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Duality Models in Social Psychology: Different Languages or Interacting Systems?

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We appreciate and welcome all three attempts at process models in social psychology. All of them try to find a solution to the problem that lies at the heart of psychology: to fill the gap between the description of human beings as individuals who intentionally act (and judge) according to their beliefs and goals, and the description of human beings as biological systems that behave according to inbuilt or acquired regularities. We appreciate the fundamental discussion in these contributions, because most of the time we psychologists suppress, circumvent, or ignore this gap by focusing solely on one or the other side of the gap.

Our contribution to the debate is not meant to add any further arguments for or against a uni- versus multimodal perspective. Instead, we want to make *explicit* a problem that implicitly lies behind the discussion of a uni- or dual-model approach. To elaborate on this point, we must focus on the aspect of theoretical languages that govern psychological theorizing.

Theoretical Languages in Psychology

In a rough picture, the decline of behaviorism swept away two "do not!"s of empirical psychology at that time: First, thoughts on the inner structure of the "black box" were no longer forbidden. Second, folk psychology (or ordinary language psychology), that is, the use of a mentalistic idiom, was no longer abandoned in the scientific community. The break of the first "do not" led to the development of cognitive psychology. In a nutshell, behavior is seen as the result of causal processes that operate within and between some functional modules. Here, (traditional) cognitive psychology does not bother too much about a concrete physical realization of a module (e.g., "working memory") or process (e.g., "spread of activation"). These scientists argue—more or less convincingly—that a certain module together with its associated processes can be implemented (at least in the long run) in rather different ways, including,

say, a computer program. (We can add as an aside: It is the endeavor of cognitive neuroscience to bother about the concrete physical realization of those modules and processes. But that is a different story.)

The disappearance of the second "do not" has reintroduced mentalistic concepts (e.g., to act, to intend, to believe, to feel, etc.) as indispensable concepts in psychology. In the end, we are very often interested in explaining phenomena that are established in a mentalistic language. Why does Judge A impose a drastically more severe sentence compared to Judge B in largely comparable cases? It is not the utterances of different strings of phonemes that are essential in marking the difference. It is the result of the *act of judging and sentencing* that matters.

Both of these approaches are intimately but not simply related. Whenever one tries to theorize about so-called higher order cognition (i.e., to theorize about mentalistic concepts like judging, intending) in a way that is inspired by the cognitive endeavor (i.e., to theorize in a functionalistic way, postulating modules and processes, etc.), the problems of this relationship become evident. In a nutshell: The mentalistic idiom is about individuals who act meaningfully. The mentalistic idiom is about the semantic and emotional meaning that something has for someone. In short: mentalistic language is a "personal" language. In contrast, cognitive psychology is inherently "subpersonal." Its theories describe syntactic regularities that have no personlike semantic qualities. A cognitive system does not judge, intend, or act but only transforms inputs, which can be discriminated by formal features, into outputs according to some built-in or acquired regularities.

We want to proceed in the following way. First, we want to give some arguments about the indispensability of a personal psychology and try to figure out what can be considered its main characteristics and/or problems. Second, we spell out how (social-)cognitive psychology tries to handle the gap between a personal and a subpersonal psychology by giving a taxonomy of solutions. Finally, we discuss the three target theories of this issue with regard to that background.

Mental Events and Human Behavior: Bridging Invisible Gaps

Why do we investigate judgments? We are convinced that judgments are a necessary component of any valid explanation of human action. If any human behavior is more than a mere automatic reaction (e.g., a reflex), it is necessarily based on an intention, which in turn is based on beliefs and evaluations and, in the end, on a personal judgment about how to weight these different aspects that have come to the actors' mind. Psychologists want to explain why human beings *decide* and *act* the way they do.

However, despite impressive progress in terms of both theoretical differentiation and empirical refinement (e.g., Gollwitzer & Bargh, 1996), fundamental theoretical problems of the explanation of (human) action still remain overlooked or ignored (see also Brandtstädter, 1998). In particular, three problems are of primary importance here. First, it is often overlooked that the concepts of personal psychology are semantically (thus not *causally*) related. Second, the connection between mental states (intentions, judgments) on one hand and physical events (visible behavior) on the other is still conceptually unclear. Third, personal psychology is not self-contained. For example, we do not learn from this type of psychology which causal processes change personal belief and value systems.

