llion-year-old dinosaur evolved in 160 years.

th the gorillas in our midst: Familiarity with
improve the detection of unexpected events.

as in our midst: Sustained inattentional blind-
.059–1074.

vailability and their relation to the reorganiza-
hological Review, 74, 505–522.

aron: Ice worlds on the ragged edge of the solar

ion and the Cambridge-Vienna controversy. In
bservation, experiment, and hypothesis in modern
ge, MA: MIT Press.

ntific theories (2nd ed.). Urbana: University of

Princeton, NJ: Princeton University Press.
Cognitive psychology and discourse: Recall-
Dressler (Ed.), Current trends in textlinguistics

nses. Journal for the History of Astronomy, 5,

onstructive remembering of the scientific litera-

ntal models of the earth: A study of conceptual
ogy, 24, 535–585.
Mental models of the day/night cycle. Cognitive

velopmental shifts in children's categorizations
alou, & M. Bucciarelli (Eds.), Proceedings of the
e Science Society (pp. 2325–2330). Mahwah, NJ:

ory. New York: Pantheon Books.
New York: Dover.
dge factor. Science, 179, 751–758.
70, 530–531.
Chichester, UK: Ellis Horwood.
gnificance of attitude in recognition. British Jour-

14 The Practice of Psychological Science in Social-Personality Research

Are We Still a Science of Two Disciplines?

Jessica L. Tracy, Richard W. Robins, and Jeffrey W. Sherman

I shall discuss the past and future place within psychology of two historic streams of method, thought, and affiliation which run through the last century of our science. One stream is *experimental psychology*; the other, *correlational psychology*. Dashiell optimistically forecast a confluence of these two streams, but that confluence is still in the making. Psychology continues to this day to be limited by the dedication of its investigators to one or the other method of inquiry rather than to scientific psychology as a whole.
(Cronbach, 1957, p. 671)

In his 1957 American Psychological Association presidential address, the eminent educational psychologist Lee Cronbach made a distinction between "two streams" of scientific psychology, *experimental* and *correlational.* Cronbach's use of his presidential address to target this issue reflects the importance with which it was imbued at the time. Many researchers, across the various domains of psychological science, were grappling with questions about the relative merits of these two streams or "disciplines," and about whether they should become more integrated.

Fifty years later, Cronbach's distinction still appears to represent the state of the field today. In his address accepting the 2007 APA Award for Distinguished Scientific Applications of Psychology, Peter Bentler (2007) commented that "Cronbach's hope has not progressed much." Indeed, the split between Cronbach's streams transcends

methodological preferences and is considerably broader than a simple division between researchers who conduct experiments by manipulating variables, and those who measure variables and search for correlations. Rather, the two streams characterize almost every aspect of the research endeavor. According to Cronbach, the two approaches differ in their "philosophical underpinnings, methods of inquiry, topical interests, and loci of application" (p. 671). To clarify, Cronbach was likely referring to the research designs, measures, and statistical analyses a researcher uses (these may be what Cronbach meant by "methods of inquiry"); the processes and causal factors he or she views as responsible for effects sought and found; the content areas studied (i.e., Cronbach's "topical interests"); the general philosophical or theoretical framework underlying a researcher's goals (i.e., Cronbach's "philosophical underpinnings"), and the ways in which he or she evaluates findings—for example, whether internal or external validity is emphasized (see Table 14.1).

Most researchers today would likely agree that the concepts, methods, and approaches of both the *experimental* and the *correlational* stream of thought are important and, in fact, essential to a complete program of research; both have contributed enormously to the current state of knowledge in psychological science.[1] Yet the distinction between these two streams permeates all domains of psychological science, albeit to different degrees. To give a few prominent examples, within clinical psychology, *experimental* stream researchers tend to conduct experimental or quasi-experimental studies on humans and animals, exploring basic processes (e.g., emotion, motivation, neurobiology) by manipulating the presumed causal influences on the etiology and maintenance of clinical disorders. In contrast, *correlational* stream clinical researchers are more likely to conduct longitudinal and epidemiological studies aimed at identifying predictors of psychiatric disorders and their consequences. Researchers in clinical psychology have also debated the utility of studying psychopathologies such as depression by seeking predictors in actual patient populations (a *correlational* stream approach), versus using "analogue" studies in which experiments are conducted on individuals (typically college students) who score high but in the normal range on measures of depressive affect (an *experimental* stream approach). Some argue that research on nonclinical samples cannot be used to make inferences about the causes and consequences of mental illness (Kazdin, 1978; Vredenburg, Flett, & Krames, 1993; Westen, Novotny, & Thompson-Brenner, 2004), whereas others maintain that the internal validity of controlled experiments, even those relying on college student samples, provides important insights into the processes underlying mental illness that offset any potential limitations in external validity (Crits-Christoph, Wilson, & Hollon, 2005).

The split between Cronbach's streams is also evident in health psychology, where there is a distinction between researchers who examine the way chronic

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[1] We have adopted Cronbach's (1957) labels of "experimental" and "correlational" to identify the two streams, and to refer to the full range of methods, statistics, research designs, and philosophical approaches that define each of the streams. Table 1 provides a complete portrait of each stream, based on Cronbach's original definition. It is important to note that although we use Cronbach's labels, we, like him, do not intend to imply that either stream can be characterized solely, or even primarily, as research guided by the correlational approach or research guided by the experimental approach.

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Table 14.1 Overview of the two streams of psychology, based on Cronbach (1957)

	Correlational stream	Experimental stream
Research design/approach	• Correlational • Longitudinal • Psychobiographic/case study • Twin/adoption study	• Dyadic/group interaction • Experimental • Quasi-experimental
Statistical/data analytic procedures	• Correlation • Convergent/discriminant function analyses • Cluster analyses • Factor/principal component analyses • Growth curve modeling • Item-response theory (IRT) • Multidimensional scaling • Multiple regression • Partial correlation • Reliability analysis • Structural equation modeling (SEM) • Time series analysis	• Analyses of variance (ANOVA) • *t*-test

Table 14.1 (Continued)

	Correlational stream	Experimental stream
Assessment methods/measures	• Autonomic nervous system assessment • Experience sampling • Hormone levels • Informant report • Molecular genetics • Narrative/open-ended questionnaires • Self-report scales • Structured interviews	• Behavioral observation • Behavioral response • Implicit measures • Judgments of groups/nations/cultures • Memory tasks • Reaction time measures
Type of validity emphasized	• External (generalizability and mundane realism)	• Internal
Theoretical approach to research	• Effects that are consistent with common sense are most informative • Emphasis on consistency of behaviors, thoughts, and feelings	• Counter-intuitive effects are most informative • Emphasis on influence of situations on behaviors, thoughts, and feelings

• Self-report scales		• Internal
• Structured interviews		
Type of validity emphasized	• External (generalizability and mundane realism)	• Counter-intuitive effects are most informative
Theoretical approach to research	• Effects that are consistent with common sense are most informative	• Emphasis on influence of situations on behaviors, thoughts, and feelings
	• Emphasis on consistency of behaviors, thoughts, and feelings	

dispositional variables influence long-term health outcomes in real-world contexts (e.g., Miller, Chen, & Cole, 2009), and those who assess online physiological or neural responses to experimental manipulations (e.g., Dickerson & Kemeny, 2004). In the field of biopsychology, researchers reflecting the *correlational stream* approach typically use observational methods to study nonhuman animal behaviors over time, often in naturalistic contexts (e.g., Weinstein, Capitanio, & Gosling, 2008); whereas researchers reflecting the *experimental stream* conduct experiments on non-human animals, manipulating genetic (e.g., through gene knockout studies), physiological (e.g., through brain lesions and psychopharmacological interventions), and social factors (e.g., exposure to dominant vs. submissive conspecifics, social isolation), and observing the behavioral and physiological consequences (e.g., Francis, Champagne, Liu, & Meaney, 1999; Winstanley, 2007). Within the field of developmental psychology, two main subareas—cognitive development and socioemotional development—map fairly closely onto the two streams, with cognitive developmentalists generally favoring experimental studies of basic processes and social developmentalists generally favoring correlational (e.g., longitudinal) studies of phenomena that can only be observed and measured outside the lab, such as parenting, antisocial behavior, and peer relations.

