sense of belonging with peers; teacher support; fairness and safety; academic engagement; engagement in the broader community; and relatedness of self with school. Confirmatory factor analysis yielded acceptable preliminary fit measures. Preliminary path analyses suggest that students' sense of relatedness with school mediates their relative propensity toward academic engagement, with the other factors antecedent. Schools seeking to obtain reliable measures of students' sense of connectedness with school will find the instrument a valuable resource for prioritizing their efforts.

## Introduction

The current emphasis on mastery and performance outcomes in schools has threatened to eclipse the importance of social connectedness as an antecedent to student success (Osterman, 2000). Timely studies have now sought to reposition issues of trust as foundational to effectiveness in schools (e.g. Bryk & Schneider, 2002; Hargreaves, 2002). Yet predominant in this literature is a focus on trust and collaboration among adults in schools more than that of students. This study builds on the established links among sense of belonging, self-esteem and self-efficacy (e.g. Battistich et al., 1995; Bishop & Interbitzen, 1995; Ryan et al., 1994) and Baumeister and Leary's (1995, p.512) argument that, "the desire for interpersonal attachment may well be one of the most far-reaching and integrative constructs currently available to understand human nature".

Among students in schools, the interactive effects of the various ways they do or do not experience and or develop trust at school, are helpful to understand in order to plan and deliver one's educational practice for success of all students. We know for instance that security among peers is associated with self-esteem (Ryan et al., 1994), although not necessarily directly (Sletta, Valas & Skaalvik, 1996) and that peer acceptance is a predictor of relative loneliness, which in turn can predict academic success (Osterman, 2000). Osterman's (2000) further review of the literature on student relatedness, sense of belonging and sense of community, helps us tease apart some of the subtle complexities in this area.

While there is a traditional view that extra curricular involvement provides sufficient opportunities for students to make all important connections with peers, Osterman (2000) highlights research that challenges this perspective. She points to studies that provide evidence of the need for a sense of belonging and acceptance - from both peers and teachers - as likely two facets of a related phenomenon that are both critical for student engagement. As academic engagement has been established as a reliable predictor of student success (Osterman, 2000), it becomes important to understand the interrelationships among student sense of belonging with peers, with teachers in classrooms, in extra-curricular settings and throughout the school community.

Using a broad definition of student engagement (in class, in response to expectations of them throughout the school, in extra-curricular activities and in decision making), Leithwood, Jantzi & Haskel (1997) and Leithwood and Jantzi (1999) reported that 84% of the variance was explained by family, school conditions and principal leadership. The inclusion of principal leadership is notable. As Osterman (2000, p.9) notes, "their finding is important because it challenges an embedded assumption that shapes policy recommendations that students develop sense of community through their participation in extra-curricular activities or that a strong extra-curricular program will satisfy student needs for a sense of community and lead to engagement". While student engagement can be taken as a reliable predictor of student success (Connell & Wellborn, 1991), student motivational variables e.g., interest in class, interest in school and social responsibility, stand between students' social connectedness with each other or 'belonging' and their academic achievement (Wentzel, 1998).

Among the most salient 'school conditions' are student experiences with teachers. Osterman (2000, p.14) suggests that "...teacher support has the most direct impact on student engagement. How students feel about school is in large measure determined by the quality of the relationship they have with their teachers in specific classes." Furthermore, "teacher preferences and patterns of interaction with students also influence the nature of peer relationships, with peer acceptance mirroring teacher preferences" (Osterman, 2000, p.19). Goodenow (1993) discovered the positive correlation among relationships with classmates, teacher support and general sense of belonging and their collective impact on student

expectations for success, finding that teacher support was the most significant predictor while peer support was also important. The intricacies and antecedent interrelationships among all of these factors are worthy of careful study. Furthermore, a school's ability to reliably measure these factors is a powerful tool for self-assessment of the school's focus and its planning for change.

While Osterman (2000) notes that the research literature is generally consistent, she suggests that one reason that might help to explain any inconsistencies concerns the common use of peer and teacher nominations to measure students' peer acceptance. This approach ignores the obviously subjective nature of this phenomenon. In the present study, self-report data were collected.

### **Context and theoretical framework**

The purpose of this study was to develop and field-test a new instrument designed to measure students' connectedness with their school community, and to determine its validity and reliability with high school students. A concurrent objective was to test current theorizing in the literature on the dimensions associated with students' sense of school community and to examine further the inter-relationships among them. This work relates specifically to recent directions in federal and private school funding for school restructuring initiatives in the United States, which aim to create smaller and more intimate learning communities. This funding direction is based on research that points to higher learning outcomes among students in smaller learning communities. A compelling body of research over the past three decades confirms that small schools are more likely than large schools to achieve greater student academic achievement (e.g. Bryk & Driscoll, 1988; Fowler 1989, Heck & Mayor, 1993; Huang & Howley, 1993; Lee & Smith, 1994; McMullan, Sipe & Wolf, 1994), especially for those from low-income families and so-called minority subgroups (Summers & Wolfe, 1976). There is also a growing body of research to illustrate that intentional restructuring of school districts to create smaller schools has measurable positive impact including student achievement, improved attendance and the creation of safer environments (Klonsky & Klonsky, 1999). The enhanced autonomy of teachers and a greater sense of intimacy, coherence and security that smaller learning communities offer students are among the findings (Klonsky, 1995). Drawing on the ideas of various researchers, small schools are considered to be more able to create a sense of community among learners.

McMillan and Chavis (1986: 9) define community as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together". Their foundational work has been variously interpreted to describe four related dimensions. Rovai (2002) proposes these to be belonging, trust, expected learning and obligation. A sense of belonging or membership is characterized as occurring when a member identifies with the group and feel a sense of commitment to the group's purposes and values. Trust occurs when there is a feeling of safety within the group, which is associated with a belief that members will generally act for the good of the whole. The expected learning dimension concerns the extent to which members expect the group to provide value, particularly with respect to their commitment to shared learning goals. The obligation dimension concerns the extent to which members feel a moral imperative to participate in activities and contribute to group goals. Osterman (2000, p.324) describes these four inter-related dimensions respectively as "membership", "a shared emotional connection", "integration and fulfillment of needs" and "influence". Similar notions of community are also discussed by Rovai (2002, p.198) drawing on the work of Bellah, Madsen, Sullivan Swidler, and Tipton (1985) which include the elements of "spirit, trust, mutual interdependence among members, interactivity, shared values and beliefs, and common expectations." The relative importance of each of these

dimensions to a sense of community, and whether one characteristic needs to be developed, encouraged and viewed in effect to be antecedent to the others, deserves further attention, especially as a systematically measurable phenomenon. To assist schools in a process of restructuring to create more effective learning communities, an understanding of the inter-relationships among these dimensions and guidance as to how to focus and prioritize efforts is needed. This assistance is even more critical given the pressures for performativity upon teachers and administrators in the current high stakes testing environments. These pressures are increasingly prevalent among western nation states and becoming associated with emotional and relational compression (Ball, 2000).

Designing for a sense of community is difficult because of the complex inter-relationships among the inherent dimensions. A sense of belonging or membership, intuitively, and based on Maslovian (1954) theory too, would seem to be a priority to establish. A sense of belonging, of course, can mean many things, for failing students may also have a strong sense of belonging, even if it is to a subculture that thwarts the school vision and academic expectations of students. As McAdam (1982) warned, a sense of connectedness within community is far more than inter-personal relationships per se. This kind of belongingness is a sense of responsibility within which members believe that through actively engaging in the community this will fulfill their needs. In Bryk and Schneider's (2002) recent work on trust in schools, the strong positive relationship between levels of trust with academic achievement is striking; schools with low levels of trust between teachers and teachers and between teachers and principals are associated with the bottom quartile schools while the top quartile schools are associated with very strong trust among faculty. This latter finding may be associated with a relationship between trust and sense of safety, safety being a prerequisite condition for belonging and achievement in the Maslovian construct.

