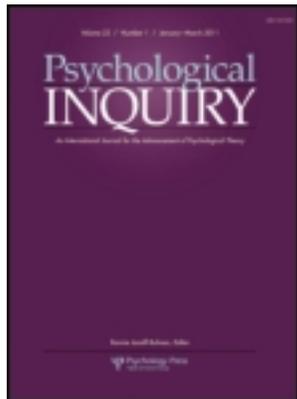


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On the Reintegration of Accuracy in Social Cognition Research: Let Us Count the Ways

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REPLY

On the Reintegration of Accuracy in Social Cognition Research: Let Us Count the Ways

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When we set out to write this review, both of us were a bit apprehensive about the responses we would receive. This anxiety was driven not just by our imaginations but also by colleagues who often seemed to take a hostile stance toward the very idea of studying interpersonal accuracy. While discussing the troubles of accuracy research following Cronbach's (1955) complaint, and our recent forays into this area of research, one senior colleague told us that the entire endeavor "should have stayed dead." Another colleague encouraged us to reconsider using the "toxic" term *accuracy* if we wanted anyone to listen to us.

As such, we were thrilled (and a touch relieved) to find, instead, an enormously generative set of responses to our article, which—although sometimes taking issue with the details of our approach and framework—rarely challenged the notion of accuracy as a meaningful or measurable construct. Perhaps the deck was stacked; many of the commentators are accuracy researchers whose work has inspired much of our own. However, even among more "process-oriented" researchers, and across behavioral and neuroscientific perspectives, the commentaries broadly converged on the idea that integrating accuracy and process in social cognition is desirable and feasible.

We like consensus, but we love new ideas, and that's what these commentaries contain in abundance. Many provide particular visions about how process- and accuracy-oriented research can and should be brought together, and indeed, how they already are being integrated. Although the landscapes each commentator sees for the future of the field often differ from each other, and from our own, in important ways, there also were commonalities in their content and architecture. Above all else, we are heartened by the sheer number of novel and innovative approaches to these issues embodied in these commentaries. It has become almost canonical for psychologists to dismiss accuracy

research as anemic or anachronistic, and the idea of integrating accuracy- and process-based approaches to social cognition is sometimes seen as too complex or vague an endeavor to be worth pursuing. By our count, this pessimism clashes with key ideas expressed by virtually every commentator.

We see these commentaries as coalescing around a set of core questions that the field of accuracy research needs to answer—and in many cases already has begun to answer. Next we describe five such questions. Between the commentators, others, and ourselves, a growing number of researchers are not only posing these questions but also producing creative new ways to answer them. Although much work obviously remains to be done, counting the ways research is moving forward leaves us optimistic about the future of accuracy as an integrated part of social cognition research.

How Accurate Are Perceivers, and How Accurate Do They Want to Be?

Epley and Eyal (this issue) and Ickes (this issue) take issue with our characterization of perceivers as "consummate experts" at mind perception, and we agree that this term lacks precision. On one hand, perceivers' skills are impressive in a number of ways. Especially in the domain of emotion perception, the fact that we can so quickly combine myriad informational sources together into *any* coherent inferences about targets is nontrivial. Further, judging performance on many emotion perception tasks is problematic because so many individuals often perform at ceiling when identifying affective states. Thus, even if perceivers fail to attain accuracy in some task types (lie detection is a prime example), they are quite accurate in others.

On the other hand, we agree with both commentaries that the only broad statement about accuracy that rests

entirely on solid empirical ground is that perceivers are better than chance, and worse than perfect, at judging social targets. We do believe that—at least in process-oriented research—the “worse than perfect” side of that equation has held too much sway in the literature (perhaps because this domain of research typically uses perfect accuracy as a baseline; see also Krueger & Funder, 2004). That said, we agree with Epley and Eyal and with Ickes that emphasizing the other side of the equation is not as useful as balancing the two. In fact, we believe that the integrative approach we advocate assumes this balanced view of perceivers’ skills. Specifically, we suggest that more attention should be paid to *shifts* in accuracy that result from alterations in social context and process use. Such shifts could not occur if perceivers were always perfect—or always terrible—at drawing inferences about targets. Thus, even if our use of the term “expert” was a bit cavalier, we believe our approach emphasizes the variance between perfection and chance that actually characterizes perceivers.

