Finding Middle Ground in Cognitive Media Psychology

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Biosketch

Richard Huskey (PhD, University of California, Santa Barbara) is an Associate Professor in the Department of Communication at University of California, Davis. He studies how motivation influences the attitudes people hold and the behaviors they adopt. He researches these questions using a variety of methodological techniques including: functional magnetic resonance imaging, computational modeling, and lab-based experiments. He is an Associate Editor at *Journal of Communication* and Chair of the ICA Communication Science and Biology Interest Group.

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Abstract

Media psychologists investigate the interactions between media content, reception processes, and subsequent effects of media exposure. The field traces its origins to the early 20th century and can be linked with important historical paradigmatic developments including behaviorism and the cognitive revolution. As other entries in this handbook demonstrate, modern media psychological research elevates cognition — psychological processes related to acquiring, processing, and storing information — as a primary object of study. Foregrounding the field's focus on media and cognition, we ask several questions: how did we decide to do it, how do we do it, and how are we doing at doing it? To answer these questions, this chapter includes a brief history of landmark developments in the field with a focus on the transition from behaviorism to cognitivism. Subsequently, we discuss the methodological toolkit for mapping cognitive processes to self-report, behavioral, and neurophysiological measures. Based on an analysis of media psychological literature from the past decade from key journals, we conclude that the study of cognition has slid towards mentalism; that is, a focus on concepts that are detached from underlying cognitive primitives with a behavioral and biological basis. We conclude by articulating a path forward, one that re-couples media psychology with cognitive processes.

Keywords: media psychology, cognition, behavior, biology, methods, epistemology

Finding Middle Ground in Cognitive Media Psychology

Media psychology focuses on the processes underlying the selection, use, and effects of media, such as classical print media, auditory media, screen-based media, and interactive media. We use *psychological processes* as a short-hand term that encompasses a broad variety of cognitive functions, including perception, attention, memory, learning, emotion, and so forth. Indeed, discussions of psychological processes can be found in every chapter in this handbook. After all, what would the field of media psychology be without psychology? Psychological processes necessarily require *cognitive processes.*[1] Cognitive processes are an object of study for media psychologists because media content (e.g., the text of a newspaper article, the flickering images of a movie, the melody of a song) stimulates the human neurocognitive system, which in turn produces the experiential and behavioral effects of media (e.g., entertainment experiences, binge watching, channel selection; Schmälzle & Huskey, 2023). The field of media psychology clearly elevates cognition as an important object of study. a

In this chapter, we reflect on the field's collective effort to better understand cognitive processes during media use. To that end, our chapter begins with a historical sketch of the field with its original goals and methods (how did we decide to do it?), followed by a discussion of current research topics and practices in media psychology (how are we doing it?). We then consider the field's current status and future (how are we doing at doing it?). We note that the field appears to increasingly focus on constructs that are untethered from cognition, behavior, or biology. This creates a risk that our field veers into mentalism[2], which would represent a retreat

[1] Cognitive processes refer to the activities and operations related to perception, cognition, and affect. These distinctions are rooted in a historical tradition that likely predates Aristotle. In practice, all three are tightly coupled and necessary to facilitate even low-level psychological processes (Barack & Krakauer, 2021; Pessoa, 2008).
[2] Like all terms, the term mentalism is used somewhat variably by different researchers – some equating mental with cognitive, some setting it in juxtaposition to behaviorism. In this article, we refer to mentalism to denote a stance in which psychological processes are seen as causing each other without any proper mechanism, i.e., disconnected

from media psychology's historical roots and impose risks to its future. We conclude with a vision for media psychology's future that builds on its strong empirical foundation, while also course correcting to re-couple cognition with behavior and biology.

How Did We Decide to Do It?

It is often said that psychology is a discipline with a long past but a short history (Ebbinghaus, 1908). The same could be said about media psychology. Indeed, human interest in the psychological effects of media can be traced back to cave paintings, ancient drama, classical books and so forth (Eden et al., 2019); yet the discipline of media psychology is much younger, including as early galvanizing points Münsterberg's study of the Photoplay (1916) and the foundational Payne Fund studies (Lowery & DeFleur, 1995). Our ambition in describing this history is not to offer a comprehensive treatment (see Tuma, this volume). Instead, our brief review looks only at the cognitive facets of media psychology's history. Our goal is to clarify major milestones that helped our field achieve a focus on cognition (the "how did we decide to do it" part).[3]

The Early Years

The Payne Fund studies were started in the 1920s and examined the effects of motion pictures on children, particularly focusing on how exposure to media content shaped recipients' values, attitudes, and behaviors (Lowery & DeFleur, 1995). The historical context for this endeavor was that mass media, particularly cinema, had rapidly gained in popularity. Results showed that movies could evoke strong emotional responses, shape attitudes, and potentially

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from causal antecedents in the external world, intermediate cognitive representations, or behavior. As a result, the kind of mentalism we see as problematic appeals to constructs that are untethered from plausible neurocognitive mechanisms or behavioral correlates (for an extended treatment, see Schmälzle & Huskey, 2023b).

