



UNIVERSITY OF THE WESTERN CAPE
DEPARTMENT OF PSYCHOLOGY

Title: The relation between children's environmental views and their subjective well-being across low and middle socio-economic status communities in the Western Cape, South Africa

Student name: Nicole Chapman

Student number: 3535048

Degree: M.A. Psychology

Department: Psychology

Supervisor: Dr Sabirah Adams

Co-Supervisor: Professor Shazly Savahl

November 2022

Keywords: children's environmental views; children's subjective well-being; New Ecological Paradigm Scale-Revised; Brief Multidimensional Students' Life Satisfaction Scale; McKendrick's conceptual framework; confirmatory factor analysis; structural equation modelling; Western Cape, South Africa

Acknowledgments

First and foremost, I would like to praise and thank God, the Almighty, who has granted countless blessings, knowledge and opportunities so that I have been able to accomplish the thesis.

To my parents, Elize and Wayne, and my brother Adrian, thank you for your unwavering support and love throughout my academic career. Thank you for all the prayers and sacrifices you have made for me throughout my academic career. I am deeply blessed to have you.

To my husband Eric, thank you for your unconditional love, support and patience. You have been my pillar of strength throughout this journey, and I cannot thank you enough for everything that you have done.

To my supervisors, Sabirah and Shazly, thank you for your support and guidance throughout this journey. I am grateful to have such inspiring supervisors I could learn from.

To the Master's Research Psychology class of 2019, thank you for all the support, love, and knowledge sharing, particularly to Seneca, Jeanine, Pascal, Ella, Noxolo and Tariq.

I herewith acknowledge the National Research Foundation, and the Ada and Bertie Levenstein Foundation for financial and institutional support. Opinions expressed and conclusions arrived at, are those of the author and are not to be attributed to these foundations.

Contents

Abstract	v
Background	1
Measuring children’s environmental perceptions	3
Measuring children’s subjective well-being	4
Measuring children’s perceptions of nature and subjective well-being.....	5
Rationale	6
Aim of the study.....	6
Literature review	7
Measuring children’s perceptions of nature	7
New Ecological Paradigm Scale for Children	8
History of the NEP Scale	8
Brief Multidimensional Students’ Life Satisfaction Scale.....	15
The relation between children’s perceptions of nature and their SWB.....	22
Summary of the literature.....	24
Theoretical Framework	26
Theories on well-being.....	26
Theories on engagement in nature	28
McKendrick framework	29
Method	32
Research design.....	32
History of the Children’s Worlds Study.....	33
Research context	33
Participants and sampling	34
Instrumentation	35

New Ecological Paradigm Scale for Children	35
Brief Multidimensional Students' Life Satisfaction Scale.....	36
Data analysis	36
Procedure and ethics	37
Significance.....	38
Results.....	39
Descriptive Statistics.....	39
Confirmatory Factor Analysis.....	44
Confirmatory Factor Analysis: BMSLSS	45
Confirmatory Factor Analysis: NEP Scale	46
Structural equation modelling.....	48
Multigroup Structural Equation Modelling.....	50
Discussion	54
Conclusion and Recommendations.....	63
References	65
Appendix A: Scales.....	79
Appendix B (Ethical clearance)	80
Appendix C (Permission letter).....	81
Appendix D:	82
Children's Worlds Ethics Statement	82



List of Figures

Figure 1	46
Figure 2	47
Figure 3	48
Figure 4	49
Figure 5	51
Figure 6	52
Figure 7	53
Figure 8.....	52
Figure 9.....	52
Figure 10.....	53



List of Tables

Table 1	40
Table 2	41
Table 3	43
Table 4.....	45
Table 5.....	46
Table 6.....	48
Table 7.....	50

Abstract

Subjective well-being (SWB) is conceptualised as a multidimensional concept that encompasses both cognitive and affective judgements and evaluations that people make about their lives. It comprises three main components, namely life satisfaction, positive affect, and negative affect. Over the past few decades, empirical literature on children's SWB has shifted to focus on their subjective perspectives of their lives. This has been attributed to the recognition and acknowledgement of children's rights, and children as experts on their lives. Of the diverse spaces and places that children engage in and make use of, the natural environment has been identified as a significant space contributing toward children's well-being. While the interest in human's connection to the natural world and their well-being is well-established in the literature, particularly with regard to adults, there is limited empirical initiatives which explore children's perceptions of natural spaces and the influence on their subjective well-being in particular. This dearth of literature is evident in both developed and developing contexts. Within South Africa in particular, research has found that children's subjective well-being and perceptions of nature differ with regard to the socio-economic context of their community. The aim of the study is thus to determine the relation between children's perceptions of nature and their subjective well-being in the Western Cape, South Africa. The study further aims to ascertain whether there are differences in this relation across low and middle socio-economic status (SES) communities. The study uses secondary data from the Children's Worlds study, and includes 3284 children from three age groups (8, 10, and 12-years old) attending primary schools in the Western Cape Province. The study uses the New Ecological Paradigm (NEP) Scale for Children to assess environmental worldviews, and the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) to assess SWB. McKendrick's conceptual framework, *Factors contributing to child well-being*, was employed in the study. The study follows the ethics guidelines as proposed by UNICEF's

“Conducting Ethical Research with Children Protocol”. Data was analysed using confirmatory factor analysis (CFA) and structural equation modelling (SEM) in AMOS. The initial BMSLSS model presented with an adequate fit, while the initial NEP model presented with an inadequate fit. The NEP fit improved substantially when item 6 “Nature Resilient” and item 7 “Rule Over Nature” were deleted. Both Item 6 “Nature Resilient” (-.42) and Item 7 “Rule Over Nature” (-.27) had low factor loadings, and the deletion of these items improved the fit indexes of the model by more than .01. Furthermore, it is important to note that both these items were negatively phrased, which is evident in the negative loading. This alludes to the participants not clearly understanding the wording or meaning of the items. An overall model including the NEP Scale and BMSLSS was tested using structural equation modelling (SEM). The initial SEM model demonstrated a good fit with adequate factor loadings of indicator variables on the latent variables. In this model, it is important to note the low standardised regression weights of the NEP to the BMSLSS. Therefore, this demonstrates that there is no relation between children’s perceptions of the natural environment (measured using the NEP) and their domain-specific life satisfaction (measured using the BMSLSS). Across SES, configural and metric invariance was tenable; however, scalar invariance was not tenable. As a resolution, the application of partial constraints was attempted to meet the requirement of scalar invariance. However, this was ineffectual as an acceptable scalar invariance model was not viable with the addition of partial constraints. This means that while the models can be compared across SES by correlations and regressions, it cannot be meaningfully compared across mean scores. As demonstrated in other studies in this context, SES is a determinant of children’s well-being and accessibility and engagement in nature. These authors found that children in lower SES communities have fewer opportunities to safely engage in nature, owing to the nature being made sense of as the ‘dangerous other’ given crime and violence that occurs in these spaces. This alludes to the

high levels of inequality in South Africa, which has roots in colonialism and apartheid. For this reason, it is important to understand the socio-political context in which these environmental conditions have been created and are continuously perpetuated. Despite children being unhappy with their environments, they maintained an adequate level of well-being, therefore aligning with McKendrick's theory that children can maintain an adequate level of well-being despite not living in a 'good place'. Further qualitative studies should be conducted to assess the gap between children acknowledging the dangers of their living environment and being satisfied with their living environment.



Background

Subjective well-being (SWB) is conceptualised as a multidimensional concept that encompasses both cognitive and affective judgements and evaluations that people make about their lives (Diener, 1984). Diener (1984; 2000) postulates that SWB comprises three main components namely life satisfaction, positive affect, and negative affect. Life satisfaction refers to the global assessment of an individual's life, while positive affect denotes experiences of positive mood and emotions, while negative affect denotes experiencing negative moods and emotions. The empirical literature on children's SWB has shifted to focus on their subjective perspectives of their lives (Savahl et al., 2015). This has been attributed to the recognition and acknowledgement of children's rights and children as experts on their lives (September & Savahl, 2009; Bradshaw et al., 2011). The tendency in thinking about children and childhood more broadly mirrors the historical shifts advocated by the child studies movement in the early twentieth century (Adams et al., 2016; Sandin, 2014; Savahl et al., 2019). This resulted in the significance of children's subjective appraisals and evaluations of their lives across numerous disciplines (Casas, 2000). In this regard, various domains of children's well-being have been identified in low, middle, and high-income contexts; these include: protection and safety, basic needs, community resources, psychosocial, physical, cognitive, economic (material), and social (Borualogo & Casas, 2021; Pollard & Lee, 2003; September & Savahl, 2009).

Empirical research demonstrates that one of the key influences on children's SWB is their engagement in various social and physical spaces and places (Adams & Savahl, 2015; Adams & Savahl, 2017; Kerret et al., 2014). Of the diverse spaces and places in which children engage in and make use of, the natural environment has been identified as a significant space contributing to children's well-being (Adams & Savahl, 2015). The

importance of the impact of nature experiences on children's SWB is emphasised by Kerret et al. (2014), proposing that the concept of environmental subjective well-being (ESWB), which integrates two contemporary concerns of society: the natural environment and children's well-being (Adams & Savahl, 2016; Adams et al., 2017). This integration between sustainability and positive psychology has led to the proposal of various concepts (Adams, 2016; Adams & Savahl, 2015, 2016) such as positive ecological attitudes (Kasser, 2011), positive psychology of sustainability (Verdugo, 2012) and the environmental dimension of child well-being (Huby & Bradsaw, 2006) (see Adams, 2016; Adams & Savahl, 2016). Moreover, this emphasises the importance of engaging in nature for children's SWB and quality of life (Adams et al., 2017).

It is thus critical to note that 'nature' is not a unitary concept (Adams & Savahl, 2015). Adams and Savahl (2016, p. 11) thus assert that there are "gradations in children's conceptualisation of the construct of nature." Linzmayer and Halpenny (2013) elaborate on this, and advance the definition of nature as comprising anthropogenic amendments on the one hand, and the other demonstrating social and cultural influences; maintaining the social construction of the concept of nature (Adams & Savahl, 2016). Adams (2016) demonstrates the complexity of nature as a concept as proposed by Williams (1983). Williams (1983) advanced that 'nature' has three broad yet interconnected meanings, (i) *intrinsic nature*, which refers to the essential characteristic of a phenomenon, (ii) *external nature*, which refers to the natural environment, the unmediated material world and (iii) *universal nature*, this is the forces controlling the world such as the laws of nature (as cited in Ginn & Demeritt, 2008; Adams, 2016; Adams & Savahl, 2015). Macnaghten and Urry (1995) similarly argues that there is no single 'nature' rather multiple natures that are geographically, historically, and culturally constituted (Adams & Savahl, 2015).

Myers (2012) contends that access to natural spaces is a determining factor limiting children's engagement therein (Adams & Savahl, 2016). A key theme that emerged from his summation of the literature was that nature brings about both intense positive and negative emotional experiences in children (Adams et al., 2017). In developing countries like South Africa, an important consideration in understanding children's engagement with nature is access to safe natural spaces (see Adams & Savahl, 2015; 2016; Adams et al., 2017; Savahl et al., 2022). With one of the highest rates of inequality in the world (Savahl et al., 2019), socio-economic status (SES) has been identified as a definitive factor shaping children's everyday lives in this context (Adams & Savahl, 2015; 2016; Adams et al., 2017; Savahl et al., 2022). The study by Adams and Savahl (2015) points to children's restricted access to natural spaces owing to threats to their safety, particularly in low SES communities. These low SES communities are very often characterised by environments that are of poor quality, including perilous natural play spaces, less natural features, poorer services, more traffic, violence, and crime, and higher levels of physical deterioration. While the interest in human's connection to the natural world and their well-being is well established in the literature, particularly concerning adults, there are limited empirical initiatives which explore children's perceptions of natural spaces and the influence on their SWB in particular (Adams & Savahl, 2016). The following section elaborates on the empirical research examining children's perceptions of nature, SWB, and the relation between children's perceptions of nature and SWB.

Measuring children's environmental perceptions

While multiple scales have been developed to measure adults' perceptions of nature, few have been developed to measure children's perceptions of nature (Adams et al., 2016; Manoli et al., 2007). The scales that have been developed to assess children's perceptions of nature include: The New Ecological Paradigm (NEP) Scale for Children (Manoli et al., 2007);

Children's Environmental Attitude and Knowledge Scale (CHEAKS) (Leeming, et al., 1995), Model of Ecological Values (2 –MEV) (Bogner & Wilhelm, 1996), and the Children's Attitudes Toward the Environment Scale (CATES) (Musser & Malkus, 1994). However, these scales have come under scrutiny (Johnson & Manoli, 2011). The CATES has been criticised for its bipolar response options and poor psychometric properties; while the CHEAKS has been criticised for the deficiency of a theoretical grounding (Johnson & Manoli, 2011). The NEP Scale has been the most widely used of these scales (Stern, et al., 1995). The scale was revised by Manoli et al. (2005; 2007) for use with children. Overall scores on the scale exist on a continuum, with low scores indicating anthropocentric attitudes (valuing nature for the material and physical advances it affords humans), and high scores indicating ecocentric attitudes (valuing nature intrinsically) (Manoli et al., 2007).

Measuring children's subjective well-being

A consistent finding emerging from the literature is that engagement in nature positively influences children's physical, psychological, emotional, and cognitive well-being (Adams & Savahl, 2015; Adams & Savahl, 2017; Wells & Lekies, 2006). Within the international literature, several instruments have been developed to assess children's SWB and have shown good validity across a range of cultural contexts (Adams & Savahl, 2015). Among the most widely used scales are those that measure global life satisfaction, such the Students' Life Satisfaction Scale (SLSS) (Huebner, 1991), and those measuring multiple dimensions for example the Personal Well-Being Index-School Children (PWI-SC), Cummins & Lau 2005, the Multidimensional SLSS (Huebner, 1994), and the Brief Multidimensional SLSS (BMSLSS) (Seligson et al., 2003). In the current study, the NEP and BMSLSS were used to assess the relation between children's perceptions of nature and SWB. Following the recommendation by Casas et al. (2014), multi-item measures of children's SWB should be

used and validated within and across contexts; a key motivation for the use of the BMLSS in the current study. The BMSLSS is concretely worded and assesses five domains in children's (family, friends, school, self, and the place I live in). Concretely worded items are more appropriate for use with children and pre-adolescents and are apposite for the current study sample of 8-, 10-, and 12-year-olds.

Measuring children's perceptions of nature and subjective well-being

Studies focusing on children's physical well-being (Bell et al 2008; Fjørtoft 2001) have explored how nature in the home and school contribute to children's healthy development, and how play in nature influences their motor fitness (Adams & Savahl, 2015). Studies investigating children's psychological and emotional well-being (see Huynh et al. 2013; Tranter & Malone 2004) have examined the effects of nature on children's ability to cope with stress and Attention Deficit Hyperactivity Disorder symptoms, the impact of nature on children's cognitive functioning, and how engaging in nature contributes to children's environmental identity, and in particular their motivations for intrinsic care for nature (Adams et al., 2017; Chawla, 2006). A study conducted by Adams et al. (2016) with 1004 children in the Western Cape, South Africa, examined the relation between children's perceptions of nature, using the NEP Scale, and their SWB, using the SLSS and PWI-SC. A key finding of the study was that no relation was found between the children's perceptions of nature and their subjective well-being. An explanation for the key finding in this study is that of compromised safety – where nature is synonymous with danger. The authors recommend that further empirical research is conducted to explore how children assign meaning to nature.

Rationale

The empirical literature consistently demonstrates that nature offers opportunities and experiences for engagement which benefit children's well-being in a myriad of ways, including improving physical, psychological, and emotional developmental outcomes (Adams & Savahl, 2016; Adams et al., 2017). While Huynh et al. (2013) postulate that nature can be regarded as a contextual determinant of children's emotional well-being, they note that there is a dearth of empirical evidence to support this (Huynh et al., 2013). The studies which have been undertaken have primarily been conducted in controlled settings, with a growing number of studies being conducted in natural settings, such as camps and forest (see Knight, 2009; Ridgers et al., 2012) and Mountain School (Burgess & Mayer-Smith, 2011) (Adams, 2016). While studies have considered children's understandings of nature and their SWB in separate disciplines, there is an absence of research that has considered merging these areas, and thereby considering the influence of nature experiences on children's SWB. Considering the current global environmental crisis, research in this area is critical as it has the capacity to raise awareness among children about sustaining the natural environment, as well as considering their well-being in the present, and the future (Adams & Savahl, 2016; Adams et al., 2017). This points to the need for further studies to explore the extent to which nature influences children's SWB specifically.

Aim of the study

The study aims to determine the relation between children's perception of the natural environment and their SWB in the Western Cape, South Africa. The study further aims to ascertain whether there are differences across low and middle SES communities. The following objectives were developed to guide the study:

- To determine the relation between children's perceptions of the natural environment and their subjective well-being
- To determine if there are differences across low and middle SES groups

Literature review

Measuring children's perceptions of nature

Over the past few decades, the development of psychometric scales measuring the perceptions, attitudes, and behaviours pertaining to the natural environment have specifically developed for use with adults (Adams et al., 2017). The absence of literature regarding children's perceptions of nature has been attributed to the lack of validated psychometric scales developed for use with children. The NEP (Dunlap & Van Liere, 1978) and the revised NEP (Dunlap et al., 2000) were originally developed for the use with adults. The revised NEP scale (Dunlap et al., 2000) has been adapted and revised for use with children ages 10- to 12-years of age – the NEP Scale for Children (Manoli, Johnson & Dunlap, 2005). The NEP Scale for Children is the most widely used scale that assesses children's environmental worldviews. In addition to the NEP Scale for Children, several other scales namely: the CATES (Musser & Malkus, 1994), CHEAKS (Leeming et al., 1995), Model of Ecological Values (2-MEV) (Bogner and Wilhelm, 1996), Attitude Toward Outdoor Play (ATOP) (Beyer et al., 2014), Children's Environmental Affect Scale (CEAS) (Erdogan & Marcinkowski, 2015), and the Environmental Awareness and Attitude Scale for Preschool Children (EAASPC) (Soydan & Samur, 2017), focus specifically on assessing children's attitudes towards nature.

The reliability and validity of the CHEAKS and CATES scales have been assessed over several years through the adaptation for various age groups. However, both scales have been

critiqued, the CATES has been criticised for the use of bipolar answer formats, while the CHEAKS has been critiqued for the lack of a theoretical basis (Johnson & Manoli, 2011). The revised 2-MEV Scale was revised in the United States over four years for children ages 9 to 12 years and is appropriate in measuring children's perceptions and attitudes toward nature (Johnson & Manoli, 2011). The NEP Scale for Children has been demonstrated to be suitable for the use with children to assess their perceptions of nature, with numerous studies demonstrating the applicability of the scale for children in various contexts (Corraliza et al., 2013; Wu, 2012; Manoli et al., 2007; van Petegem & Blicck, 2007). This review summarises and synthesises the empirical literature focused on children's perceptions of nature (using the NEP Scale for Children), their SWB using the BMSLSS, and finally the relation between the two.

