

The importance of outdoor recreation on child's mental development: focus on the child's first day in school (Review)

Abstract

Children encounter different stressors on their first day in school as they are temporarily disrupted from the existing symbiosis between them and parents. This disrupted symbiosis is manifested in the child's behavior on the first day in school characterized by hanging on to the parent, sobbing profusely upon coaxing and pleading, isolated and resistive. These often raise the glucocorticoid levels in the blood stream that could cause impairment of the critical areas in the brain: prefrontal cortex and hippocampus. The prefrontal cortex and hippocampus are very important in the child's mental development as they perform cognitive and memory functions respectively. However, researchers and anecdotal evidences have shown that outdoor recreation cushions the flux of stress by regulating glucocorticoid secretion thereby preventing possible alteration in the physiological processing of information in the prefrontal cortex and hippocampus. The present review suggests that outdoor recreation enhances child's mental development and that school teachers should employ outdoor recreational activities in the management of resistivity or other psychological experiences commonly observed in children of first time in school.

Keywords: outdoor recreation, stress, cortisol, prefrontal cortex, hippocampus

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Introduction

Child's outdoor recreation is not just all fun and games, but rather that act of play that is very critical in the development of child mentation because during outdoor recreation, the child experiments, explores and discovers, and the generated impulses resulting from these activities are transmitted into the brain.¹ Interestingly, outdoor activities are so vital to promote children's whole development including gross and fine motor skills, intellectual and social skills.^{2,3} In this article, outdoor recreation in early elementary is defined as activity children do outside the classroom for enjoyment when they are not studying and they include running, swinging, sliding, Merry-go-round, jumping, soccer, toys for skate, scooter and bike. These recreational activities could impact on the development of child mentation in the first day at school as disruption on parent-child symbiosis could pose a risk of affecting child's early beginning. Studies have shown the influence of outdoor recreation in autistic children.⁴ Apart from the mental benefits, the physical and other benefits of outdoor recreation cannot be overemphasized. In this present study, outdoor recreation is reviewed in relation to the child's mental development in the face of common challenges a child encounters during first time in school.

Common challenges during first time in school

The challenges a child encounters during first stage of education emanate from temporary separation of the symbiosis formed between parents and child. The symbiosis is reflected in the child's behavior, and behavior is complex that real understanding of it is difficult. The child upon entering school encounters his/her earliest tests because the school is a new situation as well as the teacher no matter how much friendly. Many children are unprepared to face these new situations

and the unprepared child will quickly make themselves known by their behaviors. These behaviors are evident as the children resort to crying, fretting, and reluctance to leave parent, temper displays, over-reacting to stimuli, stubbornness and fighting. Apparently the teacher uses a more subtle approach to cushion the child's behavior in order to adapt to the new symbiosis. It is very important to note that the new situation evokes flux of stress stimuli into the brain that is associated with elevated glucocorticoid (stress hormone).

Impact of "new situations" on child's mental development

The "new situations" are challenges that can cause profuse secretion of glucocorticoid in the blood stream thus causing impairment of the child's mental development. Reasonable amount of brain development occurs after birth therefore it is subject to influences. The new challenges could pose risk to some areas of the brain that are important in intellectual skills such as prefrontal cortex and hippocampus. First, the prefrontal cortex performs the executive function characterized by higher order cognitive control process for attainment of a specific goal. Moreover, prefrontal cortex plays an important role in multiple areas of child development such as social cognition, communicative and moral behavior.⁵ More importantly, anatomical studies have shown that prefrontal cortex develops during preschool years,^{6,7} and it is the most sensitive area in the brain at risk to even mild stressor especially when the child is unable to produce adequate quantity of glucocorticoid.⁸ These imply that child's behavior in the new situation could induce alteration in the release of glucocorticoid. The alteration could be due to inadequate or excessive secretion of glucocorticoid.