[3] Our historical review explicitly cherry-picks important milestones to emphasize our main point, which is the assertion that measuring behavior and biological responses are core to understanding cognition.

influence behavior. In the years since, the Payne Fund studies have received extensive methodological critique, particularly for their lack of control groups. Nevertheless, these early projects employed a battery of techniques that are still common today, including: content analysis, interviews, surveys, behavioral measures, and psychological testing.

A noteworthy aspect of the Payne Fund study series is their joint focus on both cognitive (e.g., learning, memory) and behavioral (e.g., sleep, aggression) variables. This aligns well with a sequence that starts with the media content as the causal trigger, which in turn affects the viewers' cognitive system during the reception process, and leads to subsequent longer-term changes in social attitudes and behavior (Schmälzle & Huskey, 2023a). Although the Payne Fund studies, their methods, and the results may nowadays look dated, these early efforts had an exemplary content → reception → effects framework.

Behaviorism

The emergence of media psychology coincided with the era in which behaviorism was the dominant paradigm within psychology's evolving research landscape (Burnham, 1968; Roediger, 2004). Central to the behaviorist approach was a focus on observable behavior, coupled with a rejection of internal mental events as empirical evidence (Skinner, 1974; Watson, 1913).[4] Behaviorists understood organisms (including humans) as governed by associations that linked stimuli with responses, and behaviorists rejected introspective methods as subjective and potentially unreliable. In fact, Skinner famously wrote "When what a person does [is] attributed to what is going on inside him, investigation is brought to an end" (1974, p. 20). Behavior (from simple to complex) was understood as the result of learned stimulus → response associations built on top of innate instincts and reflexes. Guided by classical and operant conditioning,

[4] To be clear, behaviorists did not deny that cognitions exist but rather that these processes were ultimately reducible to behavior; a view known as *radical behaviorism* (Schneider & Morris, 1987).

behaviorists set out to examine and modify the mappings between stimuli and responses (Ferster & Skinner, 1957).

Not all media psychologists adopted radical behaviorism; nevertheless behaviorism had a strong influence on the field (Parsons, 2021). Early theorizing on how media influenced audiences uses behaviorism's vocabulary, referencing concepts like learning, repeated exposure, the conditioning of social behavior, and so forth. Even Bandura's idea about observational learning and imitation — now labeled as social cognitive theory — once started out as social learning theory (Bandura, 1977, 2001).[5] Similar arguments have been made for the works of Hovland and others (e.g., Hovland et al., 1953a; Hovland & Lumsdaine, 1949)[6] who studied how attitudes are formed through learning (for a detailed treatment, see Sherry, 2004b). Recent trends around interactive media have once again brought such thinking to the forefront. Topics like gamification, habit learning, or the ways in which notifications, pings, and likes reinforce and shape user behaviors dominate today's intellectual landscape (e.g., Brady et al., 2020, 2021). Even though behaviorism's radical rejection of cognition ultimately led to its downfall, core ideas remain alive.[7] Nowhere is this more evident than in the field's continued study of the media content → reception → effects causal pathway.

The Cognitive Revolution

In hindsight, it seems obvious that behaviorism had an Achilles' heel. Behaviorists rejected the very aspects of psychology that everyone is most familiar with: private, mental events. However, these are obviously central to psychology in general, and to media psychology in particular: media influence us internally, they stimulate our minds and produce rich cognitive

[5] Note that Bandura's work, particularly his later scholarship, can be understood as a rejection of behaviorism.
[6] However, we note that even Hoveland's work focused on *attitudes* as a cognitive construct.
[7] The broad, brushstroke generalizations we offer in this chapter run the risk of exaggerating and oversimplifying historical events, which often are more nuanced in nature (Braat et al., 2020).

responses and experiences. A precise historical discussion of the decay of behaviorism is beyond the scope of this chapter. Nevertheless, it is safe to say that behaviorism's problems began mounting as early as the 1930s and ultimately lead to the collapse and paradigm shift that became known as the cognitive revolution (Miller, 2003). Between 1950 to 1960, topics that were once ostracized as objects of scientific inquiry — introspections about internal knowledge, imagery, language, attitudes — came to the forefront of research in psychology and the psychology-derived social sciences (Boring, 1953; Holt, 1964). Examples of this development can be seen in Hovland's studies of persuasion (Hovland et al., 1953a, 1953b; Hovland & Lumsdaine, 1949), which, despite behaviorism's prominence, nevertheless focused on linking attitudes as cognitive concepts with behavior. SMCR-style models (Source, Message, Chanel, Receiver), which focused on the transmission of bits of information (Schramm, 1955), built on cognitive concepts by taking strong inspiration from cybernetics, information theory, and the computer as a metaphor of the mind. After all, if senders and receivers process bits of information, something has to be *doing* the processing.

The result of this cognitive revolution was that, by the 1970s, cognitive research had firmly established its place in the discipline. At least among the quantitative empiricists, the pure behavioristic approach had lost steam and the discipline began to emphasize more internal cognitive processes (Miller & Berger, 1978). On the other hand, remnants of behaviorism could still be seen in the focus on media effects as a result of prior exposure, which tend to ignore the intervening information processing and focus on outcomes (for detailed treatments of this argument, see Lang et al., 2008; Sherry, 2004b).

