

The Illusionary Comfort of a Warm Normative Theory

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One of the most common tactics in Cognitive Science is the wholesale adoption of an existing normative account as a theoretical basis for understanding some aspect of human cognition or, indeed, as a yardstick for “correct” behaviour (see e.g., Eysenck & Keane, 1995, 2015). Research on the psychology of deduction (Johnson-Laird, 1999; Johnson-Laird & Byrne, 1991; Evans, Newstead & Byrne, 1993; Oaksford & Chater, 1998, 2007) has some of the most well-known examples of this tactic, where *logicism* has argued that human “thinking (1) reflects some internalized form of extensional, classical logic and (2) should be measured against classical logic as a normative system” (Elqayam & Evans, 2011, pp. 234). Similarly, Oaksford & Chater (2007) advance Bayesian probability theory as a normative account of human rationality, though many disagree (Jones & Love, 2011; Bowers & Davis, 2012).

This borrowing of normative accounts brings with it many benefits though, I will argue, it also invites several perils. Perhaps the main benefit of this tactic is that it provides researchers with an “off-the-shelf” theory; the normative account provides an explanation of the phenomenon, often identifies variables of interest and may also provide associated mathematical or computational models. These normative accounts also often suggest ways to “parse” experimental materials to determine their “true form”. However, these benefits can create an illusionary confidence about the level of control in an empirical study; that is, the “parse” of the experimental materials may lead us to ignore key variables or accept weak control. The normative account may actually filter out some variables completely. For example, consider the slow realisation of the importance of “realistic materials” in Wason’s Selection Task (Wason 1966); which started in the late 1960s, continued into the 1970s (Wason & Shapiro, 1971; Johnson-Laird, Legrenzi & Legrenzi, 1972; Manktelow & Evans, 1979) and on into the 1980s (Cheng & Holyoak, 1985; Cosmides, 1989). In this paper, I consider two separate cases from my own research – on the comprehension of novel compounds and the experience of surprise in narratives – in which the presence or absence of a normative account appeared to change the requirements for control in experimental tests. From these cases, I try to highlight some of the perils of relying too heavily on normative accounts, especially in empirical studies.

The first area I consider is work on concepts, specifically, on the understanding of novel, nominal compounds (e.g., “finger cup”, “water frame”; see Costello & Keane, 2000, 2001, 2005; Lynott, Tagalakis & Keane, 2004; Tagalakis & Keane, 2006; Tagalakis, Ferrari, & Keane, 2005). These studies rely on theories of concepts and categorisation; theories that quickly moved beyond Aristotelian Logic accounts of necessary and sufficient features, to the more statistically-oriented notions of prototype theory (Rosch, 1973). So, in these studies, one does not have the comfort of being

completely sure which variables should be ruled out or in for a given empirical test. Accordingly, when running experiments in this area, the consensus is that studies need to (i) rely the use of multiple materials, rather than a single item (as we see in the selection task), and (ii) be supported by concerted attempts to control extraneous variables. For example, Tagalakis & Keane (2006) examined 200+ compounds in a pre-test and then used 84 different concept pairs (e.g., “mountain bird”, “elephant pig”) in their experiments, controlling for 5 distinct variables (i.e., familiarity, sensibility, word length, relational frequency, word-duplication). This sort of control is to be contrasted with some reasoning and problem-solving experiments where a single item is used and few extraneous variables are controlled.

The second area I consider, the experience of surprise, involves an even more striking case in the use of normative accounts (Maguire, Maguire & Keane, 2011; Foster & Keane, 2015a, 2015b). In this area, some theorists have adopted a normative account based on probability theories (Reisenzein & Macedo, 2006; Teigen & Keren, 2003) and others have not (Foster & Keane, 2015a). Accordingly, one finds that the studies by normatively-inspired theorists tend to use single-problem tests (c.f., Teigen & Keren’s, 2003, Erik Problem), in which the material used can be directly “parsed” into a probabilistic account (i.e., there are five people in a race, so Erik has a one in five chance of winning). In contrast, studies by non-normatively-inspired theorists use multiple materials and control many extraneous variables (c.f., Foster & Keane’s 2015a, controls for surprise-scenario stories). Interestingly, in one study, which used a probability-type problem in one experiment and surprise-scenarios in its other experiments, the reviewers of the paper saw no contradiction in demanding controls for the latter but none for the former (see Maguire et al., 2011).

Both of these cases suggest that the discipline is inconsistent in its assessment of the acceptability of different experimental studies. When normative accounts are available there is a tendency to lower the bar being set for what passes for an adequate test of some phenomenon. But, when normative accounts are not available, the bar is set higher and a more thorough consideration of materials and variables is demanded. So, in many cases, we seem to be relying on an illusionary comfort about the variables-of-interest in any given study; this may mean that significant variables impacting underlying a phenomenon may be discounted as unimportant and irrelevant or, indeed, completely missed. In many cases, this may mean that that the discipline is more prone to “seeing only what you want to see” when using normative accounts and, indeed, in accepting weaker control in experimental studies.

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