Minimal Group Effects on Preschool Children's Acceptance of Incorrect Testimony Under Stepwise Reduction of Perceptual Uncertainty

UF University of Florida
CENTER for UNDERGRADUATE RESEARCH EXPLORE DISCOVER CREATE

Jared Vasil

University of Florida, Gainesville, Florida

Background

- Cultural evolutionary (CE) theory predicts a suite of learning strategies for individuals acquiring information socially (i.e., by way of information emitted by conspecifics; [17, 4]), as well as a suite of strategies for practicing "epistemic vigilance" [19] concerning the veracity of incoming social information.
- Many of these "social-learning strategies" have been experimentally tested and verified [14] and are dependent on the group affiliation of the copier relative to the copied.
- For instance, CE theory predicts a "copy-when uncertain" bias [1, 16] , that is, a bias towards copying others when the correct response pattern is uncertain given input data. This bias is hypothesized to increase in strength with increasing uncertainty. Additionally, CE theory predicts a bias towards copying the majority [9], although the underlying reasons for doing so can vary greatly [7], and determining a true majority-based influence can be tricky [21].
- These social learning strategies are, however, contingent on group affiliation. Thus, 4-year-old children less readily copy a group of reliable outgroup members relative to a group of reliable ingroup members, even when these groups lack any social significance [8, 13].
- Further, on a minority (~1/3) of trials, children have been found to copy an incorrect majority of individuals even when stimulus in question is unambiguous [5, 10*], although the strength of this effect is contingent on cultural upbringing [6]. This is similar to findings in the corresponding adult literature [2].
- CE theory predicts most individuals will actively enforce conventional norms on other individuals within the group, creating within-group uniformity and maximizing between-group differences in actions and behavior [3]. Young children enforce such conventional (and not moral; e.g., [20]) norms on individuals within their group [18, 12].
- Lastly, resistance to misleading testimony in early childhood has been found to be positively related to the development of a child's inhibitory control on a spatial conflict task [11].

Objectives

- To report on a ongoing investigation into the effects of a stepwise (that is, consistent across trials) reduction in stimulus uncertainty on preschool children's copying behavior.
- To report on a ongoing investigation into the effects of group affiliation (ingroup vs. nongroup) on children's social learning strategies
- More broadly, to report on an ongoing investigation into the ontogeny of an important aspect of social influence and learning in *Homo sapiens*.

Hypotheses

1. An increase in accuracy with increasing stimulus discriminability when children answer without first witnessing the group's response pattern.
2. A decrease in agreement with the informants with decreasing stimulus certainty, that is, an increase in the perceptually-driven [6] mode of response with increasing stimulus certainty.
3. An increase in deference to the group when the group is composed of ingroup members relative to outgroup members, that is, an increase in the socially-driven mode of response [6] when the group is composed of ingroup relative to nongroup members.
4. In the experimental group, an increase in negative attitudes towards a member of the ingroup who doesn't agree with the publicly-given response relative to one who does agree (CQ2,3; see 'Methods' section); in the control and experimental groups, no increase in negative attitudes towards any dissenting individual.
5. A positive correlation between an inhibitory control task (a day-night Stroop task; [15]) and children's acceptance of faulty testimony, independent of group affiliation.

Methods

Participants

- 10 4-year-olds (range: 50 months-61 months; 7 females)
- 3 5-year-olds (range: 63 months-65 months; 3 females)

Design

- *Pretest phase*: Subjects were given a ten-trial, modified „who-has-more" (here, „dot box") task ([16]; see box 1 for details). For 3.5 seconds per trial, children were shown two Sesame Street characters (Grover and Big Bird), each of whom had their own box with a clear amount of dots above their head. Subjects had 5 seconds to respond (by pointing) to the character whose box they thought „has the most dots."

Box 1: criteria differences in the dot-box task between [15] and the current experiment

Criteria	[15]	Current experiment
Dot ratio dynamics	Random across trials	Linearly increasing difference of one dot per trial for 10 trials — character A's box begins with 25 dots, character B's box begins with 24 dots; A ends with 29 dots, B with 19 dots
Area of box filled by dots	Area anti-correlation procedure (Halberda & Feigenson, 2008)	Within-trial equivalence of each of the two boxes' area taken up by dots (i.e., for each trial: character A's box's area taken up by dots=character B's box's area taken up by dots)
Minimum difference in dots between boxes	At least 1 dot difference	At least 1 dot difference (24:25 dot ratio in first trial)
Maximum difference in dots between boxes	Up to 20 dot difference (10-30 dots)	Up to 10 dot difference (19:29 dot ratio in final trial)
Dot location	Randomized	Randomized
Dot overlap	No dots overlapped	No dots overlapped

- *Group assignment*: subjects were randomly assigned to either a control or experimental group. In both groups, subjects received a bracelet and hat (See box 2 for group assignment details).