Perhaps a deeper and more interesting question is, “How accurate do perceivers *want* to be?” One might imagine that even if humans are not always consummate mind perception experts, we should always strive toward perfect accuracy. Such expertise would save us from Ponzi schemes, unfaithful spouses, and other inaccuracy-related pitfalls. Ickes, however, points out that—in many cases—perceivers have other motives and may sometimes avoid the very information they could use to accurately assess targets (Kunda, 1990). We strongly agree that variance in motivation powerfully affects accuracy and could play out across contexts (e.g., the same individual may be motivated to be accurate in the face of positive information and inaccurate in the face of threatening information) or across individuals (e.g., someone high in the need to belong or low in socioeconomic status may chronically strive to accurately assess others’ views of him, in order to tailor his behavior to interaction partners). This variance can importantly play into a discussion of when accuracy is highest and what accurate perceivers look like (see next).

How Should Accuracy Be Measured?

If psychology were to be compared to physics, interpersonal accuracy might be seen as a kind of quantum phenomenon: Just as measuring one feature of a particle’s state introduces uncertainty about its other features, accuracy can also change—sometimes dramatically—as a function of how it is measured and who is doing the measuring. As a result, there sometimes seem to be almost as many accuracy measurements as there are accuracy researchers (as noted by many commentators, and especially Hall & Colvin, this issue).

At first blush, this variance seems problematic. After all, methodological inconsistency was one of the primary charges leveled at the “first wave” of accuracy researchers (Gage & Cronbach, 1955). Especially troubling are the theoretical pitfalls inherent to operationalizing accuracy. The slipperiness of the concept requires any researcher to make some *a priori* assumptions about what counts as accuracy, which can be dangerous. This is known as the “criterion question”: Who or what is the authority on a social target’s traits or states? If Liz says she is nervous, is she right? What if her friends—or FACS coders, who know more about her facial expressions than she does (Ekman & Friesen, 1975/2003)—disagree? If she is not experiencing physiological arousal, is she calmer than she believes? If we were to measure activity in her insula, would it “know” more than she does about her current levels of disgust? Defining a criterion requires a researcher to decide which of these noisy, often contradictory, signals to trust. That researcher’s definition of accuracy (and its legitimacy) will, from that point on, be constrained by her criterion assumptions, any of which is necessarily imperfect.

Our own work and that of the commentators illustrate a wide range of such criteria, and a range of resulting issues. As noted by Keysers and McKay (this issue), our own choice of a criterion (a target’s self-reported emotion) is not without problems: If a target is incorrect about his own emotions, then a perceiver who agrees with him is only dubiously accurate. Keysers and McKay argue that neural engagement does not suffer from this bias, and as such shared patterns of engagement across perceivers and targets (Schippers, Gazzola, Goebel, & Keysers, 2009; Schippers, Roebroek, Renken, Nanetti, & Keysers, 2010), or across multiple perceivers viewing the same target (Stephens, Silbert, & Hasson, 2010) may provide a purer measure of accuracy than any based on self-report.

We find this idea intriguing and think that studies of brain–brain correspondence are a vital new source of data in this domain. At the same time, we caution that shared neural states are not *necessarily* indicative of correspondence between psychological states or meaningful interpersonal understanding. For example, two people looking at each other’s faces will almost certainly coengage striate and extrastriate cortex involved in perceiving complex visual stimuli, but all this coactivation tells us is that they have simultaneously seen something (likely each other), not that they have understood each other’s states or traits.

