

RUNNING HEAD: BRIDGING THE DIVIDE

**Bridging the Divide Between Functional and Cognitive Psychology**

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**Abstract**

Although the commentaries on our target paper (De Houwer, Hughes, & Barnes-Holmes, 2017) reveal general agreement about the fact that interactions between functional and cognitive researchers are possible, there is disagreement about (1) whether such interactions can be beneficial, (2) the optimal way of interacting, and (3) the maximal extent to which interactions can be beneficial. By discussing these three points of disagreement, we hope to further clarify the position that we put forward in the target paper and to eliminate some of the misunderstandings that sustain the divide between functional and cognitive psychology.

*Keywords:* functional psychology, cognitive psychology, levels of explanation

### **Bridging the Divide Between Functional and Cognitive Psychology**

In the current academic climate, there are few incentives for reflecting on meta-theoretical issues. We therefore greatly appreciate the fact that several colleagues took the time to read and comment on our target paper (De Houwer, Hughes, & Barnes-Holmes, 2017) in which we focused on one of those issues: the relation between functional and cognitive psychology within the context of applied research. The commentaries complement the target paper by providing additional support for the arguments that we put forward (e.g., Hambrick, 2017; Mickes, 2017; Smith, 2017) but also by raising possible counterarguments (e.g., Goldsmith, 2017; MacLeod & Risko, 2017; Markman, 2017; Proctor & Xiong, 2017; Wills & Hollins, 2017). We are happy to see broad consensus about the idea that communication between functional and cognitive researchers is possible. There was less agreement, however, about (1) whether communication between functional and cognitive researchers can produce benefits, (2) the type of communication that would be most beneficial, and (3) the maximal extent to which communication could be beneficial. In the remainder of this paper, we address each of these points of disagreement.

#### **Should Functional and Cognitive Researchers Communicate?**

Proctor and Xiong (2017) argue that functional and cognitive researchers cannot interact in mutually beneficial ways because their approaches are fundamentally different (also see MacLeod & Risko, 2017). Although we agree with their premise, we do not subscribe to their conclusion. We believe that scientists, just like people in general, can benefit from diversity. It is true that different worldviews lead to differences in scientific aims and differences in the actions that researchers undertake to reach those aims. However, actions that are directed at one set of aims can often be put to use in the pursuit of other aims, especially when different sets of aims are interrelated (as is the case with the aims of

functional and cognitive psychology). Hence, functional research has the potential to facilitate cognitive research and vice versa.

The fact that Proctor and Xiong (2017) resist this conclusion seems to be grounded in a continuing belief that functional and cognitive psychology are scientific rivals that can only compete. More specifically, they argue that both approaches share the aim of predicting behavior and thus compete in trying to achieve this aim. However, even an overlap in aims does not preclude fruitful collaboration between functional and cognitive researchers.<sup>1</sup> At least in principle, it is possible to learn from how (scientific) rivals operate. Denying this possibility on an a priori basis results in a monolithic scientific landscape that is viable only to those who believe that there is one objectively best way of uncovering one objective truth. Rather than adopting such a monolithic model of psychological science, we prefer to explore ways in which functional and cognitive researchers can interact to their mutual benefit.

### **What is the Best Way of Communicating?**

In the target paper, we argued that applied psychology can benefit from analyzing phenomena in terms of general functional principles such as reinforcement and stimulus control (De Houwer et al., 2017). Most importantly, it allows functional and cognitive researchers to communicate about research in a way that is both abstract (thus avoiding the problems of effect-centric research) and agnostic with regard to the mental processes that mediate the effect (thus avoiding the problem of proxies and maximizing theoretical freedom). Wills and Hollins (2017), on the other hand, argue that communication in terms of general functional principles might reintroduce the problem of proxies and orientate attention away from the unique features of the specific issue that applied researchers seek to address

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<sup>1</sup> Note that Proctor and Xiong (2017) do not take into account the fact that functional and cognitive researchers have different reasons to aim for prediction. For functional researchers, prediction cannot be seen independently from the goal to influence behavior. For cognitive researchers, prediction serves as a touchstone for the evaluation of theories about mental mechanisms (Hayes & Brownstein, 1986).

