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Measuring Social Capital: The Development of the Social Capital and Cohesion Scale and the Associations between Social Capital and Mental Health

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ABSTRACT

Over the last two decades, social capital has received increasing attention in the international literature. Despite the popularity of the construct, problems concerning definition, theoretical conceptualisation, and measurement continue to plague research and policy in this area. This investigation aimed to address this gap by developing a new social capital instrument to test the theorised nature of the construct. Utilising a sample of 1371 young Australians living in disadvantaged communities, the newly developed Social Capital and Cohesion Scale (SCCS) combined the commonalities in the current theoretical conceptualisations of social capital defining it as a multi-level, multidimensional construct consisting of trust and reciprocity across family, peer, neighbour, and institutional networks. To test the convergent validity of the scale, relations with mental health were also examined. Confirmatory factor analysis results demonstrated that the SCCS was a valid and reliable multidimensional scale, which was invariant across both regional and gender groups. Correlational analysis demonstrated that associations with depression, anxiety, and stress were consistent with past research thereby strengthening the validity of the SCCS measure.

INTRODUCTION

Over the last two decades, the concept of social capital has gained increasing attention across a wide array of disciplines and has engendered considerable research and debate in both political and social science arenas. Proponents of social capital claim that the benefits of the resource are far reaching, and have the potential to make us "smarter, healthier, safer, richer, and better able to govern a just and stable democracy" (Putnam, 2000, p. 290). It is thought that the value of social capital lies in an individual's social networks and the reciprocities and feelings of trust that arise from them, allowing people to access not only their own resources but also the resources of those to whom they are connected (Field, 2008). However, despite the increased interest in the notion of social capital, the measurement of the construct remains elusive as there is little consensus regarding: an accepted definition of the construct, a theorised conceptualisation of its structure, its relation to other variables, and how best to measure it (Stone, 2001). These ongoing problems continue to impede the application of the social capital in applied settings as theory, research, and practice are inevitably intertwined and any deficit in one area results in a deficit in another.

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Methodological Limitations

Two enduring problems seem to hinder the progression of theoretical advancement and empirical research in the area. Firstly, the definition of social capital remains "conceptually vague" (Sabatini, 2009, p. 431). For example, Coleman (1990) defined social capital as "aspects of the social structure that facilitate certain actions of the individuals within that structure" (p. 302). This definition is too vague to inform theory and instrument development as it encompasses reference to an endless variety of constructs, making empirical testing difficult. More recent definitions view social capital as multifaceted, but these definitions are often varied. For example, according to the OECD, social capital consists of the "networks, norms, values, and understandings that facilitate co-operation within or among groups" (2001, p. 4). The World Bank focuses on social cohesion and describes it as "the internal social and cultural coherence of society, the norms and values that govern interactions among people, and the institutions in which they are embedded" (Grootaert, 1998, p.iii). In addition, Putnam (2000) has defined social capital in terms of trustworthiness and reciprocity that are situated within social networks, enabling communities to collectively resolve common problems and achieve common goals.

A commonality amongst the diverse definitions of social capital is reference to social relations that have productive benefits, although the proposed elements of social relations underpinning such benefits are diverse (e.g., informal networks, political participation, cultural norms, and common values). As such, which aspect of social capital is beneficial to which outcome remains poorly theorised and largely unknown (Sabatini, 2009). Furthermore, research has tended to focus on selected aspects of social capital whilst excluding others that may be equally important. As a consequence, there is an array of measurement tools available but little commonality among the wording of items and the constructs measured.

Advances in social capital research imply that social capital is a multi-dimensional construct (Putnam, 2000; Woolcock, 1999), with bonding, bridging, and linking social capital being most commonly discussed in the literature. *Bonding* social capital refers to the social ties and networks within homogeneous groups in a community (Terrion, 2006). *Bridging* social capital refers to connections and ties across diverse, heterogeneous social groups (Terrion, 2006). *Linking* social capital is similar to bridging social capital but occurs across power hierarchies when individuals forge relations and alliances with individuals in positions of power in order to access resources and opportunities from formal institutions beyond their immediate social group. (Woolcock, 2001). These might include relationships across individuals and government, service providers, employers, and schools. According to Schneider (2004), it is vital for communities to develop all three types of social capital in order for positive outcomes to ensue. Similarly, Woolcock (2001) emphasised the important role that linking capital plays in providing communities with access to resources, jobs, advice, and further education, whereas bonding and bridging capital provide communities with networks, psychological and emotional support, and information sharing.

The second main difficultly hindering the progression of social capital research stems directly from the first. The problems in finding common definitional factors then extend to the operationalisation and measurement of the construct. As discussed, most existing definitions are imprecise and are not theorised adequately enough to enable the operationalisation and development of empirical measures to test the structure of the social capital construct. This has led to a rather vigorous debate where researchers and policy makers are divided on whether social capital can be measured and if so, how to measure it. For example, Fukuyama (2001, p. 12) concluded "one of the greatest weaknesses of the social capital concept is the absence of consensus on how to measure it". Similarly, Stone (2001, viii) has emphasised that "the increasingly central role that social capital plays in Australian public policy has fuelled demand for empirical understandings of it, yet demand for empirical measures of social capital exceeds supply".

Collier (2002) has contended that it is difficult or even impossible to measure social capital directly as the construct is abstract and subjective. In contrast, other researchers argue that it is possible to measure both social capital and its impact (Grootaert & Van Bastalaer, 2002; Onyx & Bullen, 2000). Throughout the literature, much of the criticism aimed at the existing measures is the

difficulty in separating the source, form, and consequences of social capital. There has been a tendency in past research to use outcomes of social capital (e.g., depression levels, educational retention, teen pregnancy rates, and criminal activity) as indicators of it, which will inevitably lead to the finding that social capital is related to that outcome, without the empirical means to explain why this is so (see Stone, 2001).

Stone and Hughes (2002) have argued that if the concept of social capital is to be useful theoretically, empirically, and socially, then four key principles must be followed to avoid a host of problems associated with the measurement of social capital: 1) social capital measurement needs to be theoretically informed; 2) social capital needs to be viewed as a resource for collective action and assessed as to whether or not it generates desirable social and economic outcomes; 3) social capital needs to be theorised as a multidimensional construct; and 4) it needs to be recognised that social capital will vary depending on network type and social scale under examination (i.e., family, community, societal). Essentially what is needed to advance knowledge in the area of social capital is to move away from single item indicators and develop a set of consistent indicators that can be used to draw conclusions across research studies which are applicable for use with individuals of varying ages and diverse cultural groups.