A split between the two streams is also apparent, although perhaps less obviously so, in cognitive psychology. Although the field is generally dominated by researchers working within the experimental stream, several researchers have argued for a "cognitive ethology" that openly addresses the distinction between mental processes that are operationalized as responses to laboratory manipulations, and mental processes that occur in everyday life (Kingstone, Smilek, & Eastwood, 2008). Along with earlier cognitive researchers such as Broadbent (1991), Neisser (1976, 1991), and Bruner (1990), cognitive ethologists assert that researchers should conduct complementary studies on ecologically valid behaviors, everyday life, or "acts of meaning." At the same time, others note that laboratory studies produce essential knowledge about mental processes such as attention and memory, regardless of their external generalizability (Mook, 1983).

In some disciplines the two streams coexist without competing, and researchers who identify with one stream faithfully support and respect researchers who represent the other. In other disciplines, researchers from the two streams may clash over scarce resources, such as academic positions, grant funding, power within a department, and top graduate students who, in turn, often feel that they must choose which stream to align with (Swann & Seyle, 2005). In general, the presence of a split between the two streams is a fact taken almost for granted across most areas of psychological science practiced today. Yet an important question underlies this apparent fact: To what extent is the split *real*? Is the distinction between the two streams an accurate representation of ongoing research in today's psychological scientific climate, or is it a stereotyped, mythologized distinction that allows for quick and easy conceptualizations of different kinds of research, but does not characterize actual researchers in terms of the work they do? To what extent do psychological scientists truly embody one stream versus the other? And to what extent are they in fact more likely to represent a middle-ground, hybrid perspective, making use of whatever

methods, approaches, and theoretical principles best apply to their research, regardless of any "official" stream associations? In other words, have the streams finally merged, as Broadbent, Cronbach, and Neisser hoped, or do researchers still tend to conduct research within one stream or the other?

To address these questions, we conducted a study examining the research practices of a group of prominent psychological scientists: editors and editorial board members of seven leading social-personality psychology journals (Tracy, Robins, & Sherman, 2009a). We chose social-personality researchers as a test case for examining whether psychological science remains a discipline of two streams for several reasons. First, a recent study of the interconnections among various subfields of psychology (i.e., examining the extent to which the flagship journals of each subfield cite articles from flagship journals of other subfields) found that social-personality psychology was the most central "broker" subfield, or "mediating hub of knowledge," across the past three decades (Yang & Chiu, 2009). In other words, social-personality is both the largest provider and the largest consumer of research within psychology as a whole. Given this finding, of the widespread dissemination of social-personality research to other subfields, it is important that social-personality methods and research approaches be widely accessible and comprehensible. Furthermore, researchers across disciplines may have a vested interest in understanding the basic structure of social-personality research practices (e.g., whether they can be characterized as having two streams).

Second, social-personality is characterized by the use of a particularly wide range of methods, and the research it produces seems to well represent both the *correlational* and *experimental* streams. As a broad generalization, personality psychologists are often assumed to work within the *correlational stream* (defined broadly as described above and in Table 14.1), whereas social psychologists are often assumed to work within the *experimental stream* (again defined broadly as in Table 14.1). There are, of course, many exceptions, and many researchers are likely to best be considered hybrids, more aptly characterized as "social-personality psychologists" than "social" or "personality" psychologists, and correspondingly conducting research that reflects both approaches. However, the split between the streams in social-personality research seems obvious; in fact, to some extent, social-personality psychology can be viewed as encompassing two separate areas of psychology, rather than as a single area with two general subemphases. Furthermore, each of the two "subareas" has major connections with other prominent areas of psychology (e.g., personality with clinical, social with cognitive), and for some researchers these connections may be more relevant or self-identifying than their connections with the other subarea within social-personality.

Thus, in our study of the structure of contemporary psychology research practices, we asked prominent social-personality researchers to complete an extensive survey about the methods, statistics, and research designs they use, as well as the content areas they seek to understand. By classifying these individuals as personality or social psychologists (which we did based on the journals they were affiliated with, as well as their own self-reported affiliations), we were then able to quantify the differences between the research practices of the two areas, and test whether these

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differences fit with Cronbach's distinction. We were also interested in researchers' own explicit beliefs about these differences, and whether these beliefs were accurate. Thus, we also asked these individuals to report on the research practices they believed to be typical of personality and social psychologists. In sum, this survey allowed us to directly address three important questions: (1) How do personality and social psychologists differ in research methods, designs, analyses, and general approaches to research? (2) Do the differences between personality and social psychologists converge with these researchers' own explicit beliefs about the two groups? and (3) To what extent do the various methods and statistical procedures used by these researchers reflect the two streams identified by Cronbach (i.e., do the two columns of Table 14.1 "hang together" empirically to form two distinct factors)?

A META-SOCIAL-PERSONALITY STUDY

In 2006, we attempted to recruit all individuals who were serving as editors and editorial board members of the following leading journals in social-personality psychology: *European Journal of Personality (EJP)*, *European Journal of Social Psychology (EJSP)*, *Journal of Experimental Social Psychology (JESP)*, *Journal of Personality (JP)*, *Journal of Personality and Social Psychology (JPSP)*, *Personality and Social Psychology Bulletin (PSPB)*, and *Personality and Social Psychology Review (PSPR)*. We chose to recruit editors and editorial board members of these journals for several reasons. First, they are very likely to conduct personality and social research and to perceive themselves as personality or social psychologists (or both). Second, these individuals are typically among the most productive researchers working in the field, so they are collectively responsible for a large body of social-personality research. Third, members of editorial boards cover a broad range of career stages, providing a sample that includes individuals who are at the early, middle, and late stages of their scientific careers. Fourth, members of editorial boards decide what is (and is not) accepted for publication in social-personality journals, and thus are the "gate-keepers" of social-personality psychology. These individuals are highly knowledge-able about what constitutes social-personality research; in fact, one could argue that they set the standards for the field. Fifth, including editors from these particular journals allowed us to equate the sample across personality and social psychology, and ensure that both groups were fairly equally represented.

Of the 407 individuals contacted, 39% ($N = 159$; 29% female; median age $= 45$ years, range $= 30–70$) agreed to participate, which involved completing a detailed survey asking about their research practices.[2] Seventy-four percent of these individuals were classified as either personality or social psychologists, based on the journals with which they were affiliated. The remaining participants ($n = 42$) could not

[2] This response rate is comparable to rates typically found in survey research relying on mail (20%) and telephone responding (60%; Visser, Krosnick, & Lavrakas, 2000). Given that Internet responses are more convenient than mail-in responses but that it is easier to refuse to participate over e-mail than phone, it is not surprising that the response rate found here falls in between these typical rates. It is also noteworthy that surveys with lower response rates may be more predictive of outcomes than surveys with greater response rates (Visser, Krosnick, Marquette, & Curtin, 1996).

be classified on this basis because they either served on both social and personality journals, or only on a journal that is explicitly a mixture of social and personality research. Twenty-two of these unclassified participants were subsequently classified based on the extent to which they reported studying "issues and topics related to personality psychology" and "issues and topics related to social psychology"; those with scores greater than the midpoint of the scale (4) on the "social psychology" variable and less than the midpoint (4) on the "personality psychology" variable were classified as social psychologists, and those with the reverse pattern were classified as personality psychologists. We decided not to apply further criteria to classify the remaining 20 respondents (13% of the sample), in order to maintain the distinctiveness of the two categories. Overall, 46% of the sample ($n = 74$) was classified as social psychologists and 41% ($n = 65$) was classified as personality psychologists.

A full description of the sample, all items included in the survey, and all results, are reported in Tracy et al. (2009a; see also Tracy, Robins, & Sherman, 2009b). Here, we briefly describe several key results from the study, which address our three core research questions.

What Is the Difference between Personality and Social Researchers? What Do These Researchers Think Is the Difference?

Research designs and approaches. Figure 14.1, Panel A, displays mean frequencies of each of the 12 research designs included in the survey, separately for respondents classified as personality versus social psychologists. As can be seen, the two groups differ in the majority of approaches asked about, but these differences are not absolute. For example, social researchers more frequently use experimental designs and personality researchers more frequently use correlational designs, but both groups use both designs fairly frequently. Furthermore, there are certain designs, such as correlational, that all researchers use at least occasionally. In addition, the mean frequency of use for several designs—cross-cultural, cross-species, field study, quasi-experimental, and psychobiographical—did not differ between the groups.