Keysers and McKay (this issue) and Iacoboni (this issue) suggest that “resonance” between the mirror neuron systems (MNS) of two individuals more deeply connects to empathic understanding. To a certain extent, we agree, especially when perceivers are attempting to accurately understand relatively “low-”level

motor or communicative intentions, such as a target reaching for a glass or playing charades. However, even coactivation of regions in this system could reflect a “shallow” level of accuracy that would leave most perceivers unsatisfied. This is because—contra Iacoboni’s view—we think that many important psychological states are not mapped in any direct way to motor acts that can be represented in the mirror neuron system (cf. Hickok, 2009).

Consider the example from our target article: A perceiver witnesses a target shoving someone else. Coengagement of the MNS could theoretically provide a measure of how much the perceiver understands the target’s “low-level” intention (i.e., to push), and (even better) a measure not limited by the target’s own insights about her behavior. However, as is the case with facial expressions of emotion (Aviezer et al., 2009; Carroll & Russell, 1996; Kim et al., 2004; Russell, Bachorowski, & Fernandez-Dols, 2003; Zaki, Hennigan, Weber, & Ochsner, 2010), the meaning of non-facial motor acts also vary significantly depending on the context in which they are embedded. Thus, simply understanding that a target wishes to push an unsuspecting person—and the neural resonance that can index such understanding—provide little insight about whether a perceiver correctly gauged the deeper meaning of a target’s internal states (e.g., shoving the person to start a fight vs. attempting to save him from an oncoming bus).

Iacoboni has previously demonstrated that the MNS is sensitive to the presence or absence of contextual cues surrounding a movement (Iacoboni et al., 2005), suggesting that this system may incorporate contextual information about a target’s intention as well as their motor acts. Be that as it may, we are more convinced by data suggesting that attention to context and “deeper” internal states (e.g., why someone is performing an action as opposed to how they are performing it) engages the mental state attribution system in addition to the mirror neuron system (de Lange, Spronk, Willems, Toni, & Bekkering, 2008; Spunt & Lieberman, 2011; Spunt, Satpute, & Lieberman, 2010). Further, engagement of both systems tracks with accuracy as measured by multiple criteria, including agreement with targets themselves (Zaki, Weber, Bolger, & Ochsner, 2009) and objective memory for the content of targets’ anecdotes (Stephens et al., 2010). Together, these data strongly suggest that coengagement of the MNS across target and perceiver cannot tell the whole story of interpersonal accuracy.

Finally, although Iacoboni (this issue) believes that interpreting brain activity related to mental state attribution is complicated by the fact that some key regions related to this process (e.g., the medial prefrontal cortex) are tonically active at rest, researchers have taken this issue to heart for almost a decade. In fact, the striking overlap between areas related to mental state attri-

bution and the brain’s “default network” now guides thinking about the ubiquity and centrality of social information processing to the human mind (Buckner, Andrews-Hanna, & Schacter, 2008; Buckner & Carroll, 2007; Mitchell, 2009; Wagner, Kelley, & Heatherton, 2011). For example, research on mindwandering and stimulus-independent thought suggest that when in a “default,” non-task-oriented mode, what people do much of the time is make attributions about their feelings and thoughts concerning things that are personally relevant to them, like their goals and interpersonal relationships (Christoff, Gordon, Smallwood, Smith, & Schooler, 2009; Mason et al., 2007). More broadly, organs that are tonically active at rest are not precluded from tracking subjective or psychological states in important and tractable ways. For example, though everyone hopes that their heart remains tonically active, variance in heart rate (and even second derivatives describing variance in heart rate variance) are reliable, meaningful correlates of internal subjective states (Berntson et al., 1997).

Thus, although we strongly agree that shared perceiver-target neural activity should join the cadre of criteria that can be used to assess interpersonal accuracy, we do not believe that neural resonance merits a privileged ranking as less biased or more informative than other criterion measures. Like examination of behavior and self-report, the utility of neural resonance lies in adding to a broader triangulation—based on aggregation of multiple types of data that are relevant to multiple criteria—on when and how perceivers achieve accuracy.

Thus, we propose settling our differences over the quality of any one criterion by instead focusing on aggregating data gleaned from the use of multiple criteria (in fact, as many criteria as possible). Before we can do so, however, it is worth asking the question, Why is such aggregation worthwhile? More specifically, what does the whole (aggregation across criteria) provide that is greater than the sum of its parts (separate lines of data from separate criteria)? We believe there are at least two answers to this question, which couldn’t be more different from each other.