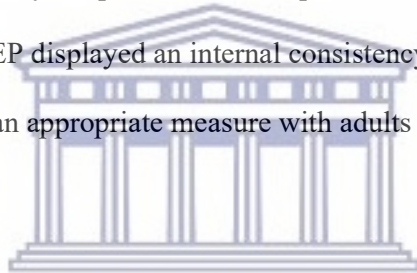
New Ecological Paradigm Scale for Children

History of the NEP Scale

The 12-item NEP (Dunlap & Van Liere, 1978) and the revised 15-item N Scale (Dunlap et al., 2000) have assessed the environmental worldviews of adults for 30 years. Dunlap and van Liere (1978) developed the New Environmental Paradigm to challenge the Dominant Social Paradigm (DSP), its aim "to reject the anthropocentric notion that nature exists solely for human use" (p, 10). The study aimed to determine if the public would accept the ecocentric ideas embodied within the NEP, and to develop an instrument to measure the new emerging paradigm. Survey data was gathered from two samples, in Washington State, USA. The first comprised 1441 households and the second sample included 558 adults from an environmental organisation. The 12-item scale consisted of eight items that endorse the NEP and the four items endorsing the DSP. The results showed that while both groups endorsed the new ecocentric worldview, as expected, the environmentalists strongly endorsed the

views embodied in the NEP. The 12-item NEP displayed an internal consistency of .81. Despite the study yielding positive results, the scale has been critiqued for its apparent multidimensionality based on the wording of the four anti-NEP items, and the lack of theoretical basis in social-psychological theories of attitude structure (Stern, Dietz & Guagnano, as cited in Dunlap et al., 2000).

Based on the methodological flaws of the original scale, Dunlap et al. (2000) revised the scale and renamed it the “New Ecological Paradigm Scale”. Dunlap et al. (2000) modified the original scale to balance the NEP and DSP items, revised the outdated wording of the items, and expanded the initial dimensions measured by the NEP. The revised scale was pretested with college students, followed by a representative sample of 1300 in Washington State, USA. The revised 15-item NEP displayed an internal consistency of .83, and overall the revised scale was reported as an appropriate measure with adults in the Washington state, USA.



In terms of dimensionality, Dunlap and van Liere (1978) found the NEP scale to measure one single dimension, while other studies have found the scale to measure up to four dimensions (Manoli et al., 2007). Dunlap et al. (2000) state that the apparent multidimensionality of the 12-item NEP Scale is due to a flaw in the wording of the items, as four of the 12-items focus on anthropocentrism. Furthermore, Dunlap et al. (2000) recommend that the NEP be considered as a multidimensional rather than unidimensional scale, as the number of dimensions derived may differ based on the sample (see Adams & Savahl, 2017; Corraliza et al 2013; Wu, 2012; Manoli et al., 2007; Petegem & Van Blicck, 2007).

The development of both the original NEP scale (Dunlap & Van Liere, 1978) and the revised NEP scale (Dunlap et al., 2000) was for use with adults. However, research interests began to shift towards the environment worldviews of children and the development of such views (Adams et al., 2016). Manoli et al. (2007) conducted a study to assess whether the revised 15-item NEP scale (Dunlap et al., 2000) were suitable for use with children ages 10 to 12-years. The study was conducted in three cities in the USA, namely Arizona, Louisiana, and Pennsylvania, over three years. In the first year of the study, February to April 2003, Manoli et al. (2007) revised the 15-item scale by reversing the negatively worded items and added a 'Do not understand' response. These revisions were piloted with 54 fifth graders from Arizona and Pennsylvania who participated in an environmental education program. The second year, September 2003 to April 2004 focused on the validation of the revised 15-item scale with 672 fourth, fifth, and sixth grade students from twenty-three schools in Louisiana and Pennsylvania who participated in earth education programs. Using exploratory factor analysis (EFA) with eleven of the 15 scale items, three factors were identified namely Rights of Nature, Eco-Crisis, and Human Exemptionalism. This three-factor structure was confirmed using CFA. In the third year, September 2004 to April 2005, Manoli et al. (2007) eliminated the items that received a high 'Do not understand' response and validated the 10-item revised scale with 515 fourth, fifth, and sixth grade students from Louisiana, Pennsylvania, and Arizona. A CFA for the total sample (n = 515) revealed a three-factor structure comprising Rights of Nature = .97, Eco-Crisis = .86, and Human Exemptionalism = .100 for the revised NEP Scale for Children. Overall, Manoli et al. (2007) found that a 10-item scale instead of 15-items was appropriate for 10 to 12-year-olds; the measure was renamed the NEP Scale for Children.

Furthermore, Manoli et al. (2007) suggest that the scale can be treated as a unidimensional measure if the negatively worded items (items 3, 6, 7, and 9) are reversed scored. The NEP Scale for children has also shown to be a useful measure for evaluating the behavioural and environmental changes related to environmental learning programs with children ages 10- to 12-years-old. The authors note the findings of the study cannot be generalised to children in other locations and further research should be conducted.

Van Petegem and Blicek (2007) conducted a cross-cultural study using the revised NEP Scale for Children (Manoli et al., 2005) to investigate the ecological worldviews of adolescents aged 13 to 15- years old from Zimbabwe and Belgium. The authors also examined whether the adolescents held beliefs that were consistent with the NEP or the Dominant Social Paradigm (DSP); the former sees human beings as part of nature, while the latter argues for human dominance over nature. Van Petegem and Blicek (2007) used the 15-item revised NEP Scale for Children (Manoli et al., 2005), which consisted of seven anthropocentric items and eight ecocentric items. Using principal component analysis (PCA), they found that the scale measured three dimensions: balance of nature, limits to growth, and humans over nature. These findings were similar to those by Dunlap et al. (2000). The findings of the study illustrate that both Belgian and Zimbabwean adolescents are moderately environmentally conscious and are aware of the dangers regarding human interference with the natural environment. However, contrary to these findings, the beliefs of the Belgian adolescents were more consistent with that of the NEP worldviews, displaying a mean NEP score of 63.18. However, the Zimbabwean adolescents' beliefs demonstrated DSP worldviews, with a mean NEP score of 51.44 (Van Petegem & Blicek, 2007). A NEP score of above 45 indicates a position in favour of the NEP, whereas a NEP score below 45 indicates a position in favour of DSP (see Rideout et al., 2005). These results indicated that while both

groups display environmentally conscious worldviews, cultural differences influence the participants' environmental worldviews. Based on the findings, the authors recommended that other cultures and contexts be explored as well as effects of personality, social and ethnic background, and educational activities (Van Petegem & Blicek, 2007).

A study by Corraliza et al. (2013) aimed to adapt the 10-item NEP Scale for children and examine its psychometric properties for Spanish-speaking children. Corraliza et al. (2013) administered an 11-item scale renamed, 'NEP_Ñ', derived from the original NEP Scale for Children. This, despite Manoli et al. (2007) suggesting eliminating item 11 owing to comprehension difficulties. The total sample comprised 574 adolescents aged 8- to 13-years. The adolescents were from urban, and rural areas in Castilla La Mancha, Spain. The Cronbach's alpha of the scale was found to be .84 and EFA revealed a unidimensional factor structure with nine of the 11 items. CFA conducted on the nine-item scale, revealed that the factor loadings were significant ($p < .0001$), with the three sub-dimensions demonstrating acceptable reliability: Respect for Nature = .88, Eco-responsibility = .96, and Eco-deterioration = .88. Even though the adolescents held beliefs consistent with ecocentrism, it was found that adolescents residing in rural areas scored higher on the NEP scale ($M = 4.07$, $SD = .76$) compared to those residing in urban areas ($M = 3.93$, $SD = 3.93$). Children residing near natural spaces who spent more time in natural environments exhibited more ecocentric worldviews and behaviours (see Cheng & Monroe, 2012; Larson et al., 2011). The authors suggest that a nine-item scale (NEP_Ñ) is best suited for the use with Spanish-speaking children ages eight and above.

The NEP scale has also been assessed in lower-to-middle income countries (LMIC). In a study conducted by Wu (2012), the revised 15-item NEP Scale (Dunlap et al., 2000) was

administered to 507 adolescents aged 10- to 12-years from three elementary schools in Shenzhen, China. The results of the study demonstrated an acceptable level of internal consistency, with a Cronbach's alpha of .65. The PCA yielded five factors, however, the factor distribution of the 15-item NEP scale appeared disordered when compared to the original factor loadings of Manoli et al. (2007). The disordered nature of the factor distribution indicates that the scale may not present a coherent environmental awareness of the children in China. Wu (2012) attributes the disordered factor distribution to the differences of ecocentric worldviews among children in China compared to those of the United States (Manoli et al., 2007), and cultural differences in interpreting the statements on the NEP scale.

Similarly, Grúňová et al. (2018) assessed the validity, reliability, and factor structure of the 10-item NEP Scale for Children (Manoli et al., 2007) with 782 adolescents from three regions in Senegal: Dakar, Thies, and Ziguinchor. The total sample comprised 782 adolescents ages 10- to 16-years old, with an average age of 13 years old. The findings showed the overall internal consistency using Cronbach's alpha to be .23, which demonstrated weak reliability and was deemed unreliable for the Senegalese population. The authors noted that the scores of the NEP Scale in the study were similar to that of the Zimbabwean adolescent sample group in the study by van Petegem and Blicek (2006). They argue that the poor fit across the countries could be attributed to the similar socio-cultural settings of the countries in which the studies were conducted. Furthermore, Grúňová et al. (2018) concluded that cultural features such as profound religious convictions, understanding human beings place in nature, and the lack of consciousness of human impact on nature also contributed to the poor reliability of the scale in the Senegalese context. While studies have been conducted across several different socio-cultural contexts, the commonality across the

studies by van Petegem and Blicek (2007), Grúňová et al. (2018), and Wu (2012) is the socio-cultural context in which the studies were conducted. The 10-item NEP Scale for Children (Manoli et al., 2007) was originally developed for a context with similar ecocentric worldviews and therefore the development process was not inclusive of other worldviews from different cultures and contexts (Grúňová et al., 2018; Izadpanahi & Tucker, 2018; Wu, 2012; Manoli et al., 2007; van Petegem & Blicek, 2007).

The NEP Scale for children has shown to be a useful instrument for evaluating environmental education programs, as illustrated by Manoli et al. (2007). However, few studies have assessed the impact that the physical environment of schools might have on the environmental attitudes and behaviours of children. Izadpanahi and Tucker (2017) adapted the NEP for Children scale to measure children's environmental attitudes in schools in Victoria, Australia. The scale was revised in two stages – first via pilot, and followed a year later with a total sample of 624 adolescents from seven schools in grade 4, 5, and 6 with an age range of 10- to 12-years. The participants were selected from two distinct types of learning settings, namely ecologically sustainable schools and conventional schools. Three sustainable primary schools were randomly selected based on the ResourceSmart AuSSI Vic 5-star certificate. The ResourceSmart AuSSI Vic certificate defines the highest level of sustainability as 5-stars, this modular approach comprises core, biodiversity, energy, waste and water. The schools were required to complete the criteria set for each module to be awarded a star. Four conventional schools were also selected for the study. Izadpanahi and Tucker (2017) adapted the 10-item NEP for Children (Manoli et al., 2007) and six additional items were included based on the ecologically sustainable design (ESD) of school buildings and outdoor classrooms. This revised NEP Scale for Children was termed NEP (Children@School), which comprised 16-items. The findings revealed a KMO value of .80

and Bartlett's Test of Sphericity was found to be significant ($p < .000$), indicating that factor analysis is appropriate. The PCA revealed three factors: Children's Environmental Attitudes towards Human Intervention, Children's Environmental Attitudes towards Eco-Right, and Children's Environmental Attitudes, towards ESD at School. Furthermore, the authors suggest that a 14-item NEP (Children@School) is appropriate to assess the influence of learning spaces on environmental behaviours and attitudes of children from ages 10- to 12-years.

Brief Multidimensional Students' Life Satisfaction Scale

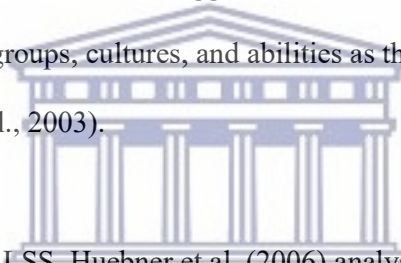
Subjective well-being (SWB) is a multidimensional concept that encompasses both affective evaluations and cognitive judgements (Diener, 1984). Furthermore, SWB comprises three components namely positive affect, negative affect, and life satisfaction (Diener, 1984; 2000). Life satisfaction assessments are derived from two conceptual frameworks namely, unidimensional, and multidimensional. The unidimensional assessment presents an overall score of the individual's LS, while multidimensional assessment provides an account of LS scores across multiple domains (Proctor et al., 2009). One of the most widely used scales to assess children's SWB is the SLSS (Huebner, 1991). The context-free SLSS consists of 7-items and is appropriate for children from age 8-years old. The internal consistency of the initial scale was .82, and test-retest reliability reported at .74. Furthermore, the conceptual basis of the SLSS influenced the development of the MSLSS (Huebner, 1994) and the BMSLSS (Seligson et al., 2003). The MSLSS (Huebner, 1994) is a 40-item scale that consists of five domains namely, family, school, friends, self, and living environment. The MSLSS is valid for use with children ages 8 to 18-years of age, and assesses general life satisfaction as well as domain-specific life satisfaction. However, one of the limitations of the scale is the absence of research about the significance of the domains with various populations (Proctor

et al., 2009). Due to the length of the MSLSS, the BMSLSS (Seligson et al., 2003) was developed as a brief, reliable, and valid substitute assessment of life satisfaction that is useful for children ages 8- to 18-years old. The BMSLSS is based on the conceptual model of the MSLSS and consists of five items, with each item representing one of the domains from the MSLSS: Family, friends, school, self and living environment. However, it should be noted that the items of the BMSLSS are unique to the scale, therefore it is not a shorter form of the MSLSS (Proctor et al., 2009). The section that follows presents the empirical studies using the BMSLSS.

The BMSLSS (Seligson et al., 2003) is a 5-item life satisfaction measure for use with children and adolescents ages 8- to 18 years old. Each of the five items of the scale represents five domains including *family, friends, living environment, self, and school*. The original BMSLSS uses a 7-point Likert type scale with response options ranging from '1= Terrible, 2 = Unhappy, 3 = Mostly Dissatisfied, 4 = Mixed, 5 = Mostly Satisfied, 6 = Pleased, to 7 = Delighted'. The scale is scored by adding the responses across the five scale domains (Proctor et al., 2009; Seligson et al., 2003).

Seligson et al. (2003) investigated the psychometric properties of the BMSLSS across two studies using two distinct age groups in the USA. Study 1 examined the internal consistency reliability of the BMSLSS, convergent and discriminant validity of the BMSLSS, and comparability of the BMSLSS and MSLSS. Study 2 assessed the convergent and discriminant validity of the BMSLSS domain scores. The total study sample consisted of 267 students, the first study comprised of 221 middle school student's aged 12-years-old, and the second study sample consisted of 46 high school student's age 15-years-old. The findings of the middle school sample reveal a high degree of global and life satisfaction, with the internal

consistency (Cronbach's alpha) of .75. The findings also revealed moderate intercorrelations among the BMSLSS domains, which ranged from .30 to .42, with a mean of .36. This was comparable to that of the MSLSS domains ranging from .25 to .55, with a mean of .37. These results indicate that students can distinguish between the domains of the BMSLSS and the MSLSS, therefore this provides preliminary support for the multidimensionality of the scale. The second study assessed the convergent and discriminant validity of the BMSLSS domain scores. The findings revealed strong convergent and discriminant validity of the BMSLSS, with the convergent validity of the high school students higher compared to the middle school students (Seligson et al., 2003). Overall, the BMSLSS displayed an acceptable internal consistency and validity across both samples and henceforth is a useful alternative to the extended MSLSS. However, the authors suggest that further research should be conducted with children of different age groups, cultures, and abilities as the study was employed in a Western context (Seligson et al., 2003).



In a review of the BMSLSS, Huebner et al. (2006) analysed six samples of students in South Carolina, USA. These samples included 518 students in grades 3-5 (Seligson et al., 2005); 221 students in grades 6-8, 146 students in grades 9-12; and 48 students in grades 9-12 (Funk et al., 2006); 5545 students in grades 9-12 (Huebner et al., 2000); and 2278 students in grade 6-8 (Huebner et al., 2005). The BMSLSS displayed an acceptable internal consistency across the six samples ranging from .68 for elementary school students to .75 for middle to high school students. Test-retest coefficient for a 2-week interval with a sample of high school students ranged from .62 to .85 for the domain-specific satisfaction, and an overall .91 for total life satisfaction (Funk et al., 2006). This demonstrated that the students were satisfied with the various domains of their life as measured by the BMSLSS. Huebner et al. (2006) state that these reliability coefficients are acceptable for research purposes, and the

scale has shown to be useful for differentiating between the five domains of life satisfaction. These findings are, however, only applicable to the USA. Huebner et al. (2006) suggested that further validation of the BMSLSS be explored in other countries to allow for cross-national and cross-cultural comparisons.

Studies conducted in the USA employing the BMSLSS previously consisted of White, Black, and other samples groups. Thus far, no BMSLSS study in the USA has been conducted exclusively with African American adolescents. Valois et al. (2019) examined the validity and reliability of the BMSLSS using a sample of 1658 African American adolescents aged 13- to 18-years. African Americans reported experiencing significant levels of discrimination, racism, and race-related stress, which contribute to mental health. Using the BMSLSS, it was found that the life satisfaction using the BMSLSS of African American adolescents were congruent with the BMSLSS literature in the USA. The mean scores of the domains, 'family', 'friendship', 'school', and 'living environment' fell within 'mostly satisfied', while the adolescents reported a mean of 6.00 ("pleased") out of 7.00 for satisfaction with themselves. Henceforth, internal consistency using Cronbach's alpha was $\alpha = .78$ and CFA demonstrated acceptable loadings for each of the five domains of the BMSLSS (Valois et al., 2019).

Siyez and Kaya (2008) assessed the reliability and validity of the Turkish version of the BMSLSS with a sample of 394 adolescents aged 9- to 16-years, in grades four to eight from two schools in Malatya, Turkey. The mean scores for the BMSLSS and overall life satisfaction scores indicated that the adolescents had a high degree of life satisfaction for each of the domains and overall life satisfaction. The Cronbach's alpha for the scale was .89, demonstrating that it is an internally consistent measure across the sample. Test-retest

reliability of the BMSLSS demonstrated a Cronbach's alpha of .82. The EFA using the BMSLSS found that all five items loaded on one factor, which is congruent with the literature on the BMSLSS. The findings of this study were consistent with similar samples from the USA (Seligson et al., 2003; Huebner et al., 2006).

Ye et al. (2014) investigated the reliability and validity of the Chinese version of the BMSLSS to identify differences in life satisfaction across gender. The study sample included 2406 adolescents ages 12 to 18 years from Hunan, China. The internal consistency of the BMSLSS was .77 for the sample, and .74 and .79 for boys and girls, respectively. Test-retest reliability for the mean score of the BMSLSS was .91. Exploratory factor structure indicated that all five items of the scale loaded onto a single factor, factor loadings for the items ranged from .63 to .73. Furthermore, the results showed that boys had higher levels of satisfaction with their self and overall life satisfaction, while girls had elevated levels of satisfaction with friends, school, and social support (Ye et al., 2014). However, both genders reported high overall scores for the BMSLSS. The Chinese version of the BMSLSS has been shown to be a reliable and valid measure for Chinese adolescents in this study.