### **Development of the Student Sense of Connectedness Scale (SSCS)**

The development of the SSCS drew on various sources. In recent years, Concord High, California, with the support of the University of California at Davis, initiated efforts to create smaller learning communities on their large campus. To obtain base-line data on students' sense of community the high school developed a student questionnaire for which validation has not been demonstrated. Over one third of the items in the initial development of the SSCS were adapted from their online questionnaire. Another source was The Search Institute ([www.search-institute.org](http://www.search-institute.org)), which has compiled a list of 40 developmental assets associated with student success and student retention. The Classroom Connected Scale (Rovai, 2002) also provided ideas for items. Given that the unit of analysis in the CSS is the classroom, direct use of the items was not appropriate for a whole school focus. School personnel from the participating schools also contributed several items. Overall, the four dimensions of a sense of community as outlined in the literature above provided a guiding principle for inclusion. Using Likert-type scaling procedures (four-point scale - strongly agree, agree, disagree and strongly disagree) an initial pool of 42 items was collated. A pilot study with 216 high school students led to small changes including a few deletions, additions and minor adjustments to wording. The original version of the scale included 45 items.

## **Method**

### *Sample and data collection*

A total of 3,424 students from seven large high school campuses (including the pilot) in two suburban school districts in the southern United States participated in the study in 2003. These schools were in the process of adopting some of the principles and practices of smaller

learning communities. The instrument was developed to assist these schools in obtaining base-line data on the students' sense of connectedness with the school community. A stratified random sample of students across the four grade levels (9-12) was requested, but in one school all grades 9-11 students were surveyed. Demographic data (racial/ethnic origin; gender and grade) were also collected. By racial/ethnic origin: 14-81 percent range Hispanic, 1-69 percent range Caucasian, 5-37 percent range African American, 1-7 percent range Asian or Pacific Islander and 1-4 percent range Native American. By grade: 36 percent grade 9, 29 percent grade 10, 21 percent grade 11 and 14 percent grade 12. By gender, 54 percent were female. Given the large sample size, listwise deletion of participants was employed to provide 2,220 complete data sets for analysis.

#### *Plan of Data Analysis*

Data analysis proceeded in five distinct phases. The first phase involved the trimming of items based on the descriptive statistics of the whole sample with respect to non-normality, (based on high skewness and/or kurtosis of values greater than 1). The entire sample was then divided into two random samples with an equal number of participants (n=1110). These two samples were designated the exploratory and confirmatory samples. Using principal axis factor analysis in SPSS version 11.5.0 the underlying uni-dimensionality of the instrument along the principal axis, determined further items for deletion. In the second phase, principal axis factor analysis with Direct Oblimin rotation assisted in determining the number of latent factors and the associated items.

The third phase involved confirmatory factor analyses using AMOS 5.0 software (Arbuckle & Wothke, 1999). When compared with EFA, the CFA procedure is considered to generate definitive empirical evidence of a measure's underlying factor structure (Cramer, 2000). The maximum likelihood estimation procedure was selected as it is recommended for use with ordered categorical data of varying degrees of skewness and kurtosis ( $\leq 1$ ) (Conroy, Motl, & Hall, 2000) and is the standard method of testing a structural equation model (Kowolski & Crocker, 2001). Several models were constructed *a priori* for the individual item data sets. Sets of random samples of 500 participants generated from the 50% allocation of the original sample (n = 1,110) were used for the CFA of each model evaluated. Random samples (or new or different samples) are required when each of the different models being tested are nested in the original model. This strategy was employed as model generation is data driven and hence new data sets are required for each model modification (MacCallum, 1995). Nesting means that the main constructs and indicators of the model remain constant but the number of estimated relationships changes. The size of these random samples were considered appropriate for CFA model testing because (a) participant numbers were greater than 200, the minimum proposed for complex models, and (b) the ratio of sample size to parameters (the primary model estimated 77 parameters) was greater than 5:1 for the individual item model (Hair, Anderson, Tatham, & Black, 1998).

The consensus across the literature in relation to the selection of fit indices is to incorporate a range of statistics that are drawn from the absolute fit, incremental fit, and parsimonious fit categories (e.g. Conroy et al, 2000; Hair et al, 1998). Model solutions in this study were evaluated using the following fit indices. The chi-square goodness of fit statistic, which is regarded as a measure of the badness of fit of models, such that a small value corresponds to a good fit and a large value represents a poor fit (Hair et al., 1998). It should be noted that chi-square and the chi-square/degrees of freedom (df) indices are affected by large sample sizes (>200) (Kline, 1998; Marsh, Balla, & McDonald, 1988). A level of good fit is typically indicated by values less than 3 (Kline, 1998). The adjusted goodness of fit index (AGFI) is an absolute fit index that indicates the proportion of the observed variance and covariance explained by the specified model (Motl & Conroy, 2000). This parsimonious fit

measure, the AGFI, is normally recommended to be above a level of .90, (Arbuckle & Wothke, 1999); however, this is often the level recommended for the unadjusted goodness of fit index (GFI), and other authors have suggested that an AGFI of .80 is indicative of a good fit (Pedhazur & Schmelkin, 1991). The normed fit index (NFI) demonstrates the degree of improvement in fit of the specified model compared to the independence model. The independence model represents a model where the observed variables are assumed to be uncorrelated with each other, and the model is so severely constrained that a poor fit is expected from any reasonable set of data (Arbuckle & Wothke, 1999). The Tucker-Lewis index (TLI) is a type-2 index and indicates the improvement per degrees of freedom of the specified model over the independence model, and is less affected by sample size than other indices (Conroy et al., 2000). The comparative fit index (CFI) is a type-3 index and indicates reduction in poor fit (Conroy et al., 2000). The NFI, TLI, and CFI are typically recommended to be above .9 to demonstrate good fit (Kowloski & Crocker, 2001). Finally, the root mean square error of approximation (RMSEA) is an indication of the specified model's lack of fit, taking into account degrees of freedom. It represents the disconfirmability of a model (Kowolski & Crocker, 2001). RMSEA values lower than .05 are indicative of good fit, between .05 and .08, a fair fit, between .08 and .10 a moderate fit, and above .10 a poor fit (Vandiver & Worrell, 2002). These indices were selected on the basis of examination of the fit indices suggested within reputable multivariate analysis techniques texts (e.g., Hair et al., 1998; Pedhazur & Schmelkin, 1991) and the review of recent articles related to measure development in education and psychology (e.g., Conroy et al., 2000, Vandiver & Worrell, 2002). The fourth phase determined internal consistency measures of each individual composite factor. Finally, preliminary path analysis was employed to explore for antecedent inter-relationships between the composite factors.

## Results

### *Descriptive statistics*

From the descriptive statistics three items were deleted from further analysis (24, 31, 39) due to skewness/kurtosis values above an absolute value of 1.0. Values that rounded down to 1.0 were retained (Table 1).

### *Exploratory Factor analysis (EFA)*

The uni-dimensionality of the instrument was upheld by the removal of six further items which had very low correlation coefficients, if at all, on the principal axis (items 9, 15, 18, 27, 30, 40). For the Direct Oblimin rotation, absolute values for any correlation coefficients  $<0.50$  were suppressed and six latent factors (LF) were evident. These LF were theorized to be: relatedness of self with school (8 items); engagement in community (2 items), academic engagement (4 items), sense of belonging/acceptance with peers (5 items), teacher support (7 items), and sense of fairness and safety at school (5 items). Five further items (45, 19, 7, 44, 21) did not have a correlation coefficient  $\geq 0.50$  in the structure matrix and these were trimmed for the confirmatory factor analysis (Table 2).

### *Confirmatory Factor Analysis*

The results of the confirmatory factor analyses are reported in two stages. First, the initial analysis tested the fit of a model incorporating 31 remaining items of the SSCS as observed variables and the 6 factors derived from the EFA as latent variables. The model (M1) (Figure 1) did represent a moderate to good fit for the data, with all indices except for NFI at or near the proposed levels of minimum fit indicative of a good model (Table 3). Review of standardized estimates and the analysis data did indicate that changes to the specified model could facilitate improvement in fit.