Convergence Across Criteria

Measuring emotional states ranks among the oldest and most Herculean challenges in psychological research. This endeavor spans a number of qualitatively different problems. Intuitively, researchers wish to understand the *psychological ingredients*—such as perception of bodily states and contextually driven appraisals—that constitute emotional states (Cannon, 1927; Forgas, 1995; James, 1884; Schachter & Singer, 1962; Scherer, Schorr, & Johnstone, 2001; Storbeck & Clore, 2007). In attempting to understand these ingredients, they run into another thorny question:

Which *levels of analysis*—for example, behavioral (self-reports & expressions) or physiological arousal (e.g., heart rate)—provide valid information about when an emotion is occurring (Ekman, Levenson, & Friesen, 1983; Ekman, Sorenson, & Friesen, 1969; Robinson & Clore, 2002)? Note that this second issue eerily resembles the criterion question just described. As such, these questions can be thought of as independent and sequential: Before delving into the components (independent variables) that produce and track emotion, one must identify the measurements (dependent variables) that signify that an emotion has occurred.

As it turned out, this sequence is not nearly as tidy as one might have imagined. Researchers argue about the relative validity of different criteria, and—even worse—self-reported, behavioral, and physiological measurements of emotion often misbehave by failing to track with each other (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005), especially in some circumstances and for some individuals (Ansfield, 2007; Gross, John, & Richards, 2000). However, emotion research's melee of operationalizations gave way to a deeper insight about emotion: The *psychological ingredients* and *levels of analysis* questions surrounding it are not at all independent. Instead, to validly identify the independent variables that produce emotion, one must demonstrate that they do so across a *range* of criteria. This “meta-criterion” produced a generative, qualitatively novel approach to defining emotion that brought research above the fray of argumentation over any one criterion's validity (Barrett, 2009; Barrett, Mesquita, Ochsner, & Gross, 2007; Gross & Barrett, 2011; Russell & Barrett, 1999).

Social cognitive research is approaching a similar moment, when convergence across criteria can be used as its own metacriterion to validate the role of predictors (such as cognitive processes) in producing interpersonal accuracy. At least some predictors do produce such cross-criterion consistency. For example, experience sharing and mental state attribution predict accuracy across a number of criteria. These relationships are relatively robust to differences in how processes are measured—through developmental trajectories (Eisenberg, 1989), self-report (Hall & Colvin, this issue) physiological arousal (Levenson & Ruef, 1992), motor mimicry (Dimberg, Thunberg, & Elmehed, 2000; Stel & van Knippenberg, 2008), neural activity (Zaki et al., 2009; Stephens et al., 2010), and its absence in neuropsychiatric patients (Fernandez-Duque, Hodges, Baird, & Black, 2010; Goodkind et al., 2011)—and differences in how accuracy is measured—through memory for target behavior (Hastie & Kumar, 1979; Mitchell, Macrae, & Banaji, 2004; Stephens et al., 2010), agreement across perceivers (Kenny et al., 2007), agreement with targets themselves (Ickes, 1997), and response latency (Stel &

van Knippenberg, 2008). Perhaps more important, the *moderators* that determine when these processes will produce accuracy (e.g., target expressivity, perceiver motivation) hold relatively constant across domains of study and criteria. For example, although knowing what someone is feeling and what that person is like in general may seem quite different, Funder (this issue) points out (and we agree) that there is impressive consistency between the factors that determine whether individuals' traits and states will be successfully transmitted by targets and received by perceivers.

