Running Head: ACTIVE INQUIRY LEARNING OF CHILDREN'S LANGUAGE DEVELOPMENT

Child Language Development Inquiry Learning of College Students

Inspired by Ludwig Wittgenstein's Language Games

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Additional information for using this activity in your classroom, including PowerPoint slides, template for cutting out shapes, and phoneme lists, may be found on-line at CopernicanRevolution.org

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Abstract

Despite the importance of language development in the study of developmental psychology, students can fail to appreciate the topic because its abstractness. This study examines the effectiveness of an interactive, small-group activity for enhancing students' understanding and appreciation of language development concepts in developmental psychology. The activity allows students to experience language development firsthand by inventing and using a limited language within a controlled environment. Students, organized into groups of 2 to 6, engage in "time-in" segments to develop their limited language using assigned phonemes and a set of 24 shapes. During "time-out" segments, the class discusses their experiences in relation to key language development topics, such as phonemes, the whole-object constraint, and pragmatics. Results from a prior knowledge survey, exam questions, and comparison of scores between participants and non-participants indicate students enjoy the activity and learn at least as effectively as through traditional direct instruction methods. A hurricane disrupting a particular semester provided a quasi-experiment such that students missing the language game activity performed worse on the same test items as students who did participant the semester before and after. I discuss implications for the inquiry learning versus direct instruction debate and connections to Ludwig Wittgenstein's philosophical work.

Child Language Development Inquiry Learning of College Students Inspired by Ludwig Wittgenstein's Language Games

Designing classroom activities to illustrate basic-research ideas is particularly challenging for Developmental Psychology instructors. I designed the following activity to recreate for college students the early childhood experience of language development. By comparing and contrasting children's language development with their experience in this inquiry-learning activity, students have an opportunity to think critically and thoroughly engage the material.

For fields like Social Psychology and Cognitive Psychology, we can make classroom versions of classic studies. Yet child-development research typically involves participants much younger than college students so students miss the opportunity to actively engage the material as participants. Many excellent instructors of Developmental Psychology have found alternative effective and engaging class activities. Instructors involve children by having college students: recreate classic experiments (Balch, 1986), observe them in natural settings (Clements, 1995) and perform community service with children (McCluskey-Fawcett, & Green, 1992). Instructors enhance students understanding with video-clips (Grabe & Tabor, 1981), newspaper advice columns (Cabe, Walker, Williams, 1999), literature (Boyatzis, 1992) and film (Boyatzis, 1994). Instructors actively engage students by having them debate (Moeller, 1985) and design toys or games (Neysmith-Roy 1994; Nigro, 1994). Despite these pedagogical accomplishments, I have only found two peer-reviewed published activities where students have experiences that parallel childhood to help them learn developmental concepts. Harper (1979) has students recreate sensori-motor schema by sucking lollipops and then trying to assimilate and accommodate to an invisible "gloquex." Holbrook (1992) adapted a formal operations task, using probability, to get

college students to think pro-operationally. Can we create similar activities to teach developmental concepts other than Piaget's theory?

Language development is a crucial area in the study of developmental psychology, as many findings from language research inform general theories (e.g., Piagetian, information processing, social contextualism, nativism). Despite its importance, students can fail to appreciate language development concepts because of their abstractness. This makes language development an ideal topic for creating a concrete activity where students directly see the parallel between their experiences and children's development. Philosopher Wittgenstein (1958) speculated on the origins of language in his blue and brown notebooks by evoking imaginary thought-experiments where people must develop a shared understanding of words in "language games." I adapted Wittgenstein's language games into a "world" where students can compare and contrast psychological findings of language development to their own experiences in a language game.

Method for Instructing Class with Language Game

During a single class lesson, organize up to six groups of 2 to 6 students. Twice as many groups can be accommodated with a teaching assistant. Illustrate an operational definition of language skill by facing a classroom wall, making a picture with shapes, and describing your picture in your native language. Facing the opposite wall, a volunteer makes the same picture from another set of shapes by only hearing your words. Students' goal is to demonstrate the same language skill in a language they invent within a limited world. Their world consists of 5 phonemes and 24 shapes (4 geometric figures * 2 sizes * 3 colors). Assign each group different phonemes; each group member gets a reference sheet listing the phonemes. Each group gets two packets with the same 24 shapes. During each "time-in," students communicate using only their

assigned phonemes. During each "time-out" the class compares and contrasts their language development with that of children; they should not discuss their limited world with one another. Explain the first language concept, phonemes (e.g., Werker, 1989), so that students understand how to play. For an 80-minute class, you can have five 7-minute "time-in's" alternating with five 4-minute discussions. This allows time for explaining the game at the beginning (including phonemes) and for demonstrating language skills at the end.

Students typically sit dumbfounded for the first two minutes of the first time-in. They can not say things like, "Let's make up the word "chooch" from 2 of our phonemes and use it for blue." About three-quarters of student groups start their language on their own. For those that struggle, give the following nudge. Combine some of their phonemes (e.g., "bak"), point to a single shape, and say the word. You may need to say the word while looking at each student. Within about 30 seconds, at least one student will show recognition by repeating the word and possibly creating more words. If necessary, point to a new shape but say nothing. Once a student makes up a word, your help is no longer needed.