Semantic Connectedness of Mental Terms

When we perceive a human action (i.e., if we see a certain behavior as human action), the presence of specific "intentional" processes (such as beliefs, aims, judgments) cannot be doubted: If the observed behavior is in fact the expression of an intentional action, then a corresponding constellation of these mental states is *necessarily* implied. This point is often overlooked. Take for example the "theory of planned behavior" (Ajzen, 1996), which remains within the parlance of personal psychology by predicting actions from intentions and, in turn, intentions from attitudes, subjective norms, and perceived control. The theory runs into logical difficulties by trying to establish *causal* relationships between mental states and intentional actions, which are in fact logical relationships (Greve, 2001). Thus, a personal psychology is about conceptual relationships between beliefs, values, emotions, and actions. The misinterpretation of these conceptual relations between personal concepts can easily lead to pseudoempirical research (Brandtstädter, 1982; Smedslund, 1978; see also Brandtstädter, 1998). Dennett (1987) compared the intentional stance (i.e., the personal psychology stance) with a calculus, in particular the calculus of forces in the parallelogram of forces: It is an idealized level of abstraction, but not, for instance, a real mechanical linkage of rods and pivots.

The Connection Between Mental States and Physical Events

Subpersonal cognitive psychology, however, is—to stay with the metaphor—about mechanical linkages of rods and pivots. Therefore, there are attempts to reconstruct action theory within a subpersonal theoretical language (e.g., see the "Rubicon model" of volitional action; Gollwitzer, 1990, 1999) with the goal to predict behavior.

Such approaches often ignore the problem that judgments (as part of the idealized personal psychology parlance) are not identical to specific cognitive processes (even if these processes can be reconstructed as necessary parts of a personal judgment). The crucial question is whether both parts of an explanation (*explanans,* i.e., some specific behavior*,* and *explanandum*, e.g., intentions) are commensurable, that is, whether they can be integrated in one theoretical explanation within one language layer.

One way to illustrate this point is to take a closer look at the hierarchical structure of actions (see also Carver & Scheier, 1998): I prepare a journey *by* packing my bag *by* filling in my shirts *by* folding my best white shirt *by* stretching it with my hands *by* moving my left hand in an angle of x° *by* a contraction of the x-muscle in my left forearm *by* a chemical reaction in the fibres of this muscle (etc.). At a first glance, these "by"-relations look like adequate empirical explanations ("what *really* happens is … ") in a progressive (reductive) direction of a cumulatively increasing insight (into microprocesses). A closer look reveals, however, that while moving through this explanatory sequence we have crossed the conceptual border between intentional, controllable actions (such as preparing, packing, folding) on one hand and physical processes (such as chemical reactions in some muscles) on the other, which we cannot intend or plan and usually are not even aware of. Somewhere in between, an invisible "semantical switch" alters the object of explanation, as it were: The action itself remains "relatively irreducible" (De Sousa, 1987).

Note that jumping over the gap marked by the lowest level of mental events is not at all senseless or useless. In certain respects, it is both the privilege and the duty of empirical psychology to boldly go beyond the limits of ordinary language and folk psychology. However, leaving the categories of our common language aside in that particular case means losing sight of the object of investigation (i.e., the intentional action). Every approach that attempts to integrate the explanations of complex human behavior into one theoretical model is in danger to do so.

Personal Psychology Is not Self-Contained

We do not learn from personal psychology which forces change personal beliefs and values. Actually, we are even unable to describe these forces properly. For example, whereas the inevitable logic of a convincing argument is describable within a personal psychology, cognitive processes of persuasion (i.e., why a certain person actually feels forced to agree with an argument whereas another person does not) are already outside this logic. The individual increase or decrease of personal values, to give a second example, cannot be understood within a personal psychology: We are not able to cancel a wish of ours intentionally, just because we realize that it cannot be fulfilled (see, e.g., Brandtstädter, 2000). Especially in the domain of judgments, a lot of evidence shows that there are several factors influencing judgments in a way that cannot be described within a rational calculus.

To summarize so far, there is a need for a description of higher cognition (e.g., judgments) in the language of personal psychology. This language, however, provides more of a description than an explanation (the connectedness problem), it is not self-contained, but the link between this level of description and the mechanics of a causal system is not a simple one. How do psychologists in general and social-cognitive judgment researchers in particular account for this duality?

Bridging Invisible Gaps: (Social-)Cognitive Solutions

(Social-)Cognitive theories on judgment and intending proceed from two starting points: First, it is clearly seen that judgments or intentions are phenomena within personal psychology: A person judges or intends on the basis of evidence, beliefs, and goals, according to the rules of a psychological calculus. Second, dual-process theories emerged as response to the permanently growing evidence that the causal factors fueling these processes, which are outside of personal psychology or—to put it the other way around—which can only be described within a subpersonal psychology, do in fact moderate or shape (personal) judgments (our third problem given previously). How should we reconcile these two perspectives? Actually, we see three attempts.