Second, the hippocampus is associated with memory, in particular long-term memory. Damage to hippocampus can lead to loss of memory and difficulty in establishing new memories. Children early exposure to stress causes deficits in hippocampal-based memory function and alteration in hippocampal morphology and these have been associated with elevated glucocorticoid.^{9,10}

Brief overview of the glucocorticoid

The glucocorticoid is synthesized and secreted by the adrenal cortex located at the outermost part of the adrenal gland upon stimulation by the adrenocorticotropic hormone. The production of adrenocorticotropic hormone occurs in response to stress exposure that causes neurons in the paraventricular nuclei to release corticotrophin-releasing hormone that stimulates the production of adrenocorticotropic hormone. The glucocorticoid in turn orchestrates person's behavior to manage stress.¹¹ Glucocorticoid secretion rises to peak early morning to buffer stress of the day and falls slowly throughout the day and to its nadir at midnight when stress is expected to decline.¹²

Brief overview of sympathetic hormone: norepinephrine or noradrenalin

Norepinephrine is derived from neurons of locus ceruleus that project to the various brain regions involved in stress response including prefrontal cortex, hippocampus, amygdala, hypothalamus, periaqueductal grey, and thalamus. These circuits interact to increase fear conditioning and encode emotional memories, enhance arousal and vigilance. This cascade is altered by glucocorticoid.¹³

The "cushion effect" of outdoor recreational facilities

In this regard, it is evident that elevated glucocorticoid is detrimental to some critical areas of the brain necessary for child's high mental performance. As the child is hanging on to the parent, fretting and sobbing quite profusely, the parent is coaxing and pleading, the child is more resistive, and these trigger glucocorticoid release. The glucocorticoid level is raised and suddenly the teacher attempts to give reassurance to the child pointing out how beautiful the school environment is cluttered with pictures and outdoor recreational facilities, the glucocorticoid level is expected to reduce. Although what matters most to the teacher is getting the child into the school or classroom, it is important to note the consequences of elevated cortisol level and not to undercut the benefits of outdoor recreational facilities.

The impact of outdoor recreation on child's mental development

The child may not be completely pacified by the environment or recreational facilities or the tumultuous recitation of alphabets and numbers by the children in the classroom. Nevertheless, recreation time does a little magic although the child may isolate himself/herself from the other children or fret. He/she will wonder how the other children feel exhilarated sliding down the board, swinging cheerfully in the air, doing dog-chase, kicking football etc. The isolated child gradually draws closer to slowly gets imbued with other children's feelings therefore he/she attempts to experiment, explore and discover and by so doing the level of glucocorticoid normalizes and new rhythm of impulses is transmitted to initiate a learning process. Swinging provides children with first-hand knowledge and experience of cause and effect and of understanding spatial learning, such as up and down and back and forth and children get a chance to see the world from a new perspective.¹⁴

These above-mentioned enhance brain development by creating new neural pathways and these neural pathways are the connections that allow information to travel through the brain. The more neural pathway, the larger the brain mutation, the higher the intellectual skill. As the child is motivated to have fun, he/she is happy and forgets the existed symbiosis and forms a new one with the teacher and other children in the classroom. Meanwhile, every physiological processing of information is sharpened and enhanced when the child begins to learn in a new world he/she is so friendly with. Conversely, if outdoor recreational facilities do not exist, it becomes a huge task on the teacher although the child's success still depends on the parent-child symbiosis. It may take days and sometimes months to put a child *in situ* for proper processing of mental information (learning) in the "new situation" and this may subsequently impede the progressive child's mental development. Study has shown that learning creates more neural networks in the brain and throughout the body, thus making the entire body a tool for learning.¹⁵ In addition, studies have shown academic performance can increase and children experience shorter periods of recovery from stress when given time outdoors.¹⁶ Furthermore, studies have found that time spent in nature (outdoor) provides benefits such as reduced stress, attention restoration and physical benefits¹⁷ and even employed teachers benefit from outdoor activities as flux of stress is markedly reduced.¹⁸

Summary

Since stress flux especially encountered on the first day in school is the culprit implicated in the impairment of prefrontal cortex and hippocampus critical in the development and maturation of child brain, the present study suggests that outdoor recreation is central to child mental development and recommends that teachers should use it as expertise therapy in the management of resistivity from children on the first day in school.

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Conflict of interest

Author declares that there is no conflict of interest.

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