

PSYCHOLOGY 450
**Special Topics in Development:
Conceptual Change in Childhood**

Winter 2023
M: 11:30–1:00; Th: 1:00–2:30
Theological Hall 209

Instructor: M. Sabbagh
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Office Hours: Fridays 10:00-12:00 or by appt.

Learning Objectives

- Identify, explain, and critically evaluate major theories of concepts
- Articulate the "epistemological" challenges associated with developing an understanding of how children acquire conceptual understandings
- Compare and contrast conceptual change with other kinds of learning
- Describe known instances of conceptual change throughout childhood
- Critically evaluate theories for understanding the domain-specific and domain-general processes that contribute to conceptual change in childhood.
- Apply a conceptual change framework to gain insight into common problems in formal and informal education for children.
- Extend the developmental conceptual change framework to understand factors that may lead folks at any age to change their minds about issues of fundamental sociological or geopolitical importance.

Course Outline

Our everyday understandings of the world are based on "concepts" – cognitive representations (or "knowledge") of what something is and why it is that way. Modern research in the area of Cognitive Development has shown that even young infants' actions in the world are guided by conceptual understandings, even before very much learning can take place. These "naïve"

conceptual understandings are frequently at odds with the conceptual understandings that children have even a few years later. What this means is that some process of conceptual change must be a critical part of development. This is especially obvious as children go through formal educational systems and gain new scientific understandings in domains such as number, biology, and physics. In this course, we will take a rigorous approach to understanding the philosophical challenges associated with coming up with truly new ideas, identify places where in child development we are pretty sure that children do in fact undergo conceptual change in some domain, and then consider the intrapersonal (cognitive) and interpersonal (social) processes by which these conceptual change takes place.

Assignments & Grading

There are three types of assignments for the course.

Lead a course meeting – 20%

Groups of 3-4 students (depending on final class size) will be asked to lead a Thursday discussion section of the course. What I am particularly interested in is the group demonstrating an understanding of the material in the article that was assigned and a critical understanding of its contribution to our understanding of conceptual change. For more information about this, please see the class onQ for guidelines on how to lead class discussions.

Reaction papers – 25%

For each Thursday class, I'd like students to turn in a reaction paper. Please see the class OnQ for the reaction paper guidelines.

Research Proposal – 40%

The main project for the course is a research proposal in which you propose a study, like the ones that you'll be reading for the course. I can imagine that there will be at least two different ways you could go with this.

One possibility is to propose a study that **establishes** some aspect of conceptual change – that is, measures it and tries to establish that it's a true conceptual change (as opposed to some other form of learning), or some latent capacity that has just been masked by "domain general" immaturity.

Another possibility is that you propose a research study to explore some **mechanism** that drives conceptual change. These studies would take as their starting point the kind of studies that we're discuss in weeks 7-9.

Another possibility is that, if you know that there's some area where children do go through some conceptual change, particularly one that is difficult and important, then you can propose an **intervention** based upon the principles that we've discussed in class to affect that change.

Of course there may be other possibilities, too! Please see the class OnQ site for a more comprehensive set of guidelines about the paper.

Attendance & Participation – 15%

I expect folks to attend class and be prepared to participate in discussions that emerge from lectures student-led discussion meetings. I know that there is a lot of variation in the extent to which folks feel comfortable speaking out in class. Yet, with material like what we're going to be dealing with, participating in and following the discussion can provide crucial insights that will be helpful as you move forward with applying the material to your other assignments.

Note: If you are ill, please follow all public health guidelines. Stay away from class if that's what you're supposed to do. You can catch up on what you missed from the discussion from a classmate, or by dropping in for my office hours. **Your participation mark will not be negatively affected by missing class because of illness.** Following standard Queen's protocol, I will trust students' claims of illness and not require proof (e.g., doctors' notes, etc.).

Grading Method

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queen's Official Grade Conversion Scale:

Grade	Range
A+	90–100
A	85–89
A-	80–84
A+	77–89
B	73–76
B-	70–72
C+	67–69
C	63–66
C-	60–62
D+	57–59
D	53–56
D-	50–52
F	≤50

Late Policy

Late work will be accepted but its mark will be discounted by 20% for each 24 hour period it is late. Exceptions to this policy are if serious extenuating circumstances prevented you from completing the work, or if we have a prearranged agreement in advance of expected extenuating

circumstances. Please do not hesitate to communicate with me regarding any difficulties you may be having completing the course material to your standards on time.