Tian et al. (2015) conducted a preliminary validation study with 1904 Chinese elementary school adolescents in grades four to six, using the BMSLSS. The students were divided into three distinct sample groups for the study. Sample 1 comprised 800 students, sample 2 included 799 students, and sample 3 comprised 305 students. Each of the samples used different data analysis: sample 1 used item analysis and EFA; sample 2 employed CFA, internal consistency, validity, and measurement invariance; and sample three used test-retest reliability and predictive validity. The findings indicate that the item-total correlations for the five BMSLSS items ranged from .53 to .63. Furthermore, the Cronbach's alpha coefficient

was .77 for the overall sample and .78 and .75 for boys and girls respectively, with a 5-week test-retest reliability coefficient of .88. The reliability coefficients were similar to the study conducted by Ye et al. (2014).

Hashim and Areepattamannil (2017) investigated the psychometric properties of the BMSLSS with a sample of 445 high school adolescents in grades 10 to 12 in Kerala, India. The study examined the internal consistency, factorial, convergent, discriminant, and predictive validity of the BMSLSS. The internal consistency of the scale was .82, indicating that the scale was reliable. The test-retest reliability of the BMSLSS indicated a reliability coefficient of .94. Multi-group CFA indicates that the BMSLSS is invariant across gender.

A longitudinal study conducted by Ng et al. (2018) investigated the measurement invariance and fit the structure of the BMSLSS using two waves of data over one year. Wave 1 included 1181 adolescents in grade six and seven, and wave 2 included 1666 adolescents in grade six, seven, and eight. The overall longitudinal sample comprised 796 adolescents, yielding a retention rate of 67%. Internal consistency for wave 1 and wave 2 were high at $\alpha = .79$ and $\alpha = .83$, respectively. The one-factor CFA model did not have an exact fit at wave 1 or wave 2, however, the close fit of the one-factor CFA model indicated that the data was consistent with BMSLSS literature. Furthermore, the strict invariance model showed there were no statistically significant differences in the BMSLSS factor means and variances across one year (Ng et al., 2017). Similarly, Huebner et al. (2011) found the BMSLSS to be a reliable measure across a one-year interval with the Cronbach alpha at .76 for year one, and .78 for year two.

Abubakar et al. (2016) conducted a cross-sectional study, with 7739 adolescents (secondary school students) and youth (undergraduate university students from) from 23 countries – Bulgaria, Brazil, Cameroon, Chile, China, Germany, Guatemala, India, Indonesia, Italy, Kenya, Lebanon, Mexico, The Netherlands, New Zealand, Oman, South Africa, Spain, Taiwan, Turkey, The United Kingdom, The United States, and Zambia. The study examined whether the BMSLSS factorial structure is invariant across contexts, and whether the BMSLSS shows multi-level invariance at the individual and country level. It was found that the internal consistency of the BMSLSS ranged from .69 to .94, which was above the cut-off scores across all contexts. Multi-group CFA indicated that the BMSLSS is suitable for use in cross-national surveys for both adolescents and youth. However, insufficient evidence for scalar invariance indicated that the mean scores cannot be compared across cultures.



A cross-cultural study conducted by Casas and Rees (2015) measured the subjective well-being of 16 704, 12-year-old children from 11 different countries using a modified version of the BMSLSS. The 11 countries include Algeria, Brazil, Chile, England, Israel, Romania, South Africa, South Korea, Spain, Uganda, and the USA. They used data from the deep pilot wave of the Children's Worlds: International Survey of Children's Well-Being (ISCWeB), which is a cross-national survey of children's subjective well-being and daily activities. Cronbach's alpha for the BMSLSS items indicated acceptable reliability of .71. Multi-group CFA of the scale suggested that correlations and regressions were comparable among seven of the eleven countries. Likewise, in a study conducted by Abubakar et al. (2016), Casas and Rees (2015) found that mean scores of the BMSLSS cannot be compared between countries.

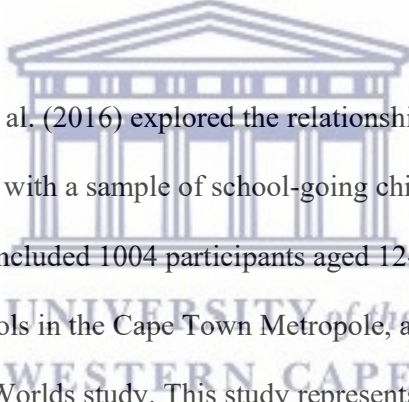
A study conducted by Strózik et al. (2016) aimed to measure the overall well-being of 3157 Polish students between the ages of 8-, 10-, and 12-years old, forming part of the Children's Worlds study. The results indicated that the degree of the students' life satisfaction was relatively high, with 8-year-olds having the highest satisfaction scores and lowest for 12-year-olds. This demonstrates the decreasing-with-age tendency of SWB. Both girls and boys displayed an average level of life satisfaction, with 8-year-old girls displaying the highest BMSLSS scores out of the three groups. T-tests and Analysis of variance (ANOVA) revealed statistically significant differences between the learners from urban and rural schools, across the three age groups. Out of the five domains of the BMSLSS, the family life domain was the most favourable in all the age groups in both rural and urban schools (Strózik et al., 2016). The BMSLSS domains in determining the overall life satisfaction of the Polish students were confirmed by multiple regression analysis ($p < .001$), indicating that all the domains significantly contribute to children's life satisfaction.

The relation between children's perceptions of nature and their SWB

While there is a burgeoning number of empirical research studies focusing on children's SWB and children's perceptions of nature respectively, there is a dearth of research exploring the relationship between children's perceptions of nature and the influence on their SWB (Adams et al., 2016). Only two empirical studies have been identified in the literature.

A study conducted by Galli et al. (2016) explored the relationship between the SWB and environmental attitudes and environmental satisfaction of 1746 adolescents aged 8 – 13 years in Rio Grande do Sul, Brazil. The following scales were used in the study: The Environmental Attitudes Scale for Children (EAAN), Environmental Satisfaction among

Children Scale (EISA), and the Personal Well-Being Index-School Children (PWI-SC). Hierarchical regression analyses were conducted using the enter method to assess whether children's environmental attitudes and satisfaction predicted their SWB (PWI-SC). Correlational analysis between the items on the EAAN scale was .54, while the EISA scale revealed a correlation coefficient of .46 – these findings indicate that no multicollinearity was present. Five of the six items from the EAAN scale explained 11.1% of the variance in SWB, similarly only five items of the EISA scale explained 14% of the variance. The overall findings of the study revealed that positive parental attitudes towards the environment, engagement with nature and animals, and the condition of the school are the contributing predictors of SWB among children. The findings of the study align with the literature, demonstrating that engagement in nature influences children's SWB.



The study by Adams et al. (2016) explored the relationship between children's SWB and their perceptions of nature with a sample of school-going children using the NEP, PWI-SC, and the SLSS. The study included 1004 participants aged 12-years old, randomly selected from 15 primary schools in the Cape Town Metropole, and formed part of Wave 1 (deep pilot) of the Children's Worlds study. This study represents the only empirical study on the topic in the South African context. Contrary to the literature, the findings of the study revealed that children's engagement in nature was not related to their SWB. However, Adams et al. (2016) note that these findings can be attributed to numerous factors as such the physical natural spaces children live in and the safety of the natural environment in the South African context. Owing to the lack of literature on the topic, the authors recommend that further quantitative and qualitative research be conducted to explore how children make sense of and understand nature.

Summary of the literature

The NEP scale (Dunlap & Van Liere, 1978) was constructed to assess whether adults endorsed the ideas related to the NEP, which rejects the notion that nature is for human consumption. The 12-item measure demonstrated to be an appropriate instrument for measuring the endorsement of the NEP. While the NEP scale (Dunlap & Van Liere, 1978) has been widely employed across various contexts such as Japan (Pierce et al., 1987), Canada (Edgell & Nowell, 1989), Turkey (Furman, 1998), and the USA, it has been critiqued for its methodological flaws. Dunlap et al. (2000) revised the scale by including an additional three items to balance the NEP and DSP items, update the terminology of the statements, and expand the initial dimensions. The development and adaptations of the NEP scale have been centred on adults and the shift in research interests with regards to children's environment worldviews and the development thereof has led to researchers assessing whether the NEP scale is an appropriate measure for children. Manoli et al. (2007) assessed the applicability of the revised 15-item NEP scale for children ages 10-12 years. The NEP scale for Children (Manoli et al., 2007) has been developed and validated in the USA. The scale has shown acceptable levels of reliability when employed in developed contexts in the global North, namely Belgium (van Petegem & Blieck, 2007), Spain (Corraliza et al., 2013), and Australia (Izadpanahi & Tucker, 2018). Studies have shown that the NEP scale for Children (Manoli et al., 2007) yields low levels of reliability as revealed in the Van Petegem and Blieck (2007), Grúňová et al., (2018) and Wu (2012) studies. These authors have proposed that one of the main reasons the NEP for Children does not display appropriate fit in these studies is the specific context the scale was developed in. The International Test Commission (2016) recommends using multiple translators and reviewers that are familiar with both the culture and the language into which the instrument is being adapted to ensure the content of the instrument is similar across cultures. Furthermore, local surveys using the adapted measure

could interview the respondents and administrators for feedback on the content of the items before administering the instrument to the intended sample. However, Wu (2012) and Grůňová et al. (2018) found that the items in the factor distribution appeared disordered, compared to Manoli et al. (2007). Thus, further research should explore the limitations of the NEP scale for Children to allow for appropriate adaptations.

The BMSLSS is a life satisfaction measure for use with children and adolescents aged 8- to 18-years. Validation studies conducted in the United States, Turkey, China, and India suggests that the scale has acceptable psychometric properties and has yielded satisfactory Cronbach's alphas ranging from .68 to .89. Furthermore, studies have also indicated that the scale continued to be invariant across one year, this implies that the life satisfaction of students was moderately stable across a one-year interval (Ng et al., 2018; Huebner et al., 2011). Studies also suggest that further research should investigate longitudinal studies. While the scale has been found to be a reliable measure across various contexts, one-year intervals and comparisons between gender indicate that there is insufficient evidence for cross-cultural invariance as indicated by Abubakar et al. (2016) and Casas and Rees (2015).

The literature suggests that engagement in natural spaces and places have a positive influence on the well-being of children's lives (Adams & Savahl, 2015, 2017; Kerret et al., 2014). The studies that have explored this relation have been conducted in LMIC in Brazil and South Africa. Overall, the studies found that engagement in natural spaces and places influence the SWB of children. However, this area of research is in its infancy and requires further exploration (Adams et al., 2016).

Theoretical Framework

The plethora of research on child well-being and the approaches to well-being has resulted a lack of consensus on the definition of child well-being and encapsulating this multidimensional phenomenon of well-being into a single theory (Minkkinen, 2013). Direct interaction with nature has been recognised to promote health and well-being (Adams & Savahl, 2016; Bratman et al., 2012, as cited in Scopelliti et al., 2019). Numerous theories focusing on well-being, and nature have been developed throughout the decades based on adult perspectives, creating a gap in the literature on child-specific theories. A recent shift in the literature has illustrated the rise of theories specific to children, this is mostly attributed to children being recognised as social actors of their environment (Ben-Arieh, 2009). These theories have been examined and synthesised more comprehensively in Adams (2016). For a more extensive review of the theoretical frameworks under consideration, see Adams (2016).

Theories on well-being

Theories on well-being can be categorised into two streams namely, hedonic, and eudaimonic well-being (Adams, 2016). Hedonic well-being focuses on the subjective experience of pleasure, which includes both cognitive and physical pleasures, and pain avoidance (Di Fabio & Palazzeschi, 2015; Venhoeven et al, 2013). Eudaimonic well-being focus on the psychological well-being, purposefulness, meaning in life, and resources (Waterman et al., 2010, as cited in Di Fabio & Palazzeschi, 2015).

Prominent hedonic theories include Brickman and Campbell's (1971) *Adaptation Level Theory of Well-being*, the original hedonic treadmill model posits good and bad circumstances only temporarily affect the happiness of individuals thereafter the individual quickly reverts to hedonic neutrality (Adams, 2016; Diener et al., 2006). The *Adaptation*

Level Theory constituted the foundation for *Cummins' Homeostasis Theory of Subjective Well-Being* (1995; 2010; 2014). The homeostasis theory proposes that SWB is controlled and maintained by neurological and psychological processes similar to the homeostatic maintenance of body temperature. The goal of SWB homeostasis is to defend the homeostatically protected mood (HPMood) which comprises of the three mood affects: alert, content, and happy (Cummins, 2010). Similarly, the *3P Model* presented by Durayappah (2011) which incorporates existing theories and current SWB literature, uses temporal states (past, present, and prospect) as the main component for governing SWB. Happy and meaningful events contribute toward the present state SWB of the individual, as well as the past and future states of SWB (Adams, 2016).

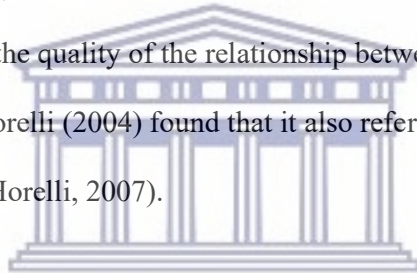
Hedonic well-being theories developed specifically for children include Minkkinen's (2013) *Structural Model of Child Well-being* (SMCW) and McKendrick's (2014) *Factors contributing to child well-being: A conceptual framework to situate place in context* (Adams, 2016). The SMCW was conceptualised as a need for understanding child well-being based on Ben-Arieh and Frønes (2011) suggestion for a child well-being framework. The SMCW is a graphic model that integrates the core dimensions of well-being, essential conditions for well-being and interchangeable relationships between the various components. Minkkinen's (2013) SMCW is based on the definition of health by the World Health Organisation (WHO, 1946), several psychological and sociological theories such as the *Bioecological Theory of Child Development* (Bronfenbrenner & Morris, 1998), *Societal Support Theory* (Cobb, 1976) and *Socio-Cultural Approach to Human Development* (Leont'ev, 1978; Vygotsky, 1962). Minkkinen's (2013) SMCW comprises of four circles: subjective action, circle of care, structures of society and culture.

Theories on engagement in nature

Engagement in nature has been recognised as beneficial for both adults and children as it positively contributes to various domains of well-being (Adams, 2016). Prominent theories that have contributed to the field include the *Biophilia hypothesis* (Wilson, 1984), which encompasses two premises firstly, that biophilia is intrinsic and is considered part of the genetic composition of human beings; secondly, biophilia is an emotional response and can stimulate responses that in turn motivate behaviours (Heerwagen, 2007, as cited in Adams, 2016). Studies employing Wilson's (1984) theory have provided evidence for the benefits of engagement in nature during childhood. Nabhan and St. Antoine (1993, as cited in Blizard & Schuster, 2007) propose that engagement in nature during childhood may be a prerequisite for biophilic tendencies in adulthood (see Adams, 2016). Kellert (2002) found that children's experiences in the natural environment can lead to numerous affective, evaluative, and cognitive benefits. Similarly, Kaplan's (1995) *Attention Restoration Theory* (ART) posits that the natural environment exhibits the ability to harness, promote, and restore attention. Wells (2000) conducted a study using *ART* and examined the cognitive functioning of low-income urban children who had relocated using a pre-move/post-move longitudinal design. The results indicated that children whose new homes were closer to a natural (greener) environment displayed higher levels of cognitive functioning (see Adams, 2016).

The *Person-Environment (P-E) Fit Theory* (Horelli, 2007) was developed due to the shortage of frameworks that considers the significance of children's perspective on their environment (Adams, 2011; Adams & Savahl, 2015). Horelli (2007) argues that while most of the research on child-friendly environment is focused on the immediate environment of the child, it fails to acknowledge the impact that various historical, social, and political factors have on the environment of the child (Adams & Savahl, 2017). The origins of the *P-E Fit*

Theory were significantly influenced by Lewin (1948) who stated that behaviour is the product of the individual and their perceived environment (Adams, 2016). While the *P-E Fit Theory* has frequently been employed with studies using adults, this theory is rarely operationalised with children and their environment settings (Horelli, 2007). A notable exception are the studies by Adams (2011) and Adams and Savahl (2015). Horelli (2007) notes that children's environmental perceptions are not static, it emphasises a multitude of factors that influence their perceptions. If the fit between the individual and their environment is poor, their experiences within the environment may be stressful (Adams, 2011; Adams & Savahl, 2015). Difficulties within the home, school, and community can contribute to the environmental stress that the child experiences if the fit between the child and their environment is not congruent (Horelli, 2007, as cited in Adams, 2016). Although the framework typically refers to the quality of the relationship between the child and their environment, Haikkola and Horelli (2004) found that it also refers to the perceived quality of that environment (as cited in Horelli, 2007).



UNIVERSITY of the
WESTERN CAPE

McKendrick's framework

The study uses McKendrick's (2014) conceptual framework, *Factors contributing to child well-being: A conceptual framework to situate place in context*. This framework has been used in a range of studies on children's engagement with natural spaces and their subjective well-being (see Adams, 2016; Adams & Savahl, 2016; Adams et al., 2017). McKendrick (2014) proposes that where children live is one of the several factors that contribute to their well-being. The aim of the conceptual framework is based on the notion that children's well-being is influenced by the spaces around them and the context they live in (Adams, 2016; McKendrick, 2014). This conceptual framework aligns with the literature that advances that one of the key influences on children's SWB is their engagement in social and physical

places and spaces (see Adams & Savahl, 2015; Adams & Savahl, 2017; Kerret et al., 2014). Furthermore, how children interact with their environment is dependent on the physical conditions of the environment. For example, in South Africa, low SES communities are characterised by high crime rates, substance abuse, and violence (Savahl et al., 2019). Furthermore, resources such as access to sanitation, water, formal housing, nutrition, and healthcare remain limited in these communities owing to social and structural inequities as a result of colonialism and apartheid (Savahl, Malcolm, et al., 2015; Savahl et al., 2019). These social and environmental factors pose a threat to the well-being of children in low SES communities, for instance, children are at greater risk of experiencing violence when they are exposed to substance abuse, and crime within their community (Adams et al., 2017).

In the current study, engagement in natural spaces is emphasised as being beneficial to children's well-being in a myriad of ways. Similarly, the concept of engaging in nature can be compared to McKendrick's (2014) proposal of 'Good places' for children, thus places that positively influence their SWB. 'Good places' provide children with positive developmental outcomes in education and health, and reduce risk behaviours and damaging relationships. Furthermore, this relates to the notion that positive environmental places and spaces influence multiple domains of children's well-being such as physical, emotional, and social spaces, and their SWB (Adams & Savahl, 2016). Within the South Africa context, SES has been identified as a determining factor influencing children's SWB, with children residing in low and middle SES communities making sense of nature in disparate ways (Adams & Savahl, 2016). In low SES communities, children have restricted access to engaging in nature owing to threats against their safety. These communities are also characterised by poor infrastructure (Adams & Savahl, 2015). This aligns with the literature that emphasises the

importance of safe places and spaces, essentially ‘good places’ that allow for the positive development of children’s well-being.

