

**A Study of the Relationship Between Current Event Knowledge and
the Ability to Construct a Mental Map of the World**

J. Christopher Bunin

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Science

in

Geography

Robert W. Morrill, Chair
L. William Carstensen
Susan G. Magliaro

January 22, 2001
Blacksburg, Virginia

Key words: mental mapping, spatial familiarity, geography education,
National Geography Standards

Copyright 2001, J. Christopher Bunin

A Study of the Relationship Between Current Event Knowledge and the Ability to Construct a Mental Map of the World

J. Christopher Bunin

(ABSTRACT)

This thesis studied the relationship between current event knowledge and the ability to construct a mental map of the world. It was hypothesized that participants with more current event knowledge would demonstrate better mental mapping abilities. The study was designed using two activities recommended for 12th graders by *Geography for Life, National Geography Standards 1994*, and the theory of spatial familiarity (Kitchen, 1994b; Gale et al., 1990, Golledge & Spector, 1978). One hundred and twenty-eight students drawn from two courses offered at Virginia Tech completed a participant profile questionnaire, a current event quiz, drew a map of the world outlining the seven continents, and located and labeled 27 cities on a world map. Using ATLAS GIS the sketch maps and place locations were digitally transformed and scored for accuracy. Descriptive statistics were used to analyze current event knowledge, place location ability, and sketch mapping ability. Using Spearman rank correlation, the relationship between current event knowledge and mental mapping abilities was assessed at a number of levels. Results indicate that participants with a stronger understanding of current events tended to create a more accurate mental map of the world. That is, place location accuracy and drawing accuracy correlated with current event knowledge. However, similar to previous research (Cross, 1987; Helgren, 1983; Muller, 1985) place location knowledge outside of North America and Western Europe was poor. The results of this thesis offer baseline data that can be used for future research to study the effectiveness of the national standards set forth in *Geography for Life*.

To
My Mother
&
Mr. Jones
(1933-1998)

ACKNOWLEDGEMENTS

I want to acknowledge and thank several people who helped me complete this thesis. I would like to thank my mother and sister for their patience, encouragement, and support whenever it was needed. I would also like to thank Ed Edelen and Krista Johnston for helping me find humor at times when laughing was the last thing on my mind.

In addition I would like to acknowledge Tim Robinson of the Statistical Consulting Center at Virginia Tech. His knowledge and recommendations were helpful for completing the statistical analyses. I would also like to thank Mark Barrow for allowing me to use his History course to recruit participants.

Next I would like to thank Bill Carstensen and Sue Magliaro for offering their guidance and insights into this thesis. Last, but not least, I would like to thank my committee chair, Bob Morrill. His friendship and advice have been instrumental to my personal, academic, and professional success.

TABLE OF CONTENTS

Abstract.....	ii
Dedication.....	iii
Acknowledgements.....	iv
List of Figures.....	vii
List of Tables.....	viii
Chapter 1: Introduction.....	1
Purpose.....	1
Background.....	1
The Study.....	3
The Hypotheses.....	5
Summary.....	6
Chapter 2: Literature Review.....	7
Interdisciplinary and Multidimensional.....	7
Related Sketch Map and Place Location Research.....	9
Place Location Research.....	9
Free Sketch Map Research.....	11
Influences on One’s Mental Map.....	19
Scope of Research.....	22
Chapter 3: Methodology.....	24
Participants.....	24
Procedures and Instruments.....	24
Instrument One – The Participant Profile.....	25
Instrument Two – Significant Current Event Quiz.....	25
Instrument Three – Free Sketch Mental Maps.....	27
Instrument Four – Place Location Exercise.....	29
Data Collection.....	30
Data Organization.....	30
Digital Transformation of Data.....	31
Sketch Map Measurement.....	31
Place Location Analysis.....	33
Organization and Measurement of Participant Profile and Current Event Quiz.....	34
Statistical Analysis of Data.....	34
Summary.....	35

Chapter 4: Results	36
Current Event Knowledge	36
Correlation Analysis for Current Event Scores	37
Place Location Knowledge	38
Participant Profile Characteristics and Place Location Ability	41
Sketch Mapping Performance	43
Participant Profile Characteristics and Sketch Mapping Ability	48
Current Event Knowledge and Mental Mapping Ability	51
North American Analysis	53
Chapter Summary	54
 Chapter 5: General Discussion and Conclusion.....	55
Discussion of Place Location Ability	55
Discussion of Sketch Mapping Ability.....	58
Sketch Mapping Examples	58
Antarctica’s Placement	64
Influence of Current Event Knowledge.....	65
Conclusion	66
 REFERENCES	69
 APPENDICES	
A. Participant Profile Questionnaire.....	72
B. Current Event Quiz	75
 VITA.....	83

LIST OF FIGURES

Figure	Page
3.1 Significant Current Event Sites.....	30
3.2 Mental Map Error Formulas	33
4.1 Current Event Test Performance According to Participant Characteristics	36
4.2 Percentage of Participants Attempting to Locate Cities by Continent	38
4.3 Mean Place Location Error for All Attempted Placements	39
4.4 Mean Place Location Errors for All Participants Including Non-Attempts..	40
4.5 Mean Total Distance Error Based on Selected Participant Profile Characteristics	42
4.6 Mean Cartographic Error for All Drawn Continents	44
4.7 Mean Cartographic Error for All Data Including Excluded Continents	44
4.8 Mean Location Error for All Attempted Continents.....	46
4.9 Mean Location Error for Data with Excluded Continents	46
4.10 Mean Area Error for All Attempted Continents	47
4.11 Mean Area Error for Data with Excluded Continents	47
4.12 Mean Mental Map Error by Selected Participant Characteristics	48
4.13 Mean MM Area Error by Selected Participant Characteristics	49
4.14 Mean MM Location Error by Selected Participant Characteristics	50
5.1 Hierarchy of Place Location Knowledge.....	57
5.2 Mental Map A	59
5.3 Mental Map B	59
5.4 Mental Map C	60
5.5 Mental Map D	61
5.6 Mental Map E	61
5.7 Mental Map F.....	62
5.8 Mental Map G.....	63
5.9 Mental Map H.....	63

LIST OF TABLES

Table	Page
3.1 Breakdown of Current Event Questions by Continent	27
3.2 Participant Demographics	31
4.1 Participant Profile Characteristics Correlating Significantly with Current Event Knowledge	37
4.2 Significant Relationships of Participant Characteristics with Place Location Error	41
4.3 Significant Relationships of Participant Profile Characteristics with Mental Map Error	51
4.4 Relationships of Current Event Knowledge with Mental Mapping Ability	52
4.5 Relationships of Current Event Knowledge with Place Location Abilities by Continent	52
4.6 Relationships of Current Event Knowledge with Sketch Mapping Abilities by Continent	53
4.7 Relationships of North American Current Event Knowledge with North American Mental Mapping Abilities	54