Table 1: *Descriptive statistics*

	Mean	Std. Dev.	Skewness	Kurtosis
Q1. I feel like a real part of this school	2.65	.807	-.446	-.233
Q2. At school I feel comfortable sharing thoughts, opinions and feelings with peers	2.69	.811	-.442	-.212
Q3. I feel safe at school	2.69	.819	-.552	-.135
Q4. It is important to participate in extra-curricular school activities	3.01	.880	-.606	-.348
Q5. Adults in my community/neighborhood treat young people with respect	2.63	.795	-.456	-.209
Q6. People at this school notice when I am good at something	2.62	.821	-.279	-.415
Q7. I can see connections among my subjects	2.59	.748	-.412	-.150
Q8. I feel comfortable asking teachers about things I do not understand	2.79	.773	-.510	.100
Q9. At school I feel reluctant to speak openly with teachers	2.44	.785	-.021	-.443
Q10. I care about my school	2.67	.834	-.516	-.243
Q11. I feel confident that teachers will support me with my learning	2.83	.740	-.664	.557
Q12. I complete my homework	2.74	.849	-.442	-.320
Q13. The principal treats students fairly at this school	2.57	.862	-.417	-.530
Q14. What I learn in school is relevant to my future	2.82	.835	-.446	-.261
Q15. Teachers at this school are not interested in my well being	2.21	.781	-.396	-.103
Q16. I feel welcome to participate in extra-curricular school activities	2.87	.814	-.512	-.077
Q17. My teachers listen to me when I have a problem	2.62	.771	-.394	-.183
Q18. I wish I were in a different school	2.29	1.005	.353	-.934
Q19. Students in my classes help me with my schoolwork	2.81	.783	-.649	.284
Q20. I apply myself to learning in class	2.94	.675	-.640	1.051
Q21. At this school there is at least one adult I would talk to if I have a problem	2.84	.905	-.505	-.462
Q22. I do my best to contribute to group projects	3.07	.727	-.664	.655
Q23. I can be myself at this school	2.95	.828	-.658	.105
Q24. My parent(s) or guardian(s) are willing to cooperate with my teachers	3.05	.713	-.776	1.138
Q25. Most teachers help me experience connections across subject areas	2.58	.744	-.350	-.188
Q26. I help other students with their learning	2.89	.747	-.722	.703
Q27. I feel isolated at this school	2.15	.854	.439	-.365
Q28. Teachers speak to me in a respectful manner	2.72	.801	-.561	-.017
Q29. This school offers learning opportunities that interest me	2.70	.800	-.474	-.128
Q30. The rules at this school need to be stricter	1.75	.873	1.051	.362
Q31. My teachers are willing to cooperate with my parent(s) or guardian(s)	2.89	.681	-.804	1.312
Q32. I make it a priority to contribute to my school in a positive way	2.76	.724	-.512	.284
Q33. My teachers give me the help I need with my schoolwork	2.81	.712	-.629	.610
Q34. I am a volunteer in my community/neighborhood	2.41	.863	.115	-.636
Q35. Teachers treat students fairly at this school	2.38	.825	-.214	-.706
Q36. Teachers make sure we understand something before going on to new learning	2.34	.834	-.036	-.688
Q37. I trust that the Assistant Principals would listen openly to me	2.43	.871	-.253	-.778
Q38. I contribute usefully to my community/neighborhood	2.61	.797	-.314	-.323
Q39. I understand the expectations of me at this school	2.93	.692	-.831	1.384
Q40. The rules in this school are consistently enforced	2.58	.826	-.325	-.441
Q41. I can succeed in this school	2.99	.771	-.779	.711
Q42. At this school I experience a sense of belonging	2.64	.795	-.473	-.184
Q43. My school is preparing me well for the world of work	2.60	.841	-.361	-.452
Q44. I have confidence in the counseling services at my school	2.55	.870	-.320	-.611
Q45. I feel welcome to participate in the advanced academic and AP course options	2.80	.913	-.501	-.486

The next stage of model re-specification involved the removal of the ‘engagement in community’ factor (M2). This factor was initially removed because we proposed that it is the least representative of school-oriented connectedness of the six factors analysed in M1. Apart from only including two items, a review of the correlation matrix for the latent constructs also highlighted that the community engagement factor shared the lowest levels of association with each of the other latent factors. CFA results, however, clearly indicated that the five factor model was not as good a fit for the data as the six factor model, with all but the AGFI incremental indices lower, and the RMSEA and  $\chi^2/(df)$  index higher (Table 3).

A third CFA was completed using the original M1 with the following 2 items - 42, 32, - to load on two rather than a single latent factor (M3). Support for an item to be drawn as an observed indicator of two factors came from a review of the original EFA factor structure, review of the AMOS implied covariances output, and review of the AMOS modification indices (MI) output. Modification indices provide information to improve goodness of fit through the process of item reduction or scale revision (Vandiver & Worrell, 2002). In this case, these indices were used to support the inclusion of additional item linkages to construct paths. Adding a path from item 32 to the community engagement factor was indicated by a high MI of 26.22 and for item 45, to students sense of belonging with peers by a MI of 23.23. As a result of this modification to the six factor model, five goodness of fit indices were improved (Table 3). This finding indicates that a more complex model is a better representation of the data.

Table 2: *Structure matrix for EFA*

	<u>Factor</u>					
	1	2	3	4	5	6
	Related-ness of self with School	Participation in community	Academic engagement	Belonging/ acceptance with peers	Teacher Support	Fairness & Safety
Q32. I make it a priority to contribute to my school in a positive way	<b>.63</b>	.57	.51			
Q43. My school is preparing me well for the world of work	<b>.63</b>				.57	
Q42. At this school I experience a sense of belonging	<b>.61</b>			.58		
Q10. I care about my school	<b>.59</b>					
Q29. This school offers learning opportunities that interest me	<b>.53</b>				.53	.52
Q14. What I learn in school is relevant to my future	<b>.51</b>					
Q4. It is important to participate in extra-curricular school activities	<b>.50</b>					
Q41. I can succeed in this school	<b>.50</b>					
Q38. I contribute usefully to my community/neighborhood		<b>.85</b>				
Q34. I am a volunteer in my community/neighborhood		<b>.80</b>				
Q20. I apply myself to learning in class			<b>.70</b>			
Q12. I complete my homework			<b>.65</b>			
Q22. I do my best to contribute to group projects			<b>.61</b>			
Q26. I help other students with their learning			<b>.61</b>			
Q45. I feel welcome to participate in the advanced academic and AP course options						
Q2. At school I feel comfortable sharing thoughts, opinions and feelings with peers				<b>.66</b>		
Q1. I feel like a real part of this school	.54			<b>.64</b>		
Q23. I can be myself at this school				<b>.54</b>		
Q16. I feel welcome to participate in extra-curricular school activities				<b>.50</b>		
Q6. People at this school notice when I am good at something				<b>.50</b>		
Q19. Students in my classes help me with my schoolwork						
Q33. My teachers give me the help I need with my schoolwork					<b>.70</b>	
Q25. Most teachers help me experience connections across subject areas					<b>.70</b>	
Q28. Teachers speak to me in a respectful manner					<b>.64</b>	.56
Q11. I feel confident that teachers will support me with my learning					<b>.63</b>	
Q36. Teachers make sure we understand something before going on to new learning					<b>.62</b>	
Q17. My teachers listen to me when I have a problem					<b>.62</b>	
Q8. I feel comfortable asking teachers about things I do not understand					<b>.56</b>	
Q7. I can see connections among my subjects						
Q44. I have confidence in the counseling services at my school						
Q21. At this school there is at least one adult I would talk to if I have a problem						
Q13. The principal treats students fairly at this school						<b>.64</b>
Q35. Teachers treat students fairly at this school					.61	<b>.64</b>
Q37. I trust that the Assistant Principals would listen openly to me						<b>.56</b>
Q3. I feel safe at school						<b>.52</b>
Q5. Adults in my community/neighborhood treat young people with respect						<b>.50</b>

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Only values  $\geq 0.50$  provided for clarity.