By the 1970s/1980s, research on cognitive processes had found its footing in media psychology. Functional theories specified how people use media to achieve desired mental states

(Katz et al., 1973; Zillmann, 1988). Researchers examined how cognitive processes elicited during media use shaped people's evaluation of characters (Zillman & Cantor, 1977), behavior (Zillmann, 1971) and retrospective media evaluations (Cantor et al., 1974). Others inquired into media's influence on cognitive processes like attention (Reeves et al., 1985), encoding and memory (Reeves & Garramone, 1983), and learning and affect (Rothschild et al., 1986). Notably, many of these studies used behavioral, psychophysiological, and neural measures to examine specific cognitive processes. In doing so, they laid the foundation for the field's next focus: information processing during media use.

The Ascent of Neurophysiology

In 1993, Geiger and Newhagen published a paper that helped usher in an information processing perspective. Just a year later, Annie Lang edited the foundational *Measuring Psychological Responses to Media Messages* book which set the agenda for the information processing perspective in Media Psychology (1994a). Prominent in both was the use of the 'black box' metaphor according to which message processing occurs hidden from view inside the human brain (see e.g., Berlo, 1969; Schram, 1954). To peer inside the black box, chapters in Lang's edited volume detailed procedures for using behavioral, psychophysiological, and neural measures to track continuously unfolding cognitive processes during media reception (e.g., for studying how attention during ongoing message intake translates into memory).

In the following decade, researchers broadened the methodological toolkit of media research towards secondary task reaction times (with the goal to indirectly infer cognitive resource availability during message processing), behavioral memory measures (e.g., signal detection), as well as eye-tracking and psychophysiological measures that circumvent the exclusive use of verbal introspection (Lang, 1994b, 1994a, 2017; Lang et al., 2008; Lang &

Basil, 1998; Pfeiffer et al., 2012; Potter & Bolls, 2012; Shapiro, 1994). These measures have undergone extensive validation efforts to showcase their linkages with attention, motivation, affect, and other cognitive processes. Indeed, it is well known that media can cause sweaty palms, racing hearts, elicit goose bumps, as well as startle and orienting responses — all of which can be assessed via physiological methods (e.g., electrodermal activity, electrocardiogram, electromyogram). Another benefit of these measures is that they afford real-time continuous measurement of peoples' responses to media messages (Potter & Bolls, 2012). Due to these desirable characteristics, more and more researchers began using psychophysiological and behavioral methods to hone in on information processing during media reception.

Media psychologists began experimenting with neural measures, particularly electroencephalogram (EEG) as early as the 1980s (e.g., Reeves et al., 1985; Rothschild et al., 1986). Techniques for investigating neural responses to media messages began to take off in the 2000s/2010s (Bolls et al., 2019) as researchers augmented the EEG toolkit by also adopting functional magnetic resonance imaging (fMRI) methods (Falk, 2012; Schmälzle, 2022; Weber, Eden, et al., 2015; Weber et al., 2017). These measures illuminate the proverbial black box by revealing hidden brain responses to media (Falk et al., 2015; Fisher et al., 2021; Schmälzle & Meshi, 2020; Turner et al., 2019; Weber, Mangus, et al., 2015). In the next sections, we zoom in on the specific details associated with these measures.

How Do We Do It?

The historical trends identified above can perhaps be understood as a series of reactions and counterreactions to a very basic problem that has plagued psychological research since the field's inception: the immense difficulty of properly conceptualizing and measuring elusive psychological processes (MacCorquodale & Meehl, 1948; Slaney & Racine, 2013). Indeed, most

readers can probably understand each side of the polarizing debates (between objective vs. subjective measurement, between behavior vs. introspection, between matter vs. mind, and so forth). However, one potential problem with these debates is that they run the risk of overshadowing the actual to-be-explained phenomenon, creating more debate than insight and actual advancement. Therefore, we want to briefly step back and ask what is at stake (i.e., what is it that media psychologists strive to explain and how do media psychologists go about it)?

In a nutshell, and stripped from much philosophical jargon, the problem is straightforward: Media, such as the images and soundtrack of a movie, represent an external stimulus. A movie carries conceptual information (e.g., a love story between two characters). When audiences are exposed to media, they take in and process this information. As this happens, a multitude of neurocognitive processes becomes engaged. These range from basic sensory impingements (e.g., the retina in the eye, the cochlea in the ear), to perceptual processes (e.g., the recognition of the depicted objects, such as faces or guns), to more complex social, cognitive, and affective responses (e.g., processes related to comprehension or social cognitive reactions like empathy and parasocial responding). These processes are complex and not yet fully understood — by neither cognitive psychology nor neuroscience — although much progress has been made in deciphering their constituents (Poeppel et al., 2020). Relatedly, an ever growing body of media psychology research builds on these insights to understand media-evoked cognitions (e.g., Bente et al., 2022; Bolls et al., 2019; Grall et al., 2021; Lang et al., 2008; Potter & Bolls, 2012; Schmälzle et al., 2022; Schmälzle & Grall, 2020; Weber, Eden, et al., 2015). One overarching generalization that can be drawn from this scholarship is that we can organize the study of media along a causal arrow that has media content as the starting point,

media reception mechanisms in the middle, and media effects as the outcome (Schmälzle & Huskey, 2023a).

