Duality Models in Social Psychology: Response to Commentaries

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The goal of this issue was to debate the pros and cons of three different types of social-cognitive process models. Clearly, the commentary authors faced a hard task identifying the merits and problems of models that differ not only in the number of processes but also in their scope of application, theoretical language, and degree of quantification. Reflecting the complexity of the topic, the commentaries are very diverse, ranging from detailed empirical arguments to metatheoretical discussions, and provide many valuable insights. Given this diversity and the limited space, we need to be somewhat selective in our responses. In what follows, we start with discussing a number of pressing topics brought up by the commentary authors. We conclude by recapitulating the function and value of dual-system models.

Response to Commentaries

Breadth and Specificity

A number of authors (Albarracin, Crano, Pryor & Reeder, Wentura & Greve, Wyer) emphasize the models' different domains of application. Whereas the unimodel focuses on the formation of judgments, the Quad Model (QM) primarily addresses behavior. The Reflective-Impulsive Model (RIM) aims at explaining both explicit judgments and behavioral responses. As some authors critically mention, the proposed interactions of reflective and impulsive processes are complex, and its reliance on the traditional box-and-arrow language may reduce the ease of deriving testable hypotheses (Albarracin, Crano, Wyer). Although this may be the case, there are no principal barriers against complementing broad models with more specific theories. In this respect, quantitative models (such as the QM) that formalize selected parts of existing dual-system models may facilitate their empirical validation (Payne & Jacoby, Pryor & Reeder, Wyer).

A Priori Dualities?

Typically, psychological dualities are characterized by a combination of multiple features. For instance, the two systems of the RIM are distinct through properties of their processes (the reflective system [RS] performs syllogistic reasoning, the impulsive system [IS] performs spreading activation) and the type of representation the processes operate on (the RS operates on propositions, the IS operates on activated patterns). Moors and De Houwer are concerned that some researchers treat overlapping features as a priori truths, which do not need further empirical investigation. Instead, one "should be cautious … not to let our implicit theories dictate overlap among categories obtained with different criteria" (Moors & De Houwer, this issue). We fully agree that hidden a priori assumptions generally pose a threat. In most current duality models, however, assumptions about overlapping features are explicitly stated and are open to debate and empirical scrutiny.[1] Moors and De Houwer conclude that until sufficient evidence supports assumptions about overlapping features, "it is best to make as few presuppositions as possible to leave open the debate and the opportunity for careful empirical research" (Moors & De Houwer, this issue). We are less certain whether theoretical presumptions necessarily shut down debates or impede careful research. To the contrary, debates call for discussants with strong opinions or hypotheses. Likewise, empirical research calls for guiding ideas that tentatively go beyond organizing what is already known with certainty.

Associations Versus Rules/Propositions

Most current dual-system models distinguish between associative- and rule-based processes (e.g., Lieberman, Gaunt, Gilbert, & Trope, 2002; Sloman, 1996; Smith & DeCoster, 2000; Strack & Deutsch, 2004). Some commentaries in this issue question the usefulness of this distinction (Kruglanski, Moors & De Houwer). Indeed, very broad notions of rules and associations are empirically vacuous (Sloman, 1996). Without further specifying the concept of rules and associations, any observation may be reconstructed in

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[1]For critical empirical tests, however, it is crucial to assess all criteria independently. If, for instance, one allows for the strong inference that a process is associative just because it is relatively quick, the theory that associative processes are quick is immunized against falsification.

terms of either concept.[2] Therefore, the RIM puts a number of constraints on the formal characteristics of impulsive and reflective processes, making them different from unqualified associations versus rules (see Strack & Deutsch, 2004). Most important, we claim representations in the RS to be propositional but representations in the IS to be not. This implies that elements in the RS are connected by meaningful relations (such as *is a*, *is not*, *likes,* etc.) whereas the elements in the IS are connected by mere excitatory links, created by their frequent and recent coactivation. An important consequence of this is that impulsive processes cannot represent truth values. Instead, this function is reserved for reflection.

Although Moors and De Houwer (this issue) conclude that the formal distinction between rule-based and associative processing does "not seem to lead to decisive distinctions at the functional level" (p. 203), and Kruglanski (this issue) doubts that the two types of processes can be distinguished even on a formal level, our assessment is certainly more optimistic. The usefulness of this distinction has been demonstrated in diverse fields such as processing negations (Deutsch, Gawronski, & Strack, in press), cognitive dissonance (Gawronski & Strack, 2004), attitude change (Gawronski & Bodenhausen, in press), or classical conditioning, where one has come to distinguish between expectancy learning (i.e., the knowledge that one stimulus predicts another stimulus) and referential learning (i.e., the mere activation of a stimulus representation upon the perception of an associated stimulus; e.g., Hermans, Vansteenwegen, Crombez, Baeyens, & Eelen, 2000).

How to Know That There Is a "System"

We have argued that dual-system models are particularly useful, because they provide a common explanatory frame for important lines of research in social cognition. The findings from work on direct versus indirect attitude measures, self-regulatory conflicts, and the development of automaticity provide many examples. However, Petty and Briñol (this issue) conclude that such findings are of limited epistemic value. Particularly, they argue that the existence of the predicted consequences does not prove the existence of dual systems. To be sure, empirical results can *prove* neither the truth of any theory in general nor the existence of mental faculties in particular. Just as with any other theory, the best possible support of dual-system notions is their continuing resistance to falsificatory at-

tempts. As things stand, the empirical support for dual-system models is substantial.