In addition to the conceptual framework, McKendrick (2014) developed a tool, *The impact of places on the well-being of children* (as cited in Adams, 2016). The tool comprises five levels, with the lowest level being ‘damaging’ and the highest being ‘transforming’ (Adams & Savahl, 2016). The lowest level, *damaging*, refers to neighbourhoods that have severe negative influences on the well-being of the child. The second level, *impairing*, refers to neighbourhoods that have few opportunities and inadequate access to resources. The third level, *reinforcing*, implies that the children have adequate access to resources and opportunities, these are congruent with children experience at home. The fourth level, *enriching*, refers to the neighbourhoods that are child-friendly and allows for maximum utilisation of the resources of the environment (Adams, 2016). The fifth and highest level of the tool, *transforming*, refers to the ideal environment in which children have an abundance of opportunities and resources, which exceeds those they receive at home. The neighbourhood children reside in can be defined according to the proposed levels, as each level makes sense of the influence it has on the child’s well-being. However, the tool should be used to allow researchers to make sense of the influence that the environment has on children’s well-being and not to analyse the levels of children’s well-being (Adams, 2016).

Furthermore, McKendrick (2014) also states that the influence of children’s neighbourhoods on their well-being can be interpreted through using a classification of stars, ranging from ‘no star’ to ‘four stars’. This classification system aligns with four key considerations of children’s well-being, namely, inclusivity, participation, opportunities available, and resources. Overall, the conceptual framework proposed by McKendrick (2014)

takes into consideration the influence that children's neighbourhoods have on their well-being. These neighbourhoods could provide environments that are conducive to children's well-being or damaging to their well-being. As noted, the study aims to determine the relationship between children's perceptions of nature and their SWB. McKendrick's conceptual framework merges both concepts of the study as it characterises how children make sense of their environment, and to what extent the environment influences their well-being. McKendrick (2014) also notes that the influence on well-being extends beyond children's neighbourhoods. Factors such as socioeconomic status, parenting styles, family dynamics also contribute to the well-being of a child (Adams & Savahl, 2016). Therefore, the conceptual model notes that the neighbourhood comprises several factors that contribute to the well-being of a child. McKendrick (2014) concludes that some children can maintain an adequate level of well-being despite the SES of their neighbourhoods, or unsupportive family (Adams, 2016).



Research design

The study formed part of and used secondary data from Wave 2 of the Children's Worlds Study: International Survey on Children's Well-Being (Ethics clearance number: 13/4/26; Appendix A). The study included children from three age groups, namely 8-, 10-, and 12-year-olds, randomly selected from 29 primary schools in the Western Cape Province of South Africa. While the larger study aimed to collect substantive data about children's perceptions, understandings, experiences, and evaluations of their lives across various domains (see Savahl & Adams, 2022; Savahl et al., 2022), the current study aimed to determine the relation between children's perceptions of nature and SWB.

History of the Children Worlds Study

The Children's Worlds Study was conceptualised in 2009 by the International Society for Child Indicators in a meeting hosted by UNICEF Geneva, to discuss the need for a study that captured information on children's subjective well-being (Savahl & Adams, 2020). The group designed a preliminary survey to determine children's subjective perceptions and evaluations of well-being across various life domains. The survey was evaluated and piloted in 2010 in seven countries, Brazil, England, Germany, Honduras, Israel, Palestine, and Spain. A second version of the survey was constructed in December 2010 and piloted in early 2011. These findings were reviewed and a third set of survey questionnaires with different versions were developed for children aged 8, 10, and 12-years old. Wave 1 was conducted in 2012-2013 across 21 countries with a sample of 8 to 12-years old ($n > 30\ 000$). The objectives of the first wave were to generate baseline data on child well-being, assess the validity of the instruments and to allow for comparability of SWB across countries. Thereafter, Wave 2 was conducted in 2013-2016 across 15 countries using the same age cohorts as Wave 1. Researchers from the University of the Western Cape joined the study in 2010, and Wave 1 of the study was conducted in South Africa in 2012-2013 with a sample of children aged 12-years old ($n = 1004$) (Savahl & Adams, 2020). Wave 2 was conducted in 2014-2016, and data was collected using a stratified random sample of children aged 8, 10, and 12-year-old ($n = 3284$) selected from 29 primary schools across the Western Cape Province from both urban and rural districts. The current study used secondary data from Wave 2 of the South African Children's Worlds Study (see Appendix B, Permission letter).

Research context

Despite the central principle of equality in the South African Constitution, inequality remains pervasive in the country (Savahl et al., 2019). Widespread social inequality is one of

the most ruinous consequences of the apartheid regime, which has resulted in privileged and disadvantaged communities (Savahl et al., 2015). Privileged communities are characterised by high income, high levels of educational attainment and employment, and low incidence of violence, while disadvantaged communities are characterised by low educational attainment and income, high rates of substance use, unemployment, crime, and community violence (Savahl et al., 2015).

Participants and sampling

The larger study was conducted in the Western Cape Province of South Africa, with a population of 6 621 100, representing 11.5% of the total population (Statistics South Africa, 2017). The Western Cape Province comprises one metropolitan area (City of Cape Town), and five district municipalities: West Coast; Central Karoo; Overberg; Eden; and Cape Winelands. The Cape Town Metropole is a typical urban area with peri-urban areas, located approximately 50 to 100km from the city centre (Savahl et al., 2015). The population for the larger study included children attending primary schools within the eight Education Management District Councils (EMDC) of the Western Cape Education Department (WCED). The EMDC's comprise four urban and rural districts. The urban districts include Metro North, Metro South, Metro East, and Metro Central; and the four rural districts include West Coast, Cape Winelands, Eden and Karoo, and Overberg (Adams et al., 2016). Stratified random proportional sampling was employed, with schools stratified and selected based on their location within the eight EMDC's, geographical location (urban or rural), and socioeconomic status (low or middle). Private schools and schools that were inaccessible (no roads leading to schools or farm schools with exceedingly small class sizes) were excluded (Savahl et al., 2015; Savahl et al., 2017).

The sampling protocol for the larger study used a 95% confidence level and a 3% margin of error. The sampling frame included 646 primary schools. The questionnaire was adapted and translated (using the backward translation method) into the three most widely spoken languages in the Western Cape Province namely, English, Afrikaans, and isiXhosa. The participants had the option to complete the questionnaire in one of the three languages they preferred. The total sample of 8-, 10-, and 12-year-olds for the larger study included 3284 children (8-year-olds: $n = 1032$; 10-year-olds: $n = 1109$; 12-year-olds: $n = 1143$) from 29 primary schools in the Western Cape. With a sample size of 3284 and noting the items (15) for the confirmatory models, the study meets the minimum sample size requirement for model identification (between 10 and 20 cases per parameter) in CFA (Savahl et al., 2019; Kline, 2011).

Instrumentation

New Ecological Paradigm Scale for Children (Manoli et al., 2007)

The revised 10-item NEP scale (Appendix C) was used to assess children's environmental perceptions, behaviours, and attitudes. Manoli et al. (2007) assessed the applicability of the revised NEP Scale for Children ages 10 to 12 years of age. The NEP Scale for Children was found to have measure three interrelated dimensions, such as Rights of Nature, Eco-Crisis, and Human Exemptionalism. The response options for the scale ranges from 'very much disagree' (1) to 'very much agree' (5). The scale has previously been validated in South Africa using a group of 12-year-olds, and has demonstrated appropriate fit and a Cronbach's alpha of .86 (Adams et al., 2016).

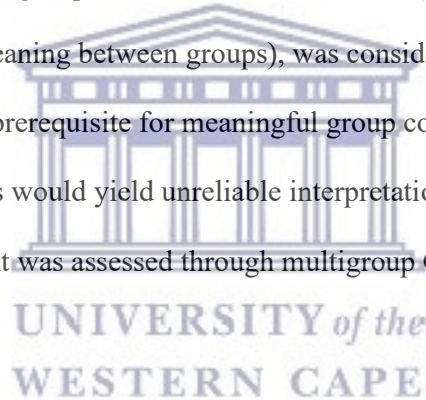
Brief Multidimensional Students' Life Satisfaction Scale

The BMSLSS is a 5-item scale developed by Seligson et al. (2003) for use with children ages 8 – 18 years of age. The items assess domains of family, friends, schools, self, and living environment (Savahl et al., 2022). The original response format for the scale is a 7-point Likert scale that ranges from 'Terrible' = 1 to 'Delighted' = 7. However, in the Children's Worlds Study, a 0 – 10 numerical response format was used (Savahl & Adams, 2020). The total score is derived from the summation of the five items. The BMSLSS has been used with children across several contexts such as Algeria, Italy, Brazil, Poland, Brazil, the USA, Canada and comparative research with α ranging from .53 to .94 (see e.g., Tiliouine, 2015; Gonzalez, Casas, Ben-Arieh, Savahl, Tiliouine, 2019). In South Africa, a study by Delport and Savahl (2017) validated the BMSLSS across three age groups (8, 10 and 12 years) and demonstrated the tenability of measurement invariance.

Data analysis

Descriptive statistics (means and standard deviations) of the scale items were conducted using Stata 14. Confirmatory factor analysis (CFA) and structural equation modelling (SEM), using IBM AMOS software was conducted to ascertain the relation between children's perceptions of nature and their SWB across low and middle SES groups in the Western Cape. The basic tenet of SEM is that proposed models (indicating the relationships between variables) have a strong theoretical rationale (Savahl et al., 2017). Subsequently, designation of specified models needs to be based on underlying theoretical relationships between observed and unobserved variables (Savahl et al., 2017). The analysis entailed establishing a model fit of the latent variables using CFA, and thereafter SEM was conducted (Byrne, 2010). Following recommendations from Casas (2016), all participants with three or more missing items on the scales were deleted and missing values were attended

to using the full imputation maximum likelihood method. Maximum likelihood estimation was used, with kurtosis and departures from normality attended to using the bootstrap method (500 samples) (Casas, 2016). Given recommendations by Jackson et al. (2009) and Kline (2010) the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and the Standardised Root Mean Square Residual (SRMR) was used as fit indexes. Results higher than .950 was accepted for the CFI, and results below .05 were regarded as a good fit for the RMSEA and SRMR. Improvement of model fit was achieved by excluding items with excessively low factor loadings ($< .2$) (Kline, 2010), the application of modification indices (error covariance constraints), and if required the application of partial measurement constraints (Casas, 2017; Savahl et al., 2017). To compare the results across the low and middle SES groups, measurement invariance (the degree to which items in the measure have the same meaning between groups), was considered (Meredith, 1993). Measurement invariance is a prerequisite for meaningful group comparisons; if it is not met group then group comparisons would yield unreliable interpretations (Millsap & Olivera-Aguilar, 2012). In this study, it was assessed through multigroup CFA (across the two SES groups).



Procedure and ethics

Ethics clearance for the larger study was obtained from the Senate Research Committee (Ethics clearance number: 13/4/26; Appendix A) at the University of the Western Cape, and the Western Cape Education Department (Savahl et al., 2015). The research team met with the school principals and life skills teachers at the selected schools to discuss the study particulars. Prior to the administration of the questionnaire, the researchers informed the participants of the details of the study including aims, their participation, and key ethics principles of informed consent, confidentiality, right to withdraw, and privacy (see Appendix

D). The participants were also informed about the dissemination procedure of the study including the future use of the data, including conference presentations, journal articles and student theses. The learners who chose to participate in the study were required to provide signed consent and acquire informed consent from their parent/guardian. Only those children that returned signed consent forms participated in the study. The questionnaires were researcher-administered within the classroom context during the administration period at the commencement of the school day. Data were captured using the double-entry method by the research team. The final captured database was sent to the international organising committee for validity checks (Savahl et al., 2015). Here, the accuracy of the data capturing procedure, an analysis of missing data, and extreme scores were conducted. This process represented an oversight function and has been shown to increase the quality of data (Casas & Rees, 2015).

Significance

Based on the evidence provided in the literature, increased time spent in nature increases various aspects of children's SWB (Adams & Savahl, 2015); experiences in nature enriches children's lives and positively influences their quality of life (Kerret et al., 2014). However, research that focuses specifically on children's perceptions of nature and the influence on their SWB is absent in the literature (Adams & Savahl, 2016; Adams et al., 2017). This gap in the literature provided the key impetus for the current study, which endeavours to make a contribution in this regard by merging two traditions namely, environmental and positive psychology as advanced by Adams (2016). The goals of these traditions are aligned – to enhance well-being pointing to how these traditions are theoretically related. Within South Africa, this study contribute to an emerging body of research on the topic (see Adams & Savahl, 2015; 2016a, b, Adams et al., 2016), and aligns to the national research priority of *Global Change, Society and Sustainability* and addresses

Sustainable Development Goal 3 (Good Health and Well-Being) and 13 (Climate Action) (United Nations, 2015).

Results

Descriptive Statistics

Table 1 displays the item mean scores, skewness, and kurtosis for the NEP Scale and the BMSLSS. Skewness of the items on the NEP scale ranged from .01 to -.62, and -1.17 to -2.35 for the BMSLSS. Kurtosis ranged from -1.05 to -1.31 for the NEP Scale, and .35 to 5.53 for the BMSLSS. The highest mean scores for the NEP Scale was for Item 5 (*When people mess with nature it has bad results*; $\bar{x} = 3.58$, $SD = 1.48$) and Item 4 (*People must still obey the laws of nature*; $\bar{x} = 3.55$, $SD = 1.58$). For the BMSLSS, the highest mean scores were for Item 1 (*Satisfaction with: Your family life*; $\bar{x} = 8.83$, $SD = 2.15$) and Item 5 (*Satisfaction with: The way that you look*; $\bar{x} = 8.61$, $SD = 2.30$). The NEP mean total score was 41.57 (out of a total of 50; $SD = 7.41$), while the BMSLSS total mean was 32.18 (out of a total of 50; $SD = 5.31$).

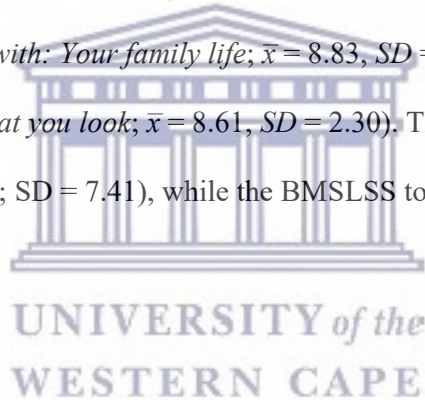


Table 1*NEP and BMSLSS Item Means*

Item	Mean	SD	Skewness	Kurtosis
PlantsAnimalsRightToLive	3.37	1.54	-.40	-1.31
TooManyPeopleOnEarth	3.10	1.34	-.10	-1.10
PeopleCleverEnough	2.84	1.39	.15	-1.17
PeopleObeyLawsOfNature	3.55	1.58	-.59	-1.24
PeopleMessNatureHasBadResults	3.58	1.48	-.62	-1.05
NatureStrongEnough	2.97	1.34	.01	-1.05
PeopleSupposedToLiveOverNature	3.28	1.35	-.26	-1.04
PeopleTreatingNatureBadly	3.34	1.40	-.34	-1.12
PeopleKnowEnoughNatureControlIt	2.73	1.37	.27	-1.09
Environ.Disaster	3.46	1.46	-.47	-1.14
NEP Total Mean	41.57	7.41		
SatisfactionFamilyLife	8.83	2.15	-2.35	5.53
SatisfactionFriends	8.10	2.44	-1.44	1.68
SatisfactionAreaLiveIn	7.64	2.94	-1.17	.35
SatisfactionSchoolExperience	8.39	2.22	-1.67	2.69
SatisfactionWayYouLook	8.61	2.30	-1.98	3.61
BMSLSS Total Mean	32.18	5.31		

Notes: Items on the NEP are on a 5-point scale (ranging from “1”: Very much disagree, to “6”: Very much agree). Items on the BMSLSS are on a 10-point scale (ranging from “0” – Completely dissatisfied, to “10” Completely satisfied. Total mean scores for both the NEP was out of a total of 50 and BMSLSS out of a total of 55.



WESTERN CAPE

Table 2
NEP and BMSLSS Item Means Across SES and Gender

Item	SES				Gender			
	Low		Middle		Boy		Girl	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
PlantsAnimalsRightToLive	3.06	1.55	3.82	1.39	3.39	1.54	3.35	1.53
TooManyPeopleOnEarth	3.10	1.40	3.11	1.26	3.09	1.36	3.11	1.33
PeopleCleverEnough	2.93	1.38	2.71	1.39	2.86	1.43	2.82	1.35
PeopleObeyLawsOfNature	3.15	1.59	4.14	1.35	3.59	1.56	3.51	1.59
PeopleMessNatureHasBadResults	3.28	1.47	4.02	1.39	3.61	1.46	3.54	1.51
NatureStrongEnough	3.00	1.34	2.93	1.34	2.97	1.37	2.98	1.30
PeopleSupposedToLiveOverNature	3.17	1.38	3.43	1.30	3.26	1.39	3.28	1.32
PeopleTreatingNatureBadly	3.02	1.34	3.81	1.35	3.38	1.38	3.31	1.42
PeopleKnowEnoughNatureControlIt	2.94	1.41	2.41	1.26	2.68	1.40	2.77	1.36
Environ.Disaster	3.12	1.47	3.96	1.31	3.52	1.46	3.41	1.47
SatisfactionFamilyLife	8.97	2.14	8.64	2.16	8.82	2.21	8.85	2.11
SatisfactionFriends	8.01	2.58	8.23	2.21	8.09	2.40	8.11	2.48
SatisfactionAreaLiveIn	7.50	3.11	7.86	2.65	7.73	2.96	7.57	2.92
SatisfactionSchoolExperience	8.45	2.26	8.31	2.17	8.40	2.23	8.39	2.22
SatisfactionWayYouLook	8.70	2.29	8.49	2.30	8.70	2.25	8.54	2.34

Notes: Items on the NEP are on a 5-point scale (ranging from “1” – Very much disagree, to “6” – Very much agree). Items on the BMSLSS are on a 10-point scale (ranging from “0” – Completely dissatisfied, to “10” Completely satisfied)

Table 2 displays the item mean scores of the NEP Scale and BMSLSS across SES (low and middle) and gender (boy and girl). The highest mean score on the NEP Scale for the low SES group was for Item 5 (*When people mess with nature it has bad results*; $\bar{x} = 3.28$, $SD = 1.47$) and the lowest mean item score was Item 3 (*People are clever enough to keep from ruining the earth*; $\bar{x} = 2.93$, $SD = 1.38$). The highest mean item score on the NEP Scale for the middle SES group was for Item 4 (*People must still obey the laws of nature*; $\bar{x} = 4.14$, $SD = 1.35$) and the lowest item mean score was for Item 9 (*People will someday know enough*

about how nature works to be able to control it; $\bar{x} = 2.41$, $SD = 1.26$). Across gender, the highest mean score was for Item 5 (*When people mess with nature it has bad results*), for both boys ($\bar{x} = 3.61$, $SD = 1.46$) and girls ($\bar{x} = 3.54$, $SD = 1.51$). The lowest item mean for the NEP across gender was for Item 9 (*People will someday know enough about how nature works to be able to control it*; boys: $\bar{x} = 2.68$, $SD = 1.40$; girls: $\bar{x} = 2.77$, $SD = 1.36$).