As can be seen from Figure 14.1, Panel B, personality and social researchers' explicit beliefs about the research designs used by each group were quite accurate. Participants' accurately predicted that personality researchers use more correlational, cross-sectional, longitudinal, patient study, and twin/adoption study designs; whereas social researchers use more dyadic/group and experimental designs. However, not all beliefs were on target. Participants mistakenly expected that personality psychologists would use more cross-cultural, cross-species, and psychobiographical designs, but this was not the case. For cross-species and psychobiographical approaches, the inaccuracy may be due to very low frequency of these designs, by both groups—at least among those researchers who serve on major social-personality editorial boards. For cross-cultural designs, the absence of a predicted difference suggests that cultural psychology spans across personality and social psychology. Interestingly, the split
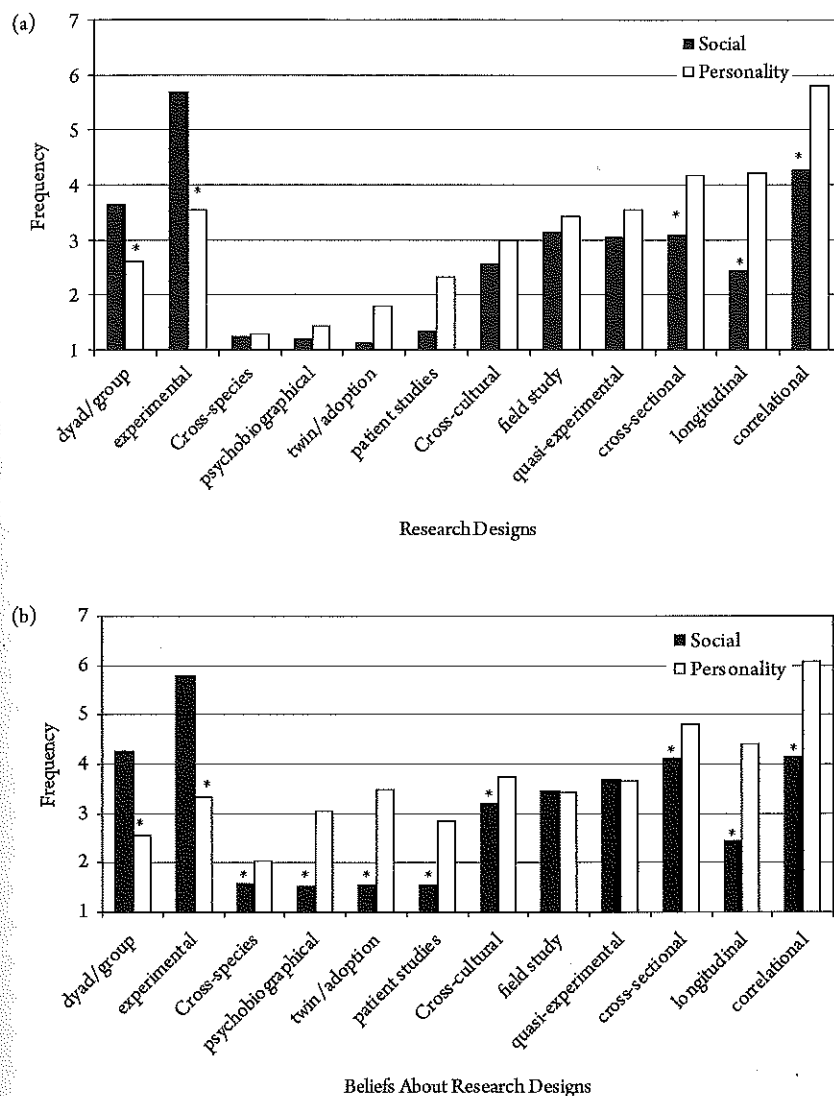
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Figure 14.1   Research designs used by personality and social psychologists (Panel A) and beliefs about research designs used by personality and social psychologists (Panel B).
Note. N = 139. *p < .05.

between the two streams seems to exist within this more narrow subfield as well: *correlational*-stream, personality-oriented cultural psychologists—referred to as "cross-cultural psychologists"—tend to focus on cross-cultural consistency (i.e., human universals), whereas *experimental*-stream, social-oriented cultural psychologists—referred to as "cultural psychologists"—tend to focus on cultural differences (i.e., viewing culture as a situational variable—or meaning system—that determines behavior; Heine, 2001).

Statistical procedures and data analytic strategies. As Figure 14.2, Panel A, shows, personality and social psychologists differ in the frequency with which they use most statistical procedures. Although social researchers use Analysis of Variance
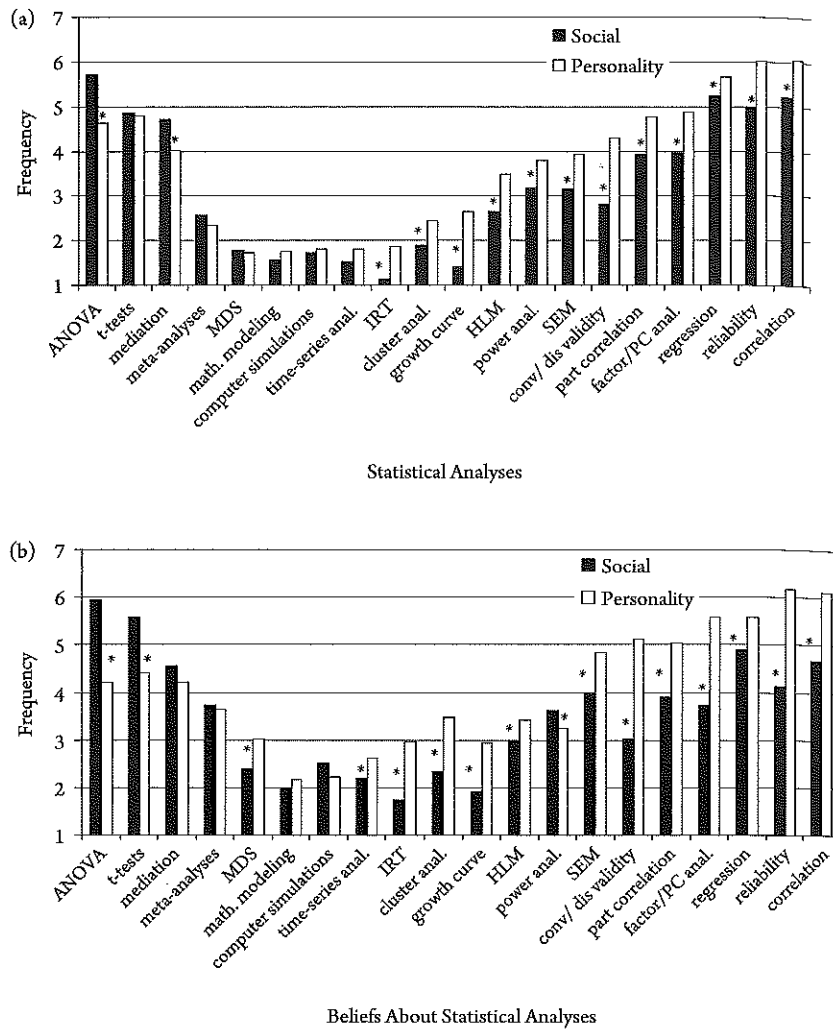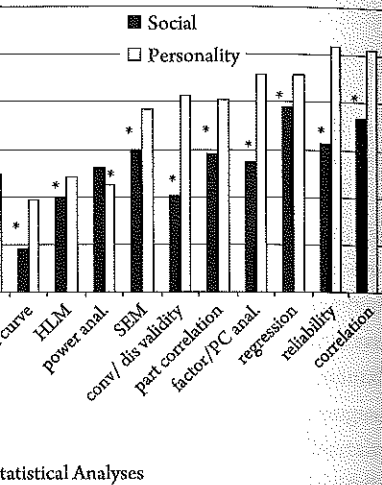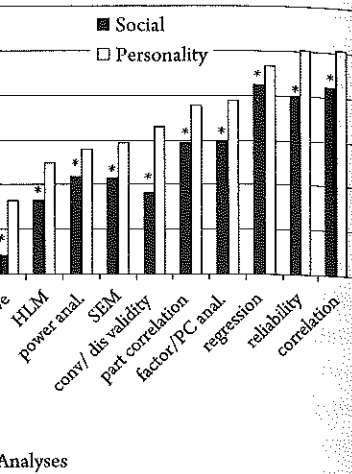
Figure 14.2 Statistical procedures used by personality and social psychologists (Panel A) and beliefs about statistical procedures used by personality and social psychologists (Panel B). *Note. N* = 139. ANOVA = Analyses of Variance, MDS = Multidimensional Scaling, IRT = Item Response Testing, HLM = Hierarchical Linear Modeling, SEM = Structural Equation Modeling, Conv/Dis Validity = Convergent/Discriminant Validity, Factor/PC Anal. = Factor/Principle Components Analysis. *p < .05.

