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Exploring the effects of outdoor activities and
connectedness with nature on cognitive styles and creativity

A thesis presented in partial fulfilment of the requirements for the degree of

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This is dedicated to

Low Ah Tian

(1922 - 2006)

My paternal grandmother who loves me unconditionally

Abstract

The natural environment's potential to improve education, work, and lifestyles is receiving increasing attention by policy makers and practitioners. Psychological research has demonstrated that stress reduction, attention restoration, and increased creativity can result from exposure to nature. Such evidence notwithstanding, the precise psychological mechanisms explaining these effects remain unclear. This thesis provides a systematic examination of how contact with nature might affect humans. Four studies were conducted. Study 1 reports two meta-analyses ($N = 10701$, $k = 100$) involving: (i) 66 studies using pre- and post-test designs, and (ii) 32 experimental studies that include a control group. Although outdoor activities have been found overall to affect personal and social outcomes positively, there has been limited research into the effects on cognitive variables of exposure to outdoor environments. To address this gap in the literature, I aim to investigate whether contact with nature (in two dimensions—the psychological attachment to nature and the physical exposure to it) is associated with processes related to creativity (i.e., cognitive styles and divergent thinking creativity). Study 2 ($N = 138$) tests the relationship between connectedness with nature and cognitive styles and reports a significant positive association between connectedness with nature and both innovative and holistic thinking styles. Building on this finding, Study 3 ($N = 185$) not only replicates the results of Study 2 by controlling for well-being processes, but includes a new creativity test to examine the link between connectedness with nature and creative processes (connectedness with nature is found to be positively linked with divergent-thinking creativity). As these three studies employ cross-sectional data where causality cannot be inferred, the last study involves an experimental design. Study 4 ($N = 93$) manipulates active versus passive engagement with nature and examines the mediating impact of connectedness with nature on the link between outdoor activities and divergent-thinking creativity. Some theoretical explanations as to how nature might affect our creativity

are proposed. Potential limitations and suggestions for future research are discussed. The findings are intended to provide supporting evidence for the relationship between nature and creativity, and hopefully inform educational pedagogy and lifestyle choices likely to enhance creativity.

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“It takes a village to raise a child.”

African proverb

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Preface

“Let Nature be your teacher.”

William Wordsworth

This thesis explores the impact of contact with nature, with a focus on creativity outcomes. In addition to the effects of being in a natural environment, the examination of a connectedness with nature is proposed here as a useful approach to exploration of the nature-creativity relationship.

My interest in this topic—the nature-creativity relationship—arises from my passion for and commitment to outdoor education (i.e., the teaching of and learning from outdoor experiences). Although there has been growing emphasis on outdoor education in school systems (Ho, Atencio, Tan, & Ching, 2016; Ministry of Education Singapore, 2016; O'Brien, 2009; Schäffer & Kistemann, 2012; Zink & Boyes, 2006), it seems to me that implementation of such learning involves a number of challenges. I will discuss two significant concerns here that motivate the aims of this thesis.

First, apart from anecdotal and statistical evidence regarding the effectiveness of outdoor experiences, we know little about how these experiences affect human thoughts and behaviour, and what ideal factors might make these experiences beneficial. In my professional experience as an outdoor educator, I have noticed that teachers have often had to design lesson plans for teaching in the outdoors despite having limited knowledge of and few skills in outdoor education. The process was essentially one of trial and error, as there was no formula to design effective outdoor programmes, and lessons were often planned in accordance with available resources and expertise. This calls for a need to further clarify the overall effectiveness of outdoor programmes on psychological outcomes, in order to gain a deeper

understanding of how contact with nature may affect us and what it is that makes outdoor programmes successful or unsuccessful.

Second, while there is evidence now to support the link between outdoor activities and cognition (Atchley, Strayer, & Atchley, 2012; Ferraro, 2015), little is known as yet about how or why outdoor activities might influence our creative cognition. Participation in outdoor activities has been used however as a potential intervention to foster innovative and creative thinking skills believed to be lacking in students (Gassner & Russell, 2008; Lim, 2012).

Inspired by recent research demonstrating that prolonged outdoor participation may foster creativity (Atchley et al., 2012; Ferraro, 2015), my hope in this thesis is to provide further insights into the understanding of the nature-creativity relationship by examining whether contact with nature (both physical immersion in and psychological connectedness with it) affects our creative thinking. It is noteworthy that the investigation of this relationship does not discount the effects of other ways by which creative cognition might be improved. Placed in a social or educational context, such clarification may hopefully encourage more people to benefit from nature engagement by engaging in meaningful outdoor activity.

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