The Toolkit

The causal path just articulated requires a toolkit of methodologies to quantitatively assay each step. Studying media content and media effects is straightforward and can be done using well-established methods — content analysis (via human or computational annotation) and studies of media effects (after-viewing behaviors of individuals or large-scale audiences). Peeking into the black box is more challenging, and the difficulties of this endeavor have led to a proliferation of measurement approaches. We will therefore highlight main measurement methods employed in media psychology, particularly those based on self-report, behavioral testing, and neurophysiological measurement.

Self-Report Measurement

Self-report is an umbrella term for methods that involve individuals providing introspective information about their experiences. Self-reports are widely used in psychological research and cover a wide range of domains (Stone et al., 1999). Advantages include self-report's relative simplicity, cost-effectiveness, ease of use, and the ability to collect data from large and representative samples, particularly via widespread online studies. Self-report allows collecting subjective information to which external observers have otherwise no access.

Though widely used, self-report measures also have key shortcomings, like potential social desirability biases. Likewise, people may not be able to introspect about their own inner states because the underlying phenomena are unconscious or decoupled from the linguistic system (Nisbett & Ross, 1980). Lastly, self-reports require people to verbalize and assign

numbers to experiences that potentially are neither verbal nor numerical in nature. Nevertheless, self-reports measures are used widely and profitably across media psychology.

Behavioral Testing

A second array of measures focuses on behavior. Methods for studying cognition operationalize these processes (e.g., attention, memory, decision making, motivation) by eliciting and measuring micro-behaviors, typically done in laboratory studies of reaction time, signal detection, and media selection (Lang, 1994a, 2017; Lang & Basil, 1998; Shapiro, 1994). An extensive toolkit exists to tap behaviorally into various aspects of cognition, like memory (e.g., recall or recognition tests), attention and executive control (e.g., Stroop interference tasks, flanker tasks, visual search tasks), and so forth. Games are particularly well-suited for tapping into many of these capacities — and the behavioral nature of games naturally recommends gathering behavioral measures. For instance, several cognitive abilities (e.g., mental rotation, color detection, place memory) are particularly relevant for video games (Bowman, et al., 2013; Lucas & Sherry, 2004). Movies and related media also require the engagement of cognitive processes (e.g., working memory, text comprehension, sustained attention), although the more passive way in which these media are typically consumed makes behavioral assessment more difficult. But methods like secondary task reaction times, which gauge the degree to which media consume attentional resources by indirectly measuring slowing on a secondary probe detection task, represent an example of how the cognitive toolbox applies to these media (Lang, 2017; Lang et al., 2006).

Of course, these techniques are largely indirect measures of cognitive processes. Direct measures of free-behavior, such as the now-famous bobo doll experiment (Bandura et al., 1963), are extremely rare these days (Baumeister et al., 2007; Rozin, 2001). Although, we note that

digital trace data (like how frequently people select or switch certain media) are on the rise, represent a return to studying free-behavior, and linking free-behavior behavior with cognitive processes (Brinberg et al., 2021; Gong & Huskey, 2023; Reeves et al., 2020).

Neurophysiological Measurement

Finally, a third group of methods measures biological responses evoked by media. This work involves psychophysiology, which measures peripheral nervous system responses that are driven by central nervous system modulations set forth by media. An example is when a horror movie causes your heart to race and palms to sweat, which can be measured via heart rate and skin conductance monitoring. By comparison, neuroimaging methods like fMRI and EEG enable measuring changes in the central nervous system evoked by media. The rationale for using such techniques is based on the notion that "the mind is what the brain does." Said differently, if cognitive processes emerge from the brain's activities, then — given the difficulties of measuring cognition directly — we can approach it from its biological underpinnings (Weber et al., 2015).

Attractive as this may sound, some caveats are worth mentioning. First, both psychophysiological and neuroimaging measures are time-consuming, limited in resolution, and expensive to collect. In addition to these operational concerns, there are also conceptual challenges. In particular, the relationship between central/peripheral nervous system activity and the psychological or cognitive realm is an issue that many struggle with. For example, current neuroimaging studies reveal results like "a horror movie engages the amygdala". This is known as a forward inference. So long as valid experimental techniques are used, it is inferentially sound to claim that watching a horror movie caused amygdala activation.

A problem emerges because what many consumers of neurophysiological scholarship would rather obtain are statements like “a horror movie activates the brain’s fear center”. Such a claim is known as a reverse inference. In short, reverse inferences occur when causes are inferred from effects. The problem is that many things in addition to fear can cause amygdala activation. Therefore, a singular cause (fear) cannot reliably be determined from an effect (amygdala activation). Overall the interpretation of psychophysiological and neuroimaging data requires caution (Poldrack, 2006). The continuous data they provide and the linkages to cognitive processes they support represent a very important addition to the media measurement toolbox (Potter & Bolls, 2012; Schmälzle & Meshi, 2020).

The Toolkit, Summarized

Above, we described self-report, behavioral, and neurophysiological measurements as widely used methods for studying the media content → reception → effects causal pathway. This leads to an interesting conundrum: A researcher interested in media content can rely on one dedicated method, content analysis. By comparison, a researcher interested in studying the consequences (reception, effects) of this content faces a diverging spectrum of methods.

