

Cooperation Through Imitation: Recognition of Dishonest Signaling in Children and Adults

Sienna Samra
California State University, Stanislaus

Research Questions

This study aims to further strain and evaluate the bandwagon effect, “copy-all, refine-later” theory, and the normative notion for over-imitation. The bandwagon effect requires continuous interactions between individuals in order to create homophily and drive cooperation between non-related individuals. In this theory, it is essential to establish homophily, which was proposed as possible through phenotypic similarities. Thus, in the current study, the limits of influence of the homophilic relationship between individuals on cooperation are tested. Is homophily, alone, a strong enough driving force? Or are the experiences with the individual beforehand essential in the collection of honest signals of possible cooperation signaling in the future?

In today’s day and age, reciprocity and punishment are rare benefits/ costs for helping someone in passing. What then drives this form of cooperation? Would this not suggest that cooperation may be motivated by factors outside of cost/benefit analyses? The normative notion claims adults to be the prescriptive norm for children. However, is an element of cooperation conflict driving the prescriptive norm of an adult to a child? An adult may be seen as the prescriptive norm for a child because isolation by the adult, if the child were not to cooperate, may lead to punishment and conflict. What happens if the authority of the cooperating adult is no longer beneficial or threatening to the adult? Will the child cooperate? Is it homophily or conflict that leads to the most successful transmission of learned behaviors through cooperation?

Furthermore, due to the discrepancy of the “copy-all, refine-later” theory in two of the above mentioned studies, this study looks to see if, after learning through over-imitation, children and adults are able to recognize the dishonest signals of the irrelevant actions and adapt their strategy to become more efficient. Should children recognize dishonest signaling, they will not engage in irrelevant actions when asked to solve a puzzle box they are familiar with. The ability to differentiate between useful and not useful actions in imitated strategies is key to efficient learning. In addition to recognition, the ability to weed out unnecessary and futile actions, and adapting a previously learned strategy is indicative of developed cognitive function in children.

Introduction

Cooperation is a driving factor in the everyday life of humans. Humans are an extremely social species and depend heavily upon reciprocity. The foundations of our society stabilize on cooperation. Having one of the most complex social structures among the animal kingdom, it is essential to understand the mechanisms and strategies employed in the cooperation of the human species.

The transmission of over imitation through partnerships is indicative of cooperation. However, this facticity is loaded with potential of dishonest signaling. For this study, dishonest signaling is defined as an action or behavior with the intent of misguidance and inefficiency in partnerships. As thus, it can be argued that over-imitation, the employment of observed relevant and irrelevant actions, leaves individuals vulnerable to dishonest signaling. This dishonest signaling leads to adaptations of unnecessary and costly trade-offs. Hence, it must be known why children, whom have a history of fidelity to over-imitation, and adults would imply such non-beneficial methods of learning.

Background and Literature Review

Humans cooperate regularly in society with non kin, which contradicts the mechanisms of evolutionary fitness. Kin selection justifies cooperation because the cooperating individual is benefiting by promoting its reproductive success indirectly through its help of its kin relations. Why, then, would stranger help strangers? What benefit do they gain? In human interactions, there is a low chance of reciprocity or reward. Di Stefano et al. (2015) describes this phenomenon as a “bandwagon effect”. Players must interact repeatedly in order for reciprocal altruism to appear. Continuous interaction creates social influence which initiates similarities within a society. These similarities form when individuals of a society exchange resources, making their needs and goals similar over time. This is driven by homophily, the tendency of individuals to form bonds and interact with other similar individuals. Higher levels of homophily invoked a more rapid rate of cooperation development because similar individuals tend to utilize the same pathway that is most profitable and effective to them. This dynamic creates a learning process with homophilic individuals. Similar individuals have similar goals and, thus, get the highest payoff in cooperating with each other to achieve these goals. As rounds progress, individuals recognize this pattern and “learn” to cooperate, hence increasing the rate of cooperation development. According to Nowak (2006), because homophilily promotes cooperation, punishment for those not involved acts as a major incentive to cooperate. Group dynamics will lean towards cooperation and resource sharing. But, should an individual choose not to cooperate in the group, they will lose the advantages of group sharing and protection by being excluded, a form of punishment. A group with similar phenotype and, thus, similar resource needs can easily monopolize resources and isolate and uncooperative individual with similarities. Lack of resource availability will threaten the isolated individuals survival and, thus, promote cooperation.

Humans have created complex social systems as a result of conflict dynamics. Social structures promote the evolution of group beneficial behaviors in individuals because of societal pressures. However, according to Bowles et al. (2003), when there is a lack of social institutions to provide this pressure to drive cooperation, the only driving force is conflict.

The “copy-all, refine later” theory suggests that children partake in over imitation in order to maximize adaptation, and, later, adjust their approach in accordance with evidence collected through experience. Though this notion was rejected by Whiten et.al., (2016), results in the studies of Mcguigan & Robertson (2015) suggest otherwise. A significant decrease in over imitation after completion of their experiment, as compared to the final experimental trial, was seen. It is proposed that children’s fidelity to imitation is governed by poor evaluation of efficacy of socially demonstrated strategies, lack of contradiction to adult model, and lack of capacity or motivation to be innovative. For children, an adult is the norm. For adults, their peers are the norm. Thus, imitation fidelity decreased with age because, as age increases, conformity decreases (Carr, Kendal, & Flynn, 2015).