The Associations between Social Capital and Mental Health Outcomes

Although a myriad of constructs have been investigated in association with social capital, the relations between mental health and social capital appear to be the most consistent in the literature therefore making it the most useful to test the convergent validity of the new measure. Although the literature pertaining to social capital and mental health is quite extensive, only a brief overview will be given here due to word limitations (for a more detailed review see McKenzie & Harpham, 2006; De Silva, McKenzie, Harpham, & Huttly, 2005). The majority of research has demonstrated that increased stores of social capital can be advantageous for mental health outcomes in children, adolescents, and adults living in both privileged and underprivileged communities (De Silva et al., 2005; Drukker, 2003; Stevenson, 1998). Furthermore, previous research studies have found a strong positive relation between social capital and mental health, even after controlling for poverty (Aldridge et al., 2002). Wilkinson (2002) argues that social relationships serve as a buffer against stress, daily hassles, illness, and depression by providing support, care, and assistance. Additionally, high levels of social capital can create feelings of well-being and belonging, whereas the absence of such capital can lead to isolation, despair, and depression (Brown & Harris, 1978).

In support of these views, a study by Aneshensel and Sucoff (1996) found that youth living in disadvantaged communities were significantly more likely to suffer from depression, anxiety, and behavioural disorders. However, when perceived levels of social capital and cohesion among residents were included into the analysis there was a clear negative relation between depression and social cohesion within these poorer neighbourhoods. Aneshensel and Sucoff concluded that building strong social ties within low SES communities can improve mental health outcomes for adolescent residents. These findings were also supported within the Australian research setting where, within an rural east-coastal town, Berry (2009) found that for a small sample of Indigenous Australian (n=84), New Australians (n=138), and Other Australian (n=743) adults, varying measures of community participation (e.g., social connectedness) and personal social cohesion (i.e., belonging, reciprocity, and trust) were negatively associated with feelings of distress, and positively associated with happiness across all participant groups. The importance of these findings (although from a limited demographic) should not be understated not only with regards to social capital's strength across cultural groups, but also that social capital may be powerful mechanism for community members who may be from an often cited disadvantaged status (namely Indigenous Australians), especially with regards to mental health outcomes (Hunter, 2013).

While there have also been studies that have failed to identify the positive relations between social capital and mental health (e.g., Carlson & Chamberlain, 2003), it may be due to the level in which social capital was measured. In fact, one of the most common areas of contention within the literature is the level at which to measure social capital. In the past it has been measured at the individual, family, community, state, and even at the national level. However, it appears logical to

assume that different types of social capital are more advantageous to some outcomes than others at different levels. The current research contributes to this multilevel perspective by measuring social capital simultaneously at the family, peer, neighbour, and community/institutional level, and investigated how these levels relate to mental health. Based on a review of the literature, close social ties with family members seems to be the most effective type of social capital in ensuring good mental health. For example, after reviewing the literature Aldridge et al. (2002) concluded that bonding social capital at the individual level is the most important determinant of reducing stress reactions in participants. Stevenson's (1998) results also showed that when teens had high levels of family social and emotional support, there was no significant differences in depressive symptoms between low and high social capital neighbourhoods. It is therefore anticipated that when investigating the associations between mental health and the factors of the newly developed SCCS scale, the family factor should hold the strongest negative associations with levels of depression, anxiety, and stress.

The Present Investigation

The overarching goal of this investigation to develop a psychometrically sound measure of social capital and further contribute to the formation of knowledge about the role it serves within the social environment. Specifically, the primary aims of the study were to: 1) develop a new multidimensional measure of social capital that accurately quantifies the extent of bonding, bridging, and linking capital an individual possesses; 2) test the psychometric properties of the new measure based on confirmatory factors analyses, tests of reliability, and invariance, and 3) establish the convergent validity of the new measure by examining the associations between the Social Capital and Cohesion Scale factors and mental health constructs.

METHOD

Participants

Participants were a purposefully selected sample of students living in two communities in New South Wales, Australia. The total sample comprised of 1371 male (n = 840) and female (n = 531) secondary students with ages ranging from 12 to 17 years, attending one of the four government schools sampled. With the exception of those not providing consent (< 3%), all students from each year group (Years 7 to 12) were surveyed with slightly larger numbers in the lower secondary years (Years 7 and 8) than the upper (Years 11 and 12) across the four schools surveyed. The sample also comprised a range of cultural and linguistic backgrounds, as well as a representative gender mix. There were large cultural and locality differences between the two communities. The first community (Community 1) is located in a beach side rural town within New South Wales with primarily Caucasian residents, whereas the second (Community 2) is located in a major metropolitan Australian city and is made up predominantly of residents from a non-English speaking background. All participants were treated in accordance with the Australian Psychological Society's ethical guidelines.

Materials and Instrumentation

The Social Capital and Cohesion Scale (SCCS).

This scale was specifically developed for the purposes of the current study. In developing the SCCS, a construct-based scale construction approach was adopted (Jackson, 1970), with the aim of developing a measure that was theoretically grounded with high validity and internal consistency. As social capital is hypothesized to be a multidimensional construct it was also an aim to develop a number of factors that measured the theorised dimensions of social capital whilst minimising the overlap between factors to ensure scales had good discriminate validity. Item selection began by generating items for each of the proposed facets of social capital. Based on the theory and recommendations found in the current literature (see Stone, 2001; Stone & Hughes, 2002) these factor items were created to assess participant networks that reflected both the types (trust, reciprocity) and levels of social capital (family, friends, neighbours, institution). This resulted in eight first order factors and the possibility of four higher order factors.