(e.g., improve the quality of eye witness testimonies). Instead, they proposed that applied psychology should focus on observations and engage in effect-centric research that sticks to the data.

We agree that *abstraction* should not be a priority for applied psychology but believe that *abstractive analysis* is vital for its success. Although both abstraction and abstractive analysis deal with the relation between knowledge about individual cases and knowledge about general principles, the flow of information differs. Whereas abstraction involves knowledge about specific cases that influences knowledge about general principles, abstractive analysis involves knowledge about general principles that is applied to specific cases. We agree with Wills and Hollins (2017) that abstraction could be detrimental for applied psychology by detracting attention away from the particularities of the specific issue that is being addressed. However, applied psychology can definitely benefit from abstractive analyses because it creates the possibility of generalizing knowledge about general principles (e.g., reinforcement) to specific cases (e.g., tantrums in children). The functional analytic-abstractive level of explanation offers an important repertoire of general principles that can be used for this type of abstractive analysis. Hence, we believe it is helpful for applied researchers to communicate in terms of general functional principles.

Doing so does not reintroduce the problem of proxies. In essence, general functional principles are categories of individual effects that share certain functional properties (e.g., all instances of reinforcement involve an increase in response frequency as the result of outcomes that follow the responses). Hence, it makes little sense to say that an individual effect is a proxy of a general principle; it is merely an *instance of* a general principle. Of course, the claim that a specific effect is an instance of a particular functional principle could turn out to be incorrect. However, because general functional principles refer only to the

environment and behavior rather than to non-physical mental mechanisms, it is much easier to verify whether a specific effect is an instance of particular functional principle than it is to verify whether an effect is mediated by a particular mental mechanism.

Although we continue to defend the usefulness of communication in terms of general functional principles, we certainly do not want to restrict all scientific communication to this level. Of course it can be useful to communicate in terms of specific observations or topographical descriptions of effects, especially as a starting point. Contrary to what Proctor and Xiong (2017) seem to suggest, we also do not want to abolish communication at the mental level. It is self-evident that cognitive researchers must speak about mental mechanisms when operating at that level. Our main point is that communication in terms of general functional principles offers unique benefits to both functional and cognitive researchers and therefore would be ideal to optimize the outcome of their interactions. This implies that we are advocating multilingualism rather than a new type of unilingualism.

Finally, Wills and Hollins (2017) argue that we struggle to give good examples of research that was inspired by both cognitive theories and general functional principles. We acknowledge that we provided too few concrete examples in our manuscript, in part because of restrictions in space but primarily because of our lack of knowledge of the applied psychology literature. We are therefore very happy that both Hambrick (2017) and Mickes (2017) give additional examples of how analyses in terms of general functional principles can facilitate cognitively inspired applied research. We are convinced that many more examples will emerge once communication between functional and cognitive researchers becomes more common.

**To What Extent Can Communication Between Functional and Cognitive Researchers  
be Mutually Beneficial?**

Goldsmith (2017), Markman (2017), and MacLeod and Risko (2017) seem to agree that increased communication between functional and cognitive researchers in terms of general functional principles can provide benefits for applied psychology. However, they discuss two reasons for why cognitive researchers might benefit less from functional research than we suggested in our target paper. They argue that we (1) underestimate the power of cognitively-inspired applied research and (2) overestimate the power of the functional approach.

Before we address these two concerns, we would like to point out that a debate about the merits of the functional-cognitive framework cannot be reduced to a debate about the relative merits of the functional and cognitive approaches themselves. Because they are fundamentally different, it should be clear from the start that one approach can never satisfy all the aims of the other approach. Hence, pointing at the strengths of one's own approach relative to the other approach does not as such undermine the functional-cognitive framework. The functional-cognitive framework does not judge the power of the two approaches but aims to provide a meta-theoretical framework for *optimizing* the extent to which one approach can help achieve the aims of the other approach. Having said this, the maximal usefulness of the framework (i.e., the extent to which interactions with the other approach can be optimized) is bound by the limitations of the individual approaches. Hence, a discussion about the merits of the functional-cognitive framework should include a discussion about the merits of each separate approach. However, rather than treating these discussions as adversarial or obstacles for collaboration, we see them as opportunities to clarify the nature of both approaches and to eliminate any misunderstandings that could hamper collaboration.