(ANOVA) and tests of mediation more frequently, personality researchers use almost every other procedure included in the survey more frequently, suggesting that personality researchers use a wider range of statistical techniques to analyze their data. This may go hand in hand with their greater reliance on correlational, rather than experimental, approaches to research design; nonexperimental studies tend to require more sophisticated quantitative techniques to infer causal relations. However, in most cases these differences were again relative; both groups very frequently use the same statistical procedures, including *t*-tests, multiple regression, ANOVA, tests of mediation, correlations, factor or principal components analyses,

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partial correlations, and reliability analyses. In fact, over 90% of respondents in both groups reported using each of these procedures at least some of the time.

As with research designs, explicit beliefs about statistical procedures largely converged with the statistics actually used (see Figure 14.2, Panel B); personality researchers were accurately expected to use more correlations, tests of convergent/ discriminant validity, cluster analyses, discriminant function analyses, factor/principal components analyses, growth curve modeling, hierarchical linear modeling, item-response theory, multiple regression, partial correlations, reliability analyses, and structural equation modeling; whereas social researchers were correctly expected to use more ANOVA. However, participants incorrectly believed that personality researchers would more frequently use time series analyses and multidimensional scaling; in fact, these two very infrequently used procedures are used equally infrequently by both groups.

Assessment methods/measures. As Figure 14.3, Panel A, shows, personality and social psychologists differ in the frequency with which they use most assessment methods. Once again though, most of these differences were relative, and there are certain methods that both groups use very frequently and do not differ in; for example, self-report and judgments of self/other. These two methods are, by far, the most frequently used forms of assessment; over 98% of individuals in both groups reported using each of these methods at least some of the time.

Once again, explicit beliefs about assessment methods were generally on target (see Figure 14.3, Panel B). Personality researchers were correctly expected to use more emotion sampling methods, hormone level assessment, informant reports, molecular genetics, and structured interviews; whereas social researchers were correctly expected to use more behavioral response assessment, implicit measures, memory tasks, judgments of groups/nations/cultures, reaction times, and other judgment tasks. However, there were several inaccuracies; personality researchers were expected to more frequently use narrative/open-ended and self-report assessments; these methods—particularly self-report—are in fact commonly used by both groups. This discrepancy between belief and actual practice has a noteworthy implication: Personality researchers may be more frequently critiqued for an overreliance on self-report, but this critique may be based more on a perception of overreliance than actual overreliance. Or, to the extent that the critique is applicable, it is equally applicable to both groups.

Types of validity emphasized. We also asked participants to rate the importance they placed on each of the following forms of validity: construct, internal, external defined in terms of generalizability (i.e., do findings generalize to other studies?), and external defined in terms of mundane realism (i.e., do findings generalize to processes/behaviors that occur outside the lab?). As can be seen from Figure 14.4, Panel A, although both groups equally value construct validity, social researchers place greater importance on internal validity than do personality researchers, whereas personality researchers place greater importance on both kinds of external validity than do social researchers.

Consistent with these differences, participants' beliefs reflected social researchers' greater emphasis on internal validity and personality researchers' greater emphasis
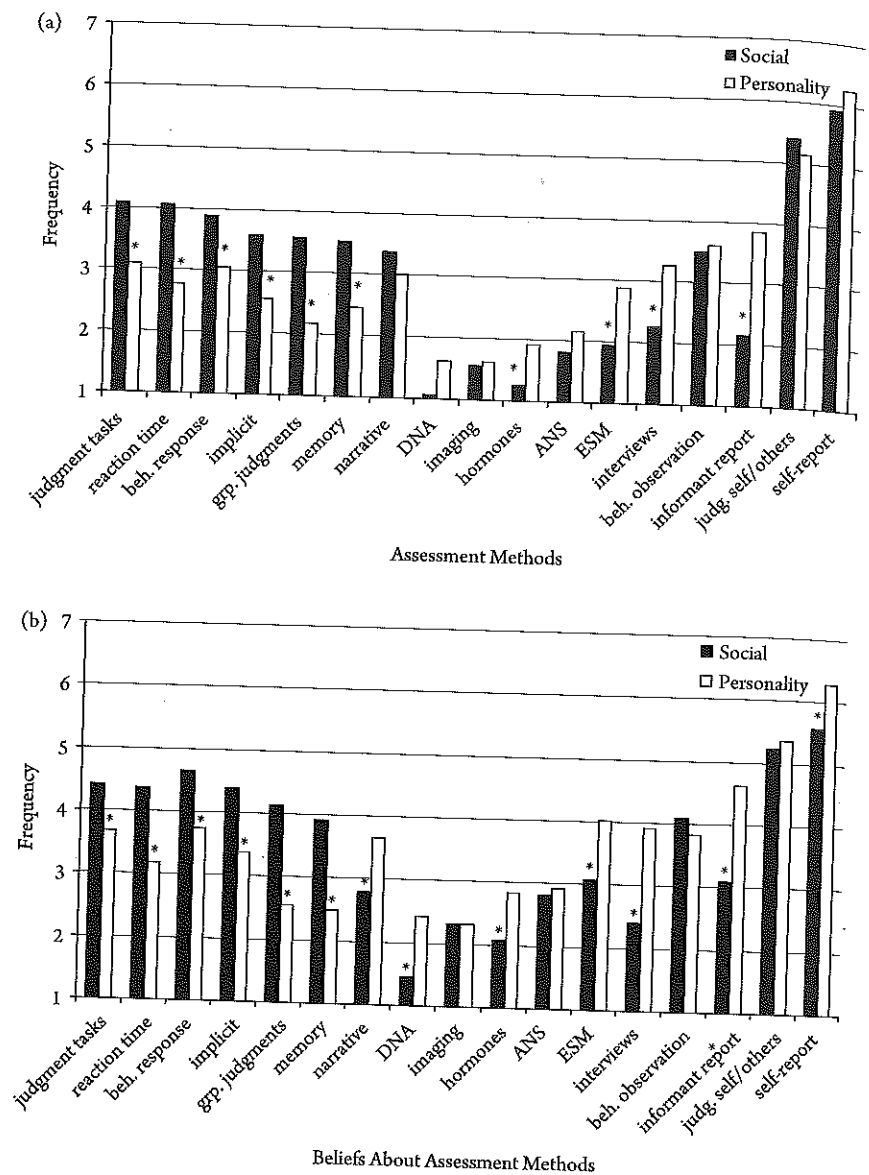
Figure 14.3 Assessment methods used by personality and social researchers (Panel A) and beliefs about assessment methods used by personality and social researchers (Panel B).
Note. N = 139. ANS = Autonomic Nervous System/physiological response methods, ESM = Experience Sampling Methods. $*p < .05$.

on external validity. However, participants expected a difference for construct validity, which did not emerge. This inaccuracy may be due to an implicit association between personality research and measurement, and a tendency to conceptualize construct validity as largely about the valid measurement of constructs. This belief was belied, however, by the high level of importance all researchers place on ensuring that their constructs of interest—be they manipulated or measured—are
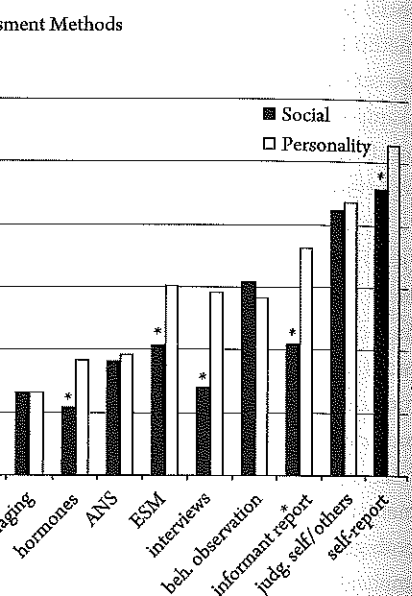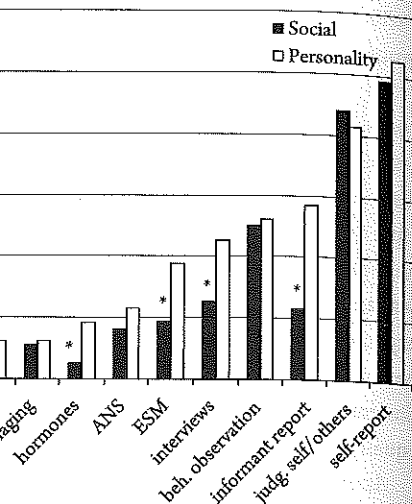
Figure 14.4 Forms of validity emphasized by personality and social psychologists (Panel A) and beliefs about forms of validity emphasized by personality and social psychologists (Panel B). *Note.* $N = 139.$ $^*p < .05.$

operationalized in a valid manner. In addition, although participants correctly predicted that social researchers would place greater emphasis on internal validity than would personality researchers, they did not recognize that, in fact, both groups value internal validity very highly, and even personality researchers rate it no less important than external validity.

