Infant Behavior & Development 36 (2013) 717–727

Contents lists available at ScienceDirect

Infant Behavior and Development

Deferred imitation in 18-month-olds from two cultural contexts: The case of Cameroonian Nso farmer and German-middle class infants

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ARTICLE INFO

Article history:
Received 26 November 2012
Received in revised form 18 June 2013
Accepted 1 August 2013
Available online 11 September 2013

Keywords:
Imitative learning
Cross-cultural research
Infancy
Deferred imitation

ABSTRACT

Imitative learning has been described in naturalistic studies for different cultures, but lab-based research studying imitative learning across different cultural contexts is almost missing. Therefore, imitative learning was assessed with 18-month-old German middle-class and Cameroonian Nso farmer infants – representing two highly different eco-cultural contexts associated with different cultural models, the psychological autonomy and the hierarchical relatedness – by using the deferred imitation paradigm. *Study 1* revealed that the infants from both cultural contexts performed a higher number of target actions in the deferred imitation than in the baseline phase. Moreover, it was found that German middle-class infants showed a higher mean imitation rate as they performed more target actions in the deferred imitation phase compared with Cameroonian Nso farmer infants. It was speculated that the opportunity to manipulate the test objects directly after the demonstration of the target actions could enhance the mean deferred imitation rate of the Cameroonian Nso farmer infants which was confirmed in *Study 2*. Possible explanations for the differences in the amount of imitated target actions of German middle-class and Cameroonian Nso farmer infants are discussed considering the object-related, dyadic setting of the imitation paradigm with respect to the different learning contexts underlying the different cultural models of learning.

1. Introduction

The imitation of others has been described as a "powerful mechanism" (Barr & Hayne, 2003) for the acquisition of behaviors, knowledge, and skills in infancy and early childhood all over the world. For example, Piaget (1969) described how his 16-month-old daughter Jacqueline imitated a rage attack she had observed the day before. Barr and Hayne (2003) revealed that Päkehä infants (New Zealanders of European descent) in their second year of life acquire up to two new behaviors each day by watching and imitating actions. Whiting and Edwards (1988) found imitation in Ngeca children from Nairobi, LeVine et al. (1994) observed imitative learning in Gusii and Ngeca children from Kenya, and Keller (2007) reported on imitation as a learning tool for Nso children from Cameroon. In a study by Maynard (2002) it was analyzed how Zinacanteco Maya children from Mexico learn to prepare tortilla by imitating older children. Consequently, these naturalistic studies based on caregivers' diary reports or everyday life observations depict imitation as a universal learning phenomenon within different cultural environments. But the learning contexts in which imitation emerges as well as the themes of the imitated behaviors

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http://dx.doi.org/10.1016/j.infbeh.2013.08.003

differ tremendously as it is embedded in culture-specific daily routines and thus occurs rather by the way. According to the theory of natural pedagogy, infants become sensitive to culturally valued behaviors which are communicated by certain ostensive signals that direct infants' attention or highlight outcomes of actions (Csibra & Gergely, 2009, 2011). By and by, infants identify situations from which they can "acquire the technological, social, conventional and institutional knowledge and skills that are necessary for survival in their culture" (Csibra & Gergely, 2011, p. 1149). Thus, they learn to deduce culture-specific to-be-imitated or learned behaviors.

Up to now, only few studies focus on the comparisons of imitative learning across cultures. An example is the study by Eckerman and Whitehead (1999) who observed Seltaman toddlers from Papua New Guinea and compared their playing behavior with the developmental pathway they revealed for USA toddlers. They found peer imitation at the same developmental level irrespective of the toddlers' cultural background. But, the themes of their reciprocal imitation games varied because Seltaman toddlers copied adult activities more often (e.g., beating rhythmically as in drumming), whereas the USA toddlers' games focused more often on play material (e.g., throwing a ball). These results are a first naturalistic insight into cultural influences on imitative learning.