A final model (M4) was constructed to check whether for these two items only, a single pathway to the alternative latent factors was a better fit to remove the complexity in the model. This was not the case, these double loads are significant to improving the model fit (Table 3). Item 42 ‘At this school I experience a sense of belonging’ is associated strongly with students sense of relatedness at school as well as their sense of belonging with peers, and item 32 ‘I make it a priority to contribute to my school in a positive way’ is associated strongly with students sense of relatedness at school and their engagement in community. Model 3 is taken as the best fit for the data.

Correlations between the latent factors for M3 calculated within the CFA (see Figure 2) indicated moderate to high degrees of association between the various latent factors. The correlations ranges in value from,  $r = 0.34$ , for sense of fairness and safety and engagement in community to,  $r = 0.89$ , for relatedness of self with school and belonging with peers. These values are appropriate for models that have proposed *a priori* that the latent constructs are inter-related in the context of school connectedness.



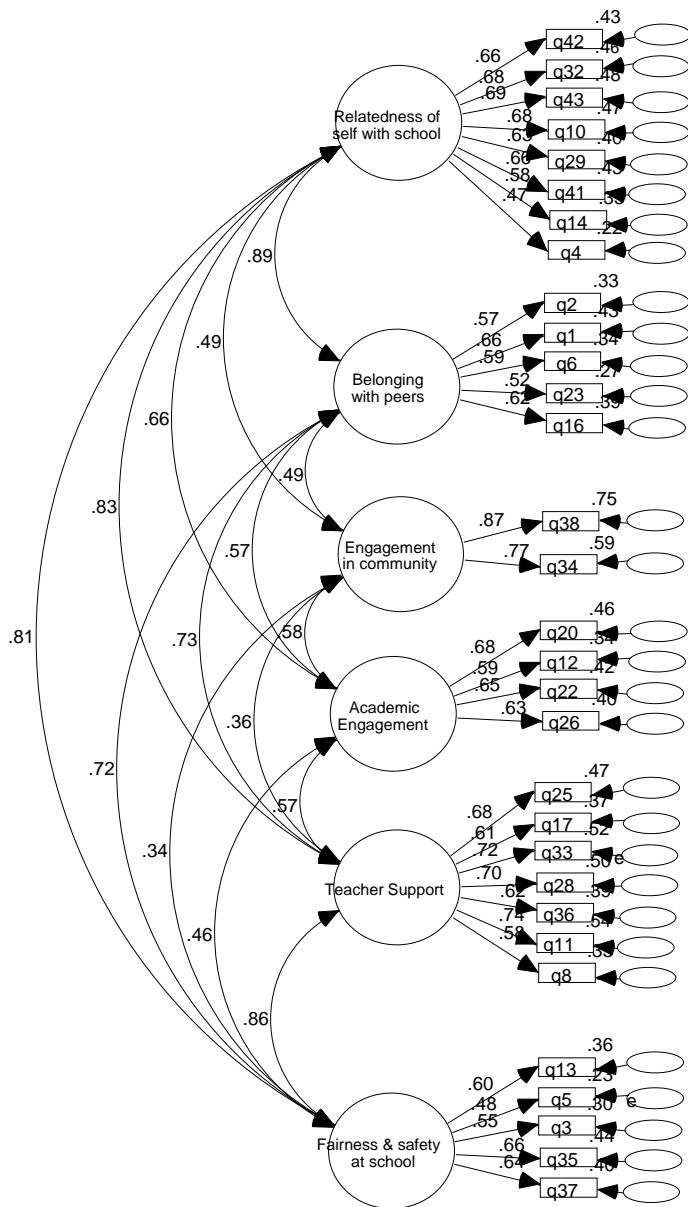


Figure 1: Model 1 SSSS CFA

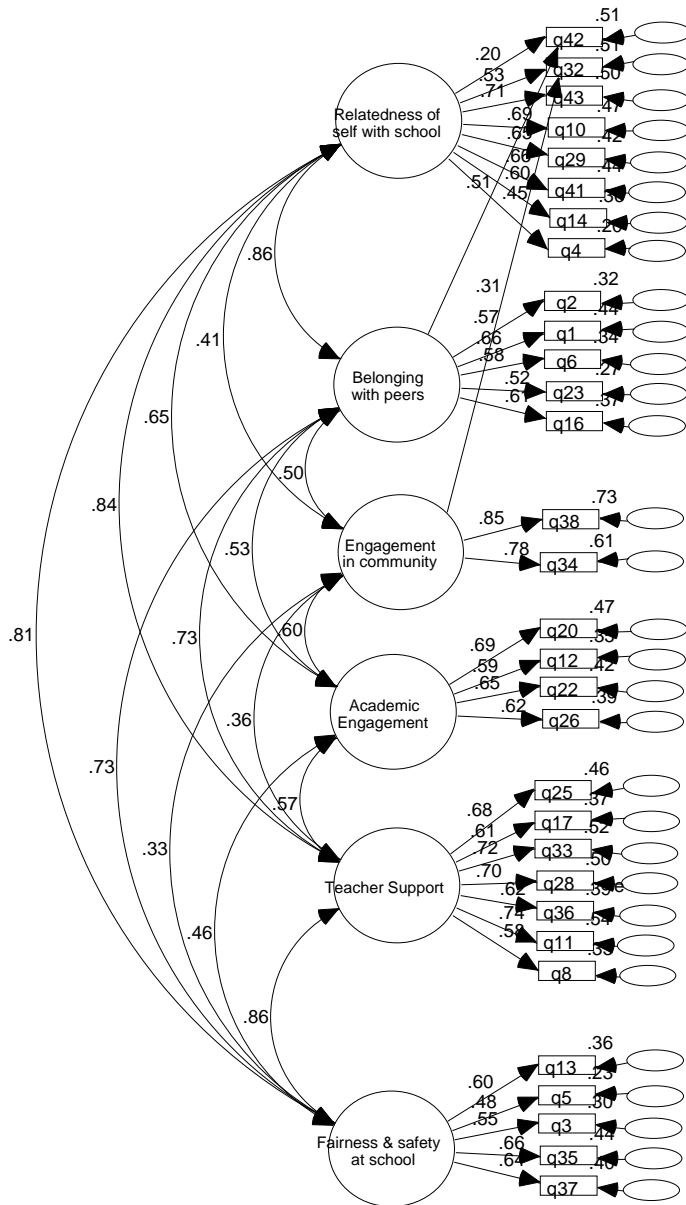


Figure 2: Model 3 SS-CS CFA

Table 3: Goodness of Fit Indices for CFA Models of SS-CS

Model	$\chi^2/(df)$	AGFI	NFI	CFI	TLI	RMSEA	Model Description
M1: SS-CS	2.45	.86	.84	.89	.88	.05	Six factor - derived from EFA
M2: SS-CS	2.59	.86	.82	.88	.87	.06	5 factor – less engagement in community
M3: SS-CS	2.28	.87	.85	.91	.90	.05	6 factor – 2 double loads, items 32, 42
M4: SS-CS	2.38	.86	.83	.90	.88	.05	6 factor – items 32,42 single load to alternative factor

### Internal consistency of composite factors

The internal consistency measures of the latent factors were first determined in SPSS. The alpha coefficients were moderate to excellent and the Pearson correlation matrix indicates that all relationships among factors were positive and significant (Table 4).