At the first time-out, I gesture to an object (e.g., overhead projector) and make up a word (e.g., "chooch."). I poll students for what they believe "chooch" means: (1) overhead projector, (2) metallic (i.e., quality), or (3) light bulb (i.e., part). Most students instantly map the meaning of the word "chooch" to the whole object "overhead projector." Note how surprising our agreement is because we never discussed rules for creating new words. Further explain how one thing that facilitates children's word learning is the biases (i.e., assumptions) they have when they hear new words. I note that we will see several examples of this in our next class when we discuss fast mapping (e.g., Carey & Bartlett, 1978). For today, I note that children behave according a whole object constraint (e.g., Markman, 1991). They assume that a novel word

refers to the entire object of shared attention, rather than to a part or a quality of the object. Ask if they used the whole object constraint when starting their languages. Most have. The most common alternative is to lay the geometric figures systematically and use a word for whole sets. For example, they may create three piles for each of the three colors and give a word for each pile, clearly understood as the color. When students do this, I ask why children do not do the same thing. We note college students' use of abstract thinking skills (i.e., categorization, planning) in the game. With prompting, this allows for a nice reminder of previous class discussion of developmental theories, notably the debate between Piaget (1962) and Vygotsky (1962) over the relationship between thought and language.

Each subsequent time-out involves similar discussion comparing and contrasting language game play with children's language development. In the second time-out, we discuss the language explosion. We note that most groups had an explosion of words early on and, like children's experience, most of these words are nouns. In the next time-out, we discuss errors of over- and under-extension. Next we discuss pragmatics (role of context in meaning), which most groups lack. Without much prompting, students attribute this to the artificial environment where nothing but game-play happens. They also note that if they played over several days they might develop pragmatics. Finally, we discuss developmental theories that are particularly relevant to language.

Results to Evaluate Use of Language Game

I have used variations on this language game in 10 semester-long undergraduate classes, from small seminars of 8 students to large lecture classes. Many students have spontaneously mentioned having fun and learning a lot. About 10% of students approach me after classes with further comparisons from their group's language development, questions about language

development, or philosophical questions related to the game. To systematically analyze the effectiveness of this activity, I examined archived naturalistic data from the several semesters of an upper-level Developmental Psychology. Students were mostly senior (39%) psychology-major (28%) Caucasian (82%) women (79%).

After the first time I conducted this activity with a large lecture class, I was not satisfied that it worked as smoothly as possible. About one week later I asked the students for their anonymous reactions on index cards. Of the 71 students who responded, 66% made entirely positive generic comments, 10% mainly compared the game to language development, and 24% gave suggestions. The most common positive generic comments were "fun", "interesting", and "learned a lot." Suggestions confirmed my belief that larger classes require more explicit instructions and greater structure so that students understand the rules and respond to time-in and time-out calls quickly. No students gave negative generic reactions. Students' subjective impressions of learning are not necessarily evidence of objective learning.

During another semester, I examined the possibility that students entered class already aware of language development and compared this with performance a game-related and another language-development exam item. On the first day of class students completed a prior knowledge survey including 2 5-item matching questions that tested simple factual knowledge of key language development terms (avg. score = .21). The exam contained two multiple-choice questions with 5 possible responses that required students to apply language development in a new context. One question based on the activity (avg. = .72) and the other from lecture (avg. = .51). Chance performance on all scores was .20. Paired-sample t-tests revealed that lecture outperformed the pre-test, $t(71)=5.33$, $p<.005$ and the activity outperformed lecture, $t(71)=2.725$, $p=.008$. Students possibly learned from lecture and learned more from the inquiry activity.

However, though I purposely made the pre-test items much easier and attempted to make test items equally challenging, an alternative possibility is that the language game item was the easiest item and the pre-test had the hardest items.

A hurricane disrupted the university's schedule of classes. One class was replaced by canceling a break and another class was replaced by asking faculty to hold class a specified Saturday. I conducted the Saturday class and it was the language game. Attendance was far below normal rates (35% vs. 75%) and anecdotal evidence from students apologizing for missing class suggested that student absences were due to other obligations and not a poor attitude toward class. The language game class occurred just following exam 1 and students who missed the language game class earned similar grades to those who missed the activity, $t(66)=1.58$, $p=.12$. Students who missed the language game received a handout providing all language-development content that they missed. Nevertheless, those who participated in the language development inquiry activity scored higher on relevant exam 2 test item than those who only learned the material through reading, $t(70) = 2.002$, $p=.049$, Cohen's $d = .52$. All aforementioned analyses use raw data because histograms show normal distributions and transformations make it less normal.

Discussion

Students enjoy the language development game and believe they learn from it. Grades suggest that they learned about language development concepts through the game better than they learn other class material and they may learn to apply material to new contexts better from this activity than from lecture. Since this data is naturalistic and quasi-experimental, rather than a controlled study, future replication is necessary to properly counter-balance content of the activity and lecture or to insure truly random assignment.

