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Do Green Spaces Matter? The Associations Between Parenting Stress, Child Mental Health Problems And Green Spaces

Birute Balseviciene ^{a*}, Liuda Sinkariova ^b, Sandra Andrusaityte ^c^{a,b}Department of Theoretical Psychology, Vytautas Magnus University, Donelaitis st. 52 – 315, Kaunas, LT – 44244, Lithuania^cDepartment of Environmental Sciences, Vytautas Magnus University, Vileika st. 8, Kaunas, LT – 44404, Lithuania

Abstract

Parenting stress is among the contextual factors that have been subject to vigorous research in terms of its effect on parenting behaviors and on child development. There is convincing evidence linking parenting stress related to reports of child behavioral and emotional problems, adjustment difficulties, and internalizing or externalizing problems (Abidin, 1995; Berllinger, 1994; Haskett et al., 2006; Bayer et al., 2006; Costa et al., 2006; Ashfort et al., 2008; Crnic et al., 2005). On the other hand, green spaces are associated with better child mental health (Strife et al., 2009; Louv, 2005). **The purpose of this study** was to examine the associations between parenting stress, children mental health and green spaces. **Methods.** Data were obtained from Kaunas cohort study (Kaunas KANC, Lithuania). Distance to natural water pond and green spaces was based on spatial land cover data sets for Kaunas city which were obtained from the municipality and were processed using ArcGIS 10 software. 645 women filled in Simplified version of Parenting Stress index – short form (S – PSI/SF, Abidin, 1995; Yeh et al., 2001), Strength and Difficulties Questionnaire Lithuanian version (SDQ, Gintilienė et al., 2004). We used regression analysis to examine a model of these associations. **Findings and Results.** The linear regression analysis showed that parenting stress was significantly predicted by the distance to natural water pond, child mental health problems, and child physical health. The best model of associations was when all predictors were included. However, the distance to green spaces was not a significant predictor. **Conclusions and recommendations.** We conclude that not only child mental health problems or physical health matter in predicting parenting stress, but the distance to natural water pond such as river is important factor too. Our recommendation is in other research to take a deeper look in these associations.

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* Corresponding author Birute Balseviciene. Tel.: +370-37-327-824
E-mail address: birutebalse@gmail.com

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1. Introduction

Parenting stress is defined as the negative strain related to the self, the child, and the parent – child interaction in the context of parenthood (Abidin, 1995). Commonly it is identified as a reaction to the demands of being a parent. There are some theories conceptualizing and explaining the mechanism of parenting stress, but one of the most popular theories is Abidin's theory. He says that parenting stress is determined by three factors from three areas: by parent and child domain factors, and situational or context factors. Parent domain factors can be such as depression and sense of competence; while child domain factors are hyperactivity, mood, health; and situational factors – the impact of parenting on other parent's life roles - parental health, social support, relationship with spouse, environment, SES and so on. Parenting stress comes from parent's imbalance of parent's expectations about the needed resources to be a good parent and real situation (Deater – Deckard, 2004).

Parenting stress is closely linked to many children's problems. Many studies showed associations between parenting stress related to reports of child behavioral and emotional problems, adjustment difficulties, and internalizing or externalizing problems (Abidin, 1995; Haskett et al., 2006; Bayer et al., 2006; Costa et al., 2006; Ashfort et al., 2008; Crnic et al., 2005). Assuming that parent – child relationships are bidirectional, it is important to study factors that are likely predict parenting stress as well. There is a growing evidence that parenting stress can be predicted by children's mental health problems such as hyperactivity (Riley et al., 2006), behavioral problems (Deater – Deckard, 2004; Solem et al., 2011).