Philosophical and theoretical approaches. Some of the sharpest differences between personality and social researchers emerged in the context of broad philosophical approaches to science and research—though it is noteworthy that the items we included to assess these issues were developed specifically to distinguish between the two groups, and between the *experimental* and *correlational* streams. First, we found that 64% of social researchers reported seeking counterintuitive effects rather than effects that are consistent with common sense, whereas only 35% of personality

researchers reported seeking counterintuitive effects over commonsensical ones, $p < .05$. This difference is consistent with a 2004 debate in *Brain and Behavioral Sciences* about the merits of seeking counterintuitive effects, which largely featured personality and social researchers on opposite sides of the spectrum (see Krueger & Funder, 2004). Given the prominence of this debate, it is not surprising that researchers' explicit beliefs about personality and social researchers precisely mirrored this finding; 60% of respondents expected social researchers to seek more counterintuitive than commonsensical effects, whereas only 10% expected personality researchers to show this preference, $p < .05$.

This distinction may reflect these researchers' differing emphases on describing a phenomenon and understanding its genetic/developmental/interpersonal history, versus seeking to understand the cognitive mechanisms that underlie the phenomenon. For example, in the self-judgment literature—an area of research populated by both personality and social psychologists—personality researchers typically seek to show that self-reports are relatively accurate, converge with reports made by others, and predict important outcomes; whereas social researchers tend to document errors and biases in self-judgments that inform on the ways in which the self-evaluative system functions (Dunning, 2005; Funder, 1987). Thus, social psychologists seek counterintuitive effects because they believe that these effects reveal something about the workings of the system, whereas personality psychologists seek commonsensical effects because these effects describe more general patterns of behavior (Darley & Todorov, 2004; Epley, van Boven, & Caruso, 2004; Krueger & Funder, 2004).

Second, two of the strongest differences that emerged between the groups reflected orientations toward the long-standing person-situation debate, suggesting that this issue continues to play a role in determining whether an individual is a personality or social researcher (in fact, a recent special issue of the *Journal of Research in Personality* featured articles from prominent researchers on both sides of the debate, discussing current perspectives on this topic; see Donnellan, Lucas, & Fleeson, 2009). Specifically, personality researchers were more likely to characterize their overarching theoretical approach with the statement, "Individuals' behaviors, thoughts, and feelings tend to be consistent across situations and over time" ($Ms = 5.09$ vs. 3.48, $d = 1.15$, $p < .05$); whereas social researchers were more likely to characterize their theoretical approach with the statement, "Situations drive most behaviors, thoughts, and feelings" ($Ms = 5.30$ vs. 3.65, $d = 1.25$, $p < .05$). Despite these large-size differences between groups, it is important to note that 5.1 and 5.3 are not at the highest end of the scale, and 3.5 and 3.6 are closer to the midpoint than low end of the scale. Thus, given that these were some of the largest differences that emerged between the two groups, the most accurate characterization of these findings is that most researchers believe in the importance of both dispositional and situational influences on behavior, but there is a relative difference between the two groups. In terms of explicit beliefs, researchers were accurate, but they expected a considerably larger difference than the one that emerged; $ds = 2.77$, 2.62; $ps < .05$. Thus, although the person-situation debate no longer entirely drives the distinction between personality and social

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Does the Structure of Social–Personality Research Conform to Cronbach's Two Streams?

Despite the differences we found between personality and social research practices, it seems that there are a set of research practices, within each domain, that are frequently used by both groups, as well as other practices that are used infrequently by both. Thus, despite between-group differences that appear to be consistent with the distinction between Cronbach's *correlation* and *experimental* streams, it remains possible that the underlying structure of social-personality research is *not* best characterized by the two-stream approach. That is, we do not know whether researchers who use experimental designs also tend to use assessment methods such as reaction times and judgments tasks, and emphasize internal validity; and whether those who use correlational designs also tend to assess their variables of interest with structured interviews and informant reports, and value external validity. It is possible that there is in fact only one central stream, with the differences we found representing tendencies toward particular approaches. To address this question, we conducted a factor analysis, using varimax rotation, on the items assessing research designs, statistics, assessment methods, and validity.

As can be seen from Table 14.2, a two-factor solution provided a good fit for the data (for greater detail, see Tracy et al., 2009a). Furthermore, the first factor seemed to clearly represent the *correlational* stream. Most of the highest positive loading items were statistical procedures (e.g., "convergent/discriminant validity," "HLM," "partial correlation"), research designs (e.g., "correlational approach," "longitudinal study approach"), and assessment methods (e.g., "informant report," "structured interviews") associated with the *correlational* stream and with personality research, both in terms of actual research practice and researchers' explicit beliefs. The second factor, in contrast, seemed to clearly represent the *experimental* stream, with the highest loading items tending to be assessment methods (e.g., "reaction time measures," "memory tasks," "implicit measures"), research designs (e.g., "experimental"), and statistical procedures (e.g., "ANOVA") associated with the *experimental* stream, and with the actual practices of, and explicit beliefs about, social researchers. Returning to our predictions in Table 14.1, 39 out of 42 items (i.e., 93%) relevant to methodology had higher loadings on the predicted factor, assuming the two-factor solution represents Cronbach's two streams.

To empirically determine the extent to which these two factors map onto the split between personality and social research, we saved factor scores for the two factors and correlated them with the personality and social research topics variables. Results showed that the split between personality and social research was fairly clear-cut; personality researchers scored higher on the first (*correlational*) factor ($Ms = .62$ vs. $-.53$, $d = 1.47$, $p < .05$); and social researchers scored higher on the second (*experimental*) factor ($Ms = .33$ vs. $-.44$, $d = .88$, $p < .05$). Similarly, the *correlational* factor was strongly positively correlated with personality research identity

Table 14.2 Two-factor varimax-rotated solution of methodology items

Items	Factor 1	Factor 2
Correlational designs	.63	
Longitudinal designs	.63	–.28
Hierarchical Linear Modeling	.63	
Convergent/discriminant validity	.62	
Informant reports	.59	
Growth curve modeling	.58	
Item-Response Theory	.58	
Structural Equation Modeling	.55	
Factor/Principal Components analyses	.54	
Molecular genetics/DNA testing	.54	
Twin/adoption designs	.53	
Cluster analyses	.52	
Partial/part correlations	.52	
Correlations	.49	
Discriminant function analyses	.47	
Structured interviews	.47	
Patient studies	.46	
Cross-sectional designs	.46	
External validity (generalizability)	.45	
Multiple regression	.42	
External validity (mundane realism)	.41	
Time series analyses	.41	
Reliability analyses	.39	
Power analyses	.39	
Hormone assessment	.37	
Experience sampling method	.36	

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	.41	
	.39	
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	.36	

	Factor 1	Factor 2
Self-report assessment	.34	
Meta-analyses	.34	.28
Field study designs	.34	
Cross-cultural designs	.31	
Mathematical modeling	.30	
Quasi-experimental designs	.26	
Computer simulations	.26	
Reaction time assessment		.77
Memory tests		.76
Implicit measures		.64
Experimental designs	−.57	.60
"Other" judgment tasks		.59
ANOVA	−.38	.54
Behavioral response measurement		.47
Internal validity		.43
t-tests		.41
Multidimensional scaling		.34
Tests of mediation/path analyses		.35
Judgments of groups		.34
fMRI		.28
ANS response assessment	.25	.26

Note. $N = 155$. Factor loadings below .25 were suppressed.

$(r = .58)$, and strongly negatively correlated with social research identity $(r = -.56)$; for the *experimental* factor, this pattern reversed $(rs = -.29, .36;$ all $ps < .05)$. To the extent that the two-factor solution represents the structure of social-personality research, then, the split between the two streams seems to fairly accurately characterize the distinction between personality and social researchers. This finding raises an important, and potentially troubling, question, suggested by Cronbach (1957): is social-personality, and, perhaps, all of psychology, a field divided?