Divergence Between Criteria

Disagreement is often as generative as agreement, and we think the “noise” created by the use of multiple criteria of accuracy is no exception. In many cases, apparent confounds between accuracy, on one hand, and the criteria used to define it, on the other, might turn out to not be confounds at all but rather clues about systematic moderators of accuracy. Consider the examples described by Epley and Eyal (this issue) in which perceivers are relatively inaccurate. These inaccuracy-producing situations cluster around two types of social tasks: (a) drawing inferences about opponents in a debate or negotiation, and (b) understanding how one will be perceived by others. Epley and Eyal claim that such situations provide accuracy criteria that are as valid (or more valid) as (or than) those produced by tasks in which perceivers are relatively accurate (e.g., rating pictures of faces or videotaped interactions). Thus, on the face of it, Epley and Eyal's examples suggest that optimism about perceivers' accuracy is driven by the use of unrealistic criteria, and altering these criteria overturns this rosy viewpoint.

Does this mean that accuracy is impossible to measure consistently or that perceivers are prone to failure when measured in the most realistic way? We don't think so, and instead find the divergent levels of accuracy produced by these measures deeply informative. Ickes (this issue) and Epley and colleagues (Epley, Keysar, Van Boven, & Gilovich, 2004; Gilovich, Medvec, & Savitsky, 2000) have documented two particularly strong forces that can influence accuracy. First, people are accurate when motivated to be so—for example, when targets are attractive (Ickes, Stinson, Bissonnette, & Garcia, 1990), or when perceivers have been rejected (Pickett, Gardner, & Knowles, 2004) or feel a lack of power (Kraus, Cote, & Keltner, 2010)—and inaccurate when motivated to be so—for example, when accuracy is self-threatening (Simpson, Ickes, & Blackstone, 1995; Simpson, Orina, & Ickes, 2003) or when inaccuracy can bolster one's self-image (Kruger, 1999; Taylor & Brown, 1988). Second, perceivers have an especially difficult time overcoming the curse of their own knowledge in understanding what targets do

not know (Gilovich et al., 2000; Gilovich, Savitsky, & Medvec, 1998), even when such knowledge objectively harms perceivers' accuracy (Epley et al., 2004) and their ability to optimally interact with targets (Camerer, Loewenstein, & Weber, 1989).

These two forces reframe the difference between methods used by process and accuracy researchers and make it unsurprising that these two groups reached different conclusions about perceivers' skills. Specifically, the examples of (in)accurate social perception highlighted by Epley and Eyal (this issue) are those in which people are (a) unmotivated to be accurate and (b) most cursed with their own knowledge when trying to be accurate. Anyone who has watched cable news in the last few years likely understands that people with strong opinions often have little interest in taking the perspective of those on the other side. This disinterest may be well guided, because perspective taking in contentious situations can sometimes produce dissonance and even worsen the outcome of intergroup interactions (Cikara, Bruneau, & Saxe, 2011; Vorauer, Martens, & Sasaki, 2009; Vorauer & Sasaki, 2009). Similarly, people are least likely to be accurate when accuracy requires them to overcome intimate self-knowledge (i.e., rate how they will be perceived by targets), especially when such ratings are further tangled with motivational forces (e.g., rating how attractive one will be rated by others compounds self-knowledge and motivated reasoning).

Eyal and Epley (2010, this issue) leverage these well-known biases to produce an intervention for improving accuracy (see 'manipulating process use can alter accuracy' below), and we commend this step in merging information about processes and accuracy. However, it is worth noting that they begin with situations in which accuracy is most likely to be poor (i.e., classes of judgment that are most loaded with motivational biases and the curse of knowledge) and in greatest need of improvement. Accuracy researchers in many other domains have, instead, sought to describe the performance of perceivers in more "neutral" settings where, in fact, accuracy can be a good bit better. For example, there is no clear reason that rating the emotions of a stranger or the traits of someone described in a vignette would systematically draw out inaccuracy related to the curse of knowledge or self-serving biases.

Which criterion, then, should we trust more: the one that pinpoints our biases and inaccuracies, or the one that does not? Our point here is that neither is more "naturalistic" or important than the other. Instead, these criteria differ in some of the very psychological ingredients that produce (in)accuracy in the first place, and this difference—in and of itself—uncovers some deeper information about *when* perceivers are likely to be most (in)accurate. In other words, when there is a divergence in accuracy across criteria, the deeper ques-

tion might not be "which criterion is better?" but rather "what does this divergence tell us about the contexts in which perceivers are most likely to be accurate?"