For the BMSLSS, the highest mean item score in both SES groups (low and middle) was for Item 1 (*Satisfaction with: Your family life*; low: $\bar{x} = 8.97$, $SD = 2.14$; middle: $\bar{x} = 8.64$, $SD = 2.16$). The lowest item mean score for both low and middle SES groups was for Item 3 (*Satisfaction with: The area you live in general*; low: $\bar{x} = 7.50$, $SD = 3.11$; middle: $\bar{x} = 7.86$, $SD = 2.65$). Across gender, the highest mean item score for the BMSLSS was for Item 1 (*Satisfaction with: Your family life*; boy: $\bar{x} = 8.82$, $SD = 2.21$; girl: $\bar{x} = 8.85$, $SD = 2.11$), and the lowest was for Item 3 (*Satisfaction with: The area you live in general*: boy: $\bar{x} = 7.73$, $SD = 2.96$; girl: $\bar{x} = 7.57$, $SD = 2.92$).

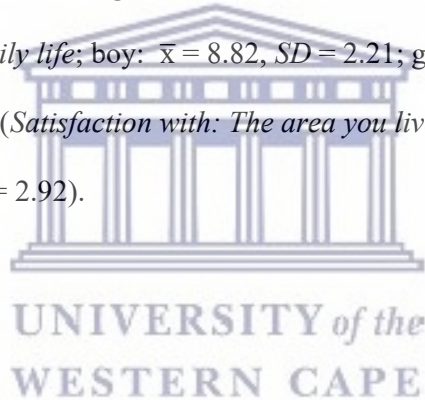


Table 3
Correlation matrix

	NEP1	NEP 2	NEP 3	NEP 4	NEP 5	NEP 6	NEP 7	NEP 8	NEP 9	NEP 10	BMSLSS 1	BMSLSS 2	BMSLSS 3	BMSLSS 4	BMSLSS 5
NEP 1	1														
NEP 2	.342**	1													
NEP 3	-.433**	-.312**	1												
NEP 4	.662**	.379**	-.449**	1											
NEP 5	.595**	.320**	-.395**	.692**	1										
NEP 6	-.265**	-.287**	.251**	-.321**	-.281**	1									
NEP 7	-.197**	-.202**	.252**	-.155**	-.154**	.323**	1								
NEP 8	.453**	.283**	-.335**	.533**	.514**	-.278**	-.207**	1							
NEP 9	-.538**	-.348**	.403**	-.549**	-.465**	.395**	.309**	-.436**	1						
NEP 10	.556**	.340**	-.389**	.665**	.609**	-.336**	-.173**	.558**	-.547**	1					
BMSLSS 1	.000	.023	-.006	-.058	-.018	-.019	-.060	-.072*	.037	-.030	1				
BMSLSS 2	-.006	-.009	-.012	-.032	-.028	.036	.058	-.026	.019	-.033	.145**	1			
BMSLSS 3	.018	-.075*	-.029	.032	-.040	-.017	.020	.023	-.033	.007	.264**	.300**	1		
BMSLSS 4	-.006	.012	-.060	-.005	.014	-.018	.027	.011	-.030	-.014	.202**	.213**	.247**	1	
BMSLSS 5	-.009	-.050	.011	-.073*	-.077*	-.029	-.017	-.078*	-.012	-.062*	.204**	.213**	.218**	.171**	1

Notes: **Correlation coefficient is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

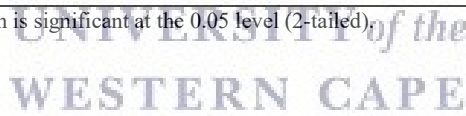
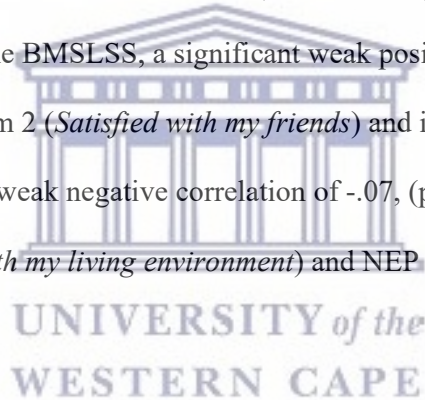


Table 3 displays the correlation matrix between the NEP Scale and the BMSLSS items. The results indicate that all the correlations were significant at $p < 0.001$, with the correlation coefficients ranging from $-.15$ to $.69$ for the NEP Scale and from $-.07$ to $.30$ for the BMSLSS. Between the NEP Scale and the BMSLSS, item correlations ranged from $-.07$ to $.05$. For the NEP Scale, a significant moderate positive correlation of $.69$ ($p < .01$) was found between Item 5 (*When people mess with nature it has bad results*) and Item 4 (*People must still obey the laws of nature*). In addition, a significant moderate positive relationship ($r = .66$; $p < 0.01$) was found between Item 10 (*If things don't change, we will have a big disaster in the environment soon*) and Item 4 (*People must still obey the laws of nature*). However, a significant weak negative correlation of $r = -.15$ ($p < 0.01$) was found between Item 5 (*If people mess with nature it has bad results*) and Item 7 (*People are supposed to live over the rest of nature*). For the BMSLSS, a significant weak positive correlation of $.30$, at $p < 0.01$ was found between item 2 (*Satisfied with my friends*) and item 3 (*Satisfied with my school*). Finally, a significant weak negative correlation of $-.07$, ($p < 0.05$) was found between BMSLSS Item 5 (*Satisfied with my living environment*) and NEP Scale Item 8 (*People Treat Nature Badly*).



Confirmatory Factor Analysis

Confirmatory factor analysis (Maximum Likelihood Estimation) was used to test the factorial structure and model fit of the BMSLSS and the NEP scales using AMOS version 27.

Table 4
Fit Statistics for The Confirmatory Factor and Structural Equation Models

Model	Chi-square	df	p-value	CFI	RMSEA	SRMR
1. BMSLSS initial	11.745	5	.038	.982	.036 (.008 - .063)	.0214
2. NEP initial	279.894	35	.000	.939	.082 (.073 - .091)	.0505
3. NEP modified: (excl. item 7 & 8)	103.149	20	.000	.977	.063 (.062 - .076)	.0281
4. SEM initial (NEP; BMSLSS)	192.012	64	.000	.968	.044 (.038 - .051)	.0313
5. SEM Multigroup: Configural	279.099	128	.000	.961	.034 (.028 - .039)	.0318
6. SEM Multigroup: Metric	348.678	139	.000	.945	.038 (.033 - .043)	.0365
7. SEM Multigroup: Scalar	432.041	150	.000	.927	.043 (.038 - .047)	.0416

Confirmatory Factor Analysis: BMSLSS

The initial model presented with an adequate fit (see Model 1 in Table 4; Figure 1). The standardised regression weights for the overall model ranged between .417 (*SatisfiedAppearance*) and .595 (*SatisfiedAreaGeneral*), with all values significant at the .001 level (see Table 5).

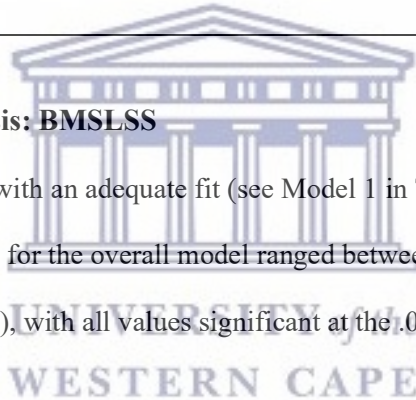
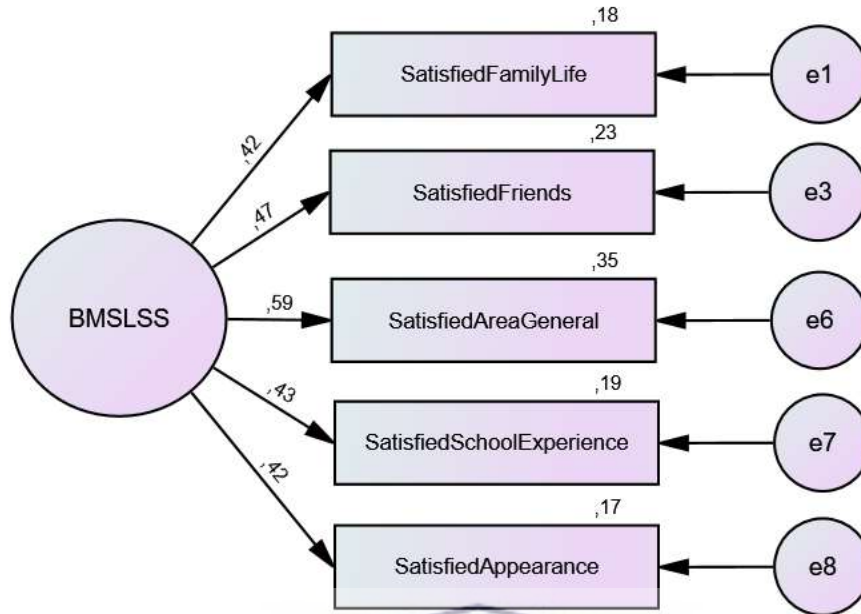


Figure 1

Initial BMSLSS Model



CHI=11,745;CFI=,982;RMSEA=,036;DF=5

Table 5

BMSLSS Standardised Regression Weights

Parameter		Estimate	Lower	Upper
SatisfiedFriends	<--- BMSLSS	.475	.371	.566
SatisfiedAreaGeneral	<--- BMSLSS	.595	.496	.674
SatisfiedSchoolExperience	<--- BMSLSS	.430	.338	.512
SatisfiedAppearance	<--- BMSLSS	.417	.331	.506
SatisfiedFamilyLife	<--- BMSLSS	.419	.316	.521

Notes: All values significant at < .001

Confirmatory Factor Analysis: NEP Scale

The initial NEP model presented with an inadequate fit (see Model 2 in Table 4; Figure 2). The NEP fit improved substantially when item 6 “Nature Resilient” and item 7

“Rule Over Nature” were deleted (see Model 3; Figure 3). Both Item 6 “Nature Resilient” (-.42) and Item 7 “Rule Over Nature” (-.27) had low factor loadings, and the deletion of these items improved the fit indexes of the model by more than .01. Furthermore, it is important to note that both these items were negatively phrased, which is evident in the negative loading. This alludes to the participants not clearly understanding the wording or meaning of the items. The standardised regression weights for the overall modified model ranged between .450 (*People Earth*) to .863 (*Obey Laws Nature*), with all values significant at $p < .001$ (see Table 6).

Figure 2
NEP Initial Model

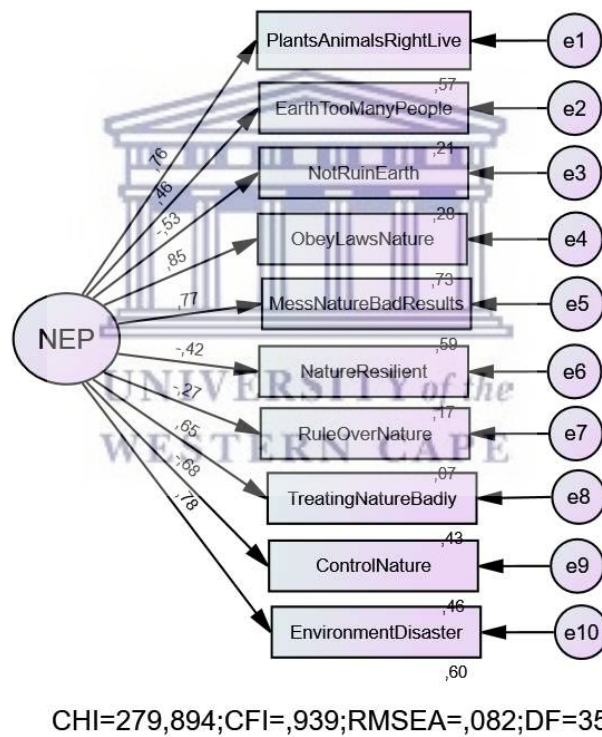
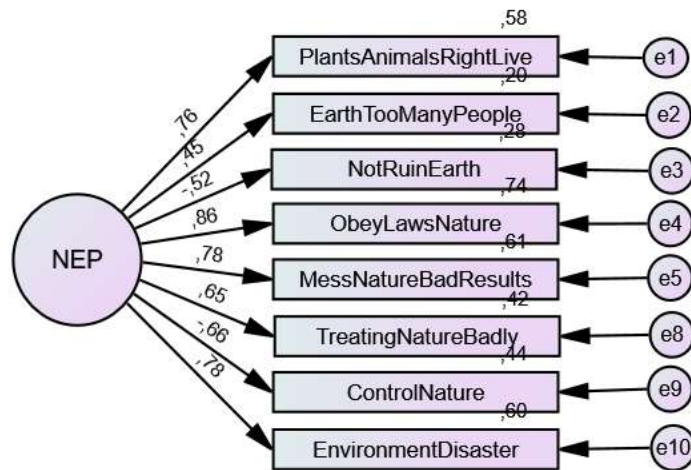


Figure 3
NEP Modified Model



CHI=103,149;CFI=,977;RMSEA=,063;DF=20

Table 6
NEP Scale: Standardised Regression Weights

Parameter	Estimate	Lower	Upper
PlantsAnimaRightToLive <--- NEP	.760	.722	.793
PeopleEarth <--- NEP	.450	.390	.500
NotRuinNature <--- NEP	-.525	-.582	-.470
ObeyLawsNature <--- NEP	.863	.838	.888
DamageNature <--- NEP	.778	.738	.815
TreatNatureBadly <--- NEP	.650	.602	.702
ControlNature <--- NEP	-.662	-.710	-.616
Environ.Disaster <--- NEP	.777	.741	.819

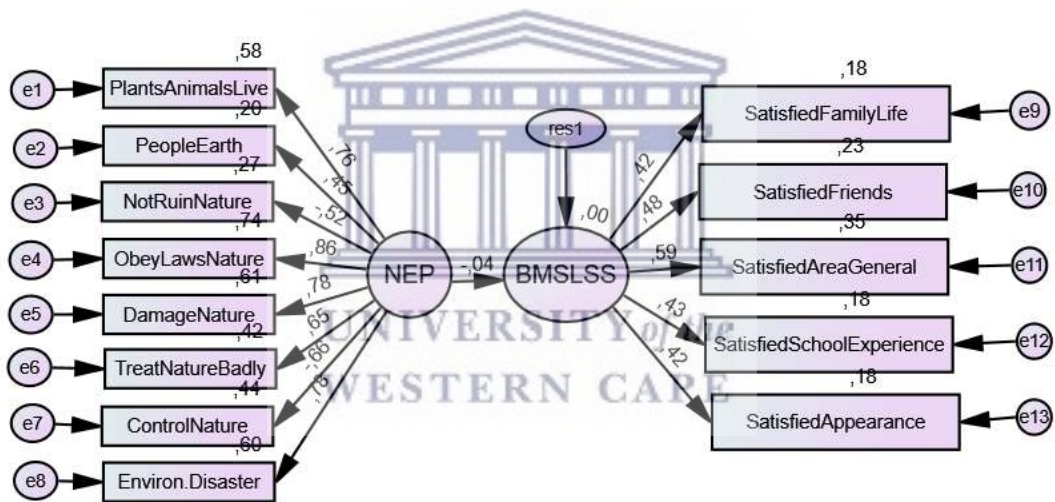
Notes: All values significant at < .001

Structural equation modelling

An overall model including the NEP Scale and BMSLSS was tested using SEM. The initial SEM model demonstrated a good fit (Model 4 in Table 4; Figure 4) with adequate factor

loadings of indicator variables on the latent variables (Figure 4). In this model, it is important to note the low standardised regression weights of the NEP to the BMSLSS (-.04). Therefore, this demonstrates that there is no relationship between children’s perceptions of the natural environment (measured using the NEP) and their domain-specific life satisfaction (measured using the BMSLSS). The standardised regression weights for the overall SEM model ranged from .863 for Item 5 (*ObeyLawsOfNature*) for the NEP Scale and .592 for the BMSLSS Item 2 (*SatisfiedAreaGeneral*), to .450 for NEP Scale Item 3 (*PeopleEarth*) and .419 for the BMSLSS Item 4 (*SatisfiedAppearance*).

Figure 4
NEP-BMSLSS Structural Equation Model



CHI=192,012;CFI=,968;RMSEA=,044;DF=64

Table 7*Standardised Regression Weights: SEM NEP and BMSLSS*

Parameter			Estimate	Lower	Upper
BMSLSS	<---	NEP	-.038	-.117	.051 ^{NS}
PlantsAnimalsRightToLive	<---	NEP	.760	.722	.793
PeopleEarth	<---	NEP	.450	.390	.500
NotRuinNature	<---	NEP	-.524	-.582	-.470
ObeyLawsOfNature	<---	NEP	.863	.838	.888
DamageNature	<---	NEP	.778	.738	.815
TreatingNatureBadly	<---	NEP	.650	.602	.702
ControlNature	<---	NEP	-.662	-.710	-.616
Environ.Disaster	<---	NEP	.777	.742	.820
SatisfiedFriends	<---	BMSLSS	.475	.372	.566
SatisfiedAreaGeneral	<---	BMSLSS	.592	.496	.674
SatisfiedSchoolExperience	<---	BMSLSS	.429	.340	.512
SatisfiedAppearance	<---	BMSLSS	.419	.331	.503
SatisfiedFamilyLife	<---	BMSLSS	.420	.318	.523

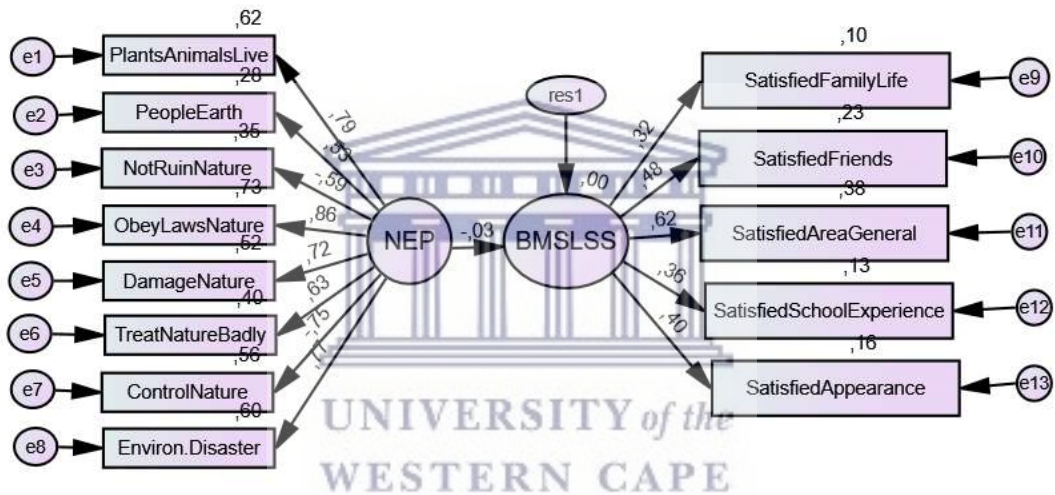
Multigroup Structural Equation Modelling

To compare the results across the low and middle SES groups, measurement invariance, the degree to which items in the measure have the same meaning between groups, was tested through a series of multigroup SEM. As stated previously, metric invariance was tested following three sequential steps. In step one, a configural model was tested by enabling all the parameters to be freely estimated. In the second step, metric invariance was tested whereby the factor loadings were constrained. Finally, scalar invariance was tested by constraining the factor loadings and measurement intercepts. Each subsequent model was considered acceptable, invariant, if the fit indices did not worsen by more than .01 on the CFI (Cheung & Rensvold, 2002) and by .015 on the RMSEA and SRMR (Chen, 2007). Across SES, it was found that configural and metric invariance was tenable (see Models 5 and 6 in

Table 4; Figures 5, 6, 7 & 8); however, scalar invariance was not tenable (see Model 7 in Table 4; Figures 9,10). As a resolution, the application of partial constraints (see Savahl et al., 2017) was attempted to meet the requirement of scalar invariance. However, this similarly proved ineffectual as an acceptable scalar invariance model was not viable with the addition of partial constraints. This means that while the models can be compared across SES by correlations and regressions, it cannot be meaningfully compared across mean scores.