The four potential higher order factors were named Family, Peer, Neighbour, and Institutional social capital to reflect the different levels in which social capital operates. As shown in the literature,

almost all current definitions of social capital view it as a multidimensional construct including both trust and reciprocity as important functions of building and maintaining an individuals' social capital (Putnam, 2000). Therefore, under each higher order factor, there were two first order factors labelled Trust and Reciprocity (see Figure 1). An initial pool of 36 variables were selected using items from existing measures of social capital as well as the creation of new items. All items were positively worded and responses were measured on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

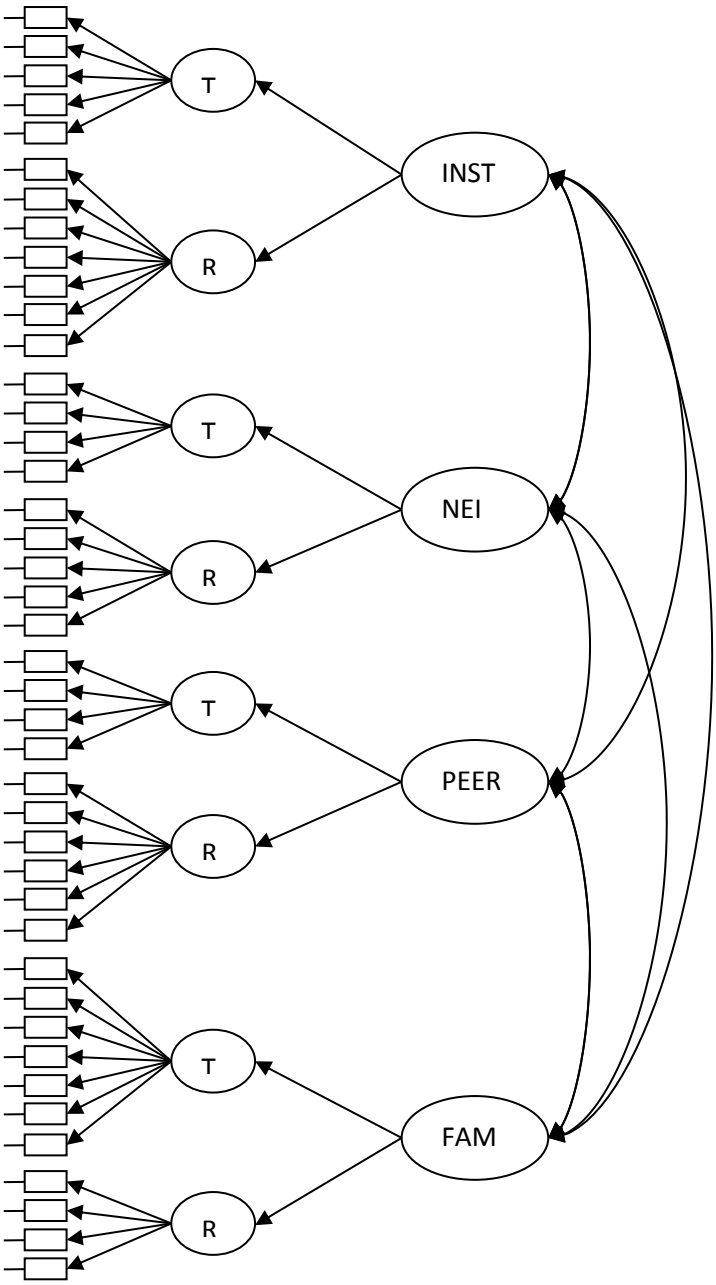

Figure 1: Pictorial representation of the initial Social Capital and Cohesion Index (SCCI).

Note. T = Trust, R = Reciprocity, FAM = Family SC, PEER = Peer SC, NEI = Neighbour SC, INST = Institutional SC.

Depression, Anxiety, and Stress Scale (DASS-21).

The DASS-21 (Lovibond & Lovibond, 1995) measures three factors consisting of Depression, Anxiety, and Stress, each containing seven items. The Depression scale assesses dysphoria, lethargy, despondency, self-deprecation, disinterest, and a lack of positive affect, with items such as "I felt I wasn't worth much as a person". The anxiety scale measures: "somatic subjective symptoms of fear...autonomic arousal, skeletal musculature effects, and situational anxiety" (Bados, Solanas & Andres, 2005, p. 679) and includes items such as "I felt I was close to panic". The stress scale assesses levels of continual tension and arousal, impatience, overreaction, and excessive irritation or agitation. The Stress scale contains items such as "I tended to overreact to situations". Participants indicate their responses with reference to their experiences over the past week on a four-point Likert scale from 0 ("did not apply to me at all") to 3 ("applied to me very much or most of the time").

The factor structure and reliability of the DASS-21 have been evaluated in both clinical and non-clinical samples and have consistently exhibited good psychometric properties for both diagnostic and research purposes (Antony, Bieling, Cox, Enns, & Swinson, 1998). Reliability estimates for the Depression, Anxiety, and Stress subscales range between .84 and .94 for the Depression factor, .70 and .87 for the Anxiety factor, and .82 and .93 for the Stress factor (Antony et al., 1998; Babos et al., 2005; Crawford & Henry, 2003).

Procedure

Ethics approval was sought and subsequently obtained from the University of Western Sydney Human Ethics Committee and the New South Wales Department of Education and Training. Government schools were invited to participate via email and principal permission was obtained during face to face information sessions. On the day of the data collection, students with parental consent were instructed verbally of the purpose of the study, of their voluntary and anonymous participation, and their right to withdraw at any time without penalty. Signed student consent was also obtained prior to the commencement of the study. To overcome any reading or language difficulties, the questionnaires were read aloud to secondary school students in their year groups by a trained researcher. This took place in the school hall and the process was repeated throughout the day for each of the five year groups. To replicate the conditions as closely as possible the same researcher read the questionnaire items to each year group. Other research assistants were present throughout to answer any questions or address any concerns. The survey took approximately 25 minutes to complete.

Statistical Analyses

Reliability Analyses. Reliability analyses, using Cronbach's alpha, was conducted for each of the subscales in the instruments utilised in the present study using SPSS 17.0. Although no universal consensus regarding acceptable reliability values currently exists, the general practice of considering internal consistency reliability estimates above .70 as acceptable (see Tabachnick and Fidell, 2007) was adopted in the current research.