What Does a "Good Perceiver" Look Like?

A perennial goal of accuracy research is to identify the dispositions that track stably with interpersonal acuity. How has this search for "good judges" fared? This depends on whom you ask. Our initial article (as well as Ickes, Kenny, and Funder's commentaries in this issue) described the good judge as elusive at best, and imaginary at worst, and claim that stable correlates of accuracy are hard to come by. Hall and Colvin (this issue) provide a valuable counterpoint to this view by presenting a wealth of data demonstrating that a number of dispositional features (e.g., intelligence, Big Five personality scores, and gender) *do* predict interpersonal accuracy.

What underlies this disparity? One possibility is that researchers' ability to identify trait-level predictors of accuracy—like the overall levels of accuracy they document—depend on the criteria they employ. For the most part, the literature Hall and Colvin describe uses standardized tests of interpersonal sensitivity, such as the Profile of Nonverbal Sensitivity (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979), Interpersonal Perception Test (Costanzo & Archer, 1989), or identification of emotions from canonically posed facial expressions (Ekman & Friesen, 1975/2003). In almost all cases, accuracy in these tests is defined as a convergence between perceivers' inferences about social cues prepared by researchers (i.e., designed to represent a given internal state) and the normative response to those cues (i.e., the state they are designed to represent). In other words, these tasks provide stable and structural "right answers" about target states, which perceivers either tap into or not.

These relatively standardized tests advance accuracy research in at least two ways: (a) by allowing for comparability across numerous studies, and (b) providing the power to detect small but consistent signatures of good perceivers. They also differ consequentially from "idiosyncratic" accuracy measures, in which the critical stimuli are not standardized or designed by researchers but rather are produced spontaneously by targets. It is this latter accuracy criterion that was most hamstrung by the methodological critiques of Cronbach and others: Idiosyncratic accuracy measures often required a "subtraction" between perceiver inferences and target self reports, and issues with this measurement produced deep problems for early accuracy researchers. Standardized accuracy tests at least partly overcome this problem by replacing such subtractions with more tractable measures of whether perceivers produce correct

(i.e., normative) judgments about experimenter-designed social cues. This may partially explain why—as Hall and Colvin note—standardized tests (largely in the domain of nonverbal sensitivity) did not suffer the slowdown that idiosyncratic accuracy measures did in the post-Cronbach age.

However, the advantages of standardizing accuracy measures comes—we think—at a real cost. This is because posed and acted expressions of emotions and social relationships necessarily diverge from “real” behavior produced by targets. This divergence may shed some light on disparities between the picture of accuracy, and accurate judges, that standardized and idiosyncratic approaches produce. For example, gender and self-reported empathy predict accuracy as defined by standardized measures (Hall, Andrzejewski, & Yopchick, 2009) but not as defined idiosyncratically (Ickes, 2003; Levenson & Ruef, 1992; Zaki, Bolger, & Ochsner, 2008).

Our explanation for this disparity tracks closely with Ickes’s (this issue): standardized measures partial out much of the variance that ends up being most important to idiosyncratic measures of accuracy and, most likely, to accuracy outside of the lab. Specifically, standardized measures rarely account for the broad disparities between how different targets translate their states and traits into perceptible cues. In many naturalistic situations, it is these differences, more than perceiver traits, that drive accuracy (Ickes et al., 2000; Snodgrass, Hecht, & Ploutz-Snyder, 1998; Zaki et al., 2008). In other words, perceiver traits may predict accuracy but only when other, potentially stronger predictors (e.g., variance in targets’ expressivity) are removed from the equation.

