The Cognitive Science of Mathematics

Tuesdays, 10 - 11:50am @ 120-414

Contact Information

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Description

Mathematics has two features which, taken together, are quite puzzling: (i) its objects (numbers, functions, derivatives, manifolds, and the like) are very unlike everyday concrete material objects, yet (ii) it seems to be the source of our most certain knowledge. In this course, we will examine literature from the cognitive sciences concerning numerical thinking to see if it can help resolve some of the puzzles raised by these two features. A recurrent theme will be the relationship between mathematical thinking and language, both of which at first glance seem to be distinctively human.

Requirements

Reading

Our primary text for this course will be:

- Heike Wiese, *Numbers, Language, and the Human Mind* (2003), Cambridge University Press, ISBN 9780521108652.

This book can be purchased from Amazon, or accessed online via Cambridge eBooks at: http://ebooks.cambridge.org/ebook.jsf?bid=CBO9780511486562. Each week, we will read one chapter from the book. In addition, I will provide a required secondary reading along with pointers to other readings which will be optional if something piques your interest. With the required secondary reading, I will distribute a list of reading questions. These are things to keep in mind as you go through the readings.

Writing

Each week, you are required to turn in a reading reflection of 300-500 words in length. These are due by *Monday @ 10am*, i.e. 24 hours before class. Submission is via e-mail only. Options for what to write include: a response to a reading question, an analysis of an argument in a reading, a discussion of how the readings relate to each other, or anything else that catches your mind. Aim to be concise and focus on one central idea / issue in each one.

Participation

Since this class is a small tutorial, it will be heavily discussion-based. It is therefore imperative that you come to class prepared to talk about the week's readings. The writing assignment will help with that, but it might also be a good idea to jot down random notes, ideas, or questions that occur to you as you read.

Grading

Your final grade will be based 50% on writing and 50% on in-class participation. Writing responses will receive a check, a plus, or a minus. Your overall writing grade will be determined as follows:

- A: 4 or more pluses
- B: 7 or more checks
- C: other

Schedule

09/24 Introductory Meeting
10/01 Ch. 1: "Numbers and objects"
10/08 Ch. 2: "What does it mean to be a number?"
10/15 Ch. 3: "Can words be numbers?"
10/22 Ch. 4: "The language legacy"
10/29 Ch. 5: "Children's route to number: from iconic representations to numerical thinking"
11/05 Ch. 6: "The organisation of our cognitive number domain"
11/12 Ch. 7: "Non-verbal number systems"
11/19 Ch. 8: "Numbers in langauge: the grammatical integration of numerical tools"
11/26 Thanksgiving recess; no class.
12/03 Concluding discussion.