Figure 5

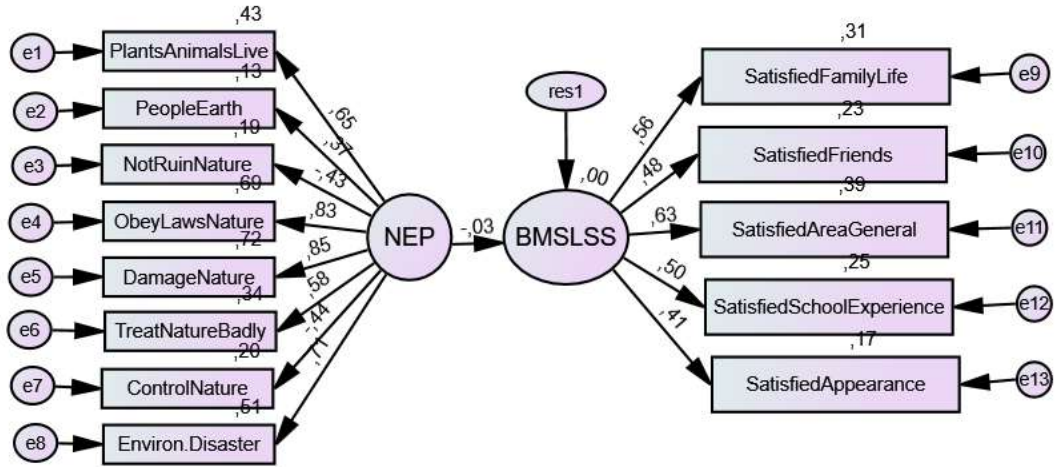
Multigroup Model (Configural): Low Socio-economic Context



CHI=279,099;CFI=,961;RMSEA=,034;DF=128

Figure 6

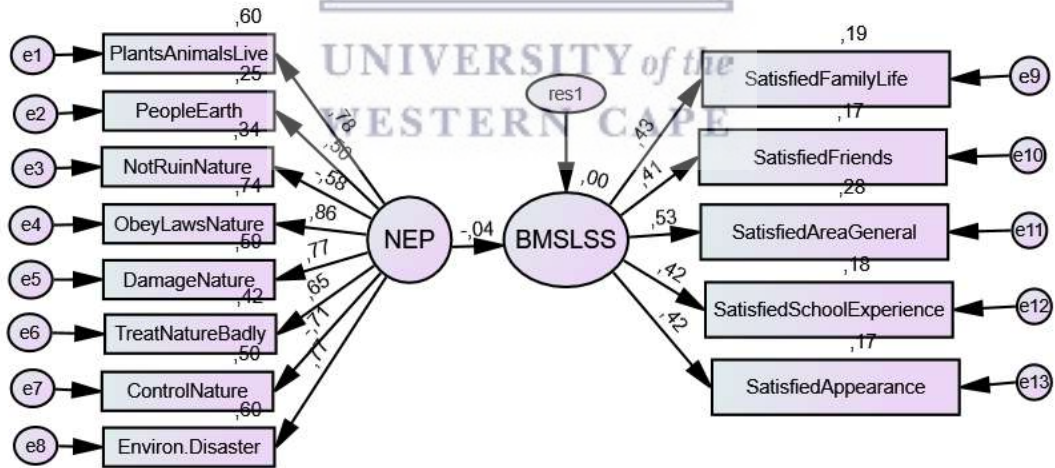
Multigroup Model (Configural): Middle Socio-economic Context



CHI=279,099;CFI=,961;RMSEA=,034;DF=128

Figure 7

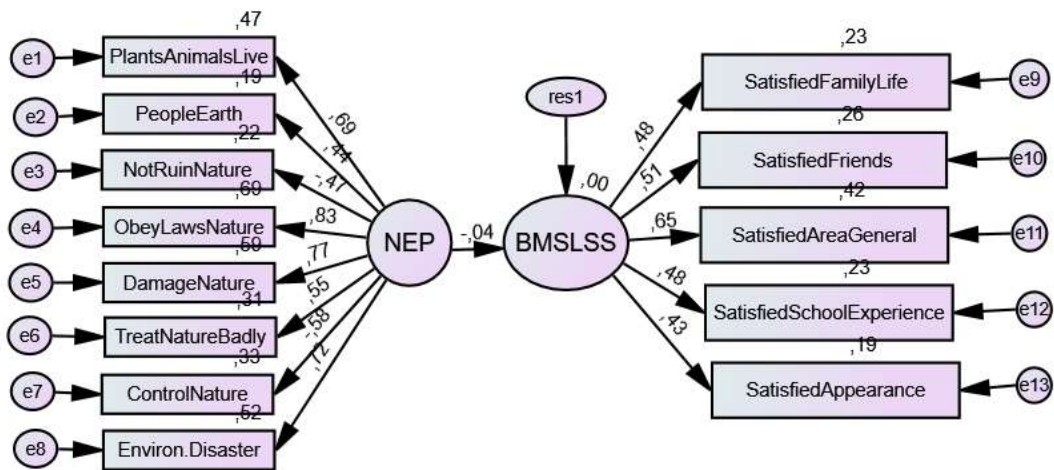
Multigroup Model (Metric): Low Socio-economic Context



CHI=348,678;CFI=,945;RMSEA=,038;DF=139

Figure 8

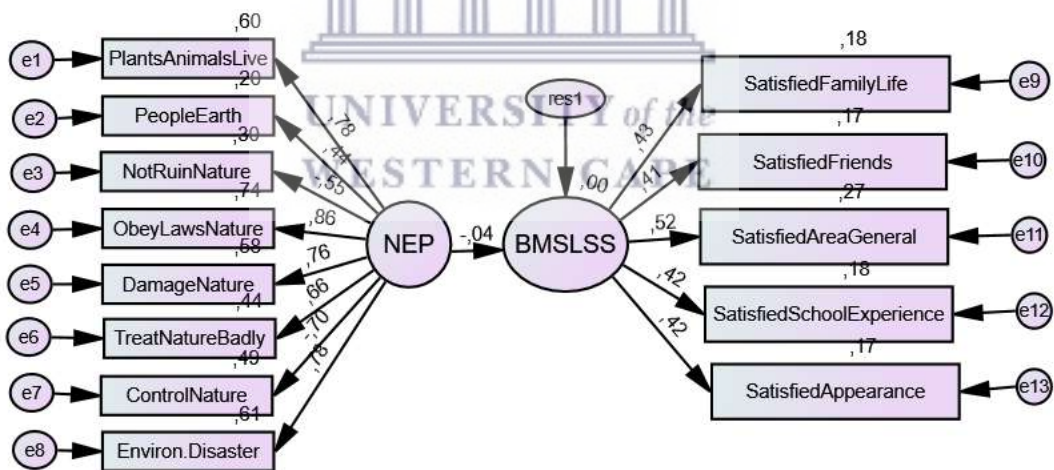
Multigroup Model (Metric): Middle Socio-economic Context



CHI=348,678;CFI=,945;RMSEA=,038;DF=139

Figure 9

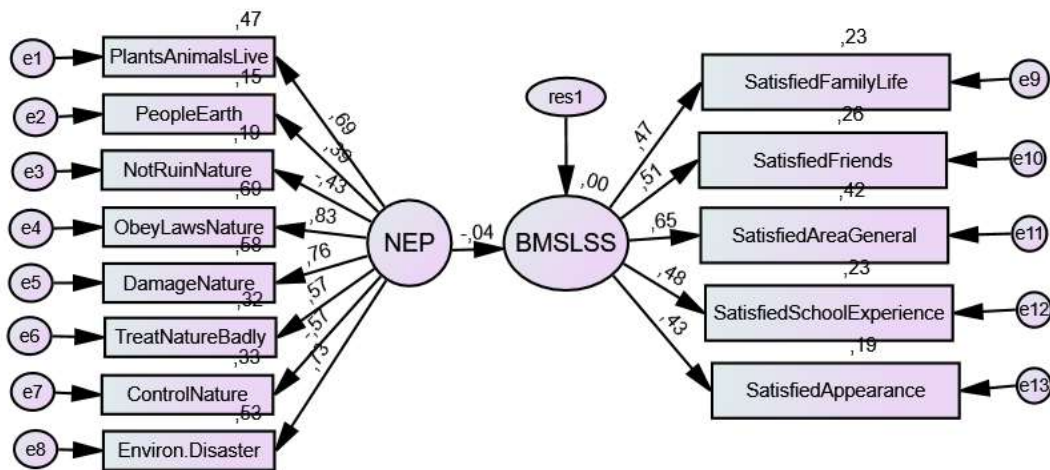
Multigroup Model (Scalar): Low Socio-economic Context



CHI=432,041;CFI=,927;RMSEA=,043;DF=150

Figure 10

Multigroup Model (Scalar): Middle Socio-economic Context



CHI=432,041;CFI=,927;RMSEA=,043;DF=150



Discussion

The study aimed to determine the relation between children's perceptions of the natural environment and their SWB in the Western Cape, South Africa. The study further aimed to determine differences across SES (low and middle).

The mean scores for the BMSLSS ranged from 7.64 to 8.83, indicating that children displayed a moderately high level of life satisfaction across the five domains (family, friends, schools, self, and living environment). Item 3 (*Satisfaction with: The area you live in general*) presented with the lowest mean scores across gender and SES groups, indicating that they were least satisfied with the area of living in general. However, Item 1 (*Satisfaction with: Your family life*) presented with the highest mean scores across gender and SES groups, indicating that children were most satisfied with their family life. For the NEP scale, the means scores ranged from 2.73 to 3.58. Item 5 (*When people mess with nature it has bad*

results) received the highest agreement, indicating that children think human beings messing with nature has negative consequences, whereas Item 9 (*People will someday know enough about how nature works to be able to control it*) received the highest disagreement, indicating that children do not think human beings will be able to control nature in the future. This could reflect a sense of disconnect between children and nature (Adams & Savahl, 2015), related to the unsafe, degraded built and natural environments in children's communities. Further, it embeds the systemic issues children experience related to material deprivation and poverty owing to the SES of children's neighbourhood contexts, including financial difficulties within the family (Adams, Savahl, Fattore, 2017). As demonstrated in other studies in this context (Adams & Savahl, 2015; 2015; Benninger & Savahl, 2016; Savahl et al., 2015), SES is a determinant of children's well-being and accessibility and engagement in nature. These authors found that children in lower SES communities have fewer opportunities to safely engage in nature, owing to the nature being made sense of as the 'dangerous other' (Adams & Savahl, 2015; Adams et al., 2016; 2017) given crime and violence that occurs in these spaces. This alludes to the high levels of inequality in South Africa, which has roots in colonialism and apartheid (Savahl et al., 2019). For this reason, it is important to understand the socio-political context in which these environmental conditions have been created and are continuously perpetuated (Savahl et al., 2019).

Despite the national government's efforts to reduce inequality since 1994, inequality within the country has remained persistent (Savahl et al., 2019; Statistics South Africa, 2019). Moreover, inequality has been identified as one of the crucial components contributing to child poverty in South Africa (Savahl & Adams, 2020). A recent study by Statistics South Africa/UNICEF (2020) reports that six out of ten South African children experience multidimensional poverty. They found that 5-12-years old reported the highest

multidimensional poverty rate at 63.4% (UNICEF, 2020). In addition, the report also implied that a key driving factor for multidimensional poverty is the poor state of social infrastructure, including poor school facilities, inadequate waste disposal services, and poor access to health services, and lack of access to safe natural spaces (Adams & Savahl, 2015). Several studies conducted in South Africa using a child-centred approach with children found that children were cognisant of their physical environment and the limitations it had on their engagement in the natural environment (see Adams & Savahl., 2015; Adams et al., 2016; Adams & Savahl, 2017; Savahl et al., 2014).

Another key finding is that of the three dimensions the NEP Scale assesses, namely *Rights to nature*, *Eco-crisis*, and *Human Exemptionalism*, the mean scores for the *Human Exemptionalism* dimension items (3, 6, and 9) received the lowest mean scores, displaying the highest level of disagreement from the participants (Adams & Savahl, 2015; Adams et al., 2016). These findings indicate that children disagree that human beings can take care of the earth, and they do not believe that nature can withstand constant degradation. A study conducted by Adams et al. (2016) within South Africa, using the same age cohort, also found that the *Human Exemptionalism* dimension received the lowest mean scores. Specifically, Adams et al. (2016) found that item 3 (*People are clever enough to keep from ruining the earth*) and item 6 (*Nature is strong enough to handle the bad effects of the way we live*) received the highest level of disagreements from the children. It implies that children do not believe that nature can survive how people treat it, or that they can conserve the natural environment. This finding is consistent with several research studies in the South African context (see Adams & Savahl, 2015; Adams et al., 2016; 2019; Adams & Savahl, 2017; 2018). In this regard, McKendrick's (2014) conceptual framework posits that children's well-being is influenced by the spaces around them and environments that pose potential threats

that can negatively affect how children interpret and interact with their surroundings. Considering the current findings, it is evident that the natural and community environments can negatively influence children's SWB (Adams & Savahl, 2016; Adams et al., 2017).

Another possible explanation for this finding is the nuanced understandings of children's perceptions of the natural environment in South Africa (Adams et al., 2017). A qualitative study conducted in the Western Cape, South Africa, by Adams and Savahl (2015) found that children avoid the natural environment, as it is perceived as threatening to their safety. This in part is owing to the degradation and violence in their communities (Adams & Savahl, 2016). As illustrated by McKendrick (2014), safe environmental conditions and surroundings are of utmost importance to children as it positively contributes to their well-being. He describes these places as 'good places' for children as they promote positive development outcomes and reduces the risk of negative behaviours and damaging relationships (Adams et al., 2017). The United Nations *Convention of the Rights of the Child* (UNCRC, 1989) advances the importance of children's rights, including protection of rights, survival and development, protection from all forms of violence, an adequate standard of living, leisure play and culture, and the right to education (Adams & Savahl, 2022). These essential children's rights have been adopted and advanced in many countries, including South Africa. However, many of these rights have not been upheld in society, with many children unaware of their own rights (Savahl & Adams, 2020). The violation of children's right to a safe environment has been reported in several studies using a child-centred approach with children in South Africa (see Adams & Savahl, 2015; Adams et al., 2016; Savahl et al., 2015). These studies concluded that SES was a determining demographic and structural factor that impacted on how children perceive nature. Children living in lower SES contexts perceived nature as threatening to their safety as they are constantly exposed to

violence and crime within these spaces in their communities and surrounding areas (see Adams & Savahl, 2015; Adams et al., 2016; Savahl et al., 2014). These findings highlight children subjective experiences of feeling unsafe and vulnerable in green spaces owing to the inability to safely to engage within their communities and the natural spaces around them. However, they are able to negotiate and navigate safety in contexts of violence (Adams & Savahl, 2022). The most recent South African Police Crime Statistics for October 2021 to December 2021 reported that approximately 164 953 contact crimes (referring to physical crimes against a person) were committed during the third quarter of 2021 (South African Police Service, 2021). More specifically, 14 231 contact crimes, including rape, common assault, gender-based violence, attempted murders, and murders, all occurred within public spaces such as the open fields, recreational centres, parks, and beaches. Of the 14 231 contact crimes, 2794 contact crimes including murder, attempted murder, and gender-based violence were committed against children ages 0 to 17 years (South African Police Service 2021). Given the positive impact of engagement in nature, children should have access to safe natural spaces (Adams et al., 2017). However, based on the statistics, it is evident that these environmental dangers can limit how children interact with the natural spaces around them (Adams & Savahl, 2015).

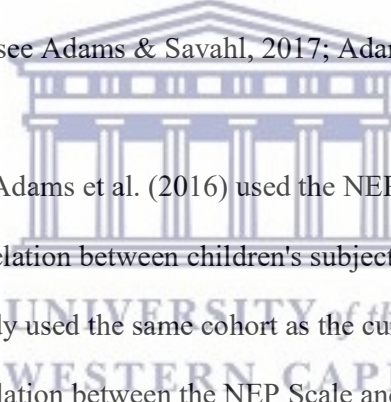
In the current study, using CFA, the BMSLSS had a good fit with the five-item scale (family life, friends, general, school experience, and appearance). The factor loadings for the BMSLSS in the current study ranged from .42 to .59. These CFA results were similar to a master's thesis by Delpont (2018). It should be noted that the factor loadings from the current study are slightly lower compared to previous studies. Casas and Rees (2015) found factor loadings ranging from .55 to .60 for a sample of 12-year-olds (N = 34 000), and Tian et al. (2015) reported factor loading ranging from .52 to .72 with a sample of elementary school

adolescents (N = 2799). Ng et al. (2018) reported consistent factor loading of .53 to .73 (N = 1181) and .59 to .76 (N = 1666) ranging over one year using two samples.

Confirmatory factor analysis (CFA) for the NEP Scale demonstrated an inadequate fit for the initial model ranging from -.27 to .85; however, the model fit improved when Item 6 "Nature Resilient" (-.42) and Item 7 "Rule Over Nature" (-.27) were removed as a result of low factor loadings, with the modified factor loadings ranging from .45 to .86. Adams et al. (2016) reported similar factor loadings ranging from .44 to .86 when excluding Item 7 (Rule Over Nature) due to their initial model demonstrating a poor fit structure. Other studies using CFA for the NEP Scale, such as Grůňová et al. (2018), reported factor loadings ranging from .25 to .72, whereas Manoli et al. (2007) found factor loadings ranging from .09 to .77 (N = 515). Furthermore, in the current study, the *Human Exemptionalism* dimension items (3, 6, and 9) reported the lowest factor loadings in the initial NEP Scale model fit; this result could be attributed to the items being negatively phrased (Adams et al., 2016; Manoli et al., 2007). Zeng et al. (2020) suggest that using a combination of positively and negatively worded items in a scale can influence the participant response style, affecting the scale's overall internal consistency and changing the scale's factor structure. In addition, Borgers et al. (2004) found that children can respond stably over time for a given scale; however, they respond differently on negatively worded items compared to positively worded items. More so, this could be attributed to the interpretation of negatively worded items compared to positively worded items (Montserrat, Savahl, et al., 2020).