Table 4: Means, standard deviations, reliabilities, and correlation matrix for composite factors

Composite factors <sup>1</sup>	M	sd	$\alpha^2$	1	2	3	4	5
1 Teacher support	2.67	.18	.84					
2 Belonging with peers	2.75	.15	.73	.49*				
3 Fairness and safety	2.51	.13	.74	.67*	.54*			
4 Academic engagement	2.91	.13	.74	.42*	.43*	.38*		
5 Relatedness of self with school	2.76	.16	.84	.66*	.67*	.63*	.55*	
6 Engagement in community	2.49	.13	.82	.27*	.35*	.29*	.42*	.42*

1. 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree.

2. Cronbach's alpha

\* all correlations significant at the .01 level (2-tailed).

The internal consistency of item loadings on each factor was further investigated in AMOS 5.0 (Arbuckle & Wothke) by constructing one-factor congeneric models based on the item loadings from the EFA (Stanton, Sinar, Balzar, & Smith (2002). One new random sample of 500 from the CFA data set was used for this purpose. The mean inter-item correlations ranged from .41 to .73, which provide evidence of convergent validity (Table 5). According to Kivimaki et al (1997), such a range of correlations suggests that the items represent a broad variety of characteristics for each factor instead of items being too similar, which could create problems of item redundancy. As the LF called “engagement in community” consisted of only two items and three items are a minimum for a congeneric model, no individual fit measures can be obtained. The fit statistics for each individual model indicate a good fit (Table 5).

Table 5: Factor loadings, inter-item correlations, and fit indices for SSCS composite factors from congeneric models

Composite factor	No of items	Range of factor loadings	Range of inter-item correlations	df	$\chi^2 / df$	AGFI	NFI	CFI	TLI	RMSEA
Teacher support	7	.56-.70	.53-.66	14	1.64	.98	.97	.99	.98	.03
Belonging with peers	5	.50-.66	.49-.59	5	1.94	.98	.97	.99	.97	.04
Fairness and safety	5	.50-.64	.45-.70	5	1.57	.98	.98	.99	.99	.03
Academic engagement	4	.61-.70	.54-.73	2	1.93	.98	.99	.99	.98	.04
Relatedness of self with school	8	.50-.63	.41-.68	20	3.53	.94	.94	.96	.94	.07
Engagement in community	2	.80-.85								

### *Locating the latent factors within the literature*

Relatedness, community, sense of acceptance, membership and the like are often treated as interchangeable in the literature (e.g., Osterman, 2000). Inherent in explorations of the community and connectedness dimension is the phenomenological experience of a sense of trust. From the corporate context, Reina and Reina (1999) have characterized different kinds of trust: contractual, communication and competency trust. Their definition of contractual trust concerns the keeping of agreements and “encouraging mutually serving intentions and being congruent in our behavior”. Communication trust is about “the willingness to share information, to tell the truth, admit mistakes and speak with good purpose” (p.65). Competency trust is defined as involving the respect of “people’s knowledge, skills and abilities, and judgment” and the “willingness to trust the capability of ourselves and others” (p.99).

In the context of schooling, Bryk and Schneider (2002) theorize that social trust, inherent in the quality of interpersonal exchanges, cumulates in an organizational property they term relational trust. A broad base of trust across a school community lubricates much of schools’ day to day functioning” (Bryk & Schneider, 2002, p.5). They tentatively position relational trust between two ends of a continuum between the contractual trust common to business enterprises, and organic trust, common to small-scale communities where there is “unquestioning belief of individuals in the moral authority” of the institution (Bryk & Schneider, 2002, p.16). In business enterprises, contractual trust is continually renewed through the provision of material or instrumental transactions, in institutions operating on organic trust, “individuals give their trust unconditionally; they believe in the rightness of the system, the moral character of its leadership and all others who commit to the community” (p.16). Schools operate through the intermediary of relational trust.

As we discuss the characteristics of the latent factors below, we propose that the element of trust pervades the six latent factors in the SSCS. These factors appear to be different domains within the students’ experience of school with respect to their peers, their teachers, their administration, their broader community, and themselves at school.

#### *The sense of belonging with peers factor*

Q2. At school I feel comfortable sharing thoughts, opinions and feelings with peers

Q1. I feel like a real part of this school

Q23. I can be myself at this school

Q16. I feel welcome to participate in extra-curricular school activities

Q6. People at this school notice when I am good at something

Double load

Q42. At this school I experience a sense of belonging

Students’ sense of connection with peers is well established as a value in the literature. Sense of belonging with peers is “significantly correlated with value of schoolwork, expectancy and persistence, even when controlling for the influence of friends’ values” (Osterman, 2000, p. 233). In the present study, the CFA suggests the sense of belonging occurs in association with being able to be open -“sharing thoughts, opinions and feelings with peers”; the ability to be oneself - which is more likely when one feels welcome by peers - and the expectation of acknowledgement as a valued member of the (peer) group. Thus we propose that this construct predominantly represents a sense of belonging with, and acceptance by peers. Inherent in these items is the element of trust in terms of the openness to share of oneself with others. We know from the literature that belongingness is a reliable predictor of engagement with other pursuits at school, including academics even though belonging consistently presents itself as only indirectly related to academic performance per se.

### *Teacher support factor*

- Q33. My teachers give me the help I need with my schoolwork
- Q25. Most teachers help me experience connections across subject areas
- Q28. Teachers speak to me in a respectful manner
- Q11. I feel confident that teachers will support me with my learning
- Q36. Teachers make sure we understand something before going on to new learning
- Q17. My teachers listen to me when I have a problem
- Q8. I feel comfortable asking teachers about things I do not understand

This factor coheres around student's connections with teachers vis a vis their expectations of teacher support with their learning, i.e., making them comfortable to ask for help with understanding, listening to their problems, helping them with schoolwork, and speaking respectfully to them. This factor links to the original dimension evident in the literature that we were seeking, ie. expected learning. While teacher relationships with students are critical to a student's self image and academic optimism we were interested to pursue Osterman's (2000) proposition that there is an undervalued link between teacher support of students and student sense of belonging with peers. Teachers may unwittingly exacerbate the alienation of an underperforming student, especially under current accountability pressures and correspondingly enhance the status of a highly performing student. Thus we sought to examine the impression students had of their connectedness with their teachers, which implicitly involves two kinds of trust - contractual (teachers deliver learning opportunities that are appropriate), and communication relational (they make sure students know that they care about them (Reina & Reina, 1999). The relationship between teacher support and school interest and academic effort is well established (Wentzel, 1997, 1998).

### *Sense of fairness and respect at school*

- Q13. The principal treats students fairly at this school
- Q35. Teachers treat students fairly at this school
- Q37. I trust that the Assistant Principals would listen openly to me
- Q3. I feel safe at school
- Q5. Adults in my community/neighborhood treat young people with respect

“The process of genuine listening fosters a sense of personal esteem for participants and cements their affiliation with each other and the larger institution” (Kramer, Brewer and Hanna, 1996; cited in Bryk & Schneider, 2002, p.23). The items in this construct involve students' expectations of receiving respect, openness of administrators to their perspectives, fair treatment and correspondingly the overall sense of safety. This construct was taken to represent sense of trust in school authority, particularly with respect to the administration. Communication trust and contractual trust are inherent in these items, but the notion of organic trust perhaps too, as adults represent institutional moral authority in their lives.

### *Engagement in community*

- Q38. I contribute usefully to my community/neighborhood
  - Q34. I am a volunteer in my community/neighborhood
- Double load
- Q32. I make it a priority to contribute to my school in a positive way

Volunteer work has been considered a worthwhile enriching experience that promotes good citizenship and an ethic of contribution to the larger society. These items were originally included to test their covariance with other factors. As the best fit model for the CFA clearly includes these two items in association with item 32, they represent an important dimension in the sense of connectedness that students experience through school, or at least an associated manifestation of trust within school as it extends into engagement both throughout and beyond the school community. It is taken as evidence of membership which is trust dependent – trust in shared value and social responsibility.