Let us start with the comment that we underestimated the power of the cognitive

approach. In hindsight, we understand why some colleagues arrived at this conclusion. Because of our aim to clarify how cognitive researchers can benefit from interacting with functional researchers, we probably put too much emphasis on widespread problems within cognitively-inspired research (i.e., the use of proxies and development of theories that apply to only one effect). We are therefore happy that the commentaries provide multiple examples of excellent cognitively-inspired research in which important applied issues (e.g., eyewitness testimony) were analyzed in terms of general cognitive mechanisms (e.g., metacognitive monitoring) without referring to proxies. Contrary to what Goldsmith (2017) seems to imply, however, this type of research does qualify as cognitively-inspired effect-centric research. As we noted in our target paper, the functional-cognitive framework entails that applied researchers can draw upon both cognitive theories and general functional principles as a source of inspiration. The research that Goldsmith refers to is clearly cognitively-inspired but remains effect-centric in the sense that it does not exploit general functional principles as a source for analyzing phenomena. The commentary of Goldsmith made us realize, however, that the term “effect-centric” is somewhat ambiguous in that it could also be understood as “lacking any type of abstractive analysis”, including an analysis in terms of general cognitive processes. This is not the meaning we had in mind, nor did we want to deny that cognitive theories can provide inspiration for highly abstractive analyses of specific effects in terms of general mental mechanisms.

Nevertheless, we continue to believe that even the best cognitively-inspired research can benefit from considering general functional principles as an additional source of inspiration. Although it is impossible to argue at this point in time that general functional principles can provide inspiration for all aspects of all possible psychological phenomena, we do believe that cognitive researchers tend to underestimate the power of the functional



analytic-abstractive approach. Because of the historic divide between functional and cognitive psychology, few cognitive researchers are aware of the developments that took place in functional psychology within the last 40 or 50 years. This includes research on phenomena such as stimulus equivalence and arbitrarily applicable relational responding that provides an entirely new functional perspective on complex phenomena such as language and thinking (see Hayes, Barnes-Holmes, Zettle, & Biglan, 2016, for reviews, and Hughes, De Houwer, & Barnes-Holmes, 2016, for an introduction geared toward cognitive researchers). Just like it would be unimaginable to evaluate the merits of cognitive psychology based on the cognitive literature of 40 years ago, it does not make sense to dismiss the potential of functional psychology without knowledge of the recent literature.

The historic divide between functional and cognitive psychology also sustains misunderstandings and misconceptions about functional psychology amongst cognitive researchers. For instance, in contrast to what MacLeod and Risko (2017) suggest, stimulus control as a functional principle (i.e., moderation of operant responses by discriminative stimuli) and bottom-up mental processes as a mechanistic concept (i.e., the lack of involvement of goal representations) are fundamentally different because they are situated at two different levels of explanation. It is of course possible to examine the relation between stimulus control and bottom-up processes by building a cognitive model of stimulus control. Interestingly, such a model would probably involve primarily top-down (i.e., goal-driven) processes in order to account for the operant nature of the responses (i.e., the fact that the responses are also a function of their outcome). Another common misunderstanding amongst cognitive psychologists is that internal phenomena such as conscious thoughts and feelings lie beyond the scope of functional psychology. As Goldsmith (2017) correctly points out, conscious thoughts and feelings can be treated as responses within a functional analysis. For

instance, one could explore whether internal phenomena such as conscious memories or meta-cognitive states can be reinforced or punished in a similar way as overt responses. Unlike Goldsmith, we do not see philosophical disputes about the causal status of internal states as an obstacle for using general functional principles as a source of inspiration for research on those internal states.<sup>2</sup> In sum, we urge applied cognitive psychologists not to dismiss too quickly the added value that general functional principles can offer.

In an age when science is becoming ever more interdisciplinary, it is striking to see so little communication between two of the most important approaches within the discipline of psychology. We continue to hope that our work will help bridge this divide.

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<sup>2</sup> When Skinner (1974) says that conscious internal states do not have a causal role in controlling external behavior, he uses the term “cause” in the sense of “ultimate” or “functional” cause. As physical beings, researchers cannot manipulate the internal states of people directly but only indirectly by intervening in the physical environment. In that sense, only elements of the physical environment are functional causes.

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