Faced with these challenges, methodological triangulation is vital. Over-reliance on any one method runs the risk of yielding an incomplete explanation of a phenomenon (Newell, 1973; Rozin, 2001). More worryingly, a singular focus on one approach potentially leads us astray by offering empty explanations. This is the concern behaviorists raised against subjectively defined data, but the same critique also applies when explanations are uncoupled from their behavioral and biological substrates (Caramazza, 1986; Caramazza et al., 2014; Hickok, 2014; Huskey et al., 2020; Krakauer et al., 2017; van Bree, 2023; van Rooij & Baggio, 2021).

The Toolkit, Applied in Our Core Journals

If methodological plurality is vital for media psychology's success, then it follows to ask how frequently these approaches are applied in the discipline. Accordingly, we content analyzed three of the discipline's representative journals: *Media Psychology, Journal of Media Psychology,* and *Psychology of Popular Media.* All empirical research articles were gathered from each journal for the 2013-2022 time-period (*Media Psychology* n = 285, *Journal of Media Psychology* n = 189, *Psychology of Popular Media* n = 383). The text for each article was read in using the *PyPDF2* Python package and stored as a *Pandas* dataframe. A custom dictionary was developed that specified key words for three different methodological categories: self-report, behavioral, neurophysiological (Table 1). The dictionary was then applied to each article. If a word for a given method category was detected, that method category was coded as "1" (present in the article). Otherwise, that method category was coded as "0" (absent). In doing so, it was possible to quantify the methods our field uses, or at least discusses. Code for reproducing this analysis is available on GitHub (https://github.com/cogcommscience-lab/method_counter).

This dictionary-based content analytic approach is liberal. For example, an article might discuss "functional magnetic resonance imaging" without actually employing the method. In such an instance, that article would be coded as "1" for neurophysiological methods, even when that does not reflect the true methodological approach employed in the study. To get a sense for just how liberal our dictionary is, we manually annotated methods used in every empirical *Journal of Media Psychology* article published in 2022. Overall reliability between a human annotator and the automated dictionary was high, Cohen's K = .81. Visual inspection of the confusion matrices (Figure 1A) shows near-perfect performance on self-report and neurophysiological measures, and slightly lower performance on behavioral measures. We

interpret this as evidence that our dictionary-based annotation procedure is valid, albeit liberal in that it slightly over-counts relative to the ground truth.

Our analysis shows that the field has an overwhelming preference for self-report measures (Figure 1B). Every article in *Media Psychology* (100%) and *Journal of Media Psychology* (100%) includes self-report; the same was true for all but three articles in *Psychology of Popular Media* (99.2%). By comparison, behavior is uncommonly discussed and appears in just 36.8% of *Media Psychology* articles, 33.3% of *Journal of Media Psychology* articles, and 28.9% of *Psychology of Popular Media* articles. Neurophysiology is barely discussed, appearing in just 6.3% of *Media Psychology* articles, 6.9% of *Journal of Media Psychology* articles, and 1.6% of *Psychology of Popular Media* articles include words in the neurophysiology dictionary.

Looking at the data over time, it becomes clear that behavioral and neurophysiological measures appear relatively stable (Figure 1C). However, the use of self-report is growing across all three journals, and this growth appears before the Covid-19 pandemic — when behavioral and neurophysiological studies temporarily became difficult or impossible to conduct. Similarly, the total number of published articles continues to increase (Figure 1D). *Media Psychology* went from four to six issues per year in 2019. *Journal of Media Psychology* followed suit by expanding from four to six issues in 2022. And even though *Psychology of Popular Media* maintains four issues per year, the number of articles per issue expanded and continued to grow starting in 2015. As journals added more page space, it seems those extra pages were largely filled by new studies detailing the results of self-report measures.

Earlier, we argued that triangulation and methodological pluralism are vital for media psychologists who study cognitive processes. However, it appears a clear winner, self-report, has emerged. In what follows, we discuss the implications of this outcome.

How Are We Doing at Doing It?

In this section, our goal is to reflect on whether current practices in the field are in harmony with the overarching goals of media psychology. Given the clear trend toward certain methodological practices, we ask: where does the pendulum currently stand and where can we expect it to move? In short, there is no point in denying that we are somewhat concerned that, despite the increasing availability of diverse methods, media psychology as a whole seems to be increasingly selecting just one — self-report — thereby closing the lid of the black box.

This increasing over-reliance on self-report is a core challenge for media psychology research because it amplifies the risk that our constructs veer into mentalism and mentalistic explanation. Such constructs often claim the label cognitive process (or even mechanism) but remain empty once one starts looking for more than verbal connotation and metaphor. More to-the-point, many of our field's constructs specify black boxes that are at best very difficult to open or, at worst, impossible to open (for an extended reflection on this point, and its dangers, see Schmälzle & Huskey, 2023b). This critique applies broadly to the field.