The Hybrid Approach

In a rough picture, dual-*process* theories tend to explain behavior by reference to a hybrid creature: Given some specified circumstances or predictors, behavior is seen as the result of rather automatic processes and can purely be explained within a subpersonal framework. When unobtrusive priming with the age stereotype modifies the speed of walking (Bargh, Chen, & Burrows, 1996), we are confronted with the challenging task to explain this perception–behavior link, but we can do so without reference to the mysteries of the "person." The same rationale applies if we observe that consumers tend to pick a product that is placed on the right hand side (Nisbett & Wilson, 1977). We have to build a story about why it is the right-hand side, but there is no need to refer to the person. By way of contrast, given other circumstances, a judgment or an action is described as a full-blown rational act of a per-

son. From the hybrid approach, we can even put the two components in opposition. The punch line of the Nisbett and Wilson story was that the *individuals* claimed to have *chosen* a product because of some plausible *reasons*, whereas Nisbett and Wilson could claim (in our terms) that a *biological system* has *picked* the right-most of almost identical items because of some *built-in or learned mechanism.* It should be obvious that the hybrid approach does not contribute much to uncover the mysteries of the personal–subpersonal *gap*.

The Interface Approach

Individuals act or judge *not* on the basis of all beliefs that are in principle available to them. It is a subset of those beliefs accessible at the moment that will enter into considerations. In addition, individuals act according to personal values and evaluations. We can add, to values and evaluations as they are at the moment of deciding, judging, or intending. There is a lot of room to specify within a subpersonal psychology what determines accessibility (e.g., recent presentation) or variations in evaluation (e.g., evaluative conditioning). Thus, this approach describes an interface between a personal and a subpersonal perspective by reference to a representational system with parameters of, for instance, accessibility and valence, which in some sense have a double character: *Accessibility* can be clearly defined as a parameter within subpersonal psychology (e.g., via activation in a network representation) *and* it has a clearly defined role in personal psychology ("Oh, you bought a new iron today! Why didn't you take into account that the store has announced a 20% discount on all products for tomorrow?" "My god, I did know that, but it was completely lost to me!"). In a similar sense, within subpersonal psychology *valence* can be defined as a feature of object representations that might have some special process qualities (e.g., Fazio, 1990) and it has a clearly defined role in personal psychology.

The interface approach is best suited to account for those phenomena doubtlessly outside the explanatory range of personal psychology (automatisms, "cognitive reflexes," etc.), that, however, contribute to our understanding of phenomena described in terms of personal psychology (see also Wentura, 2005). Let us illustrate this by an example inspired by Englich and Mussweiler (2001; see also Strack & Mussweiler, 1997). We can describe, for example, the behavior of judges completely in personal terms: They base their verdicts[1] on a weighting of all evidence they know of (i.e., all evidence that they remember at the moment they judge). They consider arguments, they ask other individuals (witnesses, lawyers, experts, etc.), and they deliberately decide in the end. However, the why-&-when of remembering facts, of weighting arguments, and so on is outside the range of explanation of a "personal" psychology. For the subpersonal part of the story, we have to assume that the beliefs about the case are represented in memory. Representations are characterized (among other aspects) by the parameter of accessibility, which can be understood as the probability that the given representation will enter into the current information processing (if it is in principle applicable). The parameter of accessibility can be manipulated by processes that can be completely understood without reference to such a mysterious thing like a person, for example, by flashing belief-associated symbols onto a screen the person is looking on.

The interface works in both directions. Let us explain by continuing the example (see Englich & Mussweiler, 2001): Assume that our judge hears the final speech of the public prosecutor who demands a sentence of 2 years. Probably, the judge will spontaneously react with some thoughts about whether the claim is appropriate. Knowing that individuals tend to follow a positive test strategy (Klayman & Ha, 1987), the judge will retrieve facts about the case that speak for this claim. This is completely a personal psychology story. However, "retrieving a fact from memory" is an interface concept. For example, in a subpersonal theory of memory the process of retrieving a representation might have the aside that the accessibility of this representation is temporarily increased, with the consequence that the corresponding fact will determine the subsequent verdict of the judge with high probability.