### *Relatedness of self with school*

- Q32. I make it a priority to contribute to my school in a positive way
- Q43. My school is preparing me well for the world of work
- Q42. At this school I experience a sense of belonging
- Q10. I care about my school
- Q29. This school offers learning opportunities that interest me
- Q14. What I learn in school is relevant to my future
- Q4. It is important to participate in extra-curricular school activities
- Q41. I can succeed in this school

The motivational need for relatedness speaks to the experience of self as worthy, autonomous, and competent (Connell & Wellborn 1991; Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan, 1995). In this factor the situated self is considered in terms of relatedness to the ‘whole school’. “*I make... my school..., I experience..., I care..., ...opportunities that interest me, What I learn...my future, I can succeed ...* . The items in this factor speak to the sense of self at ‘school’. A student’s sense of relatedness with self at school affects self-efficacy, confidence, and the sense of hope. The coupled “I” and “school” statements in each item, allowed participants to make multiple indications of their sense of relatedness between themselves and their school. This factor was the most highly correlated with the other LF suggesting it is distinct. Following a discussion of the academic engagement factor, we present a preliminary statistical analysis that suggest this distinction concerns the embodiment of an identification and internalization phenomenon that is antecedent to the relative propensity toward academic engagement. Students’ sense of relatedness at school is likely to be correlated with intrinsic motivation and sense of autonomy. There is some controversy about the impact of supportive relationships on autonomy. However according to motivational theorists, autonomy does not refer to detachment from others but rather is an individual’s sense of agency or self determination in a social context (Osterman, 2000). The needs for competence, autonomy and relatedness are connected; “the experience of relatedness and mutuality that derives from authentic contact with others appears to play a crucial role in connecting individuals to social tasks and promoting an internalization of valued goals” (Ryan, 1991, p.119).

### *Academic engagement*

- Q20. I apply myself to learning in class
- Q12. I complete my homework
- Q22. I do my best to contribute to group projects
- Q26. I help other students with their learning

This factor involves the students’ active participation in academic pursuits. The coherence of this construct is clear and we know that academic engagement is a reliable predictor of academic success (see Osterman, 2000). We also know that students’ who experience acceptance by peers and teachers are more likely to be interested in and enjoy school and their classes, be committed to their work, have higher expectations of success, and have lower levels of anxiety (Solomon et al., 1996 as cited in Osterman, 2000, p.331). In the next section we present our exploration of the latent factors in the SSCS which seem to be mediating a direct impact on academic engagement.

### *Preliminary path analysis findings*

We were interested to see whether the particular domains within which students experience a relative sense of connectedness could be examined for relationships that might suggest not only covariance but potentially causal links among them. Given adequate internal consistency measures, the number of indicator variables in the model was reduced by

associating the created composite scale for each latent factor (Politis, 2001). As Osterman (2000) has discussed, there is a traditional view that extra curricular involvement provides sufficient opportunities for students to make all important connections with peers that leads them to feel a sense of membership at school. Furthermore, the current spotlight on academic achievement may also be encouraging a perspective that a sense of membership at school is a reward rather than a requirement for academic success.

To test this notion, the first path analysis model explored the latent factors antecedent to students' sense of belonging with peers. Students' sense of relatedness at school appeared to be the mediator of the influence of the other four LFs on sense of belonging (Figure 3). Relatedness of self at school was moved forward (Figure 4) and the model was tested for goodness of fit (PM1) (Table 6). While four of the fit measures are well within the requirement for a good fit, the chi-square value is very high and the high root mean square error of approximation (RMSEA), both indicating the specified model's lack of fit. Since engagement in community was the least correlated with the other LF this was removed to see if this would improve the model fit (PM2). Both the chi-square and RMSEA fit measures increased indicating this was not an improvement on the model (Table 6).

The next model pursued was to explore the influence of five LFs on relatedness of self at school. The common assumption that if students just do their homework and try harder that they will experience a sense of connectedness with their school life, is, in part, tested here. Another reason for testing this model is based on the notion that this factor seems to resonate with a sense of identification with school, a kind of holism, and that perhaps this is likely to be mediated by all the other LFs, including academic achievement. In Figure 5, teacher support and a sense of belonging appear to mediate the influence of the other three factors on relatedness of self at school, and so these were brought forward to test the model (PM3) in Figure 6. Apart from two adequate fit measures, this model was overall a poor fit (Table 6). Removing the engagement in community factor also did not improve the model.

As academic engagement has been established as a reliable predictor of student success (Osterman, 2000), a further model was tested by positioning five of the composite LFs as antecedent to the academic engagement factor (Figure 7). The findings suggest that students' sense of relatedness at school mediates the influence of the other four LFs on academic engagement. The relatedness of self at school was brought forward and the model tested for goodness of fit (PM4) (Figure 8). While four of the fit measures are within the requirement for a good fit, the chi-square value and the RMSEA are both high, indicating the specified model's lack of fit (Table 6). Since engagement in community was the least correlated with the other LF this was removed to see if this would improve the model fit (PM5)(Figure 9). For this model (PM5), the chi-squared was lowered considerably, though not to the required less than 3 as desired, but all other fit measures improved, with the RMSEA within the range of a fair fit (Table 6). From the preliminary path analyses, the best model at this time is viewing teacher support, belonging with peers and sense of fairness and safety at school culminating their influence on academic engagement through their ability to develop students' sense of relatedness at school (PM5).

Table 6: Goodness of Fit Indices for preliminary path analysis models of SSCS

Model	$\chi^2/(df)$	AGFI	NFI	CFI	TLI	RMSEA	Model Description
PM1: (figure 4)	15.33	.91	.98	.98	.92	.11	Teacher support, fairness and safety at school, engagement in community, and academic engagement directly mediate relatedness of self with school, which then is antecedent to sense of belonging with peers
PM2	18.43	.90	.98	.98	.93	.13	PM1 with engagement in community removed
PM3: (Figure 6)	57.23	.70	.90	.90	.70	.23	Fairness and safety at school, engagement in community, and academic engagement directly mediate teacher support and belongingness, which are antecedent to relatedness of self with school.
PM4: (Figure 8)	21.04	.87	.97	.97	.89	.14	Fairness and safety at school, engagement in community, teacher support and belongingness, directly mediate relatedness of self with school which is antecedent to academic engagement
PM5: (Figure 9)	5.68	.97	.99	.99	.98	.07	PM4 with engagement in community removed

