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What are the relations among stress perception, health perception and activity participation in school-aged children?



ABSTRACT

[This correlational study examined possible relations among children's activity patterns, perceived stress, and perceived health. A variety of self-report questionnaires were administered to a sample of 33 school age children. The Pediatric Activity Sort (PACS) was used to measure activity participation, a health questionnaire was used to assess health, and the Childhood Stress Questionnaire (CSQ) was used to measure perceived stress. Correlations showed no significant relationships between stress level and the amount of reported activity participation. The absence of significant relationships may be due to testing a sample of middle to upper class, Caucasian children, as there was a skewed CSQ dispersion with the majority of children reporting less stress than expected.]

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INTRODUCTION-

STRESS:

According to the Merriam Webster Medical Dictionary, stress is “a physical, chemical, or emotional factor that causes bodily or mental tension and may be a factor in disease causation”. In fact, stress is strongly associated with negative outcomes for health and wellbeing and there is research to support the consequences of living with chronic stress (McEwen & Lasely, 2002; Sapolsky, 2004). For instance, a study by Cohen and colleagues (1998) found that psychosocial stress, particularly chronic stress, appears to increase susceptibility to upper respiratory disease. In children, stress can affect brain and immune function development, which are especially vulnerable during early childhood. Subsequently, individuals exposed to stressors in early childhood may be more vulnerable to later life stressors and their negative health effects (Middlebrooks & Audage, 2008). Stress in young children can also produce an over reactivity to the stress hormone, cortisol, which leaves them more susceptible to stressors as they age (Heim & Nemeroff, 2001 c.f. Grover et al., 2005). This is also concerning because cortisol has been found to reduce the number of natural kill cells (which seek and kill cancer cells) in the body (Segerstrom & Miller, 2004). As a whole, stress has been identified as a risk factor for diseases involving the immune system (Wyman et al., 2007), the endocrine system (Gustafsson, Gustafsson, & Nelson, 2006), and neurological processes (Carrion, Weems, & Reiss, 2007 c.f. Byrne et al., 2011).

There are many factors that interact to create a child’s perception of stress. Major life events such as divorce or the loss of a loved one contribute to stress levels. However, it appears that everyday hassles have more impact over both stress level and negative health outcomes

(Lazarus, 1984 c.f. Heubeck & O'Sullivan, 1998). This may be due to the fact that these daily hassles, such as problems at school or with friends, tend to be chronic and 'more frequent and psychologically proximal (p. 372)' (Kearney et al., 1993 c.f. Byrne et al., 2011). Experiencing major life events adds to stress as well. However, these events may have a bigger impact by lowering the ability to cope with everyday irritations, thereby multiplying the stressful impact of daily hassles (Pearlin et al., 1981 c.f. Heubeck & O'Sullivan, 1998). In fact, it is well established in the literature that everyday hassles constitute a considerable amount of stress in children, adolescents, and adults (Compas, 1987; Hurrelmann, 1990; Jewett, 1997; McNamara, 2000; Lohaus, 1990 c.f. Kraag et al., 2006)(Seiffge-Krenke, 1995 c.f. Cicognani, 2011) (Kraag et al., 2006) (Kearney et al., 1993; Bouteyre, Maurel, & Bernaud, 2007 c.f. Byrne et al., 2011). However sex differences in stress perception have been found, with girls reporting more daily hassles than boys (Daniels & Moos, 1990; Kohn & Milrose, 1993; Wagner & Compas, 1990 c.f. Heubeck & O'Sullivan, 1998), as well as being more negatively affected by these hassles than boys (Gavin & Furman, 1989; Wagner & Compas, 1990; c.f. Heubeck & O'Sullivan, 1998). Heubeck & O'Sullivan (1989) also found that girls are more likely to report high levels of stress from peer interactions, while boys are more likely to report hassles involving teachers and school-related bothers at home.