The "As If" Approach

The most demanding approach tries to build a complete cognitive system around phenomena of judging, intending, and acting. It goes like this: Saying that a *person* has made a judgment according to some *beliefs* of his or hers—which is clearly personal psychology talk with all its intricacies—has a correspondence at the level of subpersonal psychology. Because personal psychology descriptions and explanations are inherently concerned with meaning and semantics, but the cognitive apparatus is inherently a machine driven by the syntax of its components (see Dennett, 1987), it is the task of (cognitive) psychology to find out how a system must be designed such that its syntax-driven behavior mimics behavior that can be plausibly *interpreted* as intentional acts of a personal agent. The system behaves "as if" it is a person. That is a very demanding task (actually, the time-honored mind–body problem is hidden within it). For example, it is not self-evident that concepts which play a role in the personal psychological description of a given event (e.g., a certain *belief* that we ascribe to a person to understand his or her behav-

[1]The example is based on German law. Verdicts are given by the judges and not by a jury.

ior) have a structural representation (e.g., symbols in a proposition-like format, the *belief') within our cognitive apparatus. Of course, that is a good starting point if we remain aware that the semantics of a belief cannot be identical to the syntactical properties of the representation of that belief (the belief').*

The natural theoretical enemy (a built-in temptation, as it were) of the "as if"-approach is the homunculus—this little creature that acts, intends, chooses, or judges within the system. Finally, any component of the "as if" system has to be homunculus free. But up to this end, a divide-&-conquer strategy might be successful. Actually, this is an ubiquitous strategy in cognitive psychology: Take for example Baddeley's well-known working memory model (e.g., Baddeley, 2002) with its components *phonological loop* and *visual scratch pad*—which are fairly well understood at a subpersonal level—on one hand and the *central executive* on the other hand—an entity that is suspected to have homunculus qualities. The strategy can be successful as long as it is acknowledged that some components are yet not fully understood and there is no danger of an infinite regress (which would be the case if the *central executive* would need a *working memory* to fulfill its duties).

How can we categorize the approaches of Deutsch and Strack (this issue); Kruglanski, Erb, Pierro, Mannetti, and Chun (this issue); and Sherman (this issue) with regard to this taxonomy?

The Dual-System Approach by Deutsch and Strack

Deutsch and Strack's (this issue) approach is clearly driven by the goal to reconcile the personal psychology of judgments with the automatic processes that moderate judgments. Certainly, with their dual-*systems* approach they want to go beyond the hybrid theories that are known as dual-*process* approaches. There are two readings of their approach.

One reading is that the theory comprises the dual languages of personal and subpersonal psychology (while ignoring the conceptual duality). Seen from this angle, the approach is in fact an interface approach and the reflective system (RS), which then reflects the qualities of a person, is not commensurable with the impulsive system, which explains the automatisms that moderate judgments. Some sentences support this perspective (e.g., "[The RS] generates judgments, decisions, and intentions," (Deutsch & Strack, this issue); "The RS is endowed with a process of *intending,*" (Deutsch & Strack, this issue). The second reading is that their dual-systems approach is an "as if" approach, that is, it can be seen as the attempt to construct a complete cognitive system in the subpersonal language, which finally behaves in a way that makes a description of the behavior in terms of personal psychology seem plausible. Seen from this perspective, the RS in particular is yet underspecified. But, as we have argued here, this might be acceptable given a divide-&-conquer strategy: Then, the IS encompasses the mechanisms that are fairly well understood within subpersonal cognitive psychology, whereas the more complicated and less well understood processes are located in the RS.

The Unimodal Approach by Kruglanski and Colleagues

Do Kruglanski and colleagues (this issue) want to entirely discard the dual character of human beings as individuals and biological systems? Possibly not. Given our taxonomy, Kruglanski and colleagues rather attempt to paint an "as if" picture. They draw heavily on the idea of production system architectures in computer science. A production system is one (of many) conceptualization of a universal machine (the famous Turing machine is another). That is, a machine that consists of a list of if–then rules and an interpreter that processes the "then" part if the "if"-part of a rule is true can calculate anything. For a long time, cognitive psychologists have seen production systems as a possible candidate for a general cognitive architecture, with Anderson's ACT-R model as its most famous instantiation (see Anderson, 2005; Anderson et al., 2004, for the most recent descriptions).

The approach is especially appealing because the authors correctly claim that if one goes beyond personal psychology, into the subpersonal sphere, there is no principle need for a qualitative shift between the theoretical description of phenomena that are outside the range of a personal psychology (i.e., automatic behavior, "cognitive reflexes," etc.) and the "as if" description of phenomena that are established within personal psychology (e.g., an elaborated, reflective judgment). It follows from the arguments just presented, however, that there is the danger of confusing theoretical languages: A person follows a rule while judging. A system instantiates a rule.