The language development game is an example of inquiry learning (also called discovery learning) since students construct their own knowledge of the subject matter while being guided and assisted by the teacher. In contrast, teachers communicate subject matter through lecture and books during direct-instruction (like my handout and control lecture on language development). Building upon the distinct approaches of Piaget and Vygotsky, constructivist accounts provide the theoretical foundation for inquiry learning. In particular, Piaget (1969) believed that to foster science learning schools should develop "methods of teaching … that emphasize the importance of research and discovery instead of relying on mere repetition (p. 53)." In contrast, support for direct-instruction typical comes from information processing developmental theories that emphasize the gradual accumulation of knowledge. Studies by information-processing theorist Klahr and colleagues (2001, 2004) support direct instruction as the most efficient way to convey knowledge in a limited time-frame. Consistent with suggestions of those advocating inquiry learning, this activity engages students and encourages students to think deeply about the material. Consistent with Klahr's suggestion, this activity conveys fewer concepts than a lecture of the same length. In stark contrast to Klahr's results, learning through inquiry was better than direct-instruction. Our conflicting results suggest that the debate between inquiry-learning and direct-instruction requires more detailed consideration as one approach is not always superior.

The language development game is a practical activity for a typical college Developmental Psychology class. It illustrates how fields like Psychology and Philosophy can incorporate one another. It illustrates how more activities to teach Developmental Psychology can be created. Students enjoy learning through this activity and it encourages students to think critically. Like other inquiry-learning activities, it helps us understand the way students learn and how they may eventual become developmental psychologists.

References

Balch, W. R. (1986). The use of student-performed developmental exercises in the classroom. *Teaching of Psychology, 13(3),* 140-142.

Boyatzis, C. J. (1992). Let the caged bird sing: using literature to teach developmental psychology. *Teaching of Psychology, 19(4),* 221-222.

Boyatzis, C. J. (1994). Using feature films to teach social development. *Teaching of Psychology, 21(2),* 99-101.

Cabe, P. A., Walker, M. H., Williams, M. (1999). Newspaper advice column letters as teaching cases for developmental psychology. *Teaching of Psychology, 26(2),* 128-130.

Carey, S. and Bartlett, E. (1978). Acquiring a single new word. *Papers and Reports on Child Language Development 15,* 17--29.

Clements, A. D. (1995). Experiential-learning activities in undergraduate developmental psychology. *Teaching of Psychology, 22(2),* 115-118.

Grabe, M. & Tabor, L. (1981) The use of videotaped material in the instruction and evaluation of developmental psychology students. *Teaching of Psychology, 8(2),* 115-117.

Grobman, K. H. (2002). Language Developmental Game, *Learning and Teaching Developmental Psychology,* http://www.devpsy.org/teaching/language/language_game.html

Harper, G. F. (1979). Introducing Piagetian concepts through the use of familiar and novel illustrations. *Teaching of Psychology, 6(1),* 58-59.

Holbrook, J. E. (1992). Bringing Piaget's preoperational thought to the minds of adults: a classroom demonstration. *Teaching of Psychology, 19(3),* 169-170.

Klahr, D., & Nigam, M. (2004). The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. *Psychological Science, 15(10),* 661-667.

Klahr, D., Chen, Z., & Toth, E. E. (2001). Cognitive development and science education: Ships that pass in the night or beacons of mutual illumination? In S.M. Carver & D. Klahr (Eds.), *Cognition and instruction: 25 years of progress.* Mahwah, NJ: Erlbaum.

Markman, E. M. (1991). *The whole-object, taxonomic, and mutual exclusivity assumptions as initial constraints on word meanings*. In S. A. Gelman & J. P. Byrnes (Eds) Perspectives on language and thought: Interrelations in development, New York, NY: Cambridge University Press.

McCluskey-Fawcett, K., & Green, P. (1992). Using community service to teach developmental psychology. *Teaching of Psychology, 19(3),* 150-152.

Moeller, T. G. (1985). Using classroom debates in teaching developmental psychology. *Teaching of Psychology, 12(4),* 207-209.

Neysmith-Roy, J. M. (1994). Constructing toys to integrate knowledge about child development. *Teaching of Psychology, 21(2),* 101-103.

Nigro, G, N. (1994). Create-a-children's game: an exercise for developmental psychology classes. *Teaching of Psychology, 21(4),* 243-245.

Piaget, J. (1962). *Comments on Vygotsky's Critical Remarks.* Cambridge, MA, MIT Press.

Piaget, J. (1969). *Science education and the psychology of the child.* New York, NY, Viking Press.

Vygotsky, L. S. (1958). *Thought and Language.* Cambridge, MA, MIT Press.

Werker, J. F. (1989). Becoming a native listener. *American Scientist, 77,* 54-59.

Wittgenstein, L. (1958). *Preliminary studies for the "Philosophical Investigation" generally known as the blue and brown books.* Oxford, Great Britain, Basil Blackwell & Mott.