STRESS MODULATORS:

Another factor that accounts for stress perception is control. Control, also known as self-efficacy, is the personal feeling of competency that an individual has regarding their ability to influence the events in their lives. Events are perceived as more stressful when the individual feels a lack of control. In contrast, higher levels of self-efficacy correlate with lower levels of

stress and increased coping ability (Bandura, 1977, 2006 c.f. Cicognani, 2011). This can help to explain differences in stress perception amongst individuals. An individual's perception of their personal resources available to successfully cope with a stressor determines which events go unnoticed and which become a hassle (Kanner et al., 1981 c.f. Heubeck, O'Sullivan, 1998). It is understood that childhood is a period in life when children are unable to control many things, including daily hassles (McNamara, 2000 c.f. Byrne et al., 2011). Parenting constructs, however, can affect the amount of self-efficacy that children report. Parental lack of autonomy granting and over involved parenting has been associated with greater levels of anxiety, a heightened form of stress, in children (Ginsburg et al., 2004 c.f. Hudson et al., 2008). Therefore it is not just the stressful events in our life that constitute stress perception. Rather, stress perception is an interaction between different events and levels of self-efficacy. A third factor contributing to overall stress perception is effective stress coping.

Coping strategies are those methods employed by an individual to help reduce the overall level of stress perception and the negative effects and pathologies associated with stress (Compas et al., 1993 c.f. Kraag et al., 2006). Compas (2001) identified two different forms of coping. In problem focused coping the individual focuses on modifying the source of stress directly. These strategies include taking control of the situation to change the relationship with the stressor, information seeking to understand how the stressor can be avoided in the future, and evaluating the pros and cons of different methods to deal with the stressor. In contrast, in emotion focused coping the individual's efforts are aimed at managing the emotions produced by the stressor (c.f. Kraag et al., 2006). These strategies could include distraction, letting off steam through social or physical outlets, creating negative expectations to prevent letdown,

and ignoring the problem altogether. Donaldson and colleagues (2000) found that older adolescents utilized a greater variety of coping strategies to deal with life stressor than did younger age groups. This suggests underdeveloped coping ability for school-aged children, making them an at risk population for high stress perception. Interestingly, Cutrona (1990) found that high levels of social support correlate with more successful stress coping in children. Parents plays a large role in this social support, with children who feel valued and cared for reporting higher levels of social support than children with poorer parental relationships (c.f. Cicognani, 2011). In fact, Cicognani (2011) found that among Italian adolescents, family support was a strong indicator of better stress coping and lower usage of maladaptive coping strategies.

However social support does not just come from the parent child relationship. Social support can stem from relationships with peers as well. High levels of reported activity participation may indicate higher levels of social, specifically in reference to engagement in activities with a large social component such as team sports, student council or volunteering. This measure of activity participation can also be used to infer certain degrees of coping. For instance, reported participation in any type of athletic or sporting event indicates physical activity, which is an identified coping mechanism. A review of reviews by Biddle and Asare (2011) found an inverse association between physical activity and depressive symptoms, anxiety levels, and overall mental health in children and adolescents. Specifically in children, physical activity has been identified as an effective intervention for stress reduction (McBride & Midford, 1999 c.f. Kostenius & Öhring 2009). Kostenius & Öhring (2009) also found that Swedish children self report that they chose to engage in physical activity when they perceive high levels of stress because it produces a calming feeling.

STRESS AND ACTIVITY PARTICIPATION:

According to Mahoney, Harris and Eccles (2006), there are two theories to explain the relationship between participation in youth and positive outcomes. In the positive youth development perspective, organized activity participation is expected to produce positive outcomes including elevated academic performance and healthy psychological development. In contrast, the over-scheduling hypothesis holds that pressure from adults and other extrinsic factors causes excessive participation in organized activities which leads to negative developmental outcomes. This hypothesis is generally only referenced in terms of affluent youth, and is almost never applied to populations with lower socioeconomic statuses. Either of these theories could potentially explain the relations between perceived stress and activity participation in school-aged children.