The Quad Model by Sherman

Recent years have seen a growing body of research on so-called indirect (or implicit) measures of the constructs central to subpersonal social-cognitive psychology. This was an indispensable step, because first and foremost we have nothing but those measures related to that level of theorizing (see also Wentura & Rothermund, in press): If a given theory

includes assumptions about accessibility and its role in judgment, it is necessary to have an independent measure of accessibility (see, e.g., Strack & Mussweiler, 1997, who used the lexical decision task in the context of their model of anchor-moderated judgments, which was hidden in our judge example given previously). If a theory includes assumptions about the automatic activation of evaluation upon presentation of attitude-related symbols, it is necessary to have an independent measure of automatic evaluation (see, e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986, who invented the affective priming task for this purpose). Verbal data, which are the most natural measure for a personal psychology, are far too distant from the (subpersonal) process under consideration to be satisfying: It takes a long story to predict a verbal utterance solely in terms of subpersonal cognitive psychology! Without a doubt, a very elaborated "as if" theory is needed to do that job! To the contrary, a paradigm like the affective priming task can be easily linked to the concept of automatic evaluation by a simple small-scale theory of the underlying processes (see, e.g., Klauer & Musch, 2003; Wentura & Rothermund, 2003).

Given the necessity of indirect measures, it is of course a valuable task on its own to establish valid small-scale theories of those measures. For example, Rothermund and Wentura (2001, 2004; see also Wentura & Rothermund, in press) opened up a discussion about the valid small-scale theory of the Implicit Association Test. We do not want to recapitulate this discussion here. But we can discuss Sherman's (this issue) contribution in the same spirit. He refers to the well-known assumption that measures can often be traced back to processes that are not under the control of the participant (automatic components) as well as to processes that are (controlled components). Again painting a very rough picture, we can claim that only the automatic components are of interest, because they are the only ones that can be easily understood within a subpersonal cognitive psychology. (What corresponds to the personal "control" in a cognitive system?) For some paradigms, we know that the choice of simple parameters of the task makes all the difference: For example, by presenting a related prime, Neely (1977) found that semantic priming effects with short stimulus onset asynchronies result from automatic processes that increase the accessibility of the target concept, whereas priming with longer stimulus onset asynchronies can be suspected to have a component based on participants' expectancies. For the Implicit Association Test, there is no such parameter. Sherman (this issue) tries to solve this problem by multinomial modeling. If he succeeds, this kind of modeling will certainly by a valid tool in social-cognitive research.

Conclusions

Psychological theorizing inherently has a dual character that is given by the two perspectives on human beings as individuals and human beings as biological automata. Many psychological phenomena are given or established by the perspective of human beings as individuals, including phenomena that are of special interest in social cognition research (e.g., judgments). From that point of view, a personal psychology perspective is indispensable at least to describe the phenomena of interest. However, psychologists are interested in the "mechanics" that are behind a complex behavior described as an act of, for example, judging. Therefore the leading theories are phrased in the language of subpersonal cognitive psychology.

The dual-system approach of Deutsch and Strack (this issue) mirrors the dual character of psychology. However, the approach appears somewhat undecided: Some aspects of the reflective system seem to have person-like qualities, which would make it incommensurable with the mechanics of the Impulsive system. If, however, the reflective system is meant as a subpersonal cognitive system (and we think the authors had this in mind), the authors must be aware of the traps that are inherent in any attempt to "translate" personal psychology in the most straightforward way into the cognitive language (e.g., a "belief" translated into a "string of symbols"). The same applies to the approach of Kruglanski and colleagues (this issue) who correctly claim that if one goes beyond personal psychology into the subpersonal sphere, there need not be a qualitative shift. Thus, in conclusion, what is contrasted (uni- vs. dual-approaches) seems at the end to be of a similar character. It is interesting to note that although we are not very much concerned with the developments of Anderson's ACT-R approach (see Anderson, 2005; Anderson et al., 2004), both the dual-process as well as the unimodal approach reminded us of that general cognitive architecture. This should be evident for the model of Kruglanski and colleagues (this issue), who apply the same basic mechanism and who explicitly refer to Anderson's work. But it appears to us that the dual-system approach can benefit from this analogy as well. As we have argued, the RS is somewhat ambiguous. The success as an "as if" system depends on its power to simulate higher cognition with all the moderations that stem from lower processes. As far as we can see, the Anderson group has comparable goals (albeit in somewhat different domains of content), and it has powerful tools for simulation.

In our view, the Quad Model of Sherman (this issue) focuses on a somewhat different spot in the research process. With the multinomial model, Sherman tries to separate automatic and controlled components of measurement tools. This is highly valuable, because we

need variables that can be plausibly interpreted within subpersonal theorizing. As the name suggests, *controlled processes* are processes that carry with them the burden that we partially attribute them to a person who intentionally controls the behavior.

Note

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