Academic Integrity

Queen's students, faculty, administrators and staff all have responsibilities for supporting and upholding the fundamental values of academic integrity. Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see www.academicintegrity.org) and by the quality of courage. These values and qualities are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University.

Students are responsible for familiarizing themselves with and adhering to the regulations concerning academic integrity. General information on academic integrity is available at Integrity@Queen's University, along with Faculty or School specific information. Departures from academic integrity include, but are not limited to, plagiarism, use of unauthorized materials, facilitation, forgery and falsification. Actions which contravene the regulation on academic integrity carry sanctions that can range from a warning, to loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

Accessibility & Accommodation

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Wellness Services (SWS) and register as early as possible. For more information, including important deadlines, please visit the Student Wellness website at: <http://www.queensu.ca/studentwellness/accessibility-services/>

Extenuating Circumstances

The Senate Policy on Academic Consideration for Students in Extenuating Circumstances (<https://tinyurl.com/yaj7be64>) was approved in April, 2017. Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and which have a direct and substantial impact on their ability to meet essential academic requirements. The Faculty of Arts and Science has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances, which can be found at: <http://www.queensu.ca/artsci/accommodations>

Course Schedule and Readings

Links to the readings are available on the course onQ site.

Week	Reading	Monday Class	Thursday Class
1	Vosniadou & Brewer	Intro, Course set up	Methods and illustrations
2	Margolis & Laurence	What are concepts?	Where do concepts come from?
3	Medin & Atran	"Folk biology"	Variation in concepts
4	Sarnecka	Understanding of number	Thinking new things
5	Smith	Bootstrapping change I	student led discussion
6	Ronfard et al.	Bootstrapping change II	student led discussion
7	Legare; Stahl	Exploration and learning	student led discussion
8	Bonawitz et al.	Discovering theories	student led discussion
9	Tardiff et al.	Domain-general mechanisms	student led discussion
10	Shtulman & Lombrozo	Do we really change?	student led discussion
11		STUDENT PRESENTATIONS	STUDENT PRESENTATIONS
12		STUDENT PRESENTATIONS	STUDENT PRESENTATIONS

Readings

- Vosniadou, S & Brewer, W. F. (1992). Mental models of the Earth: A study of conceptual change in childhood. *Cognitive Psychology*, 24, 535–585.
 - Margolis, E. & Laurence, S. (2022). Concepts. In E. N. Zalta & U. Nodelman (Eds.). *The Stanford Encyclopedia of Philosophy*.
<https://plato.stanford.edu/archives/fall2022/entries/concepts>.
 - Medin, D. L. & Atran, S. (2004). The native mind: Biological categorization and reasoning in development across cultures. *Psychological Review*, 111, 960–983.
 - Sarnecka, B. W. (2016). How numbers are like the earth (and unlike faces, loitering or knitting). In D. Barner & A. S. Baron (Eds.) *Core Knowledge and Conceptual Change*, (pp. 151–170). New York: Oxford.
 - Smith, C. L. (2007). Bootstrapping processes in the development of students' common sense matter theories: Using analogical mappings, thought experiments and learning to measure to promote conceptual restructuring. *Cognition and Instruction*, 25, 337–398.
 - Legare, C. H. (2012). Exploring explanation: Explaining inconsistent information informs exploratory, hypothesis-testing behavior in young children. *Child Development*, 83, 173–185.
- Stahl, A. E. & Feigenson, L. (2017). Expectancy violations promote learning in young children. *Cognition*, 163, 1–14.

7. Ronfard, S., Brown, S., Doncaster, E., & Kelemen, D. (2022). Inhibiting intuition: Scaffolding children's theory construction about species evolution in the face of competing explanations. *Cognition*, *211*, e104635.
8. Bonawitz, E. B., van Schijndel, T. J. P., Friel, D., & Schulz, L. (2012). Children balance theories and evidence in exploration, explanation, and learning. *Cognitive Psychology*, *64*, 215–234.
9. Tardiff, N., Bascandiziev, I., Carey, S., & Zaitchik, D. (2020). Specifying the domain-general resources that contribute to conceptual construction: Evidence from the child's acquisition of vitalist biology. *Cognition*, *195*, e104090.
10. Shtulman, A. & Lombrozo, T. (2016). Bundles of contradiction: A coexistence view of conceptual change. In D. Barner & A. S. Baron (Eds.) *Core Knowledge and Conceptual Change*, (pp. 53–72). New York: Oxford.