However, there is limited evidence in the literature to support the over-scheduling hypothesis, at least in adolescents. Much more empirical evidence is found to support the positive youth development perspective. A strong, positive correlation is consistently found between participating in organized activities and positive developmental outcomes including academic achievement, school completion, continuing education, normal psychological adjustment, reduced rates of substance use, fewer internalizing symptoms, and high quality parental interactions (Mahoney et al., 2006; Bohnert et al., 2007; Fredricks & Eccles, 2006¹; Larson et al., 2006; Fredricks & Eccles 2000²). Greater breadth of activity involvement and longer duration of engagement increase the positive outcomes observed from extracurricular involvement (Fredricks & Eccles, 2006¹; Fredricks & Eccles 2000²; Larson et al.,

2006). In fact, as the amount of time dedicated to extracurricular activities increase, the associated benefits of participation and eventually level off at relatively high levels of participation (Mahoney et al., 2006). It is important to note that even extremely high rates of activity participation (20+ hours per week) are more beneficial than having no involvement at all (Mahoney et al., 2006). There were a few instances where activity participation correlated with negative outcomes, specifically involving athletic involvement in sports. Sports participation has been linked with higher levels of stress and increased consumption of alcohol (Larson et al., 2006; Fredricks & Eccles 2000²). However, athletes also experience positive outcomes from their sport participation as well (Fredricks & Eccles, 2006¹; Fredricks & Eccles 2000²; Larson et al., 2006). All of these studies utilized a sample of adolescents. There is a gap in the literature regarding the relations between activity participation and school aged children.

Stress and daily life activities are also conceptually linked, at least in adults. It is suspected that under high stress conditions occupation (activity) engagement becomes limited to only those activities critical to sustain daily life (Wilcock, 1998). This would include activities of self-care and work or school primarily. However, good health is associated with a balance of life activities that include leisure and social. However, there is little to no information in the research literature to guide our thinking regarding possible implications of stress on children's activities, occupations and overall health. While the concepts of occupation, health, and stress have been linked (Csikszentmihalyi, 1993; Wilcock, 1998; & Yerxa, 1998), they remain conceptual relationships. Thus, the extent to which perceived daily life stressors may impact occupational choices and health is not well studied in children.

THE CURRENT STUDY:

In a recent study at UNH, *Children's health, stress and occupations (IRB #3807)* (White, 2011), researchers have looked at whether perceived stress is linked to overall health and activity/occupation patterns in children. Preliminary data has been presented in a number of researcher conferences. At the time, there were no available tools to address perceived stress that were free and accessible, easy to administer, and designed for children to self-answer. In order to obtain a measure of perceived stress for the study, the principal investigator developed a Perceived Stress Scale for Children (PSS-C). However, the tool has not been extensively studied for its external and internal validity. Recently a new tool called the Childhood Stress Questionnaire (CSQ) was described in the literature. This tool has strong data to support its applicability with children.

This study is designed to extend UNH's study *Children's health, stress and occupations, UNH IRB #3807* by gathering information regarding the perception of stress in children based on data from administering the CSQ in place of the PSS-C. These results will be compared with the children's related participation in activities and occupations, as well as their perceived health. The use of the CSQ, a recently published (2011) and well-established stress perception tool, will be expected to provide more valid and supported data than when the study first took place using the PSS-C. My hypothesis is that there will be significant relations among stress perception and reported daily life activities/occupations. However, there is insufficient information in the research literature to support a directional hypothesis about these relations.

METHODS-

PARTICIPANTS:

Through convenience, or “snow-ball” sampling, 33 participants (18 male, 15 female) between the ages of 5 and 15 ($m=9.55$) were recruited to participate in this study. We obtained referrals of possible participants from friends, and then friends-of-friends in a snowball-sampling procedure, relying on referrals from initial participants to generate additional recruits. The majority of these participants represent white, middle- to upper-class children from New Hampshire.