Confirmatory Factor Analysis (CFA). A CFA was conducted to validate the factor structure of each instrument using PRELIS and LISREL 8.72 (Joreskog & Sorbom, 2004). In evaluating the model fit, the Root-Mean Square Error of Approximation (RMSEA); the Tucker Lewis Index (TLI); and the Comparative Fit Index (CFI) were emphasised as currently recommended (e.g., Byrne, 2001; Holmes-Smith, 2000; Marsh, Balla, & Hau, 1996). For the RMSEA, conventionally values below .050 represent excellent fit and values up to .070 -.080 indicates acceptable errors of approximation (Holmes-Smith, 2000, Steiger, 2007), however, it must be acknowledged that others have contested the utility of using these fixed cut-off values (see Chen, Curran, Bollen, Kirby, & Paxton, 2008 for a discussion). For the TLI and CFI, values greater than .95 indicative of excellent fit, and values greater than .90 are indicative of good model fit (Schumacker & Lomax, 1996).

Invariance Testing. The invariance testing involved the examination of a succession of five logically structured and increasingly stringent models whereby any one, or set, of parameters is held invariant across groups (Byrne, 2004). Changes in the goodness-of-fit indices were examined to determine whether the factor structure was invariant across the groups of interest. Cheung and Rensvold (2002) suggest changes in the CFI statistic between the models should ideally not exceed .01

to meet the requirements of factorial invariance across groups. Although there is some controversy surrounding the minimum conditions for invariance, Byrne and others (1998; 2001; Cheung & Rensvold, 2002) argue that generally speaking, the minimal requirement for factorial invariance is equivalent factor loadings across groups, which was used as the criteria for an acceptable level of invariance in this study.

RESULTS

Factor Structure of the SCCS

The initial CFA based on the factor structure shown in Figure 1 resulted in a poor fitting model with a RMSEA of .082, and a CFI and TLI of .92 (Chi-square = 7657.71, df = 750). An additional problem was the lack of discriminant validity evident between the trust and reciprocity first order factors within each of the higher order factors. Within-factor construct correlations varied from .84 to .99 indicating that the two first order factors (trust and reciprocity) were largely indistinguishable, and as recommended by Byrne (2001) should be collapsed into a single factor. In contrast, correlations between unrelated first order factors (e.g. Family Trust & Peer Trust) indicate the measurement of distinct constructs across the four levels of social capital and were therefore retained in the subsequent analyses. Collapsing all Trust and Reciprocity first order factors into a single factor, resulted in a four factor model measuring Family, Peer, Neighbour, and Institutional SC. All original items were retained and the CFA was rerun using the revised structural model.

The revised model produced less than optimal fit indices when the second CFA was run. The RMSEA was .084 thereby exceeding the acceptable level of .80 (Holmes-Smith, 2000) and the CFI and TLI, whilst considered acceptable at .92 (Schumacker & Lomax, 1996) is not indicative of an excellent fitting model. Examination of the modification indices, factor loadings, and squared multiple correlations (R^2) indicated 11 problematic items. Nine of these items had low factor loadings, R^2 scores below .50, and relatively high modification indices in the theta epsilon matrix. As a result all nine were deleted from the instrument. Two further items in the Family factor were particularly problematic showing extremely high modification indices ("I trust my family to do what is best for me" and "I can tell my family anything"). It is probable that the wording of the first item was somewhat ambiguous or "double barrelled" as it possible that a respondent may trust their family but not believe that their family always do what is best for them. The latter item may have been overly general and naming specifics (i.e. "I can talk to my family about problems at school") may be more beneficial in the future. These two items were also excluded from further analyses. The remaining 25 items were then analysed in a third CFA. The results of the third CFA indicated an excellent fitting model with an RMSEA of .050 and a CFA and TLI of .98. All factor loadings were positive and significant, and exceeded values of .45. All item squared multiple correlations were greater than .50 with the exception of two items with loadings below .30 ("I am always happy to help my family" and "I depend on my friends when I am upset"). It is likely that the qualifier "always" in the first item is too absolute. That is, very few things in life can be so definitive, as there are usually exceptions to any proposition. The second item could be interpreted as depending *only* on one's friends when upset, thereby excluding other important social networks such as family members. Both items were subsequently deleted from the instrument as advised by Hills (2011).

This resulted in a total of 23 items measuring the four levels of social capital in the final SCCS instrument. An additional six items, measuring two factors (School Belonging and School Isolation) adopted from the Program for International Student Assessment (PISA) survey (2003) were also integrated in to the SCCS model, to assess students' connectedness with their school as a sense of cohesion within the school/community is often used synonymously with social capital (Worldbank, 1999; OECD, 2001). The final instrument contained a total of 29 items, arranged into six first order factors (see Figure 2). As shown, the final scales consisted of: Family Social Capital (e.g., "I trust my family"); Friends Social Capital (e.g., "I can depend on my friends for help when I need it"); Neighbour Social Capital (e.g., "My neighbours would help me in an emergency"); Institutional Social Capital (e.g., "I'm happy to work with people in my community to improve it" and "the police in my local area are trustworthy"); School Belonging (e.g., "My school is a place where I feel like I