Flow: A Case Example

Turning the pointy end of the spear towards ourselves to demonstrate the point, consider research on flow during media use. One of us (R.H.) works extensively on flow[8] (Huskey, Craighead, et al., 2018; Huskey et al., 2022; Huskey, Wilcox, et al., 2018). Flow is characterized by several phenomenological properties that occur when task challenge and individual skill are both high, including: high task-focus, diminished self-awareness, merged action-and-awareness, altered time perception, a feeling of skillful task performance, and high levels of intrinsic reward (Csikszentmihalyi, 1990). In media psychology, flow is offered as an explanation for everything

[8] R.S. is studying engagement and the same argument as presented for flow could be applied to the relationship between engagement and attention, as well as the 'phenomenological surplus' engagement has over attention.

from media selection to effects (Sherry, 2004a). From an explanatory perspective, are all of flow's phenomenological properties required to explain various media selection or effect results? The answer is that we do not know. This is because flow is almost never experimentally manipulated; and even when it is, flow is almost always measured via retrospective self-report, which captures its subjective experience, but says nothing about flow's internal workings. After all, what would a neurocognitive or behavioral correlate of flow even look like?[9]

Put another way, the flow construct has features that are indicative of untethered mentalism, as do many other concepts in the field. A hallmark of such constructs is that they are largely detached from lover-level cognitive primitives (e.g., perception, attention, memory, emotion) and draw mainly on their intuitive and phenomenological properties. If we ask, "how do cognitive primitives map to flow's phenomenological properties?" the problem becomes evident: One can offer symptom lists that bear resemblance to lower-level cognitive primitives (e.g., task focus, diminished self-awareness, intrinsic reward), but when it comes to specifying "how it works", the original flow theory has many gaps and builds heavily on the construct's subjective appeal. The reason why this matters is because constructs that lack cognitive specificity encounter cascading problems as we try to open the black box. For instance, and when thinking about flow, what biological processes should we expect to be involved in its generation? One explanation that focuses on flow's diminished self-awareness and skillful performance postulates a deactivation of the prefrontal cortex (Dietrich, 2004). Another, focusing on the high-task performance and reward aspects of flow, predicts a large-scale activation and connectivity between prefrontal and subcortical structures (Weber et al., 2009).

[9] There have been attempts to address this question (e.g., Ju & Wallraven, 2019; Klasen et al., 2012; Melnikoff et al., 2022). Each encounters important limitations which is partially why the approaches have not been widely adopted.

These two explanations are incompatible, unmasking a theoretical ambiguity around the flow construct.[10]

Flow is a vast literature that is more than 50 years old. Only in the last two decades has work been undertaken to map its phenomenology with cognition and biology. But even when that work is done, difficult questions remain. Is flow different from related concepts like immersion, transportation, absorption, presence, or engagement? How will we know?

What Is at Stake?

As a field, we often pride ourselves on doing concept explications (Chaffee & Berger, 1987). Achieving clarity in terminology is indeed important, but merely explicating a term's meaning cannot establish validity in the ontological sense (i.e., whether the explicated concept actually exists). Keeping with the flow example, most people can answer self-report questions about flow and personal experience confirms that the phenomenological experience flow scales try to capture is real. However, imagine a study showing that self-reported measures of flow during media use emerges as statistically significant mediator between media and effect (e.g., amount of media enjoyment), can we really say that flow explains that relationship?

Not according to Skinner, who famously argued that mentalistic explanations explain nothing (Skinner, 1974). One cannot deny that he has a point: many media psychological explanations rest heavily on statistical associations between concepts that rely on introspective answers to survey questions. If we observe the mediation effect described above, is it because flow is the only explanation for media enjoyment, or because we have constrained our study to exclude equally plausible alternative explanations? If the former, fantastic! If the latter, we are in trouble if the alternate (and untested) explanation is correlated with our current explanation

[10] Although progress is being made (Kotler et al., 2022) and accumulating evidence better supports the connectivity hypothesis (Harris et al., 2017)

(Tosh et al., 2022). Indeed, it is a well-known fact that many constructs correlate with each other (e.g., flow, transportation, presence). Accordingly, both flow and transportation are likely to mediate the direct path between media use and enjoyment. In fact, they do (Green et al., 2004; Keller & Bless, 2008). However, when flow and transportation are correlated, they cannot simultaneously explain much variance in enjoyment[11]. This example demonstrates the limits of a statistics-based approach to identifying, specifying, and studying self-reported constructs (Boster, 2023; Mook, 1983; Spencer et al., 2005). The solution still requires statistics, but also an infusion of theory, substance, and linkage between constructs of interest and their cognitive, behavioral and neurophysiological substrates. But, as we demonstrate with the flow example, this is made more difficult if our constructs are ambiguous or untethered from their lower-level constitutive parts.

How Did We Get Here?

We believe that the present situation can be understood, at least in part, by recognizing the historical trends mentioned above, the economic realities of the scientific enterprise (Anderson, 2016), and the inherent tensions that characterize the highly interdisciplinary discipline of media psychology (Craig, 1999).

The trend towards mentalism may represent an unintended consequence in the wake of cognitive revolution: a sort of overshoot in the opposite direction from behaviorism. Another reason could be that innovative media formats (e.g., television, digital media, virtual reality) encourage the development of new constructs.[12]

[11] In this context, psychometric construct validation is a bit like covering up for the embarrassment that our measures lack objective behavioral or biological grounding and discriminant validity.