PROCEDURE:

Approval to conduct this study was obtained from the University of New Hampshire Institutional Review Board. Parental consent and child assent were obtained for all participants. A demographic sheet was provided for a parent of each child to fill out to collect basic family information. Then, 30-45 minute interviews were conducted to administer three tools designed to capture perceived health, perceived stress, and activity participation. Interview length varied greatly depending on the age of the child, with younger children requiring more time to complete the measures than older children. The three tools are as follow:

- Perceived health: A perceived health questionnaire originally created for use in *UNH IRB #3807* (unpublished) (White, 2011) was implemented to measure perceived health. It consists of 8 questions regarding general level of health and well being and perception of overall health. This questionnaire takes approximately 5 minutes to complete.
- Perceived stress: The Childhood Stress Questionnaire (CSQ) (Byrne et al., 2011) was used to measure levels of perceived stress in the participants. It contains 50 questions

that identify stressors that the participant may or may not have experienced in the past year in areas such as everyday hassles beyond normal control, parental relationships, periods of transition and change, school based problems and family upheaval. Children are then asked to rate how the event affected them, on a range from the event did not upset me to the event made me very upset. The tool takes approximately 15 minutes to implement.

- Activity Participation: The Pediatric Activity Card Sort (PACS; Mandich, Polatajko, Miller & Baum, 2004) is an occupation-based, pediatric self-report assessment tool that is used to measure levels of activity participation. It contains cards with pictures of daily activities and asks children to report how often they engage in each. Generally, there are a total of 75 cards/activities exploring activities involving personal care, school/productivity, hobbies/social activities, and sports. However, for the purposes of this study, we expanded the PACS to include 15 additional activities and occupations. These additions included: horseback riding, lacrosse, field hockey, dance, cheerleading, physical education class, mini golf, gymnastics, softball, snowboarding, skateboarding, going to the library, internet use, playing computer games, and instant messaging. This tool takes approximately 15 minutes to complete.
- Control: In this study we are also interested in the mediating role of control. As the administration time of the other three measures was already difficult for some of the younger children, rather than administer another questionnaire or tool to measure control we simply asked the children, “After school and on weekends, do you get to

chose most of the things that you do?” This allowed us to capture a measure of control without greatly increasing the testing time.

ANALYSES-

We analyzed the sample’s demographic data using descriptive statistics (see tables 1.1 and 1.2). Some data was missing from this demographic information as it was self-reported by the parents of the child participants. However on the measures self-reported by the children, there was no missing data. Spearman Brown correlations were calculated for relations among stress, health, age, and occupations with control as a possible mediating factor. We used this form of non-parametric correlational analyses because of the modest sample size; however Spearman’s rho correlations and Pearson’s rho correlations did not differ greatly. There were no statistically significant correlations among our variables of interest. Therefore, we elected to create variables with a higher and lower condition for stress, age and control to observe likelihoods with Chi Square testing. For each of these variables, all responses below the 50th percentile were considered a low condition variable, and all responses above the 50th percentile were considered a high condition variable.

Table 1.1

Ethnicity	94%white/Caucasian
Maternal Education	82% college degree
Paternal Education	76% college degree
Annual Family Income	88% \$75,000+ 76% \$100,000+

Table 1.2

	motherage	fatherage	parentalrelationship	mothereducation	fathereducation	householdincome	childage	childgender	ethnicity
N Valid	29	20	31	30	30	31	33	33	33
Missing	4	13	2	3	3	2	0	0	0
Mean	42.00	43.35	1.55	2.90	2.80	4.74	9.546061	1.45	1.09
Median	41.00	42.00	1.00	3.00	3.00	5.00	9.400000	1.00	1.00
Std. Deviation	5.318	5.594	.925	.305	.484	.575	3.0028330	.506	.292
Skewness	.083	.319	2.414	-2.809	-2.499	-2.201	.153	.191	2.983
Std. Error of Skewness	.434	.512	.421	.427	.427	.421	.409	.409	.409
Range	18	18	4	1	2	2	10.1000	1	1

RESULTS-

The descriptives for the demographic information revealed some interesting characteristics about the sample. The children were almost exclusively Caucasian children, from educated homes with middle to upper socioeconomic status. Brief analysis of the health questionnaire also showed that they are by and large a healthy population of children. Since there was very limited variation and no outlying data on this health measure, no further analysis were required.

For both the correlational analyses and Chi Square likelihoods, there was no relation amongst perceived stress levels and activity participation in children. This is contrary to our hypothesis. However, according to Chi Square testing, there was a likelihood to report lower levels of stress with higher levels of control, and higher levels of stress with lower levels of control (Table 2.1). These findings are expected and mirror the conclusions regarding stress and

control in the literature. There was also likelihood to report lower levels of stress at older ages, and higher levels of stress at younger ages (Table 2.2). This finding was not as expected.