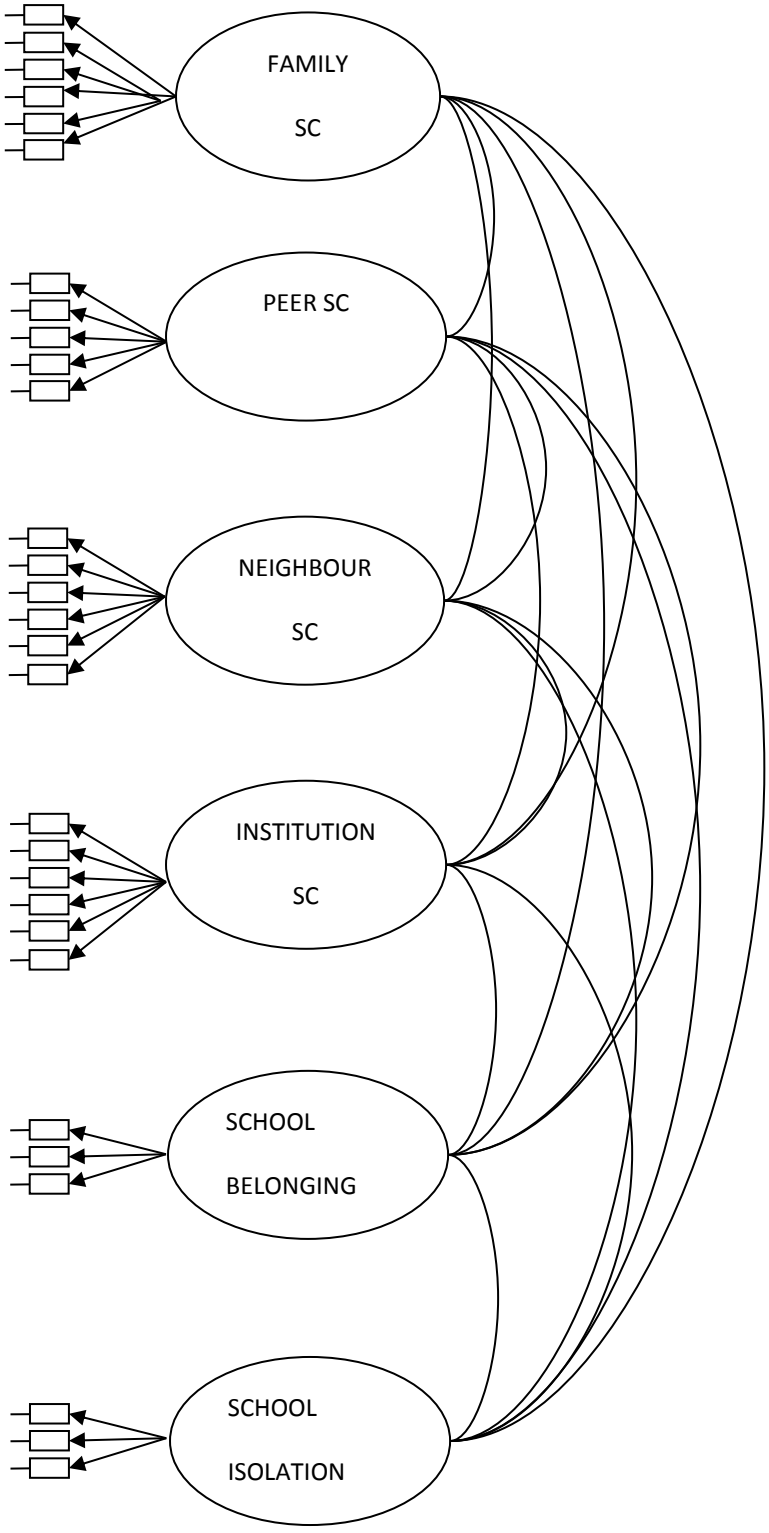

Figure 2: Pictorial representation of the final Social Capital and Cohesion Index.

Note. SC = Social Capital

belong"); and School Isolation (e.g. My school is a place where I feel lonely"). The psychometric strength of this final model was tested in the remaining analyses.

Psychometric testing of the final SCCS model

Factor Structure: Results from the first-order CFA examining the six factor model (Family SC, Friends SC, Neighbours SC, Institutional SC, School Belonging and School Isolation) are presented in Table 1. The hypothesised model demonstrated an excellent fit to the data with a TLI and CFI of .98, and a RMSEA of .042. The factor loadings for each individual item indicate that all six factors are well defined with acceptable values ranging from .46 to .81. Table 1 also presents the correlations among the six factors of the SCCS. All correlations between factors were significant ($p<.001$) and ranged from -.41 to .60, providing further support for the model consisting of six distinct factors. Due to the relatively low to moderate correlations between the factors, it was not deemed necessary to conduct a higher-order CFA.

Reliability

For the total sample, all scales showed acceptable Cronbach alpha values ranging from .70 to .89 (see Table 2). The reliability estimates for males ranged from .71 to .89, with males being higher than females on the Family, Peer, Institution, and Belonging social capital subscales. Cronbach alphas for females ranged from .68 to .90, showing higher reliabilities for females on the Neighbour and Isolation social capital scales. Reliability estimates for Community 1 residents were all acceptable (.77 to .89) and alphas for Community 2 residents ranged from .68 to 89. Despite the good to excellent reliabilities for most of the scales and samples, the female and Community 2 residents' reliability scores on the Institution subscale fell just below the traditionally accepted level of .70 (.68; Hills, 2008).

Invariance Testing

Gender. Model 1(completely free) showed an acceptable fit to the data, with fit indices > .95 and a RMSEA of .065 (χ^2=2834.12; df =726), supporting the hypothesis of a similar overall factor structure for both males and females. In Model 2, when the factor loadings were held invariant, there was no change in the CFI and TLI and a minimal change in the RMSEA (.002; χ^2 =3020.33; df=749). Similar results were obtained in Model 3, when the factor variance/covariance parameters were also constrained, again producing very little change in the fit indices (CFI & TLI=.95; RMSEA=.068; χ^2=3185.48; df=770). When the factor uniqueness (i.e., error terms) parameters were also held

Table 1: Confirmatory Factor Analysis Results for the Social Capital and Cohesion Index

	Family SC	Peer SC	Neighbour SC	Institution SC	Belonging SC	Isolation SC
Items			Factor Loadings			
1	.63	.79	.80	.47	.77	.79
2	.81	.67	.81	.55	.71	.59
3	.81	.71	.81	.47	.73	.73
4	.76	.68	.71	.67	-	-
5	.77	.61	.68	.46	-	-
6	.67	-	.71	.59	-	-
Factor Correlations						
Family	--					
Peers	.48	--				
Neigh	.32	.35	--			
Institution	.42	.47	.60	--		
Belonging	.33	.44	.46	.49	--	
Isolation	-.31	-.26	-.20	-.19	-.41	--
Model Fit						
N	χ^2	df	TLI	CFI	RMSEA	
1371	1231.12	362	.98	.98	.042	

Table 2: Reliability Estimates (α) for the Social Capital and Cohesion Index: For the Total Sample and Gender and Regional Groups.