Evidence for a Merging of the Streams

In fact, other findings from our survey suggest a more optimistic conclusion, for those who share Cronbach's wish for the field. First, we found that almost half the sample (44%; $n = 68$) was best classified as *hybrids*, in that these researchers rated themselves as "4" (the midpoint of the scale, anchored with "sometimes") or higher on *both* the personality and social research topics questions. Furthermore, only 10% of the sample ($n = 15$) reported never studying topics related to one of the two fields and always studying topics related to the other. Thus, the large majority (90%) of the leading researchers in the field view themselves as studying topics from both areas.

As for the hybrid researchers, they were found to score higher on the *correlational* factor than social researchers (i.e., those who rated themselves as 4 or higher on the social research scale and below 4 on the personality scale), $d = .84$, $p < .05$, and lower than personality researchers, $d = .72$, $p < .05$. Hybrid researchers also scored higher on the *experimental* factor than personality researchers, $d = .92$, $p < .05$, and lower than social researchers, $d = .31$, $p < .05$ (one-tailed). This pattern suggests that for these hybrids, the two streams have, in essence, merged. In fact, factor scores on the *correlational* and *experimental* factors did not significantly differ for these individuals.

Other evidence for a possible merging of the streams comes from the results we obtained on the content areas researchers reported studying. In contrast to our findings on research methods, for content areas far more similarities emerged than differences. Specifically, personality and social researchers were equally likely to report studying most of the topics that constitute the core of social-personality research: aggression, attribution, brain functioning, creativity, clinical disorders, cultural psychology, education/achievement, emotion, evolutionary psychology, gender/sexuality, intelligence/cognitive ability, implicit processes, interpersonal attraction, judgment and decision making, motivation, nonverbal behavior, political psychology, positive psychology, relationships, personality traits, persuasion, self-concept, self-esteem, self-regulation, social development, and statistics. Furthermore, many of the topics that did show a difference between groups were those that, by definition, are explicitly personality or social research topics (e.g., personality traits, personality development, social cognition, social influence, social roles; see Tracy et al., 2009a). These findings suggest that, personality and social researchers study largely the same topics; but, given the results on the methodology items, they do so, to some extent, in different ways.

To more directly examine whether this is the case, we identified subsamples of personality and social researchers who reported studying the same topic, and directly tested whether they differed in how frequently they used correlational versus experimental designs, and correlations versus ANOVA statistical analyses. We conducted these analyses on all research topics that showed no group differences and were listed as a content area by at least 25% of each group: attribution, cultural psychology, emotion, gender/sexuality, implicit processes, motivation, relationships, self-concept, self-esteem, and self-regulation. In all cases except two, social and personality researchers differed significantly in all four methodological variables

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examined, with personality researchers more frequently using correlational design and correlational statistics, and social researchers more frequently using experimental design and ANOVA, all $ps < .05$. Thus, the two groups differ more in *how* than *what* they study.

IMPLICATIONS AND FOR THE FIELD OF SOCIAL-PERSONALITY RESEARCH

In summary, our research suggests that Cronbach's two streams are alive and well in psychological science. Our findings also suggest that social-personality researchers hold accurate beliefs about the research practices of members of their field, suggesting that at least these most prominent individuals within the field know themselves and their field quite well. It is noteworthy, however, that beliefs about differences tended to be larger (in most cases by at least a standard deviation) than actual differences. That is, researchers tend to overemphasize the magnitude of the differences between the two groups, although they are accurate in their assessment of where these differences lie.

Importantly, despite the clear distinction that emerged between personality and social researchers, there was also a tremendous amount of overlap between the two groups. Differences were typically moderate to large in size, but almost all of these differences were relative, as many approaches, designs, methods, and statistics were used by both personality and social researchers. Furthermore, for content areas, there was a great deal of similarity between the two groups, suggesting that personality and social psychologists study largely the same topics, but they do so in different ways. This finding has an important implication: If the two groups are interested in understanding the same psychological constructs, yet use distinct approaches, methods, and analyses to do so, then the field as a whole may benefit from greater adoption of an interactionist, or symbiotic approach (Swann & Seyle, 2005).

To take a prominent research example, both personality and social researchers study aggression, but they do so in different ways. Social psychologists have documented a broad range of situational factors that can lead to frustration and anger (e.g., Anderson et al., 2010; DeWall & Anderson, 2011), demonstrating how certain conditions or contexts can influence aggressive behaviors, and how seemingly nonaggressive individuals can, under extreme circumstances, be influenced to commit atrocities (e.g., Zimbardo, 2007). From this perspective, the prison abuse that occurred at Abu Ghraib reflects a "rotten barrel" rather than a few "rotten apples." In contrast, personality researchers have documented stable individual differences in aggressive tendencies and shown that these aggressive tendencies are highly heritable and consistent across situations and over long periods of time (e.g., Lahey, Moffitt, & Caspi, 2003). For example, even in bad situations, not everyone becomes "evil," and in real-life contexts such as at Abu Ghraib, we can predict which individuals are likely to commit criminal acts on the basis of previous antisocial behavior, and from scores on variables such as authoritarianism, negative emotionality, impulsivity, (low) intelligence, and (low) self-esteem (Altemeyer, 1996; Caspi et al., 1994; Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Miller & Lynam, 2001).

Of course, both situations and stable individual differences are likely to influence behaviors, and it is noteworthy that the basic effects in personality psychology (i.e., correlations of individual differences) and the basic effects in social psychology (i.e., differences between conditions/situations) are independent, such that large main effects of situations do not imply an absence of stable individual differences, and large correlations between person factors do not imply an absence of situation effects on the behaviors predicted by these factors (Funder, 2006). In other words, an individual like former army reserve specialist Charles Graner, an Abu Ghraib prison guard who was convicted of abusing prisoners and had a previous history of spousal and coworker abuse, is probably more dispositionally aggressive than an individual like the Dalai Lama, and would likely show higher levels of aggression than the Dalai Lama across a wide range of situations. Yet, given evidence from Zimbardo's famous prison experiment, both individuals are probably more likely to engage in aggressive behaviors in the Abu Ghraib prison than in a monastery. Thus, the most fruitful approach may be to simultaneously study both dispositions and situations, by conducting experiments that compare the effects of different situational factors on behavior, while also correlating relevant predictors and outcomes and testing which situational conditions moderate the effects of which personality dispositions. Indeed, using precisely this approach, Bushman (1995) demonstrated that both person and situation factors—as well as the interaction between the two—predict aggression. Our finding that many social-personality researchers are best considered hybrids suggests that this combined approach is, in fact, taken with some regularity.

In other areas of psychology, considerable debate has emerged over how best to approach and study topics of wide interest, such as the emotional phenomenon of fear. The neuroscientific view holds that fear should be studied through its neuroanatomy and neurochemistry, using MRI, brain-lesioned patients and animals, and single-cell recording in rats (e.g., Amaral, 2002; Damasio, 1999; Davidson, 2001; LeDoux, 1996; Panksepp, 1998). More traditionally, psychoanalysts have studied fear as displaced anxiety, typically due to repressed sexuality (Freud, 1909/1955). Behaviorists later reduced fear to a behavioral response to conditioned stimuli (Wolpe & Rachman, 1960), and cognitive psychologists viewed fear as a cognitive appraisal of threat and, in fact, viewed all emotions as cognitions paired with undifferentiated arousal (Schachter & Singer, 1962). Yet, as Miller and Keller (2000) argued, "Researchers are learning a great deal about the biology of fear—and the psychology of fear—from studies of the amygdala (e.g., Lang, Davis, & Öhman, 2000), but this does not mean that fear *is* activity in the amygdala. That is simply not the meaning of the term. 'Fear' is not reducible to biology" (p. 212). In fact, this holds for almost any important psychological phenomenon: It cannot be completely explained from any single perspective. Fear cannot be reduced to amygdala activity, nor to repressed castration anxiety, nor to a conditioned response to a stimulus, nor to a cognitive appraisal of threat. Fear may be all of these things, and it can best be understood when the various ideas are viewed as complementary, rather than antagonistic.

