Stage fright: Internal reflection as a domain general enabling constraint on the emergence of explicit thought

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A B S T R A C T

It has become increasingly clear over the last half century that there are multiple important changes in children’s abilities taking place at around age 4. These changes span social, emotional, and cognitive domains. While some researchers have argued that a domain-general development explains some of the changes, such a position is a minority view. In the current article, we provide some evidence for the development of an age 4 domain-general enabling constraint on children’s ability to reflect. In turn, the development of reflection is argued to enable the transitions that we see within and across developmental domains. The model of reflection being offered is part of a broader action-based model of cognition and mind – interactivism (Bickhard, 1973, 1978, 2009a,b). The empirical part of the article presents a new object reasoning task. This task was derived from theoretical constraints on the interactivist models of knowing and reflection. Results indicated that most children responded to the task incorrectly until age 4 which was interpreted as evidence that they lacked the ability to explicitly reason about relations between objects. Correlations between our new task and standard false-belief tasks were explored. Collectively, these results provide empirical support for the claim that children undergo a domain-general development in their ability for epistemic reflection at around age 4.

1. The transition in the room

It is increasingly clear that children’s performance on multiple tasks, within and across different developmental domains, involve important changes at around age 4: social-cognitive abilities (Wellman, Cross, & Watson, 2001); executive functioning (Zelazo, Muller, Frye, & Marcovitch, 2003); appearance-reality understanding (Flavell, Flavell, & Green, 1983); language (de Villiers & Pyers, 2002); learning from informants (Harris et al., 2013); deception (Lee, 2013); autobiographical memory (Nelson & Fivush, 2004); meta-cognition (Woolley & Ghossainy, 2013); counterfactual and future thinking (Guajardo, Parker, & Turley-Ames, 2009; Atance, 2008); and, delay of gratification (Mischel, Shoda, & Rodriguez, 1989; Moore, Baressi, & Thompson, 1998).

The main thesis of the current paper is that the changes in performance across domains during the preschool years are a consequence of an underlying “stage-like” development in the ability for reflection. The development of reflection constitutes a domain-general transition, and that transition is itself a predicted consequence of a naturalized model of knowing. While the presence of performance changes within and across domains does not force a commitment to a stage transition in development, it does motivate and support the possibility of one. Conversely, the underlying naturalized model of knowing yields such a transition as a consequence, and the evidence of such transitions across domains supports that consequence: the empirical evidence supports the
The current paper begins by suggesting that a qualitative change in ToM development around age 4 is well motivated. We review two domain-general explanations for such qualitative change. The first is that of Perner and colleagues, followed by Zelazo and colleagues. The basic logic used by both groups of researchers to provide empirical support for their theoretical positions was applied to our own study. After introducing our general framework (i.e., interactivism) and some specific models of representation, implicit presupposition, and epistemic reflection, we explain the age 4 transition in terms of a domain-general enabling constraint on the emergence of explicit reasoning and thought. Similar to the empirical approach used by Perner and Zelazo, we designed a new task outside the social-cognitive domain (i.e., the physical domain), assessed age differences and possible relations with FB tasks. We present our study and its results followed by some discussion of the alternative proposals and implications for social-cognition research.

2. Stages: post-Piaget

Piaget was interested in the emergent origins and development of knowledge, and Piaget's stage model was a domain-general way to characterize qualitative transitions in children's development. Subsequent to serious critiques of Piagetian stages (Gelman & Baillargeon, 1983) developmental researchers have tended to avoid the use of stages as a theoretical construct. Neo-Piagetians are an exception to this tendency but, for some, their commitment to an information-processing framework made their use of stages problematic. See Bickhard (1993) for a specific response to Case's (1991) model and see Lourenço (2016) for a recent review of developmental stages. However, while not invoking the notion of stages per se, some researchers have argued for qualitative developments taking place between three and five years of age. For a well-known example, Theory of Mind (ToM) research has focused extensively on preschool age differences in performance as being theoretically important for understanding the nature of development. One prominent explanation has argued for changes in meta-representational abilities (Perner, 1991) while the second (starting-state nativism) advocated for the idea of a conceptual shift analogous to the conceptual advances in science (Gopnik & Wellman, 1992). These two approaches differ in that the first is domain general (the new knowledge-abilities apply across several domains) while the second is domain specific (the new knowledge is specific to ToM). More recently, in reaction to new empirical evidence for continuity accounts (Onishi & Baillargeon, 2005), other researchers have argued that early and later abilities are indicative of two qualitatively different systems (Apperly & Butterfill, 2009; Fenici, 2013; Low & Perner, 2012). In short, there is clear motivation from across the theoretical landscape for the idea that ToM developments undergo qualitative change. We will consider two lines of research that have argued that such change happens around age 4 and that such change is domain general.

2.1. Domain-general explanations of the age 4 transition

Two well-known groups of researchers have argued that changes in children's ToM performance around age 4 are not specific to ToM developments, though they differ in terms of the scope and content of that non-specificity (Frye, Zelazo, & Palfai, 1995; Iao et al., 2011; Perner, Mauer, & Hildenbrand, 2011; Perner et al., 2007; Zelazo, 2004; Zelazo et al., 2003). For both groups, the general experimental-design logic has been to show similar transitions in domains unrelated to social-cognition. The less conceptually related the domains in which a statistical relationship is shown on task performances, the more powerful the empirical demonstration of some sort of underlying domain-general development. Equally important as the "empirical argument" is the theoretical integration used to explain the statistical relationships. While both groups argue for domain-general developments to explain changes in ToM performance, they provide very different proposals about the nature of those developments.

2.1.1. Perner and colleagues

The research by Perner and his colleagues has involved varying degrees of distance between the new tasks from other domains and the original FB tasks. The False-Sign (FS) task (Parkin, 1994, unpublished doctoral dissertation, as cited by Iao et al., 2011) was an early attempt to design a task that was structurally similar to FB tasks but that did not involve mental-state content as part of its misrepresentation of the world (i.e., an object is moved to location B but the sign continues to point to location A). Statistical relationships between FS and FB tasks, as well as bi-directional training effects, have been found (Iao et al., 2011). These results have been interpreted as the consequence of a broader underlying development regarding children's understanding of the nature of (mis)representations. That is, FB and FS understanding are argued to be two manifestations of underlying qualitative developments in metarepresentational abilities.

Another manifestation of these metarepresentational abilities was explored through language. The alternative naming task (Perner, Stummer, Sprung, & Doherty, 2002) was designed to assess preschoolers understanding of the representational nature of language (e.g., that a 'bird' can also be called an 'animal'). Results indicated a strong relationship between performance on the alternative naming and FB tasks. In this case, metarepresentational knowledge about perspective is used to explain the statistical unity between the different knowledge domains. Most recently, dual-identity tasks (e.g., used to assess understanding that the same person can be both Superman and Clark Kent) have been used to further demonstrate the non-specificity of changes in ToM performance (Iao et al., 2011). Metarepresentational abilities concerning the distinction between sense (perspective) and reference are used to explain the unity between dual-identity and FB tasks. Perner's explanations go into much more detail but they are all united by the idea of a domain general development for new metarepresentational abilities that emerge at around age 4.
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