	Total Sample (N=1371)	Males (n = 840)	Females (n = 531)	Comm1 (n=478)	Comm2 (n=893)	No. of Items
Family SC	.87	.89	.86	.86	.88	6
Peers SC	.82	.80	.79	.85	.80	5
Neighbour SC	.89	.88	.90	.89	.89	6
Institution SC	.70	.71	.68	.78	.68	6
Belonging	.78	.79	.75	.78	.78	3
Isolation	.74	.72	.77	.77	.72	3

invariant with the factor loadings in Model 4, the TLI deteriorated slightly (.01), however there was no change in the CFI (.95) and RMSEA (.068; χ^2=3411.49; df=777). In Model 5, full constraints (loadings, variances/covariances, and uniqueness) were placed on all parameters and the CFI lowered by .01, but did not exceed it (CFI & TLI=.94; RMSEA=.069; χ^2=3411.49; df=798), therefore just meeting the criteria for a fully invariant model across gender.

Region. The original free model showed an acceptable fit to the data with a CFI of .95, a TLI of .95 and an RMSEA of .067 (χ^2=2943.10; df =726), providing support for the hypothesis that a common six-factor model exists for both regional groups. In Model 2, imposing equality constraints on the factor loadings showed negligible changes in the fit indices (CFI & TLI=.95; RMSEA=.068; χ^2=3088.20; df =749), thereby satisfying the minimal requirement for factorial invariance across the two groups (Byrne, 2001). Imposing additional constraints on the factor variances/covariances in Model 3 produced a .007 change in the TLI, a small change in the RMSEA (.003), and a change of .009 in the CFI indices (χ^2=2834.12; df =726). However, as the change in the CFI did not exceed the .01 criteria, the third model can also be considered invariant. In Models 4 and 5, where the factor uniquenesses were constrained, the goodness-of-fit-indices deteriorated further with the CFI exceeding a .01 change from the baseline model, and therefore this aspect of the model cannot be considered invariant. However, as the model did meet the minimum requirement for structural invariance, it can be concluded that the SCCS is invariant across regional groups.

Relations between Social Capital and Mental Health

Examination of the correlations between the factors of the SCCS and Depression, Anxiety, and Stress revealed that the four types of social capital (Family, Peer, Neighbour, and Institutional), along with sense of School Belonging, were all negatively and significantly ($p < .001$) associated with Depression, Anxiety, and Stress (see Table 3). Of these relations, the strongest associations were found between Family social capital and the three mental health outcome factors. In contrast, School Isolation was not significantly associated to the three mental health outcomes suggesting that greater isolation one feels at school is not related to depression, anxiety, or stress. Taken together, the pattern of correlations presented in Table 3 provides support for the view that social capital and belongingness can serve as a buffer against poor psychological health.

DISCUSSION

As anticipated, the results demonstrated that the Social Capital and Cohesion Scale (SCCS) showed strong psychometric properties with a clear six factor structure. Support was also found for the invariance of the SCCS instrument across gender and region in relation to factor structure, factors loadings, and factor variances/covariances. Therefore, the SCCS can be considered to hold acceptable

Table 3: Factor Correlations between the SCCS and the DASS-21

Factor		1	2	3	4	5	6	7	8	9
1.	Family	1								
2.	Friends	.398**	1							
3.	Neighbours	.306**	.309**	1						
4.	Institution	.335**	.350**	.489**	1					
5.	Belonging	.281**	.352**	.394**	.361**	1				
6.	Isolation	.176**	.028	.045	.030	.045	1			
7.	Depression	-.309**	-.150**	-.147**	-.127**	-.169**	.011	1		
8.	Anxiety	-.197**	-.077**	-.074**	-.030	-.089**	.024	.733**	1	
9.	Stress	-.233**	-.074**	-.087**	-.072**	-.097**	.014	.794**	.784**	1

levels of invariance for both males and females and residents living in Community 1 and 2 (Byrne, 2001).

Results also indicated that the measure has acceptable reliabilities across the populations sampled. It can therefore be concluded that the SCCS shows strong evidence for being a valid and reliable measure for use with males and females residing in urban and rural communities.

The empirically derived model supports previous suggestions by Putnam (2000) and Woolcock (1999, Woolcock & Narayan, 2000) viewing social capital as a multidimensional construct, as correlations between the SCCS factors were low to moderate thereby demonstrating distinct dimensions between social capital within the family, within the peer group, among neighbours, and across community institutions. In contrast, previous instruments measuring the construct have been unidimensional (Krishna & Uphoff, 1999; Reid & Salem, 2002) and may not have accurately captured the diversity of elements underlying the social capital resource. The new SCCS measure has also incorporated the recommendations by Stone and Hughes (2002), who argued that in order for a measure of social capital to be useful theoretically, socially, and empirically, it needs to be multidimensional, assess collective action, be measured at varying levels, and be theoretically informed. The current measure successfully integrated these suggestions by including multiple factors incorporating trust and reciprocity items, along with the social capital factors being measured at the family, peer, neighbourhood, and institutional levels. As a result, it may be argued that the measure is consistent with the theoretical conceptualisation of the construct.

When investigating the relations between social capital and mental health, the findings of the current investigation revealed that higher levels of social capital across family, peers, neighbours, and institutions was related to lower levels of depression, anxiety, and stress among the adolescent sample. Hence the results of the present investigation imply that maintaining high levels of social capital contributes positively to mental well-being and serves as a buffer against common mental health issues during adolescence. These findings support a growing body of research demonstrating the positive links between one's social networks and increased psychological health (e.g., Aldridge et al., 2002; De Silva et al., 2009; Drukker, 2003; Machin, 2006; Stevenson, 1998), and provide evidence for the convergent validity of the new SCCS measure by establishing its predicted associations with the well validated DASS-21. Critically, it also suggests that multiple dimensions of social capital may be important for adolescents, as much of the social capital research within Australia to date has been limited to adult samples (cf. Berry, 2009).

Furthermore, the present investigation revealed that family social capital had the strongest associations with adaptive mental health outcomes. These results are consistent with Aldridge et al.

(2002) who concluded that bonding social capital at the individual level is the most important determinant of reducing stress reactions in participants. In addition, one should consider Stevenson's (1998) results which showed that when teens had high levels of family social and emotional support, there was no significant differences in depressive symptoms between low and high social capital neighbourhoods. However, Stevenson also found that neighbourhood social capital significantly lowered levels of depression among students although this effect was only evident in participants with low levels of social capital within the family. This suggests that while neighbourhood social capital can compensate for poor familial support, when social capital within the family is high, it takes precedence over the influence of neighbourhood social capital on mental health, which is ultimately consistent with the results of the current investigation. Therefore, adding to the validity to the present results, the findings of the present investigation support prior research in relation to the importance of bonding capital for the healthy emotional functioning of disadvantaged youth.