Generally, you would expect that as children age they are given more responsibility and more is expected out of them. The increasing demands, both at home and at school, would be expected to increase stress levels. However, this is not what we found in our sample.

Table 2.1

Chi Square Crosstabulations	control		Total
	high	low	
stress low	12	4	16
stress high	3	14	17
Total	15	18	33

Table 2.2

Chi Square Crosstabulations	age		Total
	younger	older	
stress low	5	11	16
stress high	11	6	17
Total	16	17	33

CONCLUSIONS-

LIMITATIONS:

The first, most compelling weakness of this study is the modest sample size. A sample of 33 participants does not give you the power to perform advanced statistical testing. It is also unlikely that a sample with n=33 will be representative of the general population. In fact, based on our descriptive statistics of the demographic data, we know that we do not have a representative sample. Our sample accessed a very specific, well-of population of children. There was an extreme lack of diversity within the sample, with 94% of the children identifying as white or Caucasian. The majority of the sample came from highly educated parents with high

incomes. A factor contributing to this lack of diversity is that within the sample there are many sets of siblings. From a recruitment standpoint this was very helpful. However, it considerably reduces the variety of children sampled. Clearly, these children do not represent the general population, so caution should be used to refrain from making generalized statements when interpreting the results from this study.

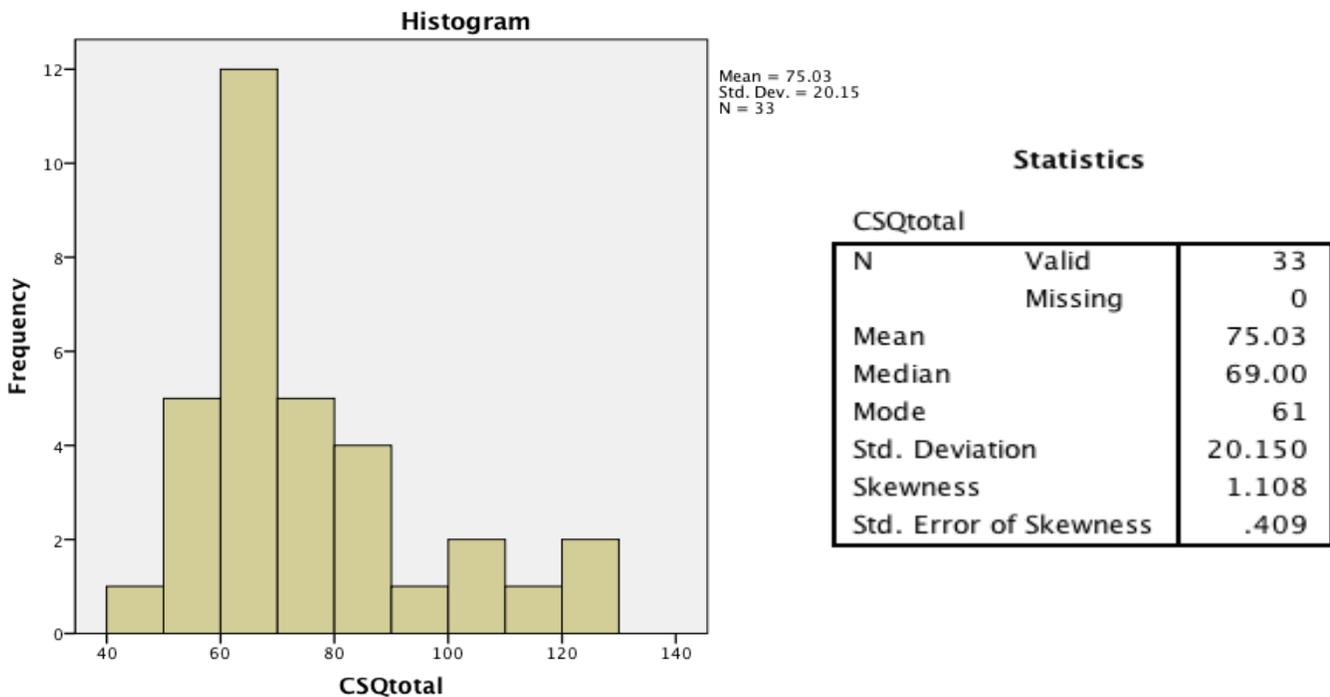
The next obvious limitation of this study is that the dispersion of scores on the stress measure were not normal. More children reported lower levels of stress than would normally be expected, with a mean stress score of 75 out of a possible 250 points. This is very apparent when looking at the skew of the CSQ score frequency histogram (Table 3.1). As there was not much stress present in this sample, it is no surprise that we did not find the correlations we were looking for in regard to stress and activity participation. There would need to be higher levels of stress in the sample to find any sort of relations. This apparent lack of stress is likely attributable to the abnormal sample of well-of children used in this study. Due to their high levels of health and socioeconomic status, it is not surprising that they may report lower levels of stress than you would expect to see in the general population.