[12] To be clear, we believe new constructs can and do point to something important and worth investigating. But with a purely introspective approach, it will be difficult to achieve robust insights into causes and consequences.

Second, with regards to economic considerations, it is clear that academia's current incentive structure strongly favors survey-style studies, which are more suited to assess subjective experiences than task-based cognitive or behavioral processes. Compared to behavioral or neurophysiological studies, survey-style studies are much faster and cheaper to conduct, and they allow for publishing more papers with larger samples. Thus, especially in a competitive academic market in which publication quantity serves as key hiring, tenure, and status criterion, there is a selection pressure towards these kinds of methods, and away from bio-behavioral work (for extended reflections on these issues, see e.g., Anderson, 2016; Edwards & Roy, 2017).

Finally, media psychology is already a massively interdisciplinary subfield (as the chapters in this handbook demonstrate). Academic training and epistemological orientation (e.g., humanistic, quantitative social scientific, STEM) interact with the fact that there are only 24 hours in a day and not all of them can or should be spent working. In short, the required interdisciplinary work is challenging to realize.

A Path Forward

The question that follows from this assessment is clear: How can we recouple cognition and media psychology? In our view, the situation is not dire, and we are optimistic about the field's future. Reasons for our optimism include: the presence of theoretical remedies, transformational advances in cognitive automation and artificial intelligence (AI), and a growing repertoire of methods that offer viable alternatives.

Insight is found by turning to other areas of psychology, particularly cognitive psychology and neuroscience, where similar challenges have been extensively discussed and solutions developed. Indeed, the conundrum that psychological phenomena create is not unique

to media psychology. Cognitive science, for instance, has long faced the same issues. For example, Marr's framework specifies three levels of analysis for understanding information processing in biological systems (Marr, 1982). The first level, the computational level, describes the problem to be solved from an abstract, functional perspective. The second level, the algorithmic level, refers to the procedures that can solve the problem. The third level, the implementation level, deals with the physical realization of the algorithms in the brain or a computational device. This approach has been adapted as a model for communication in general, and it is certainly highly applicable for media psychology (for relevant applications, see Huskey et al., 2020; van Bree, 2023; van Rooij & Baggio, 2021). Thus, we can be optimistic because a theoretical framework exists that allows us to integrate cognitive processes with media psychology, and to discuss them with other cognitively oriented disciplines.

A second reason for optimism is recent progress in AI. In particular, advances like the development of large language models (LLMs) and parallel developments for computer vision provide new ways to computationally simulate specific cognitive processes. Not only do these models allow researchers to study cognition-like processes "in silico", but several researchers have already voiced the opinion that they could take over many domains that have henceforth been dominated by survey research. This includes particularly widespread 'data annotation' tasks (Rathje et al., 2023; Veselovsky et al., 2023), but we can already see developments that leverage LLMs to make human-like judgments. This could ultimately reduce reliance on human participants (Dillion et al., 2023) and spur faster, more cumulative, and more comprehensive social scientific inquiry (Grossmann et al., 2023).

This leads us to our third reason for optimism — a rapidly diminishing methodological bottleneck. As argued above, one reason why behavioral and neurophysiological measures have

been used less frequently is that they are currently comparatively expensive, slow, and difficult to integrate with the prevailing paradigm in terms of training and theoretical commensurability (Sherry, 2015). However, this situation is changing swiftly as measurements become commodified (Jahn et al., 2022) or even integrated into media devices like webcams, cellphones, or VR headsets. Moreover, both industry and academia are clearly starting to recognize that cognitive measures provide the "missing link" for understanding how people respond to messages, one that provides an added benefit that cannot be gleaned from other information sources (Al-Doulat, 2018; Moscato et al., 2021; Schmälzle et al., 2023; Shrestha et al., 2020). In sum, the increasing accessibility of a broad array of methods, coupled with the increasing recognition of their benefits and the theoretical integration suggest that we can expect a rebalancing and diversification of media psychological measurement practices.

Conclusion

Media psychology not only has a long past, but we are convinced that it has a long and bright future. In this chapter we discussed the past, present, and future of media psychological research, highlighting challenges and discussions the field has faced since its inception. These challenges center around the difficulty associated with measuring the cognitive processes that close the theoretical gap between media content and effects. We presented evidence for a mounting methodological imbalance that leads to non-trivial theoretical challenges. Importantly, our goal was not to come across as accusatory and we do not want to be understood as rejecting self-report measures altogether. After all, self-report is the only method that provides insights into subjective states, the use of scales is based on a valid statistical framework, and it is promising to triangulate between different methodologies. However, just like financial markets tend to build bubbles, it seems a bit excessive if a majority of papers rely solely on self-report.

We worry that the field might be heading toward a bubble itself, especially when LLMs appear poised to either reduce or replace humans for many self-reported tasks (Dillion et al., 2023; Grossmann et al., 2023). Science is ever advancing, and new methodological techniques unlock previously impossible theoretical discoveries (Greenwald, 2012). We propose that by recoupling media psychology with the study of cognitive processes, we can make substantial progress in deciphering media's effects on individuals and audiences.

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Figure 1

(A) Confusion matrices comparing human and dictionary-based annotation. (B) Measures in total for each journal. (C) Measures by year for each journal. (D) Publication rate by year.