The comparability of children's environmental perceptions and SWB was assessed across low and middle SES groups using multi-group SEM. It was found that while the BMSLSS and NEP Scales can be compared across SES by correlations and regressions, it

cannot be meaningfully compared across mean scores. Adams et al. (2017) found that children from low SES communities were restricted from engaging and exploring safe, natural spaces compared to those living in middle SES communities. While international literature indicates that children's engagement in nature positively influences their SWB (see Galli et al., 2016; Huynh et al., 2013; Kerret et al., 2014), given the contextual realities of children's lives in South Africa, it was not found in the current study. Using the NEP Scale and BMSLSS, there was a low standardised regression weight of .04 between the scales. Therefore, a key finding of the current study is that no relation was found between children's perceptions of the natural environment (measured using the NEP) and their domain-specific life satisfaction (measured using the BMSLSS). This finding does not align with literature that reports on the positive influence of children's engagement in natural spaces on their general well-being and SWB (see Adams & Savahl, 2017; Adams et al., 2016).



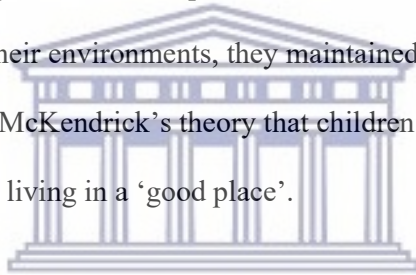
A study conducted by Adams et al. (2016) used the NEP scale, SLSS and PWI-SC endeavoured to ascertain the relation between children's subjective well-being and their perceptions of nature. The study used the same cohort as the current study, and the results concluded that there was no relation between the NEP Scale and the two SWB scales. These results reflect the current study findings that found no relation between children's SWB and their perceptions of the natural environment. Moreover, Adams et al. (2016) indicated that the findings could be attributed to several factors such as the degraded physical environment in which the children reside, safety, and the SES of the communities, amongst others. However, it should be noted that while several studies refer to the positive influence of nature on children's SWB, few studies have empirically examined this relation (see Adams et al., 2016).

The current findings suggest that children have the ability to recognise that individuals, particularly adults, lack environmental awareness and disregard natural spaces. This demonstrates children's sense of environmental awareness (Adams et al., 2016). Previous studies examining the relationship between children's subjective well-being and their engagement in nature was conducted in LMIC such as Brazil and South Africa. Galli et al. (2016) found that among the Brazilian cohort, positive parental attitudes towards the environment, engagement with nature, and the physical conditions of the school were contributing predictors of SWB. However, Adams et al. (2016) found that engagement in nature was not related to the SWB of children and instead reported that this finding can be attributed to various social issues that influence the physical spaces around children.

While the findings point to the participants being environmentally aware; however, environmental education has not been implemented in the South Africa school curriculum (Adams & Savahl, 2015). In 2011, the National Department of Basic Education advocated for the implementation of environmental education commencing in Grade R until Grade 12 with the current Curriculum and Assessment Policy Statement (CAPS) (Hebe, 2019). However, Mokhele and Jita (2008) found that many schools and educators lacked the capacity, knowledge, and experience to implement environmental education in their teaching syllabus. The study also found that the national government could not drive its environmental education policy throughout the local education departments. A study conducted by Hebe (2018) found that CAPS contains numerous topics that could be implemented to support the incorporation of environmental education. However, the execution and implementation of EE depend on the educators' experience and capacity. There is an absence of guidelines to assist educators in making informed decisions on what to teach and how to integrate environmental education in their teaching syllabus.

The national government's lack of environmental education capacity can be attributed to its core focus on other subjects such as literacy, mathematics, and physical science (Adams, 2011). This was similarly found by Adams and Savahl (2015) in the Western Cape, South Africa. This shift is evident in the National Development Plan 2030 (National Planning Commission, 2017) long-term goals for basic education include increasing the number of learners eligible to study mathematics and science-based degrees. One of the ways the national government plans to achieve these goals is to increase the literacy, mathematics, and science competency of grade three, six, and nine learners by ensuring that they achieve 50% or more in the national assessments. Based on these long-term goals for education set by the National Development Plan for 2030, environmental education is not considered a priority (Adams & Savahl, 2015; Adams et al., 2016). This could explain the absence of guidelines to assist educators with teaching environmental education. Kerret et al.'s (2014) environmental subjective well-being (ESWB) model (see Adams, 2016; Adams & Savahl, 2015; 2016; Adams, Savahl, & Fattore, 2017), advances that schools that promote environmentally friendly behaviours facilitate the SWB of students and increase environmental behaviours. Therefore, educating students on sustainable practices during their formative years could prevent anti-environmental behaviours later in life, such as pollution, depletion of natural resources, and environmental degradation (Adams & Savahl, 2016; Kerret et al., 2014). The model also proposes that environmental education instils hope for the future of the environment. Students are more likely to engage in environmental behaviours if they are aware of the positive impact of their actions. Furthermore, Adams and Savahl (2015) and Adams et al. (2019) reported that children demonstrated intrinsic care and affiliation to nature despite the lack of frequent engagement with nature owing to threats to their safety.

McKendrick's (2014) conceptual framework merges children's SWB and their environmental worldviews, as it characterises how children make sense of their environment and to what extent the environment influences their well-being. Based on the findings of the study, it is evident that SES plays a pivotal role in how children are able to engage in the natural spaces around them based on the affordances of the environment (Adams & Savahl, 2016). McKendrick (2014) proposes that the area children live in is one of several factors influencing their well-being (Adams & Savahl, 2016). Other factors such as SES, parenting styles, and family dynamics contribute to a child's well-being. However, the theory also postulates that children can maintain an adequate level of well-being despite not living in a 'good place'. The findings of the current study demonstrate that children maintain a high level of satisfaction with their family life, school experience, friends, and themselves. Despite children being unhappy with their environments, they maintained an adequate level of well-being, therefore aligning with McKendrick's theory that children can maintain an adequate level of well-being despite not living in a 'good place'.



Conclusion and Recommendations

While there is extensive research focusing on children's SWB and children's perception of nature independently, few studies have assessed the relation between these aforementioned areas (Adams & Savahl, 2015; 2016). The current study aimed to contribute to the dearth of literature by determining the relation between children's perceptions of nature and their SWB in the Western Cape, South Africa. A crucial finding of the study revealed there is no relation between children's SWB and their perceptions of nature in South Africa.

Irrespective of SES, children in this study were cognisant of their physical environment and the dangers associated alongside engaging in the physical spaces (Adams et

al., 2016). It should be noted that despite children being aware of the dangers within the environment, they are still moderately satisfied with the living environment around them. Further qualitative studies should be conducted to assess the gap between children acknowledging the dangers of their living environment and being satisfied with their living environment.

A limitation of the study is that the data was only collected from one out of nine provinces in South Africa, and therefore the findings cannot be generalised in relation to the rest of South Africa. Another limitation points to the development of the NEP Scale for Children and the BMSLSS used in the study. Given the diversity and multi-cultural setting of South Africa, further validation and adaptation of both scales is required across all the 11 language groups.

Within the study children demonstrated environmental awareness irrespective of environmental education not being part of the school curriculum in South Africa. Further research is required to assess the environmental awareness between children that receive environmental education during the formative years and those that do not (Adams, 2011; 2016). This would enable researchers to understand the importance of environmental education within South Africa (Adams & Savahl, 2015; 2016).



References

- Abubakar, A., van de Vijver, F., Alonso-Arbiol, I., He, J., Adams, B., Aldhafri, S., Aydinli-Karakulak, A., Arasa, J., Boer, D., Celenk, O., Dimitrova, R., Ferreira, M. C., Fischer, R., Mbebeb, F. E., Frías, M. T., Fresno, A., Gillath, O., Harb, C., Handani, P., Tair, E. (2016). Measurement Invariance of the Brief Multidimensional Student's Life Satisfaction Scale Among Adolescents and Emerging Adults Across 23 Cultural Contexts. *Journal of Psychoeducational Assessment*, 34(1), 28–38.
<https://doi.org/10.1177/0734282915611284>
- Adams, S., & Savahl, S. (2015). Children's perceptions of the natural environment: a South African perspective. *Children's Geographies*, 13(2), 196-211.
<https://doi.org/10.1080/14733285.2013.829659>
- Adams, S., & Savahl, S. (2017). Children's discourses of natural spaces: considerations for children's subjective well-being. *Child Indicators Research*, 10(2), 423-446.
<https://doi.org/10.1007/s12187-016-9374-2>
- Adams, S., & Savahl, S. (2015). Nature as children's space: A systematic review. *The Journal of Environmental Education*, 48(5), 291-321.
<http://dx.doi.org/10.1080/00958964.2017.1366160>
- Adams, S., & Savahl, S. (2018). Children's recreational engagement with nature in South Africa: Implications for children's subjective well-being. In *Handbook of leisure, physical activity, sports, recreation and quality of life* (pp. 71-95). Springer, Cham.
- Adams, S., Savahl, S., & Casas, F. (2016). The relationship between children's perceptions of the natural environment and their subjective well-being. *Children's Geographies*, 14(6), 641-655. <https://doi.org/10.1080/17482631.2017.1333900>
- Adams, S., Savahl, S., Florence, M., & Jackson, K. (2019). Considering the natural environment in the creation of child-friendly cities: Implications for children's

subjective well-being. *Child Indicators Research*, 12(2), 545-567.

<https://doi.org/10.1007/s12187-018-9531-x>

Bartlett, S., Casey, T., Chatterjee, S., Hart, R., McKendrick, J., Miller, R. M., Towler, K.

(2016). *Children's Right to Play and the environment*. International Play Association.

Bell, F., Wilson, J.S., & Liu, G.C. (2008). Neighborhood Greenness and 2-Year Changes in Body Mass Index of Children and Youth. *American Journal of Preventive Medicine*, 35(6), 547–553. <https://doi.org/10.1016/j.amepre.2008.07.006>

Ben-Arieh, A. (2008). The Child Indicators Movement: Past, Present, and Future. *Child Indicators Research*, 1(1), 3–16. <https://doi.org/10.1007/s12187-007-9003-1>

Ben-Arieh, A., & Frønes, I. (2011). Taxonomy for child well-being indicators: A framework for the analysis of the well-being of children. *Childhood*, 18(4), 460–476.

<https://doi.org/10.1177/0907568211398159>

Benninger, E., & Savahl, S. (2016). The use of visual methods to explore how children construct and assign meaning to the “self” within two urban communities in the Western Cape, South Africa. *International journal of qualitative studies on health and well-being*, 11(1). <https://doi.org/10.3402/qhw.v11i3125131251>.

Beyer, K., Bizub, J., Szabo, A., Heller, B., Kistner, A., Shawgo, E., & Zetts, C. (2014).

Development and validation of the attitudes toward outdoor play scales for children.

Social Science & Medicine, 133(2015), 253-260.

doi: 10.1016/j.socscimed.2014.10.033

Blizard, C. R., & Schuster, R. M. (2007). Fostering children's connections to natural places through cultural and natural history storytelling. *Children Youth and Environments*, 17(4), 171-206.

Bogner, F. X., & Johnson, B. (2009). 2-MEV Model: Individual green attitude-sets over the years. *Environmental, health and outdoor science education*, 1207-1213.

- Bogner, F., & Wilhelm, M. (1996). Environmental perspectives of pupils: The development of an attitude and behaviour scale. *The Environmentalist*, 16(2), 95-110.
- Borgers, N., Sikkel, D., & Hox, J. (2004). Response effects in surveys on children and adolescents: The effect of number of response options, negative wording, and neutral mid-point. *Quality and Quantity*, 38(1), 17-33.
<https://doi.org/10.1023/B:QUQU.0000013236.29205.a6>
- Borualogo, I. S., & Casas, F. (2021). Subjective well-being of Indonesian children: A perspective of material well-being [Kesejahteraan Subjektif Anak Indonesia: Sebuah Perspektif Kesejahteraan Materi]. *ANIMA Indonesian Psychological Journal*, 36(2), 204-230. <https://doi.org/10.24123/aipj.v36i2.2880>
- Bradshaw, J., Keung, A., Rees, G., & Goswami, H. (2011). Children's subjective well-being: International comparative perspectives. *Children and Youth Services Review*, 548-556. <https://doi.org/10.1016/j.childyouth.2010.05.010>
- Brickman, P., & Campbell, D.T. (1971). Hedonic relativism and planning the good society. *Adaptation level theory*, 287-301.
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Theoretical models of human development*, 993–1028. John Wiley & Sons Inc
- Burgess, D.J., & Mayer-Smith, J. (2011). Listening to children: Perceptions of nature. *Journal of Natural History Education and Experience* 5, 27-43
- Byrne, B. M. (2010). *Structural equation modelling with AMOS: Basic concepts, applications and programming* (2nd ed.). New York, NY: Routledge.
- Casas, F. (2000). Quality of life and the life experience of children. In E. Verhellen (Ed.), *Understanding Children's rights*. Ghent: University of Ghent.

- Casas, F. (2017). Analysing the comparability of 3 multi-item subjective well-being psychometric scales among 15 countries using samples of 10 and 12-year-olds. *Child Indicators Research*, 10(2), 297-330. <https://doi.org/10.1007/s12187-015-9360-0>
- Casas, F. & Rees., G. (2015). Measures of Children's Subjective Well-Being: Analysis of the Potential for Cross-National Comparisons. *Child Indicators Research*, 8(1), 49–69. <https://doi.org/10.1007/s12187-014-9293-z>
- Chawla, L. (2006). Childhood Experiences Associated with Care for the Natural World: A Theoretical Framework for Empirical Results. *Children, Youth and Environments*, 17(4), 144-170.
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, 38(5), 300–314. <https://doi.org/10.1097/00006842-197609000-00003>
- Corraliza, J. A., Collado, S., & Bethelmy, L. (2013). Spanish version of the new ecological paradigm scale for children. *Spanish Journal of Psychology*, 16, 1–8. <https://doi.org/10.1017/sjp.2013.46>
- Cummins, R.A. (1995). On the trail of the gold standard for subjective well-being. *Social Indicators Research*, 35, 179-200. <https://doi.org/10.1007/BF01079026>
- Cummins, R. A., & Lau, A. D. L. (2005). Personal Wellbeing Index: School Children (PWI- SC). 3rd ed. Melbourne: Deakin University.
- Delpont, A. (2018). Preliminary construct validation of the brief multidimensional students' life satisfaction scale amongst a sample of children in the Western Cape, South Africa: multi-group analyses across three age groups. *Unpublished Masters mini-thesis*. University of the Western Cape: Bellville.
- Di Fabio, A., & Palazzeschi, L. (2015). Hedonic and eudaimonic well-being: the role of resilience beyond fluid intelligence and personality traits. *Frontiers in Psychology*, 6, 1367.. <https://doi.org/10.3389/fpsyg.2015.01367>

- Diener, E. (1984). Subjective Well-Being. *Psychological Bulletin*, 95(3), 542-575.
- Diener, E. (2000). Subjective Well-Being: The Science of Happiness and a Proposal for a National Index. *American Psychologist*, 55, 34-43.
<https://doi.org/10.1037/0003-066X.55.1.34>
- Diener, E., Lucas, R.E., & Scollon, C.N. (2006). Beyond the hedonic treadmill: revising the adaptation theory of well-being. *The American psychologist*, 61(4), 305-14 .
DOI: 10.1037/0003-066X.61.4.305
- Dunlap, R. E., & Van Liere, K. D. (1978). The New Environmental Paradigm: A Proposed measuring instrument and preliminary results. *The Journal of Environmental Education*, 9(4), 10-19. <https://doi.org/10.1080/00958964.1978.10801875>
- Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. (2000). Measuring Endorsment of the New Ecological Paradigm: A Revised NEP Scale. *Journal of Social Issues*, 56(3), 425-442. <https://doi.org/10.1111/0022-4537.00176>
- Durayappah, A. (2011). The 3P Model: A general theory of subjective well-being. *Journal of Happiness Studies*, 12(4), 681-716. <https://doi.org/10.1007/s10902-010-9223-9>
- Edgell, M. C., & Nowell, D. E. (1989). The new environmental paradigm scale: Wildlife and environmental beliefs in British Columbia. *Society & Natural Resources*, 2(1), 285-296. <https://doi.org/10.1080/08941928909380692>
- Erdogan, M., & Marcinkowski, T. (2015). Development and Validation of Children's Environmental Affect (Attitude, Sensitivity and Willingness to take action) Scale. *Eurasia Journal of Mathematics, Science & Technology Education*, 11(3), 577-588.
<https://doi.org/10.12973/eurasia.2015.1347a>
- Fjørtoft, I. (2001). The Natural Environment as a Playground for Children: The Impact of Outdoor Play Activities in Pre-Primary School Children. *Early Childhood Education Journal*, 29(2): 111–117. <https://doi.org/10.1023/A:1012576913074>

- Funk, B., Huebner, E. & Valois, R. (2006). Reliability and Validity of a Brief Life Satisfaction Scale with a High School Sample. *Journal of Happiness Studies*, 7(1), 41-54. <https://doi.org/10.1007/s10902.005.0869.7>.
- Furman, A. (1998). A note on environmental concern in a developing country: Results from an Istanbul survey. *Environment and behavior*, 30(4), 520-534. <https://doi.org/10.1177/001391659803000406>
- Galli, F., Castellá-Sarriera, J., & Bedin, L. (2016). Childhood, environment and subjective well-being. *Infancia, ambiente y bienestar subjetivo, Psycology*, 7(2), 130-151.
- Ginn, F., & Demeritt, D. (2009). Nature: a contested concept. In S. L. Holloway, S. P. Rice, G. Valentine, and N. Clifford (Eds.), *Key Concepts in Geography* (pp. 300-311). London: Sage.
- Gonzalez-Carrasco, M., Casas, F., Ben-Arieh, A., Savahl, S., & Tiliouine, H. (2018). Children's perspectives and evaluations of safety in diverse settings and their subjective well-being: A Multinational Approach. *Applied Research in Quality of Life*, 309-334. <https://doi.org/10.1007/s11482-018-9594-3>
- Grůňová, M., Sané, M., Cincera, J., Kroufek, R., & Hejmanová, P. (2019). Reliability of the new environmental paradigm for analysing the environmental attitudes of Senegalese pupils in the context of conservation education projects. *Environmental Education Research*, 25(2), 211–221. <https://doi.org/10.1080/13504622.2018.1428942>
- Hebe, H. (2019). Locating the position of Environmental Education in the South African School Curriculum: The case of Grade R. *Eurasia Journal of Mathematics, Science and Technology Education*, 15(9), 1–11. <https://doi.org/10.29333/ejmste/108486>
- Horelli, L. (2007). Constructing a theoretical framework for environmental child-friendliness. *Children, Youth and Environments*, 17(4), 267–292

- Huby, M., & Bradshaw, J. (2006). A Review of the environmental dimension of children and young people's well-being. London: Sustainable Development Commission.
- Huebner, E. S. (1991). Initial Development of the Student's Life Satisfaction Scale. *School Psychology International, 12*: 231–240.
- Huebner, S. E. (1994). The Students' Life Satisfaction Scale: An Assessment of Psychometric Properties with Black and White Elementary School Students. *Social Indicators Research, 34*: 315–323. <https://doi.org/10.1037/1040-3590.6.2.149>
- Huebner, E. S., Antaramian, S. P., Hills, K. J., Lewis, A. D., & Saha, R. (2011). Stability and predictive validity of the brief multidimensional students' life satisfaction scale. *Child Indicators Research, 4*(1), 161–168. <https://doi.org/10.1007/s12187-010-9082-2>
- Huebner, E. S., Suldo, S., Valois, R. F., Drane, J. W., & Zullig, K. (2004). Brief multidimensional students' life satisfaction scale: Sex, race, and grade effects for a high school sample. *Psychological Reports, 94*(1), 351–356. <https://doi.org/10.2466/pr0.94.1.351-356>
- Huebner, S. E., Seligson, J. L., Valois, R. F., & Suldo, S. M. (2006). A review of the brief multidimensional students' life satisfaction scale. *Social Indicators Research, 79*(3), 477–484. <https://doi.org/10.1007/s11205-005-5395-9>
- Huynh, Q., Craig, W., Janssen, I., & Pickett, W. (2013). Exposure to Public Natural Space as a Protective Factor for Emotional Well-Being among Young People in Canada. *BMC Public Health, 13*: 1–14.
- Izadpanahi, P., & Tucker, R. (2018). NEP (Children@School): An instrument for measuring environmental attitudes in middle childhood. *Australian Journal of Environmental Education, 34*(1), 61–79. <https://doi.org/10.1017/ae.2017.25>

- Jackson, D.L., Gillaspay, Jr., J.A. & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological perspectives, 14*(1), 6-23. doi: 10.1037/a0014694.
- Johnson, B., & Manoli, C. C. (2011). The 2-MEV Scale in the United States: A Measure of Children's Environmental Attitudes Based on the Theory of Ecological Attitude. *The Journal of Environmental Education, 42*(2), 84-97.
<https://doi.org/10.1080/00958964.2010.503716>
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*(3), 169–182.
[https://doi.org/10.1016/0272-4944\(95\)90001-2](https://doi.org/10.1016/0272-4944(95)90001-2)
- Kasser, T. (2011). Ecological Challenges, Materialistic Values, and Social Change. In *Positive Psychology as Social Change*, edited by R. Biswas-Diener, 89–108. New York: Springer.
- Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. H. Kahn, Jr. & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp.117–151). MIT Press.
- Kerret, D., Orkibi, H., & Ronen, T. (2014). Green Perspective for a Hopeful Future: Explaining Green Schools' Contribution to Environmental Subjective Well-Being. *Review of General Psychology, 18*(2), 82-88. <https://doi.org/10.1037/gpr0000006>
- Kline, R.B. (2010). Principles and practice of structural equation modelling (3rd ed). New York: Guilford Press.
- Knight, S. (2009). *Forest schools and outdoor play in the early years*. London: Sage Publications.