By investigating in which situations imitative learning occurs, it can be described how these situations differ across cultural contexts. But despite their ecological validity, these results cannot be easily compared, interpreted, and generalized if the described age groups, characteristics of the learning contexts as well as the kind of the imitated behavior differ. By applying a more systematic procedure, the results can be better generalized or even referred to different cultural practices or experiences. There is one well-established experimental approach by which imitative learning in infants and toddlers has been studied (for an overview, see e.g., Bauer, Larkina, & Deocampo, 2011): the imitation paradigm. The imitation paradigm is an experimental method which enables an assessment of imitative learning under controlled conditions and which is generally conducted in a laboratory setting. By providing a systematic setting with a model demonstrating the infant something new, the complexity of the to-be-learned behavior (e.g., gestures vs. actions, one- vs. multi-step target actions) can be systematically varied. Furthermore, the influence of the models characteristics (e.g., adult vs. child, known vs. unknown person) as well as the test conditions (e.g., variation in the number of demonstrations, change of test setting, live vs. video demonstration) can be investigated under controlled conditions – even within different cultural contexts. In general, in case of action imitation, no play material except the test objects is available with the aim to reduce children's distraction and to motivate their imitation. For the most part, an adult model demonstrates the child age-adapted target actions with one or more unfamiliar objects (mostly in terms of toys; demonstration phase). In the *immediate imitation design*, the child is given the opportunity to imitate these target actions directly after the demonstration phase (imitation phase). In the *deferred imitation (or observation-only) paradigm*, a delay is inserted between the demonstration and the imitation phase, so that the child gets the opportunity to imitate these target actions after a defined retention interval (Meltzoff, 1985; Meltzoff & Moore, 1998). The imitation rate is obtained by comparing the amount of performed target actions in spontaneous play with the objects (baseline phase) and the amount of performed target actions after demonstration (imitation phase). The baseline behavior is assessed either before the demonstration phase or in a control group (Meltzoff, 1985). In the *elicited imitation paradigm*, the immediate and the deferred imitation paradigms are combined by introducing an immediate imitation phase directly after the demonstration of the target actions so that the child can imitate the demonstrated target actions more often (e.g., Bauer & Hertsgaard, 1993). During the whole experiment, the adult model is generally behaving friendly, but neutral in respect of the child's imitative behavior.

Numerous studies applying the imitation paradigm to analyze imitative learning in infancy and early childhood have been conducted (for an overview, see e.g., Bauer et al., 2011). They revealed for example that younger infants are more sensitive to contextual changes like the stimulus material or the experimenter's person than are older infants. Up to now, these studies mostly included children from Western, urban, educated middle-class families. Heimann and Meltzoff (1996) are, to our knowledge, the first to compare imitative behavior between two different Western contexts. Their results showed that 9-month-old infants from the U.S. need less time than 9-month-old infants from Sweden to reproduce the same amount of target actions. The authors refer these subtle time differences to the way adults speak with children. However, systematic cross-cultural research on children's imitative learning is almost missing. Consequently, it remains an open question to what extent the children's cultural background causes similarities as well as differences in imitative learning. For example, Nielsen and Tomaselli (2010) tested the immediate imitation performance of previously demonstrated target actions in two cultural contexts, children living in an Australian city and children living in the Kalahari Desert in South Africa and Botswana. They found that children between the ages of 2 and 13 years living in rural African communities imitated the previously demonstrated actions to the same extent as children growing up in an urban Australian surrounding. Thus, this study reveals no difference in the immediate imitative behavior as a function of the cultural context the children grow up in. Nevertheless, it should be noted that these results are based on small sample sizes for the different age groups. In a lab-based study by Goertz, Lamm, Graf, Kolling, Knopf, and Keller (2011), 6-month-old German middle-class and Cameroonian Nso farmer infants were compared with respect to their imitation performance by using the deferred imitation paradigm. Goertz and colleagues found that infants from both cultural contexts performed a comparable mean deferred imitation rate. In a subsequent study of the same research group, these results were confirmed and extended. The comparison of 6- and 9-month-old Cameroonian Nso farmer and German middle-class infants revealed a higher number of performed target actions in the imitation compared with the baseline phase in both cultural contexts and at both ages as well as an improvement in the number of imitated target actions with increasing age (Graf et al., 2013). Moreover, Graf et al. (2013) described an age-related effect of cultural context revealing a growing influence of the infants' background on spontaneous play since it has