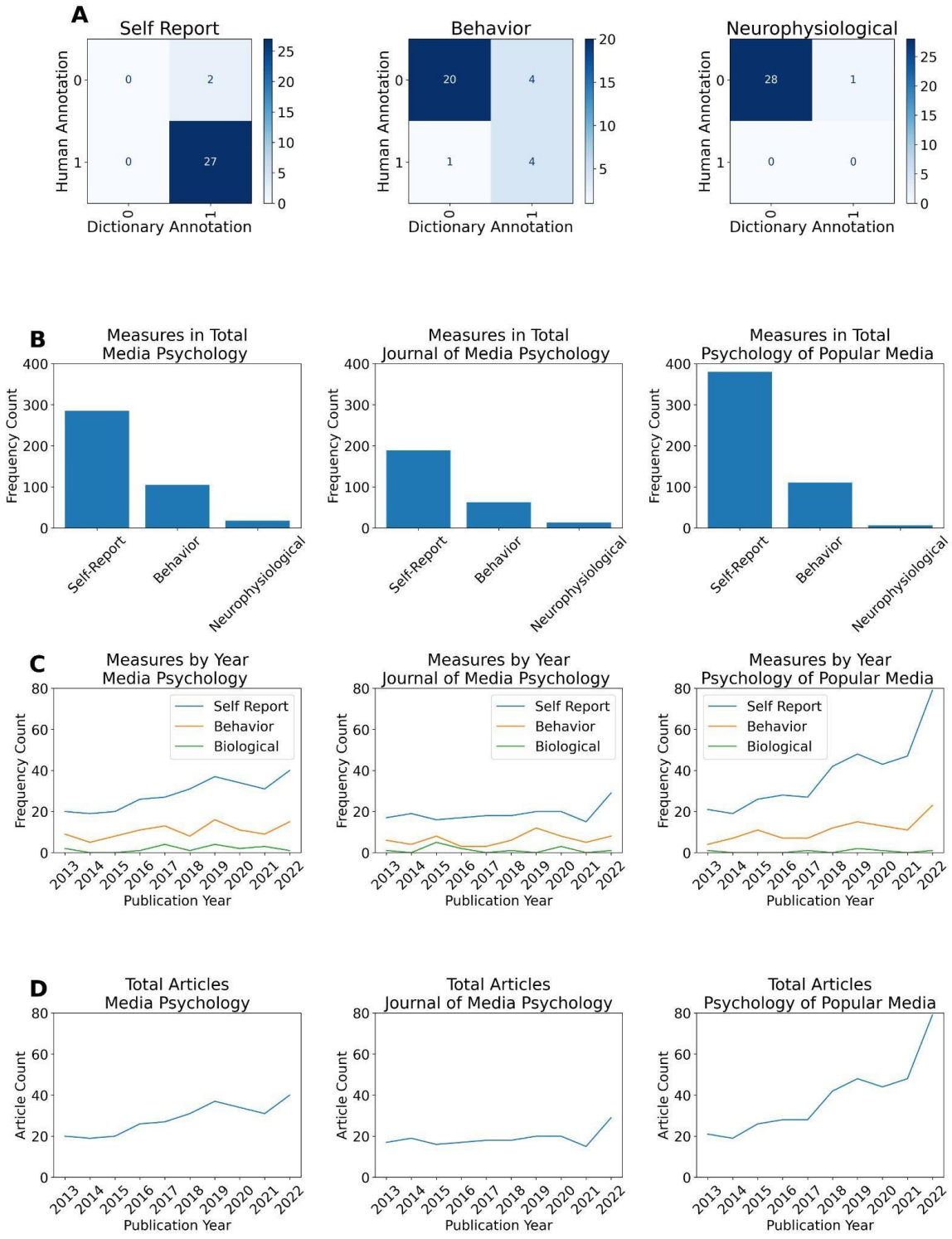

Table 1

Words included in the dictionary-based method analysis.

Self-Report	Behavioral	Neurophysiological
Self-report	Signal detection	ECG
Scale	D-prime	EKG
Think aloud	Recognition test	Electrocardiogram
Thought listing	Recognition	EMG
Thought-listing	STRT	Electromyography
Rate	Secondary Task Reaction Time	Orbicularis oculi
Rated	RT	Corrugator supercilli
Likert	Reaction time	Skin conductance
	Mental Rotation	Heart rate
	Kills per round	Heart rate variability
	Kills-per-round	EEG
	Task performance	Electroencephalogram
	Task-performance	Event related potential
	Weak-Link Coordination Exercise	Electrodermal activity
	Weak Link Coordination Exercise	Eye-Tracking
	Implicit Attitude	Eye Tracking
	Implicit Attitudes	Dwell Time
	Implicit Association Test	Dwell-Time
	Helping Behavior	Eye Gaze
	Helping-Behaviors	Eye-Gaze
	Decision time	fMRI
	Response inhibition	Functional magnetic resonance imaging
	Continuous response measures	
	Tangram	
	BeanFest	
	Aggressive Behavior	
	Anagram Task	
	Posted a Comment	
	Wrote a Comment	
	Write a Comment	