Box 2: Group assignment details

Criteria	Control group	Experimental group
Assignment policy	The subject was politely asked if s/he „would like to wear a hat and bracelet" the experimenter (E) had already picked out. It was noted by E that E would also wear a hat and bracelet as well.	The subject was told about a „secret" group that the experiment is a part of. The subject was told that s/he would have to wear the requisite hat and bracelet if they wanted to join. It was noted by E that E would also put them on as well. No other information concerning the group was given.
Dress policy	Every individual's hat color was obviously different from their bracelet color, and no two individuals (subject, E, or informants) had the same-colored hat/bracelet combination. It was explicitly noted to the subject that the colors of everyone's hats and bracelets were different.	Every individual's hat color was obviously the same as their bracelet color, and all individuals (subject, E, or informants) had the same-colored hat/bracelet combination. It was explicitly noted to the subject that the colors of everyone's hats and bracelets were the same.

- *Test phase*: This phase of the experiment was identical to the pretest phase, however, before being shown two different characters from those in the pretests' boxes (Elmo and Cookie Monster), children were first shown a short video of four college-age informants providing a unanimous answer to a voiceover asking them which character's box they thought „has the most dots."
- Following completion of the test phase, children were asked if they thought the informants were „good at picking the box with the most dots."
- *Enforcement phase*: children in the control group were introduced to *two* characters, both of whom wore different-colored hats and bracelets as well (this was noted to the subject). Both were described as having „played the same game" as the subjects, however, one character was described as thinking the informants were „good," and the other character was described as thinking the informants were „bad." In the experimental group, those same two characters were used, in addition to the introduction of *two more* characters, both of whom wore same-colored hats and bracelets as the subject (this was noted to the subject). One character was described as thinking the informants were „good" and the other as thinking the informants were „bad" at picking the box with the most dots. Following introduction of the first character, children were asked two memory check questions (MCQs): 1) whether they remembered their response to the question at the end of the test phase; and 2) what their response was. Following the introduction of each character, subjects were asked three character questions (CQs): 1) Do you think [character's name] is good at picking the box with the most dots in it?; 2) „What do you think about [character's name] – would you want to play a game with [character's name]; and 3) Do you think [this character] should be put in time-out?"
- *Inhibitory control task*: a ten-trial baseline congruent (sun-daytime, moon-nighttime) naming task was administered, followed by a ten-trial incongruent naming task (sun-nighttime, moon-daytime).