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treatments. A united discipline will study both of these, but it will also be concerned with the otherwise neglected interactions between organismic and treatment variables" (p. 681). In fact, modern researchers have lived up to Cronbach's hope for the field, and not only his worry. Many researchers have adopted a symbiotic perspective and examine interactions between person and experimental variables. The hybrids in our sample represent this trend, but as Swann and Seyle (2005) noted, a larger number of researchers (who may nonetheless identify with the personality or social group) have also done precisely this, integrating correlational and experimental approaches in their research, using assessment methods and statistics from either stream as necessary, and producing bodies of work that have greatly added to the field's knowledge. Examples of the interactionist approach pervade the field, and many are summarized by Swann and Seyle (2005), but to name just a few prominent exemplars: In Carver and Scheier's (1998) research on self-focused attention, these researchers both manipulated self-focus and measured dispositional "self-consciousness"; in Higgins's (1987) model of actual, ought, and ideal selves, Higgins outlined a causal process that could be manipulated and laid the groundwork for measuring individual differences in self-views; and in Dweck's (1999) model of implicit self-theories, Dweck proposed scales for assessing self-theories as stable individual differences, but also directly influenced and manipulated them through interventions. The lines of research that resulted from each of these initial programs are impressive, and each has shaped the field in important ways. Many more examples exist, and the fact that researchers can fruitfully merge the two streams in this most literal way makes the streams' overlap quite clear and demonstrates their compatibility as research endeavors. At the same time, it is worth noting that both personality and social psychology have flourished as somewhat separate subfields, and both maintain several distinct high-impact journals that largely publish research emphasizing one stream or the other. Thus, the current structure of the field also may be a fruitful division of labor, allowing for a high level of productivity and efficiency within both subfields.

BROADER IMPLICATIONS: WHAT DOES IT ALL MEAN FOR PSYCHOLOGICAL SCIENCE?

The fact that the split between the *correlational* and the *experimental* streams of thought remains prominent in social-personality psychology suggests that this split is likely to be prominent in other areas of psychological science as well, and thus that there is no single paradigm for conducting psychological research. It would be surprising if a general paradigm had been adopted across the rest of psychological science, but, for whatever reason, had not yet taken hold within the area of social-personality. Thus, from a Kuhnian perspective, psychological science is still in the preparadigmatic stage, characterized by multiple, coexisting research practices and schools of thought. According to Kuhn (1962, 1970), the extent to which psychology is a paradigmatic science is reflected in its adoption of an integrated set of methods and approaches. If there are still two separate streams, relying upon divergent sets of methods and approaches, it would suggest that psychology has yet to reach the paradigmatic stage.

Kuhn portrayed the development of a science as moving from a *preparadigmatic* stage, characterized by multiple, competing schools, to a *paradigmatic* (or *normal science*) stage, characterized by a single dominant paradigm of shared assumptions and methodologies. Once a field has attained paradigmatic status, further scientific development involves a succession of revolutions in which the dominant paradigm within the field is displaced by a new one. The question of whether psychology has reached the paradigmatic stage of science has long been a source of fierce debate (e.g., Briskman, 1972; Leahey, 1991; Robins, Gosling, & Craik, 1999; Schultz, 1981; Warren, 1971; Watson, 1977). For example, Masterman (1970) argued that psychology may be characterized by a *multiparadigmatic* stage, which precedes the eventual emergence of a single dominant paradigm.

In contrast to Kuhn and Masterman, Lakatos's (1970) theory of scientific development allows for multiple, competing schools at any stage of a science's historical development. These schools ("research programmes" in Lakatos's terminology) may coexist indefinitely, and there is no assumption that one school will eventually emerge as the dominant paradigm. Lakatos viewed scientific progress as akin to a horse race in which competing schools progress, degenerate, are revived, and so on, depending on the ability of the school to generate new hypotheses that lead to empirical discoveries. Lakatos (1970) argued that a school becomes "progressive" when it yields new predictions that lead to empirical successes (Gholson & Barker, 1985, p. 757). Latour (1987) also suggested that multiple schools of thought within a single discipline might coexist, but in his view each school's prominence is determined by sociological, not scientific, factors. Specifically, schools rise in prominence when they successfully disseminate their scientific products to the rest of the field through communication networks that determine what becomes attended to and widely known.

Given that the two streams have coexisted now for over a century, and have ebbed and flowed in their relative prominence within the field as a whole, psychology may simply be a Lakatosian science that is constituted of two paradigms. Indeed, many of the most important variables that define human behavior and real-world outcomes cannot be directly manipulated, yet when manipulation is possible most scientists would, at some point, want to find a way to do that. Thus, it seems likely that psychology will always rely upon both *correlational* and *experimental* stream research practices, and psychological science as a whole may be better off for not being uniparadigmatic. Future research might address this issue by comparing indices of scientific progress among sciences that have a single paradigm and those, like psychology, which are multiparadigmatic. Despite Kuhn's arguments, it is not clear that psychology has been disadvantaged by the absence of a single consensual view on the best way to practice research.

Nonetheless, the success of multiple paradigms in psychology may, in part, lie in the fact that the two streams are not entirely separate. Although most researchers subscribe more fully to one stream or the other, our research demonstrates that the majority of researchers make use of designs, methods, and statistics from both streams, and (for the most part) view both as valid ways of conducting research. Thus, although psychology can be said to be multiparadigmatic, the two paradigms

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 be multiparadigmatic, the two paradigms

are not paradigms in the traditional sense. Rather, they might be more accurately viewed as two perspectives, or general approaches, that shape an individual's research but do not constrict it, in the way that, for example, the "standard model" does for physicists, or Darwin's theory of evolution does for biologists. Indeed, there may be other divides, such as that between researchers who conduct quantitative research and those who conduct qualitative research, that better represent distinct paradigms than the *correlational/experimental* split.

It is also noteworthy that Kuhn developed the concept of the scientific paradigm partly to distinguish the natural sciences from the social sciences. In Kuhn's (1962) view, paradigms cannot exist in the social sciences, where multiple theories are always competing for attention and empirical support. Given this background, the extent to which the approaches, methods, processes, content areas, and philosophical perspectives in social-personality research tend to be shared and endorsed by most researchers across both sides of the divide is, at some level, quite remarkable. It would seem unfair to relegate psychological science to a perpetual nonparadigmatic state; rather, at worst it may be preparadigmatic until a full merging of the streams occurs. Attaining this state would require that a truly integrative interactionist approach becomes dominant, both in terms of the underlying theoretical assumptions and the research methods employed to study psychological phenomenon.

REFERENCES

Altemeyer, B. (1996). *The authoritarian specter.* Cambridge, MA: Harvard University Press.

Amaral, D. G. (2002). The primate amygdala and the neurobiology of social behavior: Implications for understanding social anxiety. *Biological Psychiatry, 51,* 11–17.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A.,… Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries. *Psychological Bulletin,136,* 151–173.

Bentler, P. M. (2007). Can scientifically useful hypotheses be tested with correlations? *American Psychologist, 62,* 772–782.

Briskman, L. B. (1972). Is a Kuhnian analysis applicable to psychology? *Science Studies, 2,* 87–97.

Broadbent, D. E. (1991). A word before leaving. In D. E. Meyer & S. Kornblum (Eds.), *Attention and performance, 14* (pp. 863–879). Cambridge, MA: Bradford Books / MIT Press.

Bruner, J. (1990). *Acts of meaning.* Cambridge, MA: Harvard University Press.

Bushman, B. J. (1995). Moderating role of trait aggressiveness in the effects of violent media on aggression. *Journal of Personality and Social Psychology, 69,* 950–960.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior.* New York: Cambridge University Press.

Caspi, A., Moffitt, T. E., Silva, P. A., Stouthamer-Loeber, M., Krueger, R. F., & Schmutte, P. S. (1994). Are some people crime-prone? Replications of the personality-crime relationships across countries, genders, races, and methods. *Criminology, 32,* 163–195.

Crits-Christoph, P., Wilson, G. T., & Hollon, S. D. (2005). Empirically supported psychotherapies: Comment on Westen, Novotny, and Thompson-Brenner (2004). *Psychological Bulletin, 131,* 412–417.

Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist*, *12*, 671–684.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness.* New York: Harcourt, Brace.

Darley, J., & Todorov, A. (2004). Psychologists seek the unexpected, not the negative, to provoke innovative theory construction. *Brain and Behavioral Sciences, 27,* 331–332.

Davidson, R. J. (2001). The neural circuitry of emotion and affective style: Prefrontal cortex and amygdala contributions. *Social Science Information, 40,* 11–37.

DeWall, C. N., & Anderson, C. A. (2011). The general aggression model. In M. Mikulincer & P. Shaver (Eds.), *Understanding and reducing aggression, violence, and their consequences* (pp. 15–33). Washington, DC: American Psychological Association.

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130,* 355–391.

Donnellan, M. B., Lucas, R. E., & Fleeson, W. (2009). Personality and assessment at age 40: Reflections on the past person-situation debate and emerging directions of future person-situation integration. *Journal of Research in Personality, 43* (special issue), 117–290.