The stress of parents from interactions with their children also depends on parents' mental health and psychological well – being (Anthony et al., 2005). Green spaces are often closely connected to individual's mental health and well – being (Taylor et al., 2002; Louv, 2005; Pretty et al., 2007; Barton & Pretty, 2010; Bowler et al., 2010; Pretty, 2011; Berg et al., 2010). Green spaces are usually defined as all urban green, agricultural green, forests and nature conservation areas with water or without water (Berg et al., 2010). It is possible that there are four main pathways of positive effects of green spaces and water ponds on mental health. They reduce stress (Laumann et al., 2003), foster social bonds (Barton et al., 2012; Pretty, 2011), provide outdoor activities and opportunities for “green exercise” (Ward Thompson, 2002; Barton & Pretty, 2010; Pretty et al., 2007), reduce threats from pollutants and noise (Pretty, 2011). Moreover, even viewing nature through a window can help to improve mental well – being (Maller et al., 2006). Green spaces, including lakes and rivers or ponds help not only to recovery from stress or improve mental health of mother, but it helps children, who have mental health problems to concentrate, to recover from stress, improve cognitive thinking and aid self – discipline (Taylor et al., 2002). Children who had an access to green spaces were more successful to cope with stressful life events and were generally less stressed individuals than those in urban habitats lacking green space (Wells & Evans, 2003). So, we can hypothesize that green spaces with or without water reduce not only mother's stress and improve her mental well – being, but have an impact on children's mental health. We can say that if mother has better mental health, so she do better with her child even in the case when her child has some problems. On the other hand, if children have an access to green spaces they have better cognitive skills, higher self – esteem self – discipline and etc., so there are increased risk of parenting stress because of lower child mental health problems.

In Abidin's theory such contextual factors as physical environment (for example green spaces) are not involved as in many psychological theories. But we use Bronfenbrenner bioecological model (2001), where not only child's biological factors matter, but physical environment and its components matters too. It was stated above there are more and more studies showing that physical aspects of child's and mother's environment are important to mental health. So *the purpose of this study* was to examine the associations between parenting stress, children mental health and green spaces.

Despite the fact that children problems are closely related to parenting stress, for example when child has behavioral problems or ADHD his parents usually have more stress than other parents, but in this study we will analyze what predicts parenting stress, but not children's problems. That is why we will concentrate on child and context domain factors which can predict parenting stress.

2. Method

2.1. Procedure

Data were obtained from Kaunas cohort study (Kaunas KANC, Lithuania). Participants were given the questionnaires by mail. 645 mothers of children of ages between 4 and 7 filled in Simplified version of Parenting Stress index – short form Lithuanian version (S – PSI/SF, Abidin, 1995; Yeh et al., 2001, Balseviciene et al., 2013a), Strength and Difficulties Questionnaire Lithuanian version (SDQ, Gintiliene et al., 2004).

Spatial land cover data sets for Kaunas city were obtained from the municipality and were processed using ArcGIS 10 software to produce the green space classification. Our definition of “green space” included city parks larger than 1 ha with most of them having 65% land cover with trees. We estimated the distance to the nearest park for women at their current residential address. Our definition of “natural water pond” included biggest city water ponds – rivers (two main rivers) and big ponds.

2.2. Measures

2.2.1. Simplified Version of Parenting Stress Index – Short Form (S – PSI/SF, Abidin, 1995; Yeh et al., 2001)

The S-PSI/SF is used for early identification of dysfunctional parent – child interactions, parenting stress and difficulties with child. The S - PSI/SF consists of 15 – item test. It yields 4 scores, including child domain score, parent domain score, child – parent interaction score and total stress score. For further analysis only total stress score was used. Responses are given on 5 - point Likert scale ranging from 1 (indicating strong agreement) to 5 (indicating strong disagreement). S-PSI/SF demonstrated a good factorial and construct validity and internal reliability in the group of Chinese women and Lithuanian woman (Yeh et al., 2001; Balseviciene et al., 2013a). The internal consistence reliability of the S-PSI/SF, as measured by Cronbach alpha statistic, was 0.905.

2.2.2. Strength and Difficulties Questionnaire Lithuanian version (SDQ, Gintiliene et al., 2004)

The SDQ is a brief behavioral screening questionnaire designed to assess prosocial behavior and emotional and behavioral problems of children of five scales. In Lithuanian sample study (Gintiliene et al., 2004) five scales were found namely conduct problems, hyperactivity, emotional problems, peer relationship problems and prosocial behavior. All subscales except prosocial behavior subscale are summed up to generate a Total Difficulty score. Responses are given on 3 - point Likert scale ranging from 0 (indicating strong disagreement) to 2 (indicating strong agreement). The internal consistence reliability of the SDQ, as measured by Cronbach alpha statistics, in this study was 0.903 (compared to Gintiliene et al., 2004 – 0.790).

3. Results

First of all we analyzed regression model of children mental health problems and distance to green spaces and natural water pond on parenting stress. Our regression model was quiet good and statistically significant, but the distance to green spaces and natural water ponds were not related to parenting stress. As we mentioned earlier many researchers found these associations (Ward Thompson, 2002; Pretty et al., 2007; Barton & Pretty, 2010; Bowler et al., 2010; Pretty, 2011, etc.). Also research shows that child mental health problems often are very closely associated with environmental pollution factors such as prenatal and postnatal environmental tobacco smoke exposure (Bellinger et al., 1994; Wigle et al., 2008; Sagiv et al., 2012). So we analyzed regression models for non – smoking mothers and smoking mothers separately.