The results also demonstrated that social connectedness in the schooling context is a powerful facilitator of adolescent mental health. Ensuring students have a secure sense of school belonging is important for facilitating adaptive mental health, and students whom lack such feelings may benefit from positively orientated interventions that aim to increase the adaptive ties between a sense of belonging and mental health. These findings are also consistent with a larger body of research which has found that high levels of social integration resulted in improved emotional health among participants, whereas poor social connections with teachers and fellow students have resulted in increased levels of mental illness during adolescence and later life (Bond et al., 2007; Resnick, Bearman, & Plum, 1997; Rose, 2000). Although no significant effects between school isolation and mental health emerged within this study, researchers should be aware of the detrimental effect of isolation at school within Bond et al.'s (2007) results, which demonstrated that becoming isolated and socially excluded from peers and teachers at school resulted in higher levels of depressive symptoms among secondary students regardless of the extent of their social relationships outside of school. The current findings of this present investigation contribute to this rich body of evidence by explicating the importance of positive social connections in the schooling context, especially for contributing to a stronger sense of emotional well-being. Whilst feelings of isolation may have been unrelated to mental health in this study, one cannot ignore the adaptive associations for mental health with feelings of belonging.

Over the last 20 years there has been increasing concern about the future burden of mental illness which has led to a paradigm shift away from a focus on treatment, to ways in which it can be prevented (Australian Health Ministers, 2003). The findings of the present study contribute to this current focus by demonstrating that students with high levels of social capital, particularly within the family, are less likely to experience mental illness, therefore indicating that enhancing social capital is an effective agent for fostering mental health resilience in teens. To inform intervention strategies, the current results also demonstrate the importance of recognising the social context of the school environment and indicate that school-based initiatives could benefit from focusing on encouraging strong relationships among students, and between teachers and students. Furthermore, the stable and controlled nature of the school site can create an optimal environment for which to promote adolescent connectedness both within the school and the family, as it is assumed that families can be readily accessed through their children's ties with the educational institution.

In the past, one of the main problems hampering the advancement of social capital theory and research has been the difficulty in determining what types of social capital are beneficial, and at what level, due to the different conceptualisations and measurement techniques used (Aldridge et al., 2002). Now that a valid measure of social capital has been developed, this instrument may be helpful across various research projects, allowing researchers to draw comparable conclusions about the usefulness of social capital in improving outcomes for both individuals and communities. Furthermore, it may resolve some of the controversy and ambiguity surrounding the construct, and the array of potential benefits that have been put forth by past researchers (e.g. Machin, 2006).

In addition, to the positive outcomes of the present study, it is important to note a number of limitations. Firstly, although the reliability estimates for each subscale were acceptable using the total sample, when subgroups were analysed the alpha coefficients for the Institution factor dropped

marginally below the acceptable level for the female sample and residents living in Community 2. The institutional factor also had the lowest reliability of the six factors when using the total sample. The items in the Institution factor ask about trust and reciprocity within the community in general, and the institutions within the community (i.e. school and police). The lack of cohesion in this scale may therefore reflect the varying views the participants have on the different institutions in the area. Future research may explore this possibility, or alternatively items within the Institution factor may benefit from further refinement. Secondly, despite a large cultural diversity within the sample, there were not sufficient numbers of any one culture to warrant cross-cultural comparisons. Therefore, due to these practical limitations, it is important for future research to validate the use of the SCCS measure in cross-cultural settings.

In summary, the SCCS demonstrated sound psychometric properties, with a clear factor structure and acceptable reliabilities in all six subscales. Furthermore, the pattern of associations found between social capital types and the well validated DASS-21 contributes to the convergent validity of the newly developed measure. As very few studies have attempted to develop a stable measure of social capital, it is anticipated that new SCCS measurement tool which integrates theorised aspects of social capital (trust, networks, and reciprocity) across multiple levels may contribute to addressing the ambiguity and controversy currently found in the social capital literature.

REFERENCES

Aldridge, S., Halpern, D., Fitzpatrick, S. (2002), Social Capital: A Discussion Paper, Performance and Innovation Unit, London. Retrieved on the 9th of March, 2011 at http://ec.europa.eu/employment_social/knowledge_society/docs/aldridge_b.pdf.

Aneshensel, C. S., & Sucoff, C. A. (1996). The Neighborhood Context of Adolescent Mental Health. *Journal of Health and Social Behavior, 37*(4), 293-310.

Australian Health Ministers. (2003). *National Mental Health Plan 2003-2008*. Department of Health and Aging, Australian Government, Canberra. Retrieved 11th of July 2009 from: http://www.health.gov.au/internet/main/publishing.nsf/content/mental-pubs-n-plan03

Berry, H. L. (2009). Social capital and mental health among Indigenous Australians, New Australians and Other Australians living in a coastal region. *Advances in Mental Health, 8*(2), 142-154.

Bond, L., Butler, H., Thomas, L., Carlin, J., Glover, S., Bowes, G. & Patton, G.C. (2007). Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health, 40* (357), 9–18. doi: http://dx.doi.org/10.1016/j.jadohealth.2006.10.013.

Brown, G. W. & Harris, T. (1978). *Social origins of depression: A study of psychiatric disorder in women*. London: Tavistock Publications.

Byrne, B. N. (1998). Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming. Mahwah, NJ: Lawrence Erlbaum.

Byrne, B. N. (2001). Structural equation modeling with AMOS. Mahwah, NJ: Lawrence Erlbaum Associates.

Byrne, B. M. (2004). Testing for multigroup invariance using AMOS graphics: A road less travelled. Structural Equation Modeling: A Multidisciplinary Journal, 11(2), 272-300.

Carlson, E. D., & Chamberlain, R. M. (2003). Social Capital, Health, and Health Disparities. *Journal of Nursing Scholarship, 35*(4), 325-331. doi: 10.1111/j.1547-5069.2003.00325.x

Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research, 36*(4), 462-494.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255.