Automatic Thought, Self-Regulation, and Goal Pursuit?

Moskowitz and Li (this issue) wonder whether dual-system models provide a place for automaticity in goal-directed behavior and self-regulation that are assumed to occur in the RS of the RIM. We would like to answer in a variation of Moskowitz and Li's own words[3]: If it looks like a goal, then it must be a goal? Of course, automatic behaviors can be *described* as approaching a goal or as regulating a person's behavior. For example, motivational orientations in the IS guide behavior toward the "goal" of approaching or avoiding and object, and deprivation of basic needs, trigger automatic "self-regulation" by increasing the accessibility of previously useful behavioral schemata in the IS (see Seibt, Häfner, & Deutsch, in press).

However, a number of cognitive operations are specific to the RS, which results in functional differences between reflective goal pursuit or self-regulation and impulsive behavioral manifestations. For example, reflective goal pursuit involves the generation of new action plans when habitual ways toward the goal are blocked, whereas impulsive goal-directed behavior is predicted to lack this property (see also Lieberman et al., 2002). Also, knowledge about behavioral outcomes that occur in the distant future requires reflective mechanisms.

Social Interaction and Language

The three target models are designed to explain various aspects of social cognition, whereas the social environment is understood as the primary source for acquiring attitudes, stereotypes, or social norms. Two commentary authors (Albarracin, Semin) argue that, mediated through language, the social environment has even more formative influences on human cognition than our theory acknowledges. Albarracin's analysis suggests that social interaction may generally promote reflective processes by forcing people to translate their unstructured stream of consciousness into the discrete, propositional symbols of language.

Particularly, self-referent concepts such as *intention* or *goal* are important to coordinate actions with others. At the same time, they are the *objects* of many reflective processes. Some dual-system models (e.g., Smith & De Coster, 2000; Strack & Deutsch, 2004) already assume that the need to justify actions or decisions trig-

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[2]For example, modern connectionist networks are computationally equivalent to a turing machine and are general function approximators (Anderson & Lebiere, 2003). In other words, they can simulate any observed psychological regularity.

[3]While addressing the observation that every regularity can be expressed in terms of if–then rules, Moskowitz and Li rhetorically ask, "if it looks like a rule then it must be a rule?" (Moskowitz & Li, this issue).

gers reflective thought. Beyond this function, Albarracin's and Semin's comments suggest that social interaction helps to *create* important building blocks of reflection. Semin further suggests that understanding and producing language is the result of a complex interaction of automatic and controlled processes. Although the RIM does not yet explicitly address many of the important language-related phenomena reviewed by Semin, we believe that the model is relatively well prepared to accommodate them in the future. This is because the RIM does not locate language *exclusively* in one of the two systems. Although the RS deals with abstract symbols, these symbols always refer to associative clusters in the IS. These clusters represent concepts in a concrete, modal manner and are the semantic grounding of abstract symbols. According to our model, language always implies the interaction of both systems.

Final Thoughts

The RIM (Strack & Deutsch, 2004) was built on the foundations of previous dual-process models (Chaiken & Trope, 1999) and recent dual-system models (e.g., Epstein, 1991; Lieberman et al., 2002; Sloman, 1996; Smith & DeCoster, 2000). Although these theories differ in numerous ways (e.g., whether they postulate a sequential or a parallel processing), duality models share the idea of qualitatively different operating principles.

The value that is added to the existing models by the RIM has several components. First, it links its mechanisms to behavior. Unlike most predecessors, the described processes do not stop at the generation of judgments or decisions but include the execution of behaviors. Moreover, the model predicts complex interactions of behavior and cognition and foresees behavior independent of decisions. A second characteristic is that it integrates motivational and emotional components. Specifically, the RIM provides for the possibility that the execution of a particular behavior may be facilitated by a given motivational orientation. This mechanism also describes direct influences of a behavior on cognitive and affective processing and is connected to the deprivation of basic needs (homeostatic dysregulation). Third, the RIM specifies the interaction between reflective and impulsive operations at various stages of the processing. Assuming that both systems operate simultaneously, human thinking, feeling, and behaving is understood as a joint function of both systems. However, the degree to which one or the other will have the upper hand depends on specified conditions within and outside of the person. Fourth, the RIM closely corresponds to operational models in the neurosciences that identify similar systems in the brain (e.g., Bechara, 2005).

In addition, the RIM has inspired empirical research in a broad variety of both basic and applied domains. For example, it has offered a new perspective on the processing of negations (Deutsch et al., in press), and it has contributed to a better understanding of addictive behavior (Deutsch & Strack, 2005) and to the mechanisms of self-regulation (Hofmann, Rauch, & Gawronski, in press). The RIM has been applied to explain the dynamics of consumer behavior (Strack, Werth, & Deutsch, 2006) as well as the evaluation of leadership (Werth, Markel, & Förster, 2006). Most important, perhaps, the RIM has conceptually inspired the discussion on relationship between implicit and explicit measures of attitudes and dispositions (e.g., Hofmann, Gschwendner, Nosek, & Schmitt, 2005; Perugini, 2005) and has thereby shed new light on phenomena of cognitive consistency (e.g., Gawronski & Bodenhausen, in press).

In conclusion, although the epistemic analysis of various types of models is an important endeavor, the ultimate criterion for evaluating a theory is the research it generates and the new insights that eventually accrue from it. Therefore, Popper's (1959) motto of his Logic of Scientific Discovery may be extended to this debate: "Theories are nets: only he who casts will catch (Novalis)."

Notes

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