

Conflict paradigms cannot reveal competence

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ABSTRACT

De Neys is right to criticize the “exclusivity assumption” in dual process theories, but he misses the original sin underlying this assumption, which his working model continues to share. *Conflict paradigms*, in which experimenters measure how one cognitive process interferes (or does not interfere) with another, license few (if any) inferences about how the interfered-with process works on its own.

Imagine you want to study how people walk. If you’re a dual process theorist, you would use a *conflict paradigm*. You start by shackling a big weight to your participants’ ankles and testing if they can walk a lap around a track. If they fall down or give up, you conclude they must not be very good at walking. If they make it, you conclude that with enough effort and motivation, people’s walking capacity can overcome their tendency to fall. Either way, you conclude that walking is effortful, requiring focused attention, motivation, and some combination of talent and training.

De Neys is rightly unhappy with this picture. To advance dual process theory, he proposes to figure out exactly how ankle weights affect walking. He reviews a wealth of evidence that complicates the picture: Some people (maybe Hafþór Björnsson) can still walk well even with the weight. If the weight is smaller, people walk better. If, instead of a weight, you attach a rope that pulls people towards the finish line (a *non-conflict paradigm*), they actually get there faster. This shows that walking and added weight do not have to produce different outcomes (De Neys: *the alleged System 2 response does not seem to be out of reach of the intuitive System 1*).

Wouldn’t it be better to remove the ankle weight altogether? De Neys concedes that people do seem to be pretty good at walking without it (*nobody will disagree that educated adults can intuitively solve a problem such as “Is 9 more than 1?”*), but he thinks that dual process theories are not responsible for explaining this fact (*as any scientific theory, dual process models make their assertions within a specific application context. For the dual process model of logical reasoning, the application context concerns situations in which an intuitively cued problem solution conflicts with a logico-mathematical norm.*) As a description of dual process theories, this may be true. Still, it’s fair to ask whether it should be.

Whether conflict paradigms are informative depends on what dual process theories are meant to be theories of. If they aim to explain interference itself – how and under what circumstances it appears, disappears, hinders or helps – then conflict paradigms are an excellent tool for eliciting the explanandum. But if dual process theories are theories of reasoning, then studying interference can tell us roughly as much about reasoning as shackling strongmen on a gym track can tell us about walking. If, as is typically the case, the interference is designed to impede reasoning, then conflict paradigms will create a performance limitation that necessarily underestimates reasoning competence. Nevertheless, despite their limited “application context”, dual process theories make

many claims about reasoning, tout court. For instance, De Neys describes how reasoning develops: *the working model postulates that intuitive responses primarily emerge through an automatization or learning process*. But his working model is based on evidence from different flavors of conflict and no-conflict paradigms, so the developmental claim is a non-sequitur. Evidence about how some other process does or does not interfere with reasoning cannot warrant any conclusion about how the interfered-with reasoning develops.

This is, in fact, a hard-won lesson from the history of developmental psychology. Jean Piaget (1950) famously studied children's ability to reason about number, volume, and other abstract concepts and he frequently used conflict paradigms. For example, to investigate how children thought about number, Piaget showed them two identical rows of coins across from each other. When he asked children if the rows had the same number, they correctly said "yes". But Piaget worried that children were relying on a proxy to number, the equal lengths of the rows. To test this, he created a conflicting cue. He spread one row out so it looked longer and asked the same question again. Children as old as 6 years of age consistently switched to saying "no", the rows did not have the same number. Piaget concluded that 6-year-olds could not reason about number per se without conflating it with other properties, like length or area. Just like later dual process theorists, Piaget presented his participants with a conflicting cue designed to tempt the wrong answer, showed that participants fell for it, and concluded that there was something wrong with their reasoning ability generally.

In the seven decades since, a vast body of work has shown that much younger children know much more about number than Piaget believed (see Carey, 2009; Carey & Barner, 2019). Summarizing this literature would take a book, but for present purposes it holds two critical lessons for dual process theories. First, evidence that younger children have rich numerical understanding did not come from more or better variants of conflict paradigms. It came from new tasks that were designed to eliminate both the confounds that Piaget worried about and the conflicting cues he added, to make reasoning as easy as possible given the requisite competence. Second, this new understanding emerged without anyone figuring out exactly why children fail on Piaget's conflict paradigm. It turns out there are many different ways to make that task easier (e.g. Mehler & Bever, 1967; McGarrigle & Donaldson, 1974; Rose & Blank, 1974; Samuel & Bryant, 1984), but still no comprehensive theory of exactly what makes it hard. Understanding the interference proved unnecessary for understanding the interfered-with competence.

The science of children's thinking progressed not by drilling down on conflict paradigms, but by leaving them behind. It is well past time to let the science of adults' thinking do the same. The deep, difficult question about reasoning is, and has always been, the one De Neys and other dual process theorists locate outside of the theory's scope. Discussing the conjunction fallacy, Kahneman (2011) notes in passing that it doesn't always arise. Everyone agrees that "Jane is a teacher" is more likely than "Jane is a teacher and walks to work". Kahneman even explains why: *In the absence of a competing intuition, logic prevails*. Right! Now, how does that work?

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