Does this mean that including target variance in a predictive model destroys any prospects of identifying good judges? We don’t think so; in fact, we think it will enrich our understanding of differences between perceivers by affording a more nuanced, conditionalized view of interperceiver differences. Specifically, people may differ not in *how accurate* they are, full stop, but rather in *when or for whom* they are relatively accurate or inaccurate. This interactionist approach reframes individual differences as dependent on context, and specifically the social contexts provided by the targets with whom perceivers interact (Mischel, 1973; Mischel & Shoda, 1995; Zayas, Shoda, & Ayduk, 2002). Such an approach can open numerous avenues for incorporating the situational forces that powerfully affect accuracy and examine their interaction with individual differences in perceivers’ motivational and cognitive tendencies (or cognitive and affective “units”; see Mischel & Shoda, 1995). For example, if perceivers are more accurate when in a position of low social power, then we might ask which perceivers are most sensitive to that effect. We continue to feel that such an approach can refine the study of good perceivers and produce sta-

ble predictors of accuracy that generalize across many different contexts (e.g., different social targets).

How Can Processes and Accuracy Be Integrated Best?

The central aim of our target article was to provide a framework for systematically relating social cognitive processes and measures of interpersonal accuracy to one another. Our hope was to promote thinking about the ways in which research focusing on these two domains could inform each other rather than continue in isolation. The data presented and arguments made in the commentaries suggest at least three ways in which processes and accuracy can be fruitfully related to each other, which we consider in turn.

Manipulating Process Use Can Alter Accuracy

Epley and Eyal (this issue) demonstrate one way in which process-based research can make direct predictions about when perceivers are likely to be more or less accurate. They draw on the idea that individuals tend to construe their own experiences and behaviors at a fine-grained, detailed level but think about others at a coarser, more global level. This asymmetry in construal levels lawfully produces two errors: A perceiver will often underascribe fine-grained detail to others’ experience while considering too many such details when guessing how others will view the perceiver herself. Although this bias has been characterized across many studies (Gilovich, et al., 1998), Eyal and Epley (2010) went one step further by showing how manipulated shifts in construal level can alter accuracy. In a simple paradigm, they induced perceivers to be more detailed when thinking about others and more global when thinking about themselves. By going against their baseline tendencies, this exercise heightened perceivers’ accuracy, both about others’ experiences and how others’ would view perceivers themselves. Other process-based approaches can similarly increase accuracy. For example, building on evidence that perceivers tend to overascribe their own internal states onto targets, Todd, Hanks, Galinsky, and Mussweiler (2011) demonstrated that inducing a “difference mindset” (priming people to think of disparities between themselves and others) improved accuracy in a number of domains.

Accuracy Can Tell Us About Process Use

The strategy of converting well-known processing biases into prescriptions for improving accuracy epitomizes the integrative style of research we hope to see

much more of in the future. However, like social cognitive biases themselves, these improvements may be local to particular classes of inferences. For example, differences in perceivers' construal levels when drawing inferences about themselves and others are likely most pronounced in when perceivers are drawing inferences about stable, traitlike attributes (e.g., how attractive a perceiver thinks others will find him or how conscientious he believes a target to be). When drawing other types of inferences—critically including inferences about how others are feeling—perceivers may naturally “match” construal levels with targets; indeed, the phenomenon of experience sharing suggests such matching. More important, strategies that produce accuracy in some contexts can reduce accuracy in others. For example, although assuming similarity with targets is often bad for accuracy, it can also often improve accuracy (Hoch, 1987; Neyer, Banse, & Asendorpf, 1999).

Such complexities do more than provide boundary conditions on the utility of process-based techniques for improving accuracy. They also demonstrate the utility of accuracy-based research to circle back and inform our understanding of social cognitive processing. Biases such as assumptions of self-other similarity may not exist solely because they such assumptions are cost little in information-processing terms but also because they *work* (i.e., produce accuracy) in some cases. As such, measuring accuracy can help researchers understand the nature and utility of the processes they study. West and Kenny's Truth and Bias Model (Kenny, this issue; West & Kenny, 2011) provides a method for gathering just such information. The strength of its contribution comes from quantifying the role of multiple processes in producing accuracy across different contexts. This approach could enrich the new tack being taken by Epley, Eyal, Todd, and others: In addition to trying to improve accuracy by reducing well-known processing biases, these researchers could ask *when* reducing a given bias should be expected to help accuracy, and when it might be expected to hurt it.