Another weakness of this study is the large span of child ages. With a range in ages of 5-15, there were not many children representing each age group. Additionally, when we created high and low conditions for Chi Square testing, data may have been lost by creating only two age groups when there was such great variability in age. In future studies of this nature, it would be a better research design, and prevent the loss of data, if there were more same-aged children. For instance, if a group of five and six year olds was compared to nine and ten year

olds, twelve and thirteen year olds, etc. This grouping of ages may allow for more sophisticated analysis that would expose some of the relations that we were looking for but did not find.

The use of the Childhood Stress Questionnaire (CSQ) could also be a potential weakness of this study. Although this tool was meticulously developed and psychometrically tested, it is a very recently published tool (2011). At the time this study was conducted, there were no published studies utilizing the CSQ, other than papers about the development and testing of the CSQ. Therefore, there it is hard to say what the 'expected' stress scores would be for this sample. Although we interpreted the skew in CSQ scores to reflect low levels of stress, it could be that this is a trend that is common in children taking the CSQ. Because the tool is so new, it is useful in comparing different participants within the sample; however it is difficult to know what a normative distribution of scores would be.

Table 3.1



DISCUSSION:

This study attempted to fill a gap in child specific stress research. However, in doing so, we accessed a specific population of well-of, Caucasian children who may demonstrate specific patterns that are not in line with the pre-existing research in the literature. This demonstrates that, not only must you use caution when generalizing adult and adolescent research to children, but you should be aware that the same problem may occur when discussing specific populations of children.

In regards to our hypothesis, this study found no relation between stress perception and activity participation. Although we partially attribute this to the nature of our sample, it is interesting to look at our sample demographics in relation to the over-scheduling hypothesis. This theory is generally only referenced in terms of affluent youth, and is almost never applied to populations with lower socioeconomic statuses. Given that this perfectly captures the characteristics of the sample utilized in this study, we are providing direct evidence to negate the over-scheduling hypothesis. With these findings, combined with the lack of empirical support for the over-scheduling hypothesis in the literature, parents should not worry that too much activity participation is bad for their children. However, the hitch to this is our findings of control. Children who reported higher control also were likely to report lower levels of stress. Therefore, activities are liable to be more beneficial when they are selected by the child himself and not chosen for him.

The other unexpected finding of this study was the likelihood that older children will report less stress and younger children will report more stress. Generally, you would expect that as children age the increasing demands that they face, both at home and at school, would

contribute to a greater stress level. However, that was not the case in our sample. Another way to think about these findings is, again, in terms of control. As higher control had a likelihood for lower stress, perhaps this age related decline in stress represents an increase in control.

Although parents usually speak in terms of giving their children more responsibility as they get older, the kids themselves may perceive this as more control. Having a later curfew or bedtime, being able to go to the park alone, and even earning a higher allowance are all things that come with age that could increase a child's own perception of having control of their life. As we've seen both in the literature and in this study, a sense of control reduces the experience of stress. So, in this study when we found that children report less stress as the age, this could be demonstrating the mediating role of control.

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