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Reprint of: Equal egocentric bias in school-aged children with and without autism spectrum disorders ☆

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ABSTRACT

Egocentric bias is a core feature of autism. This phenomenon has been studied using the false belief task. However, typically developing children who pass categorical (pass or fail) false belief tasks may still show subtle egocentric bias. We examined 7- to 13-year-old children with autism spectrum disorder (ASD; $n = 76$) or typical development ($n = 113$) using tasks with a continuous response scale: a modified false belief task and a visual hindsight bias task. All children showed robust egocentric bias on both tasks, but no group effects were found. Our large sample size, coupled with our sensitive tasks and resoundingly null group effects, indicate that children with and without ASD possess more similar egocentric tendencies than previously reported.

Introduction

The term *autism* stems from the Greek *autos,* meaning "self." An extreme orientation toward the self, usually referred to as "egocentrism," is one of the defining features of an autism spectrum disor-

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der (ASD). Over the past 30 years, egocentrism in ASD has been widely studied using the theory of mind (ToM) concept (Baron Cohen, Leslie, & Frith, 1985). Theory of mind refers to the ability to understand people as experiencing subjective mental states. Limited ToM of individuals with ASD can be conceptualized as an egocentric bias—a tendency to overestimate how similar other people's experiences are to one's own (Frith & de Vignemont, 2005; Goldman & Sebanz, 2005). This bias is typically assessed by asking children to reflect on a naive story character that holds an objectively false belief. The false belief paradigm has been highly successful in identifying egocentric bias in young children with ASD (Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998), but its sensitivity to potential egocentric bias is limited when used with older and cognitively able children with ASD (Fisher, Happé, & Dunn, 2005; Scheeren, de Rosnay, Koot, & Begeer, 2013). The current study highlights two new tasks to assess egocentric bias in school-aged children with ASD.

Conventional false belief tasks often have limited value for assessing ToM in older children with ASD and those with normal intelligence. The first article on false belief in autism acknowledged this point (Baron Cohen et al., 1985). The usual solution to this problem is to use advanced versions of ToM tasks (e.g., Baron Cohen, Jolliffe, Mortimore, & Robertson, 1997), which require complex forms of reasoning, including double bluff and faux pas. However, even with advanced tasks, the performance of school-aged children and adolescents with ASD and normal intelligence has not consistently indicated a stronger egocentric bias when compared with their typically developing (TD) counterparts (e.g., Scheeren et al., 2013). More important, daily interactions may require advanced ToM reasoning only on relatively rare occasions (e.g., double bluff might be used during a poker game). Much more frequently, daily interactions require the elementary ability to orient oneself toward the inner world of other people. Such interactions do not involve complex recursive thinking but require basic perspective taking. Failing to orient oneself toward the inner world of other people can be referred to as "elementary egocentric bias." Thus, rather than developing complex measures targeting skills that are required infrequently, we need to develop sensitive but simple measures to examine frequently used, basic perspective-taking skills that, despite their elementary nature, remain a problem for individuals with ASD. The problem is to find ways to develop measures for these skills that are sensitive enough to tap individual differences beyond the preschool age.

A recent innovation in the study of elementary egocentric bias is the use of continuous response scales. These allow for a more sensitive measure of egocentric bias, in contrast to the categorical nature of the standard approach, which may be insensitive to perspective-taking deficits in school-age children and beyond. To explain this, consider the standard change-of-location task (Wimmer & Perner, 1983). In this task, participants predict the behavior of a story character who is looking for an object but is unaware that the object has been relocated. Participants must choose between two locations: the object's initial location or its new location. Because the story character is unaware that the object has been relocated, it would be correct to predict that this character would look in the initial location. However, providing participants with a choice *only* between the initial and new locations prompts the initial location as one of the two possible options. This directs participants toward the perspective of the naive story character. In real-life situations, however, we generally do not make egocentric errors in this way. We do not explicitly compare our own perspective with that of another person. In fact, we rarely, if ever, really know another person's perspective (Camus, 1942; Nagel, 1974). However, in the standard change-of-location task, participants who are inclined to respond egocentrically may reconsider their answer after being presented with the two response options. Presenting the alternative correct choice as an explicit option highlights the other person's perspective and, thus, prompts an other-oriented response. This may lead to an underestimation of egocentric bias, which is relevant to individuals with autism but also to individuals with normal development, who may be more egocentrically biased than previously thought.

A first candidate alternative to the standard change-of-location task that uses a continuous response scale is the Sandbox task (Bernstein, Thornton, & Sommerville, 2011b). The Sandbox task is a modified change-of-location task (Wimmer & Perner, 1983) that includes an object that is first buried and then reburied in a sandbox. When participants predict the story character's response, they can pick any spot in the sandbox. Indeed, the continuous response scale that is used in the Sandbox task has been shown to reliably measure egocentric bias in typically developing children, young adults (Sommerville, Bernstein, & Meltzoff, 2013), and older adults (Bernstein et al., 2011b). A previous