Comparison With Other Domains Can Shed Light on Processes and Accuracy

A third way to unite processes and accuracy is by way of analogy to other domains in which these phenomena are already more intertwined than they are in social cognition research. Bahrami and Frith (this issue; Bahrami et al., 2010) offer a compelling example of such a parallel in their model of social decision making. This model quantitatively captures the rules by which two observer's individual perceptions of the outside world aggregate into a joint, multiperson perceptual judgment.

Of course, Bahrami and Frith's approach does not tackle mind perception proper, in that it models two

perceivers' cooperative attempts to understand *physical events*, not perceivers' attempts to understand *each other's* internal state. However, their model nonetheless lays a rich groundwork for integrating social cognition and decision-making research. For example, we would expect the quality of joint decisions to be critically limited not only by the judgments and confidence of each interlocutor but also by each person's ability to accurately understand their interaction partner's confidence. As Bahrami and Frith point out, this ability will be shaped importantly by the motives of each individual. To follow Bahrami and Frith's athletics example (but in a context more familiar to us), two individuals watching a basketball go out of bounds at an NBA game not only perceive a sensory event but also imbue the simple physics of that event with deep affective significance. A Boston Celtics fan's motivation for her team to keep the ball can not only influence her willingness to say that it was last touched by the opposing team from Los Angeles but can also shift her private perception of what occurred (Balcetis & Dunning, 2006, 2010) and her confidence in that percept. This same fan may be highly motivated to accurately understand and integrate another Celtics fan's perception into her final judgment of the event but much less motivated to understand what a Lakers fan witnessed. As anyone familiar with a contentious sports rivalry knows, such motivations can produce extremely noisy perceptions of physical events across fans of different teams. Thus, models of multiperson decision making should incorporate roles for affect and motivation in shaping the interpersonal judgment steps Bahrami and Frith describe so nicely.

That said, a broader point that we see in Bahrami and Frith's commentary is that considering the cognitive “building blocks” underlying mind perception can provide important clues about the structure of social cognitive processes and their relation to accuracy. Oftentimes, this requires incorporating models and paradigms inspired by research outside of mind perception (and social psychology altogether). In our target article, we mentioned executive function as one such building block that supports accurate perception of complex social cues (Davis & Kraus, 1997). Another domain we feel can connect well with research on mind perception is the study of reward processing and feedback learning. People find being accurate rewarding (Tricomi, Delgado, McCandliss, McClelland, & Fiez, 2006; Tricomi & Fiez, 2008), and we expect that being accurate about other people also would be perceived as rewarding. If—like other rewards—accuracy feedback motivates changes in behavior, this could provide a mechanism for understanding the origins of (and a possible means for changing) perceivers' cognitive biases when encountering targets. For example, if the strategic bias to assume self-other similarity has been reinforced over time (by affording an accurate

inference about a target), then perceivers' continued use of that strategy becomes easier to understand.

Can Processes and Accuracy Be Integrated at All?

Our article was meant as a call for researchers to spend a lot of time attempting to explicitly integrate process and accuracy measures in single research programs and to taxonomize the relationships between these phenomena. But the very act of making that request begs the question of whether such an integration is even possible. If the answer to that question is no, then this endeavor is in trouble from the get-go. Hall and Colvin (this issue) caution that such trouble may be on the horizon. They argue that process- and accuracy-oriented researchers begin with different metatheoretical points of view (in Kuhn's, 1962, terms: "mutually incommensurable paradigms") that could hamper our ability to fruitfully compare notes or combine forces.

We find this argument interesting but believe that these theoretical differences are more historical than intrinsic, and offer—by way of counterpoint—an existence proof that integration across process- and accuracy-oriented research is both possible and currently thriving. A number of the commentaries in this issue not only argue for cross-talk between these domains but also, more important, exemplify the fact that such integration is already occurring and can continue to expand. In counting the ways that such progress is being made across just this small sample of researchers, we feel more confident than ever that the future of this endeavor is bright.

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Note

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