Collier, P (2002). Social capital and poverty: a microeconomic perspective. In *The Role of Social Capital in Development*, Thierry Van Bastelaer (Ed.), pp. 19 - 41, Melbourne: Cambridge University Press.

Comrey, A. L. & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Drukker, M., Kaplan, C., Feron, F., & van Os, J. (2003). Children's health-related quality of life, neighbourhood socio-economic deprivation and social capital. A contextual analysis. *Social Science & Medicine, 57*(5), 825-841. doi: 10.1016/s0277-9536(02)00453-7

De Silva, M. J., McKenzie, K., Harpham, T., & Huttly, S. R. A. (2005). Social capital and mental illness: a systematic review. *Journal of Epidemiology and Community Health, 59*(8), 619-627. DOI: 10.1136/jech.2004.029678

Fukuyama, F. (2001). Social capital, civil society and development. *Third World Quarterly* 22, 7–20.

Garson, G. D. (2009). *Reliability Analysis*. Retrieved March 30, 2011, from http://www2.chass.ncsu.edu/garson/pa765/reliab.htm

Garson, GD (2010). *Reliability Analysis*. Retrieved February 2, 2010, from http://faculty.chass.ncsu.edu/garson/PA765/reliab.htm

Grootaert C. (1998). *Social Capital: The Missing Link*? Social Capital Working Paper 3, The World Bank: Washington DC.

Grootaert, C. Van Bastelaer, T. (2002). Conclusion: measuring impact and drawing policy implications.' In *The Role of Social Capital in Development*, Thierry Van Bastelaer (Ed.), pp. 341-350. Melbourne: Cambridge University Press.

Hills, A. M. (2003). *Foolproof guide to statistics using SPSS, 2nd Ed*. Pearson Education Australia.

Holmes-Smith, P. (2000). *Applied structural equation modeling*: School research, evaluation and measurement services.

Hunter, E. (2013). Indicators of psychoses or psychoses as indicators: the relationship between Indigenous social disadvantage and serious mental illness. *Australasian Psychiatry*, *21*(1), 22-26.

Jackson, D. N. (1970). A sequential system for personality scale development. In C. D. Spielberger (Ed.) *Current topics in clinical and community psychology* (Vol. 2, pp. 61-96). New York: Academic Press.

Joreskog, K. G., & Sorbom, D. (2004). LISREL 8.71 [Computer software]. Chicago, IL: Scientific Software International

Krishna, A., and N. Uphoff. 1999. *Mapping and Measuring Social Capital: A Conceptual and Empirical Study of Collective Action for Conserving and Developing Watersheds in Rajasthan, India*. Social Capital Initiative, Working Paper #13. Washington, DC: The World Bank. Available online at: http://www.worldbank.org/poverty/scapital/wkrppr/sciwp13.pdf

Machin, S. (2006). Social disadvantage and education experiences. OECD Social, Employment and Migration Working Papers No. 32. Retrieved December, 2010 from http://www.oecd.org/dataoecd/13/60/36165298.pdf

Marsh, H. W., Balla, J. R., & Hau, K.-T. (1996). An evaluation of incremental fit indices: A clarification of mathematical processes. In G. A. Marcoulides & R. E. Schumaker (Eds.), *Advanced structural equation modelling techniques* (pp. 315-353). Hillsdale, NJ: Erlbaum.

Marsh, H. W., Byrne, B. M., & Yeung, A. S. (1999). Causal ordering of academic self-concept and achievement: Reanalysis of a pioneering study and revised recommendations. *Educational Psychologist, 34*, 155–167.

McKenzie, K., & Harpham, T. (2006). *Social capital and mental health*. Jessica Kingsley Publishers.

OECD (2001). *The well-being of nations: The role of human and social capital*. Organisation for Economic Co-operation and Development.

Onyx, J., & Bullen, P. (2000). "Sources of social capital." In Ian Winter (Ed.) *Social capital and public policy in Australia*, pp 105 -135. Melbourne: National Library of Australia.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.

Reid, C. and L. Salmen, (2002) "Qualitative Analysis of Social Capital: The Case of Agricultural Extensions in Mali, in Grootaert , C. and T. van Bastelaer (2002), *Understanding and Measuring Social Capital, A Multi-disciplinary Tool for Practitioners*, Washington D.C., World Bank.

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., ... & Udry, J. R. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on adolescent health. *The journal of the American Medical Association*, *278* (10), 823-832. doi: 10.1001/jama.1997.03550100049038

Rose, R. (2000). How much does social capital add to individual health? *Social Science & Medicine, 51*(9), 1421-1435. doi: http://dx.doi.org/10.1016/S0277-9536(00)00106-4

Schneider, J. A. (2004). *The role of social capital in building healthy communities*. Policy paper produced for the Annie E. Casey Foundation.

Schumacker, R.E., & Lomax, R.G. (1996). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum Associates.

Steiger, J.H. (2007). Understanding the limitations of global fit assessment in structural equation modelling. *Personality and Individual Differences, 42* (5), 893-98.

Stevenson, H. C. (1998). Raising Safe Villages: Cultural-Ecological Factors That Influence the Emotional Adjustment of Adolescents. *Journal of Black Psychology*, *24*(1), 44-59. doi: 10.1177/00957984980241004.

Stone, W. (2001). *Measuring social capital: Towards a theoretically informed measurement framework for researching social capital in family and community life*. Research paper No. 24. Australian Institute of Family Studies.

Stone, W. & Hughes, J. (2002). Social capital: empirical meaning and measurement validity. Melbourne: Australian Institute of Family Studies.

Tabachnick, B. G. & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston, MA: Pearson Education, Inc.

Terrion, J. L. (2006). Building social capital in vulnerable families: Success markers of a school-based intervention program. *Youth and Society*, 38(2), 155-176.

Wilkinson R. (2002). Liberty, fraternity, equality – a commentary on Rodgers G. B., Income and inequality as determinants of mortality: an international cross-sectional analysis. *Population Studies, 1979. International Journal of Epidemiology*, January 2002.

Woolcock, M. (1999). Social capital and economic development: Towards a theoretical synthesis and policy framework. *Theory and Society*, 27, 151-208.

Woolcock, M. (2001). The place of social capital in understanding social and economic outcomes. Isuma - *Canadian Journal of Policy Research*, 2(1), 11-17.