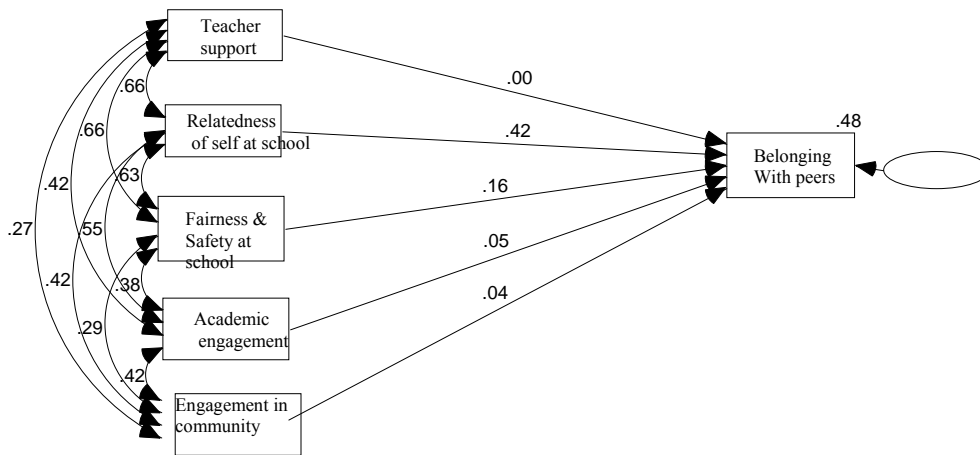


Figure 3: Five LFs antecedent to a sense of belonging with peers

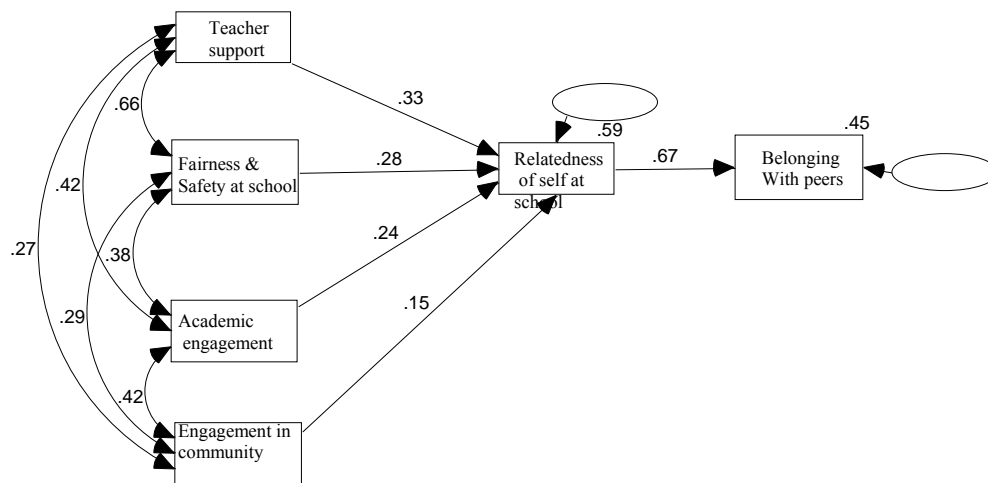




Figure 4: PM1 to test for the influence of teacher support, fairness and safety at school, academic engagement and engagement in community on belonging with peers being mediated by relatedness of self at school.

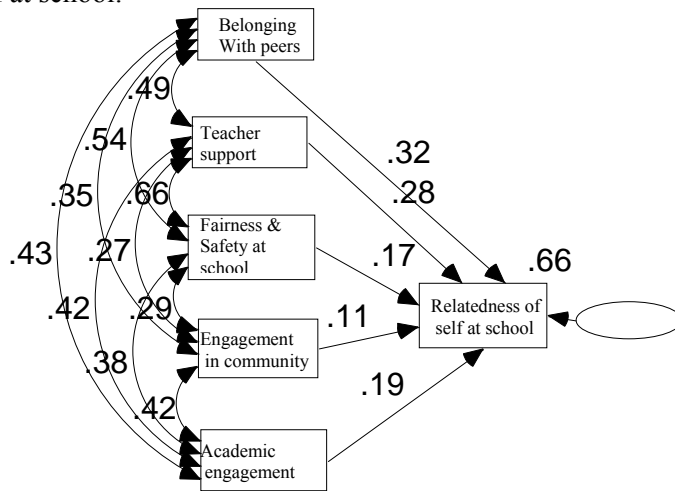


Figure 5: Five LFs antecedent to relatedness of self at school

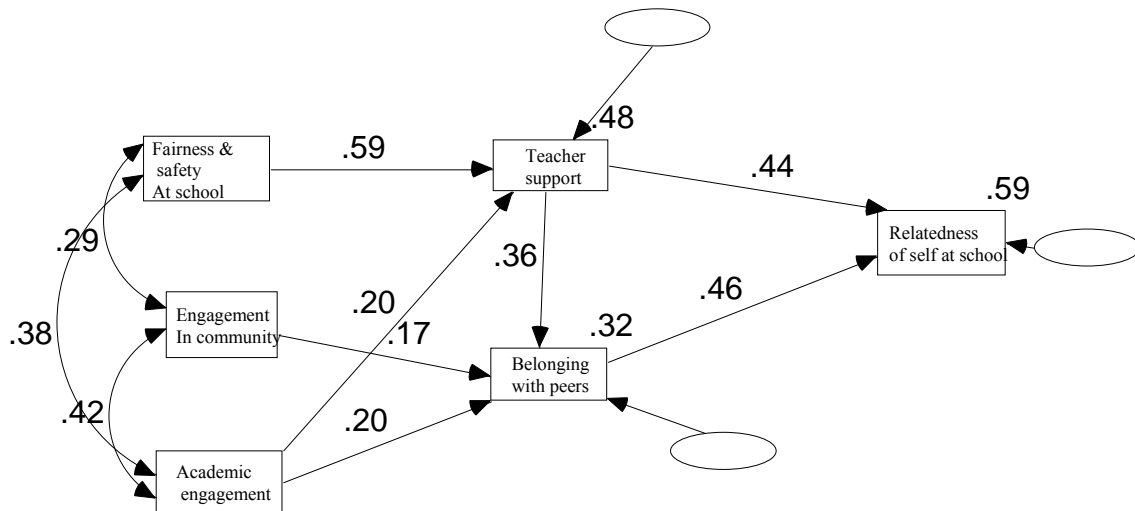


Figure 6: PM3 for the influence of fairness and safety at school, engagement in community and academic engagement on relatedness of self at school through the mediating influence of teacher support and sense of belonging with peers.

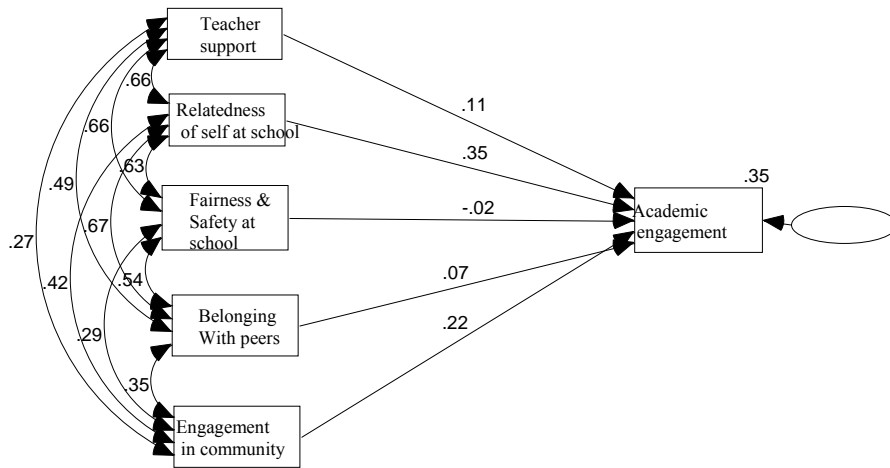


Figure 7: Five LFs antecedent to academic engagement

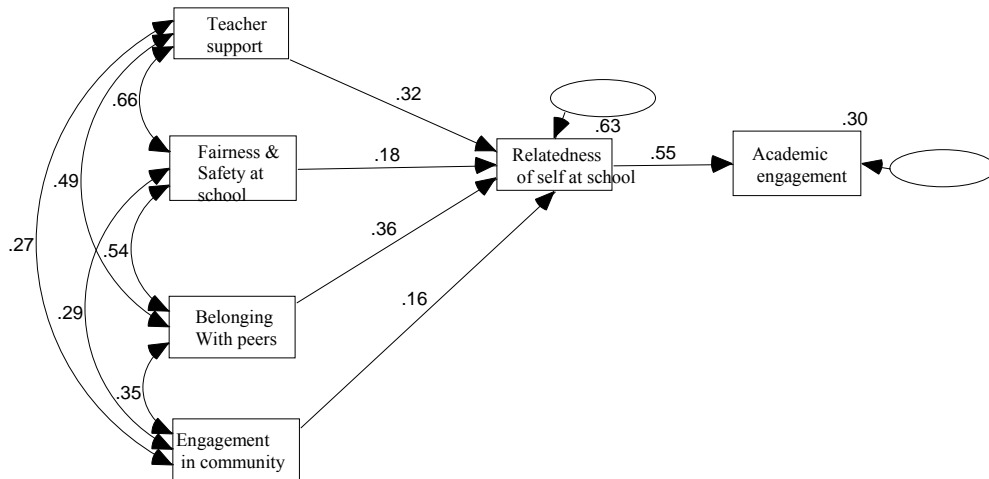


Figure 8: PM4 for the influence of fairness and safety at school, engagement in community, teacher support and belonging with peers on academic engagement through the mediating influence of relatedness of self at school.