The first regression model tests the effects of child mental and physical health problems, distance to natural water pond and green spaces, mother’s educational status, child sex and age on parenting stress in subpopulation of non – smoking mothers. The regression model is statistically significant ($F=12,551$, $p=0.0001$, $p<0.05$). Child mental health problems and physical health have an impact on parenting stress. However, five dimensions, such as distance to green spaces and natural water pond, child sex and age, mother’s education status have not been found to be related to parenting stress.

1 Table. Regression analysis of child’s, mother’s and environmental variables on parenting stress (non - smoking mothers N=573)

Dependent Variable	Independent Variables	β	t	p	F	Model (p)	R ²
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Parenting stress S-PSI/SF	Coefficient		4,498	0,0010	12,551	0,0001	0,428
	Child mental health problems (SDQ problems total score)	0,346	7,637	0,0001			
	Child physical health (in 12 month)	0,159	3,550	0,0001			
	Child sex	-0,002	-0,057	0,955			
	Child age	0,057	1,336	0,182			
	Mother's education status	-0,057	-1,308	0,192			
	Distance to natural water pond	-0,002	-0,056	0,955			
	Distance to green spaces	0,050	1,167	0,244			

This second regression model tests the same effects as in the first model, but in subpopulation of smoking mothers. The regression model is statistically significant ($F=3,978$, $p=0.001$, $p<0.05$).

2 Table. Regression analysis of child's, mother's and environmental variables on parenting stress (smoking mothers N=72)

Dependent Variable	Independent Variables	β	t	p	F	Model (p)	R ²
Parenting stress S-PSI/SF	Coefficient		2,638	0,0010	3,978	0,001	0,579
	Child mental health problems (SDQ problems total score)	0,422	3,740	0,0001			
	Child physical health (in 12 month)	0,251	2,273	0,026			
	Child sex	-0,008	-0,072	0,943			
	Child age	0,015	0,139	0,890			
	Mother's education status	-0,027	-0,237	0,813			
	Distance to natural water pond	-0,239	-2,131	0,037			
	Distance to green spaces	-0,154	-1,382	0,172			

This regression model revealed that child mental health problems, distance to natural water pond and child's physical health have an impact on parenting stress. However, four dimensions, such as distance to green spaces, child sex and age, mother's education status have not been found to be related to parenting stress.

In subpopulation of smoking mothers the proportion of variance explained by the model was much higher (R square 0.579) than in the non – smoking subpopulation (R square 0.428).

4. Discussion

The aim of present study was to analyze the associations between parenting stress, child mental health and green spaces. There were many studies that evaluated the associations of parenting stress and child mental health problems (Abidin, 1995; Haskett et al., 2006; Bayer et al., 2006; Ashfort et al., 2008). The main results of earlier studies had showed the importance of parenting stress on children mental problems development. There are also evidences that show children mental health impact on parenting stress (Deater – Deckard, 2004; Solem et al., 2011). The results of this study of the first and second models indicated that children mental health problems have an impact on parenting stress. This result is in agreement with findings of other studies in this field. But when studying results of green spaces and natural water ponds associations with parenting stress, we have got no significant associations. That is to say, the distance to green spaces or water ponds is not a good predictor for parenting stress. On the other hand the results of previous studies show that green spaces are associated with better child and parent mental health (Strife et al., 2009; Pretty et al., 2007; Barton & Pretty, 2010; Berg et al., 2010; Bowler et al., 2010; Pretty, 2011), but there are the results that indicated small and not significant connections between these two (Wigle et al., 2008). Furthermore, there is convincing evidence indicating that mental health is associated with environmental pollution factors (Sagiv et al., 2012). When we analyzed these associations separately for smoking and non - smoking mothers, we have got significant relationships between distance to natural water pond and parenting stress, but only in smoking group. This result is in conformity with other studies, where environmental pollution factors have important impact on health (Shankardass et al., 2009; Balseviciene et al., 2013b). It is possible that postnatal environmental pollution factors (such as mother's smoking) mediate or moderate the connections between child and

parent mental health, and impact of green spaces and natural water ponds on mental health. As we said before, there are no other studies that analyzed all these variables together, so it is important to study carefully these connections and to look for the reasons of these interesting findings.

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