- Leeming, F. C., Dwyer, W. O., & Bracken, B. A. (1995). Children's Environmental Attitude and Knowledge Scale: Construction and Validation. *The Journal of Environmental Education*, 26(3), 22-31. <https://doi.org/10.1080/00958964.1995.9941442>
- Linzmayr, C.D. & Halpenny, E.A. (2013). 'I might know when I'm an adult': Making sense of children's relationships with nature. *Children's Geographies*, 12 (4), 412 - 428. <https://doi.org/10.1080/14733285.2013.821262>
- Macnaghten, P., & Urry, J. (1999). *Contested Natures*. London: Sage.
- Manoli, C., Johnson, B., & Dunlap, R. E. (2005). *Assessing children's views of the environment: Modifying the New Ecological Paradigm Scale for use with children*, Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, 11–15 April.
- Manoli, C., Johnson, B., & Dunlap, R. (2007). Assessing Children's Environmental Worldviews: Modifying and Validating the New Ecological Paradigm Scale for Use with Children. *The Journal of Environmental Education*, 38(4), 3-13. <https://doi.org/10.3200/JOEE.38.4.3-13>
- McKendrick, J. H. (2014). Geographies of children's well-being: In, of and for space. In A. Ben-Arieh, F. Casas, I. Fronès, & J. E. Korbin (Eds.), *Handbook of child well-being: Theories, methods and policies in global perspective* (pp. 279–300). Dordrecht: Springer.
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525-543. <https://doi.org/10.1007/BF02294825>
- Millsap, R.E. & Olivera-Aguilar, M. (2012). Investigating measurement invariance using confirmatory factor analysis. In R.H. Hoyle (Ed), *Handbook of Structural Equation Modeling* 380 -392. New YorkL Guilford Press

- Minkkinen, J. (2013). The structural model of child well-being. *Child Indicators Research*, 6(3), 547-558. doi:10.1007/s12187-013-9178-6
- Musser, L., & Malkus, A. (1994). The Children's Attitudes Toward the Environment Scale. *The Journal of Environmental Education*, 25(3), 22-26.
<https://doi.org/10.1080/00958964.1994.9941954>
- Myers, O. E. (2012). Children and nature. In S. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 113–127). London: Oxford University Press.
- Ng, Z. J., Huebner, E. S., Maydeu-Olivares, A., & Hills, K. J. (2018). Confirmatory Factor Analytic Structure and Measurement Invariance of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) in a Longitudinal Sample of Adolescents. *Child Indicators Research*, 11(4), 1237–1247.
<https://doi.org/10.1007/s12187-017-9468-5>
- Pierce, J. C., Lovrich Jr, N. P., Tsurutani, T., & Abe, T. (1987). Culture, politics and mass publics: Traditional and modern supporters of the new environmental paradigm in Japan and the United States. *The Journal of Politics*, 49(1), 54-79.
- Pollard, E.L., & Lee, P.D. (2003). Child Well-being: A systematic review of the literature. *Social Indicators Research*, 61(1), 59-78. <https://doi.org/10.1023/A:1021284215801>
- Proctor, E.L., Linley, P.A., & Maltby, J. (2009). Youth life satisfaction measures: a review. *The Journal of Positive Psychology*, 4(2), 128 -144.
<https://doi.org/10.1080/17439760802650816>
- Ridgers, N.D., Knowles, Z.R., & Sayers, J. (2012). Encouraging play in the natural environment: A child-focused case study of Forest School. *Children's Geographies*, 10(1), 49–65.

- Sandin, B. (2014). History of children's well-being. In a. Ben-Arieh, F. Casas, I. Frones, & J. E. Korbin (Eds.), *Handbook of child well-being: Theories, methods and policies in global perspective* (pp. 31–86). Dordrecht: Springer.
- Savahl, S., Adams, S., Slembrouk, S., & Malcolm, C. (2022). Ideological constructions of childhood: Considerations for children's subjective well-being. Habib Tiliouine et al. (Eds): *Handbook of Children's Risk, Vulnerability and Quality of Life*. Springer
- Savahl, S., Adams, S., Casas, F., and Florence, M. (2022). Children's interactions with family and friends in constrained contexts: Considerations for children's subjective well-being. *Applied Research in Quality of Life*, <https://doi.org/10.1007/s11482-022-10059-7>
- Savahl, S., Malcolm, C., Slembrouk, S., Adams, S., Willenberg, I. A., & September, R. (2015). Discourses on well-being. *Child Indicators Research*, 8(4), 747-766. <https://doi.org/10.1007/s12187-014-9272-4>
- Savahl, S., Montserrat, C.S., Casas, F., Adams, S., Tiliouine, H., Benninger, E., & Jackson, K. (2019). Children's Experiences of Bullying Victimization and the Influence on Their Subjective Well-Being: A Multinational Comparison. *Child development*, 90(2), 414-431. doi: 10.1111/cdev.13135.
- Savahl, S., Tiliouine, H., Casas, F., Adams, A., Mekonen, Y., Dejene, N., Witten, H. (2017). Children's subjective well-being in Africa: A comparative analysis across three countries. *Children and Youth Services Review*, 80, 31–40. <https://doi.org/10.1016/j.childyouth.2017.06.063>
- Scopelliti, M., Carrus, G., & Bonaiuto, M. (2019). Is it really nature that restores people? A comparison with historical sites with high restorative potential. *Frontiers in psychology*, 9(2742). <https://doi.org/10.3389/fpsyg.2018.02742>

- Seligson, J. L., Huebner, E.S., & Valois, R.F. (2003). Preliminary Validation of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS). *Social Indicators Research*, 61(2), 121-145. <https://doi.org/10.1023/A:1021326822957>
- September, R., & Savahl, S. (2009). Children's perspectives on child well-being. *The Social Work Practitioner-Research*, 21(1), 23-40.
- Siyez, D. M., & Kaya, A. (2008). Validity and reliability of the brief multidimensional students' life satisfaction scale with Turkish children. *Journal of Psychoeducational Assessment*, 26(2), 139–147. <https://doi.org/10.1177/0734282907307802>
- South African Police Services. (2021). Police Recorded Crime Statistics. Third Quarter of 2021/2022 Financial Year Report.
- Soydan, S., & Samur, A. (2017). Validity and Reliability Study of Environmental Awareness and Attitude Scale for Preschool Children. *International Electronic Journal of Environmental Education*, 7(1), 78-96.
- Statistics South Africa. (2017). *General Household Survey*. Pretoria: Statistics South Africa.
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The New Ecological Paradigm in Social-Psychological Context. *Environment and Behavior* 27: 723–743. <https://doi.org/10.1177/0013916595276001>
- Strózik, D., Strózik, T., & Szwarc, K. (2016). The Subjective Well-Being of School Children. The First Findings from the Children's Worlds Study in Poland. *Child Indicators Research*, 39-50. <https://doi.org/10.1007/s12187-015-9312-8>
- Tian, L., Zhang, J., & Huebner, E. S. (2015). Preliminary Validation of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) Among Chinese Elementary School Students. *Child Indicators Research*, 8(4), 907–923. <https://doi.org/10.1007/s12187-014-9295-x>

- Tiliouine, H. (2015). School bullying, victimisation and subjective well-being in Algeria. *Child Indicators Research*, 8 (1), 133-150. <https://doi.org/10.1007/s12187-014-9286-y>
- Tranter, P.J., & Malone, K. (2004). Geographies of Environmental Learning: An Exploration of Children's Use of School Grounds. *Children's Geographies*, 2 (1), 131–155. <https://doi.org/10.1080/1473328032000168813>
- UNCRC, U. N. (1989). *Convention on the Rights of the Child*. New York: United Nations General Assembly
- United Nations (2015). *The 2030 Agenda for Sustainable Development*. United Nations, Geneva.
- Valois, R. F., Zullig, K. J., Brown, L. K., Carey, M. P., Vanable, P. A., Romer, D., & DiClemente, R. J. (2019). Is the Brief Multidimensional Student's Life Satisfaction Scale Valid and Reliable for African American Adolescents? *American Journal of Health Education*, 50(6), 344–355. <https://doi.org/10.1080/19325037.2019.1662348>
- Van Petegem, P., & Blicek, A. (2006). The environmental worldview of children: A cross-cultural perspective. *Environmental Education Research*, 12(5), 625–635. <https://doi.org/10.1080/13504620601053662>
- Venhoeven, L. A., Bolderdijk, J. W., & Steg, L. (2013). Explaining the paradox: how pro-environmental behaviour can both thwart and foster wellbeing. *Sustainability*, 5(4), 1372-1386. <https://doi.org/10.3390/su5041372>
- Verdugo, V. C. (2012). The Positive Psychology of Sustainability. *Environment, Development and Sustainability*, 14, 651–666.
- Vygotsky, L. S. (1962). Thought and Word. In L. Vygotsky & E. Hanfmann, G. Vakar (Eds.), *Thought and language* (pp. 119–153). MIT Press. <https://doi.org/10.1037/11193-007>

- Wells, N. M. (2000). At home with nature: Effects of “greenness” on children’s cognitive functioning. *Environment and behavior*, 32(6), 775-795.
<https://doi.org/10.1177/00139160021972793>
- Wells, N.M., & Lekies, K.S. (2006). Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism. *Children, Youth and Environment* 16(1), 1-24.
- Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press
- Wu, L. (2012). Exploring the new ecological paradigm scale for gauging children’s environmental attitudes in China. *Journal of Environmental Education*, 43(2), 107–120. <https://doi.org/10.1080/00958964.2011.616554>
- Ye, M., Li, L., Li, Y., Shen, R., Wen, S., & Zhang, J. (2014). Life Satisfaction of Adolescents in Hunan, China: Reliability and Validity of Chinese Brief Multidimensional Students’ Life Satisfaction Scale (BMSLSS). *Social Indicators Research*, 118(2), 515–522. <https://doi.org/10.1007/s11205-013-0438-0>



Appendix A (Scales)

1) New Ecological Paradigm Scale for Children

Environment



Please tell us how much you agree or disagree with the following sentences	Very much agree	Agree	Not sure	Disagree	Very much disagree
1. Plants and animals have as much right as people to live.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. There are too many (or almost too many) people on earth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.* People are clever enough to keep from ruining the earth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. People must still obey the laws of nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. When people mess with nature it has bad results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.* Nature is strong enough to handle the bad effects of the way we live.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.* People are supposed to rule over the rest of nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. People are treating nature badly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.* People will someday know enough about how nature works to be able to control it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. If things don't change, we will have a big disaster in the environment soon.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Brief Multidimensional Scale Students' Life Satisfaction Scale

How satisfied are you with each of the following things in your life?	0 = Not at all satisfied Completely satisfied = 10										
Your family life?	0	1	2	3	4	5	6	7	8	9	10
Your friends?	0	1	2	3	4	5	6	7	8	9	10
Your school experience?	0	1	2	3	4	5	6	7	8	9	10
Your own body?	0	1	2	3	4	5	6	7	8	9	10
The area where you live?	0	1	2	3	4	5	6	7	8	9	10



Appendix B (Ethics clearance)

OFFICE OF THE DEAN

DEPARTMENT OF RESEARCH DEVELOPMENT

07 May 2013

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and ethics of the following research project by: Dr S Savahl (Psychology)

Research Project: Children's Worlds: International Survey of Children's Well-Being.

Registration no: 13/4/26

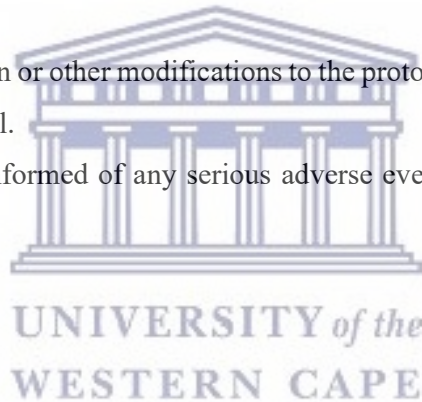
Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias

Research Ethics Committee Officer

University of the Western Cape



A place of quality,
a place to grow, from hope
to action through knowledge

Appendix C (Permission letter)

**Chairperson
Higher Degrees Committee
Faculty of Community and Health Sciences
Dear Chairperson
Permission for Nicole Chapman**

23/09/2019

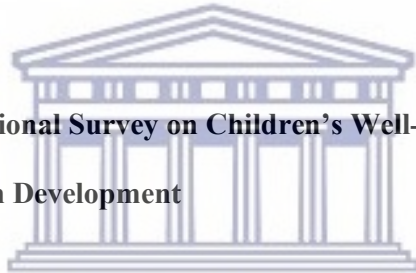
Ms Nicole Chapman is a registered student in the M.A Psychology programme. She has submitted her proposal in fulfillment of the mini-thesis component of the degree. Her thesis forms part of a UWC registered project Children's Worlds: International Survey of Children's Well-Being (13/4/26).

We the undersigned hereby grant permission for her to access and use the data of the above-mentioned project as part of the requirements for the degree.

**Sincerely,
Sabirah Adams**

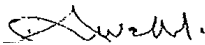


**Principal Investigator
Children's Worlds: International Survey on Children's Well-Being
Senior Lecturer
Centre for Higher Education Development
University of Cape Town**



**UNIVERSITY of the
WESTERN CAPE**

Shazly Savahl



**Principal Investigator
Children's Worlds: International Survey on Children's Well-Being
Associate Professor
Department of Psychology
University of the Western Cape**

Appendix D

(Children's Worlds Ethics Statement)

While childhood is regarded as a valid structural feature of modern society with rights and privileges in law and policy, they still constitute a vulnerable population. Special care and attention is therefore necessary when conducting research with children. When conducting child centred research it is incumbent on researchers to consider children's agency and children's rights in relation to the potential harms and benefits of the proposed research study. This essentially points to the notion of acknowledgment of competencies – researchers are required to take special consideration of the age and maturity of child participants. Furthermore, the researcher also needs to be aware of children's vulnerability to exploitation in their interaction with adults. This is particularly relevant given the differential power relationship between adult researcher and child participant. Considering the above, the study follows the ethics guidelines as stipulated by UNICEF's Ethical Research Involving Children Report (2013) with particular cognisance of the key principles of harms and benefits, informed consent, privacy and confidentiality and dissemination of findings. These are discussed below:

i. Harms and benefits

Through participation in the study the child participants shall not be discriminated against based on ethnic or social characteristics. The researchers will ensure that children are not harmed through commission or omission of taking part in the study. It is through the promotion of children's well-being, maintaining the view that children are right-bearing citizens and competent decision makers who are authorities of their own lives and honouring children's right to express their beliefs and opinions either by writing, talking or drawing. Furthermore, the researchers will ensure that children have access to advice and support should they experience any trauma or difficulties relating to the topic. The researchers will ensure that children are not exploited in any way and that their health, safety and educational development

are not compromised. Finally, the researcher will be aware and reduce the power relationship between the participants and the researcher.

ii. Informed consent

Children will be informed of the rationale of the study, its subsequent aims and objectives and what the nature of their anticipated role within the research study will be. The researchers will be aware of their role in ensuring that children understand their rights as participants in a language that they understand. Children will be informed of the option of non-participation without discrimination, which is applicable at any time or phase of the study. The views, experiences, perspectives, dignity and integrity of each child, as well as their specific contexts shall be respected and valued by the researchers. Researchers will therefore obtain written and voluntary informed consent from both children and their parents/guardians in a language that they understand. Children will also be given sufficient time to consider the information of the study, reflect on their decision to participate and have any questions answered before providing their consent.

iii. Privacy, confidentiality and anonymity

Particular consideration to the privacy of children will be ensured pertaining to the divulging of personal information that may cause them to feel anxious or uncomfortable. This further extends to being cognisant of not divulging any information provided by children to family members, friends or others known to the child. The researchers will ensure that the identity of each child is protected as well as the setting in which data collection will take place. Any sensitive information that is required will be limited to a minimum necessary to achieve the aim of the research study.

Confidentiality in terms of the protection of disclosed information and the protection of children's identity will be strictly enforced. Any personal information that each child provides will not be disclosed. Participation within the study will be kept confidential to ensure that

individual identities cannot be linked to the results of the study. The information that each participant provides will be kept private. Children will be advised prior to the commencement of the questionnaire administration that disclosure of any current or potential abuse would need to be engaged with and may need to be referred for professional assistance. Furthermore, no personal identification details will be requested on the questionnaires in order to ensure anonymity of the participants. This will ensure that the information that each participant provides will not be identifiable to a specific participant's identity.

iv. Dissemination of findings

Particular ethical consideration will be given to ensure that the privacy of the research participant's identities which will be maintained through dissemination of the findings. To achieve public confidentiality, the researchers will omit or disguise various identifying information without compromising the integrity of the findings. Consent to disseminate the findings through various conference presentations, journal publications, student theses/dissertations and reports will be obtained from the participants. This will be ensured by securely storing, protecting and disposing of information that has been collected that can only be accessed by the research team. The data will be kept in a locked room with controlled access as well as password-protected computer files. Hard data will be destroyed after five years, while electronic data will form part of a larger longitudinal data set, including Wave 1 and 2 data. Consideration will further be extended to the transporting and storage of data. All identifiers will be destroyed or removed throughout the data collection phase.