Donnellan, M. B., Trzesniewski, K., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychological Science, 16,* 328–335.

Dunning, D. (2005). Self-insight: Roadblocks and detours on the path to knowing thyself. New York: Psychology Press.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development.* Philadelphia, PA: Psychology Press / Taylor & Francis.

Epley, N., van Boven, L., & Caruso, E. M. (2004). Balance where it really counts. *Brain and Behavioral Sciences, 27,* 333.

Francis, D. D., Champagne, F. A., Liu, D., & Meaney, M. J. (1999). Maternal care, gene expression, and the development of individual differences in stress reactivity. *Annals of the New York Academy of Sciences, 896,* 66–84.

Freud, S. (1909/1977). Analysis of a phobia in a five-year-old boy. In The Pelican Freud Library (Vol. 8, Case Histories 1, pp. 169–306). London: Hogarth Press.

Funder, D. C. (1987). Errors and mistakes: Evaluating the accuracy of social judgment. *Psychological Bulletin, 101,* 75–90.

Funder, D. C. (2006). Toward a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality, 40,* 21–34.

Gholson, B., & Barker, P. (1985). Kuhn, Lakatos, and Laudan: Applications in the history of physics and psychology. *American Psychologist, 40,* 755–769.

Heine, S. J. (2001). Self as cultural product: An examination of East Asian and North American selves. *Journal of Personality, 69,* 881–906.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94,* 319–340.

Kazdin, A. E. (1978). Evaluating the generality of findings in analogue therapy research. *Journal of Consulting and Clinical Psychology, 46,* 673–686.

Kingstone, A., Smilek, D., & Eastwood, J. (2008). Cognitive ethology: A new approach for studying human cognition. *British Journal of Psychology, 99,* 317–340.

Krueger, J. I., & Funder, D. C. (2004). Toward a balanced social psychology: Causes, consequence, and cures for the problem-seeking approach to social behavior and cognition. *Brain and Behavioral Sciences, 27,* 313–376.

scientific psychology. *American Psychologist,*

ppens: Body and emotion in the making of con-

sts seek the unexpected, not the negative, to *Brain and Behavioral Sciences, 27,* 331–332.

f emotion and affective style: Prefrontal cor- *ence Information, 40,* 11–37.

general aggression model. In M. Mikulincer *educing aggression, violence, and their conse-* merican Psychological Association.

ute stressors and cortisol responses: A theo- ratory research. *Psychological Bulletin, 130,*

V. (2009). Personality and assessment at age on debate and emerging directions of future *Research in Personality, 43* (special issue),

R. W., Moffitt, T. E., & Caspi, A. (2005). Low cial behavior, and delinquency. *Psychological*

s and detours on the path to knowing thyself.

in motivation, personality, and development. lor & Francis.

04). Balance where it really counts. *Brain and*

Meaney, M. J. (1999). Maternal care, gene idual differences in stress reactivity. *Annals of* –84.

in a five-year-old boy. In The Pelican Freud –306). London: Hogarth Press.

Evaluating the accuracy of social judgment.

the personality triad: Persons, situations, and *ty, 40,* 21–34.

atos, and Laudan: Applications in the history *hologist, 40,* 755–769.

: An examination of East Asian and North *9,* 881–906.

theory relating self and affect. *Psychological*

lity of findings in analogue therapy research. *gy, 46,* 673–686.

008). Cognitive ethology: A new approach for *al of Psychology, 99,* 317–340.

rd a balanced social psychology: Causes, con- king approach to social behavior and cogni- 3–376.

Kuhn, T. S. (1962). *The structure of scientific revolutions.* Chicago: University of Chicago Press.

Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.

Lahey, B. B., Moffitt, T. E., & Caspi, A. (2003). *Causes of conduct disorder and juvenile delinquency.* New York: Guilford Press.

Lakatos, I. (1970). Falsification and the methodology of scientific research programmes. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge* (pp. 91–196). Cambridge: Cambridge University Press.

Lang, P. J., Davis, M., & Öhman, A. (2000). Fear and anxiety: Animal models and human cognitive psychophysiology. *Journal of Affective Disorders, 61,* 137–159.

Latour, B. (1987). *Science in action.* Cambridge, MA: Harvard University Press.

Leahey, T. H. (1991). *A history of modern psychology.* Englewood Cliffs, NJ: Prentice-Hall.

LeDoux, J. E. (1996). *The emotional brain: The mysterious underpinnings of emotional life.* New York: Simon & Schuster.

Masterman, M. (1970). The nature of a paradigm. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge* (pp. 59–89). Cambridge: Cambridge University Press.

Miller, G. A., & Keller, J. (2000). Psychology and neuroscience: Making peace. *Current Directions in Psychological Science, 9,* 212–215.

Miller, G. E., Chen, E., & Cole, S. W. (2009). Health psychology: Developing biologically plausible models linking the social world and physical health. *Annual Review of Psychology, 60,* 501–524.

Miller, J. D., & Lynam, D. (2001). Structural models of personality and their relation to antisocial behavior: A meta-analytic review. *Criminology, 39,* 765–798.

Mook, D. G. (1983). In defense of external invalidity. *American Psychologist, 38,* 379–387.

Neisser, U. (1976). *Cognition and reality.* San Francisco, CA: Freeman.

Neisser, U. (1991). A case of misplaced nostalgia. *American Psychologist, 46,* 34–36.

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions.* New York: Oxford University Press.

Robins, R. W., Gosling, S. D., & Craik, K. H. (1999). An empirical analysis of trends in psychology. *American Psychologist, 54,* 117–128.

Schachter, S., & Singer, J. E. (1962). Cognitive, social and physiological determinants of emotional state. *Psychological Review, 69,* 379–399.

Schultz, D. (1981). *A history of modern psychology* (3rd ed.). New York: Academic Press.

Swann, W. B. & Seyle, C. (2005). Personality psychology's comeback and its emerging symbiosis with social psychology. *Personality and Social Psychology Bulletin, 31,* 155–165.

Tracy, J. L., Robins, R. W., & Sherman, J. W. (2009a). The practice of psychological science: Searching for Cronbach's two streams in social-personality psychology. *Journal of Personality and Social Psychology, 96,* 1206–1225.

Tracy, J. L., Robins, R. W., & Sherman, J. (2009b). Will the real personality psychologist, and the real social psychologist, please stand up? *Journal of Research in Personality, 43,* 272–273.

Visser, P. S., Krosnick, J. A, & Lavrakas, P. J. (2000). Survey research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 223–252). Cambridge: Cambridge University Press.

Visser, P. S., Krosnick, J. A., Marquette, J., & Curtin, M. (1996). Mail surveys for election forecasting? An evaluation of the Columbus Dispatch poll. *Public Opinion Quarterly, 60,* 181–227.

Vredenburg, K., Flett, G. L., & Krames, L. (1993). Analogue versus clinical depression: A critical reappraisal. *Psychological Bulletin, 113,* 327–344.

Warren, N. (1971). Is a scientific revolution taking place in psychology? Doubts and reservations. *Science Studies, 4,* 407–413.

Watson, R. I. (1977). The historical background for national trends in psychology: The United States. In J. Brozek, & R. B. Evans (Eds.), *R. I. Watson's selected papers on the history of psychology* (pp. 83–94). Hanover, NH: University Press of New England.

Weinstein, T. A. R., Capitanio, J., & Gosling, S. D. (2008). Personality in animals. In O. P. John, R. W. Robins, & L. A. Pervin, (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 328–350). New York: Guilford Press.

Westen, D., Novotny, C. M., & Thompson-Brenner, H. (2004). The empirical status of empirically supported psychotherapies: Assumptions, findings, and reporting in controlled clinical trials. *Psychological Bulletin, 130,* 631–663.

Winstanley, C. A. (2007). The orbitofrontal cortex, impulsivity and addiction: Probing orbitofrontal dysfunction at the neural, neurochemical and molecular level. *Annals of the New York Academy of Sciences, 1121,* 639–655.

Wolpe, J., & Rachman, S. (1960). Psychoanalytic "evidence": A critique based on Freud's case of Little Hans. *Journal of Nervous and Mental Disease, 130,* 135–148.

Yang, Y., & Chiu, C. (2009). Mapping the structure and dynamics of psychological knowledge: Forty years of APA journal citations (1970–2009). *Review of General Psychology, 13,* 349–356.

Zimbardo, P. (2007). *The Lucifer effect.* New York: Random House.