Results

- Pretest trials: Overall correct: M=5.55 (N=11; SD=1.508); 1st 5 trials: 2.45 (N=11; SD=0.82); 2nd 5 trials: M=3.09 (N=11; SD=1.446)
- CG test trials: Overall correct: M=6.00 (N=5; SD=3.08); 1st 5 trials: 3.0 (N=5; SD=1.871); 2nd 5 trials: 3.0 (N=5; SD=1.58)
- EG test trials: Overall correct: M=6.2 (N=5; SD=2.7); 1st 5 trials: 2.80 (N=5; SD=1.30); 2nd 5 trials: 3.40 (N=5; SD=1.52)
- An overall difference score was constructed (# correct in the pretest phase - # correct in the test phase): CG: M= -1.2 (N=5; SD=3.56); EG: M=0.4 (N=5; SD=2.79)
- A first half-test difference score was constructed (# correct in the first five trials of the pretest phase - # correct in the first five trials of the test phase): CG: M= -2.6 (N=5; SD=1.51); EG: M= -2.6 (N=5; SD=1.67)
- A second half-test difference score was constructed (# correct in the second five trials of the pretest phase - # correct in the second five trials of the test phase): CG: M= -0.8 (N=5; SD=2.17); EG: M= 0.8 (N=5; SD=1.30)
- In the CG (N=6): 100% of children responded with a 'yes' to CQ1 for character 1; 33% of children responded with a 'yes' to CQ1 for character 2
- In the EG (N=4): 75% of children responded with a 'yes' to CQ1 for character 1; 50% of children responded with a 'yes' to CQ1 for character 2; 75% of children responded with a 'yes' to CQ1 for character 3; 25% of children responded with a 'yes' to CQ1 for character 4
- In the CG (N=6): 66.6% of children responded with a 'yes' to CQ2 for character 1; 66.6% of children responded with a 'yes' to CQ2 for character 2
- In the EG (N=4): 100% of children responded with a 'yes' to CQ2 for character 1; 25% of children responded with a 'yes' to CQ2 for character 2; 75% of children responded with a 'yes' to CQ2 for character 3; 25% of children responded with a 'yes' to CQ2 for character 4
- In the CG: 40% (N=5) of children responded with a 'yes' to CQ3 for character 1; 50% (N=6) of children responded with a 'yes' to CQ3 for character 2
- In the EG (N=4): 25% of children responded with a 'yes' to CQ3 for character 1; 25% of children responded with a 'yes' to CQ3 for character 2; 0% of children responded with a 'yes' to CQ3 for character 3; 50% of children responded with a 'yes' to CQ3 for character 4
- A Pearson correlation between subjects' inhibitory control and test phase scores revealed that: CG: r = -0.588 (N=5; 2-tailed sig.=0.297); EG: r =0.748 (N=5; 2-tailed sig.=0.146)
- A Pearson correlation between subjects' inhibitory control and overall difference scores revealed that: CG: r =0.629 (N=5; sig.=0.256); EG: r =-0.360 (N=5; sig.=0.552)

Preliminary Conclusions

- Nonsignificant (NS) positive trend towards an increase in accuracy with concurrently increasing stimulus discriminability in the pretest phase provides some evidence in favor of hypothesis 1.
- NS trend towards increasing accuracy throughout the test phase for the EG weak evidence in favor of hypothesis 2; however, this effect was not found for the CG. Thus, validation of this hypothesis awaits further testing.
- NS trend towards both larger overall as well as 2nd-half difference scores for the EG relative to the CG provides weak evidence in favor of hypothesis 3.
- Mixed results concerning the status of hypothesis 4 owing to limited sample size.
- NS correlations between inhibitory control and test phase scores and overall difference scores are interesting: the correlatory effect of subjects' inhibitory control capacites seems to be moderated by group status such that an increased inhibitory control capacity is NS positively correlated with an increased acceptance of the ingroup's faulty claims (i.e., a relative increase in the socially-driven mode of response; [6]), but an increased denial of the nongroup's faulty claims (i.e., an increase in the socially-driven mode of response; [6]). This is potentially suggestive of greater inhibitory control capabilities being at least *related* to the (perhaps only public*) adoption of ingroup attitudes, building off of prior work demonstrating that greater spatial inhibitory control capabilities are positively correlated with dismissal of faulty testimony by a single nongroup informant [11]. However, more data is needed before any firm conclusion can be suggested.