Over imitation is argued to be an informative learning tool as well as a social learning tool. The development of these two arguments is essential in understanding how over imitation can be used to the advantage of the teaching system, and can only be done by proving and disproving possible mechanisms driving this seemingly inefficient behavior.

Research Design

Participants

Because a secondary sample (those involved in partner trials) is dependent on the success rates of participants in the primary sample, a pilot study will be conducted in order to ascertain a success rate for children solving the puzzle box in the primary trials and a separate success rate for adults solving the puzzle box in the primary trials. These rates will be employed to calculate the approximate number of initial participants needed in the primary sample in order to obtain approximately 30 children and 30 adults in the secondary sample. Participants between the ages of 3-9 and 18 and up will be recruited. Attempts to allocate a 1:1 equivalent ratio of males to females for each grouping will be made.

Materials or Apparatus

A transparent puzzle box, equipped with the ability to perform 5 irrelevant and 2 relevant actions in order to obtain the reward inside will be constructed, as used by Mcguigan & Robertson. (2015). An irrelevant score, ranging from 0 (no irrelevant actions performed) to 5 (all irrelevant action performed) will be utilized to assess participants.

Immediate recognition of dishonest signaling in all participants

All participants will witness a video model solving the puzzle box utilizing all 5 possible irrelevant actions and the two relevant actions to obtain the reward. Each participant will be presented with the same puzzle box used in the model video. Individuals will be asked to obtain the reward from the puzzle box through a multitude of controlled trials. Successful participants will be defined as those who are able to successfully obtain the reward in at least one attempted trial. Unsuccessful participants will be defined as the who were unable to obtain the reward in any of the three individual trials.

Transmission of imitated strategies through cooperation of homophilic and non-homophilic partnerships

Unsuccessful individuals will be paired in one of two partner types for partner trials, homophilic and nonhomophilic. Homophilic partnerships will be between unfamiliar participants of the same age group. Non-homophilic partnerships will be between unfamiliar participants of differing age groups. This will lend itself to a total of three possible, general groupings - adult with adult partner, child with child partner, and adult with child partner. Partnered trials will ensue. Following the partnered trials, the unsuccessful individual will undergo a final trial.

Refinement of learned strategies from over imitation

Successful individuals, both those involved in partnered trials and those not, will be given a test interval of 90 days, with no research. Following the test interval, successful individuals will undergo one final trial

Expected Results

This study brings to attention 4 cognitive skills - fidelity to over-imitation, cultural transmission, ability to learn from cooperation, and recall of a strategy learned through imitation. In accordance with Whiten et.al., (2016), fidelity to over-imitation in both adult and children will be seen, indicated by high irrelevant action scores during the first 3, individual trials. Through the partnered trials, it is proposed that cooperation will be seen with all groupings, but adult homophilic partnerships will be the most successful as homophily promotes cooperation and adults have increased efficacy evaluation skills due to more progressed cognitive skills (Carr, Kendal, & Flynn, 2015). Individual trials of unsuccessful participants after exposure to partnerships will show the use of only relevant actions, despite use of irrelevant actions in partnered trials, as was seen in Whiten et. al., (2016). Successful participants able to retrieve the reward during the recall trial will utilize irrelevant actions as memory cues for reward acquisition.

Implications

Should cooperation in imitation transmission be successful in the promotion of individual learning, methods of imitation in group puzzle solving may be applicable to promote cognitive development in the intellectually challenged. This may provide a road of improved treatment options in individuals affected with Autism and other alike conditions. Successful recall through the use of irrelevant actions as memory cues suggests that over-imitation has been used as a learning tool throughout social evolution. Successfully applied learning through transmission of over-imitation suggests over-imitation as a tool of cooperation with little costs to the provider and overall benefit to the receiver. No use, or limited use, of irrelevant actions is suggestive of recognition of dishonest signaling. Knowing the age at which this can be distinguished opens a forefront for future research wanting to decipher the mechanisms of dishonest signal recognition in a target group.

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Theory/Concept	Questions this study addresses	Study Design
The Bandwagon Effect and Homophily	Is cooperation driven by homophily or the collection of honest signals of future reciprocity?	Comparison of transmission of imitated strategies between unfamiliar homophilic and non-homophilic partnerships.
Cooperation Dynamics	Do children cooperate with adults because the authority of the adult poses a threat of conflict/punishment to the child?	By partnering children with adults that have no authority over their decisions, the element of conflict is eliminated. Cooperation in these partnerships is, thus, driven by another force.
Homophily v. Conflict Dynamics	Is cooperation driven by fear of conflict or homophily?	Comparison of transmission of cooperation between homophilic (adult-adult, child-child) and non-homophilic (adult-child) partnerships.
Dishonest Signaling and The Copy-all, Refine-later Theory	Do children/adults immediately recognize dishonest signals, or do they employ the copy-all, refine-later theory?	If participants have an irrelevant action score of 0 in their primary, individual trials, they are capable of immediate recognition of dishonest signaling. Should participants refine their imitated strategies over time, they will have an irrelevant action score of 0 during the real trials.

Table 1. Applications of cooperation theories and concepts as addressed in this study.