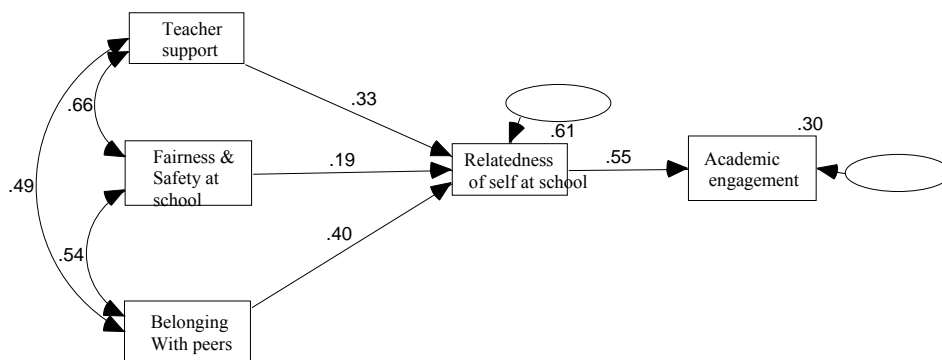


Figure 9: PM5 for the influence of fairness and safety at school, teacher support and belonging with peers on academic engagement through the mediating influence of relatedness of self at school.

### Construct measures and student sense of failure: practical implications

A comparison for each of the six measures between those students who indicated they had passed all their subjects in the previous year with those who indicated they had not provided a kind of validity test of the instrument. For all six construct scores significant differences were evident, and interestingly, the smallest difference concerned level of perceived teacher support (Table 7) and this construct was among the highest scoring (Figure 10). Apart from academic engagement and engagement in the wider community, the next largest difference between these two groups was a sense of fairness and safety. This construct relates, in part, to the students' trust that school administrators (principal and assistant principals), would be fair and listen openly to them. The scores for this construct were also among the lowest. Practically speaking, for these schools as a whole, the focus areas of concern might be interpreted to be about improving the relationship between students and the administration, and with the wider community, and less so on relationships between teachers and students.

Table 7 Comparison of construct measures with student sense of failure

	t-test for Equality of Means (df=1092)		
	t	Sig. (2-tailed)	Mean Difference
relatedness of self at school	5.15	.000	.18
engagement in the wider community	6.31	.000	.31
academic engagement	9.63	.000	.33
belonging with peers	5.59	.000	.17
teacher support	2.43	.015	.08
Fairness and safety in school	5.37	.000	.20

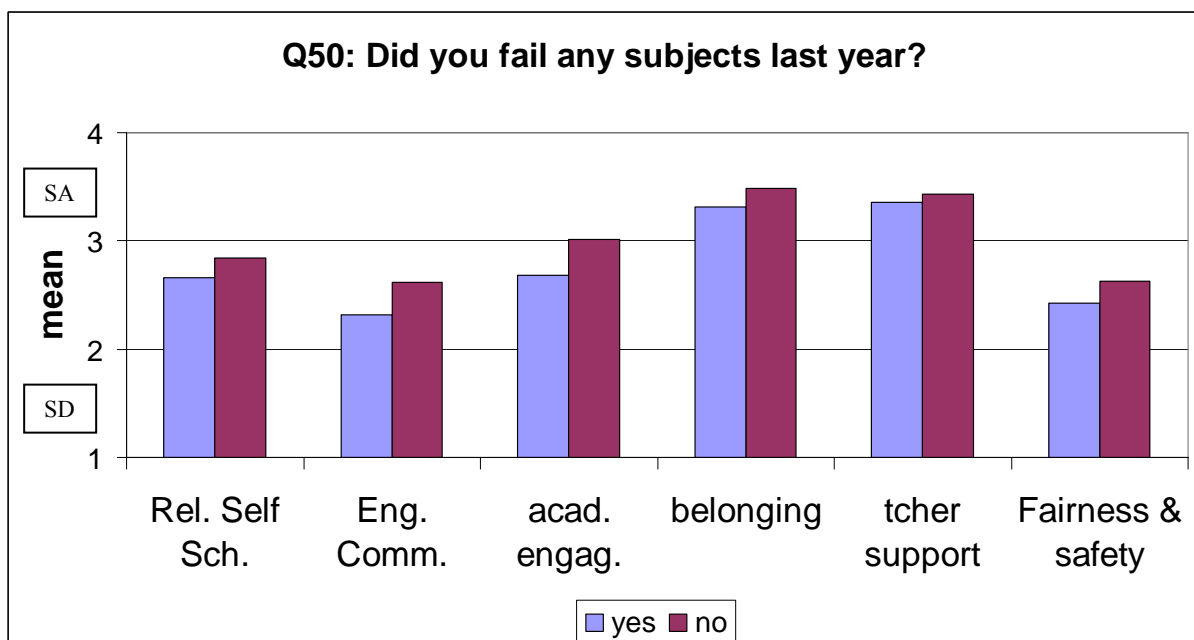


Figure 10 Construct measures and student sense of failure

## Discussion

Following the revision of the SSCS as a result of descriptive analysis and EFA, the factor structure derived from the confirmatory factor analysis of the original 31 item, six-factor model (M1) indicated that a representation of school connectedness in the context of items that load on only a single factor is difficult to substantiate entirely. It would seem that school connectedness is representative of a set of interrelated constructs that demonstrate associations at the school, teacher, peer and community levels. The proposed five-factor model that did not include the engagement in community factor, yielded lower fit indices compared to the six factor model indicating that engagement in community is relevant to school connectedness. Accordingly, CFA for M3 with targeted items to load on more than one latent factor produced fit statistics that were approaching or above accepted values, based on current interpretations (e.g., Comrey et al., 2000; Kowolski & Crocker, 2001; Vandiver & Worrell, 2002). It is rare that in multiple item measures that an individual item will always be a pure indicator of a latent construct. It is acknowledged that test developers endeavour to meet this goal. In reality, many items are representative of latent constructs that share variance of a higher order construct such as school connectedness. As a result of both logical analysis of the standardized estimates and comparison of the CFA data, we propose that at this stage of the measure's development, M3 provides the most parsimonious representation of school connectedness as measured by the SSCS.

It is acknowledged that the generation of models of many educational and psychological attributes that fully satisfy CFA fit index criteria is a difficult procedure, and only recently becoming common practice in the development of educational measures (e.g., Vandiver & Worrell, 2002). The current CFA of the SSCS contributes to the establishment of a valid model of school connectedness. This model will provide a foundation to support both the evaluation of existing phenomenological representations of this construct and the more intricate process of educational theory development in the area of student outcomes from involvement in the school process.

The results of the preliminary path analysis, assist in bringing into focus the critical antecedent role of the need for connectedness- with peers, teachers and the self as a member of the whole school - relative to academic engagement. Furthermore, a sense of trust was implicit across the located factors suggesting that trust is an integral component of the domains in the lives of students' at school. The findings are consistent with Rovai (2002), who found that in the development of the Classroom Connected Scale, trust items and the items associated with learning did not separate as latent factors. When students are learning, they do need to trust that when they enter their zone of proximal development (Vygotsky, 1978), they will not be shamed by their lack of understanding. From this frame of reference it would seem not unexpected that these items could be associated with the same factor. Our findings suggest the need to revisit the foundational role of connectedness generally and trust and belonging particularly, as foundational to capacity building for greater success in schools, particularly with respect to the role of principals and assistant principals. Supporting and extending from the work of others that has featured trust among faculty, and relatedness and connection among peers, this study contributes a particular focus on the student-teacher and student-administration relationships and how they contribute to students' sense of connectedness at school.

In the future, the instrument will be further theorized drawing on the various demographic data, and refined with additional data collection that will attempt to bring in the key role of parents and community members and other authority figures such as police as part of a constellation of significant others associated with students' sense of connectedness with school.

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