References

1. Bernard, S., Harris, P., Terrier, N., and Clément, F. (2015). Children weigh the number of informants and perceptual uncertainty when identifying objects. *Journal of Experimental Child Psychology, 136*, 70-81. http://dx.doi.org/10.1016/j.jecp.2015.03.009
2. Bond, R. and Smith, P. B. (1996). Culture and Conformity: A Meta-Analysis of Studies Using Asch's (1952b, 1956) Line Judgement Task. *Psychological Bulletin, 119(1),* 111-137
3. Boyd, R. and Richerson, P.J. (2002). Group Beneficial Norms Can Spread Rapidly in a Structured Population. *J. theor. Biol., 215*, 287-296
4. Chudek, M., Brosseau-Liard, P., Birch, S., and Henrich, J. (2013). Culture-gene coevolutionary theory and children's selective social learning. In *Navigating the Social World: What Infants, Children, and Other Species Can Teach Us* (2013). Eds. Banaji, M. R. and Gelman, S. A. http://dx.doi.org/10.1093/acprof:oso/9780199890712.003.0033
5. Corriveau, K. H. and Harris, P. L. (2010). Preschoolers (Sometimes) Defer to the Majority in Making Simple Perceptual Judgements. *Developmental Psychology, 46(2),* 437-445. http://dx.doi.org/10.1037/a0017553
6. Corriveau, K. H., Kim, E., Song, G., and Harris, P. L. (2013). Young Children's Deference to a Consensus Varies by Culture and Judgement Setting. *Journal of Cognition and Culture*, 367-381. http://dx.doi.org/10.1163/15685373-12342099
7. Deutsch, M. and Gerrard, H. B. (1955) A study of normative and informational social influences upon individual judgement. *J. Abnorn. Soc. Psychol., 51*, 629-636
8. Dunham, Y., Baron, A. S., and Carey, S. (2011). Consequences of "Minimal" Group Affiliations in Children. *Child Development, 82(3),* 793-811. http://dx.doi.org/10.1111/j.1467-8624.2011.01577.x
9. Harris, P. L. and Corriveau, K. H. (2011). Young children's selective trust in informants. *Phil. Trans. R. Soc. B., 366*, 1179-1187. http://dx.doi.org/10.1098/rstb.2010.0321
10. Haun, D., and Tomasello, M. (2011). Conformity to Peer Pressure in Preschool Children. *Child Development, 82(6),* 1759-1767. http://dx.doi.org/ 10.1111/j.1467-8624.2011.01666.x
11. Jaswal, V. K., Pérez-Edgar, K., Kondrad, R. L., Palmquist, C., Cole, C. A., and Cole, C. E. (2014). Can't stop believing: inhibitory control and resistance to misleading testimony. *Developmental Science*, http://dx.doi.org/10.1111/desc.12187
12. MacAuliffe, K. and Dunham, Y. (2016). Group bias in cooperative norm enforcement. *Phil. Trans. R. Soc. B 371*: 20150073. http://dx.doi.org/10.1098.rstb.2015.0073
13. MacDonald, K., Schug, M., Chase, E., and Barth, H. (2013). My people, right or wrong? Minimal group membership disrupts preschoolers' selective trust. *Cognitive Development, 28*, 247-259. http://dx.doi.org/10.1016/j.cogdev.2012.11.001
14. Mills, C. M. (2013). Knowing When to Doubt: Developing a Critical Stance When Learning From Others. *Dev Psychol, 49(3)*, 404-418. http://dx.doi.org/10.1037/a0029500
15. Montgomery, D. E. and Koeltzow, T. E. (2010). A review of the day-night Stroop task: The Stroop paradigm and interference control in young children. *Developmental Review,* 30, 308-330. http://dx.doi.org/10.1016/j.dr.2010.07.001
16. Morgan, T. J. H., Laland, K. N., and Harris, P. L. (2015). The development of adaptive conformity in young children: effects of uncertainty and consensus. *Developmental Science*, http://dx.doi.org/10.1111/desc.12231
17. Richerson, P. J. and Boyd, R. (2005). *Not by Genes Alone: How Culture Transformed Human Evolution*. Chicago, Illinois: The University of Chicago Press
18. Schmidt, M. and Tomasello, M. (2012). Young Children Enforce Social Norms. *Current Directions in Psychological Science, 21(4),* 232-236. http://dx.doi.org/10.1177/0963721412448659
19. Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., and Wilson, D. (2010). Epistemic Vigilance. *Mind & Language, 25(4),* 359-393
20. Tomasello, M. and Vaish, A. (2013). Origins of Human Cooperation and Morality. *Annu. Rev. Psychol., 64*, 231-255. http://dx.doi.org/annurev-psych-113011-143812
21. van Leeuwen, E. J. C., Kendal, R. L., Tennie, C., and Haun, D. B. M. (2015). Conformity and its look-a-likes. *Animal Behaviour, 110*, e1-e4. http://dx.doi.org/10.1016/j.anbehav.2015.07.030

Notes

*This paper [10] demonstrates response rate difference in children as a function of the privacy of the response period. Thus, when a child is allowed to answer in a context such that they are perceived as not being watched by anyone else, children tend to comform to the majority's response more often than if they perceive the context as one such that they are being observed. The current experiment also separated control and experimental groups into these subconditions (private vs. public response), but, owing to the size of the respective N's, these subconditions were collapsed within conditions. This will assumedly impact on the currently-presented results.

Acknowledegements

My mentor, Prof. Dr. MJ Farrar of the UF Psychology Department has been instrumental. His guidance cannot be overstated in helping to get me to this point in my studies.