Phygital marketing through the lens of neuroscience and phenomenology: an interpretivist account

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Abstract

Purpose – The purpose of this paper is to explore the prospect of using neurophenomenology to understand, design and test phygital consumer experiences. It aims to clarify interpretivist approaches to consumer neuroscience, wherein theoretical models of individual phenomenology can be combined with modern neuroimaging techniques to detect and interpret the first-person accounts of phygital experiences.

Design/methodology/approach – The argument is conceptual in nature, building its position through synthesizing insights from phenomenology, phygital marketing, theoretical neuroscience and other related fields.

Findings – Ultimately, the paper presents the argument that interpretivist neuroscience in general, and neurophenomenology specifically, provides a valuable new perspective on phygital marketing experiences. In particular, we argue that the approach to studying first-personal experiences within the phygital domain can be significantly refined by adopting this perspective.

Research limitations/implications – One of the primary goals of this paper is to stimulate a novel approach to interpretivist phygital research, and in doing so, provide a foundation by which the impact of phygital interventions can be empirically tested through neuroscience, and through which future research into this topic can be developed. As such, the success of such an approach is yet untested.

Originality/value – Phygital marketing is distinguished by its focus on the quality of subjective first-personal consumer experiences, but few papers to date have explored how neuroscience can be used as a tool for exploring these inner landscapes. This paper addresses this lacuna by providing a novel perspective on "interpretivist neuroscience" and proposes ways that current neuroscientific models can be used as a practical methodology for addressing these questions.

Keywords Neuroscience, Phenomenology, Interpretivism, Phygital, Neurophenomenology

Paper type Conceptual paper

Introduction

Phygital marketing is a set of marketing strategies that combine both physical and digital elements to create a seamless, integrated experience for customers. As Batat (2022) describes, phygital is "A holistic and integrative ecosystem that adopts a consumer standpoint as a starting point and then integrates a combination of physical, human, digital and media content elements, platforms, technologies, and extended realities, among others." (Batat, 2022, p. 10). Prominent examples of phygital marketing include creating more immersive in-store or online purchasing experiences by using virtual reality or augmented reality to simulate engagement with products (Johnson and Barlow, 2021; Neuburger *et al.*, 2018) or

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using QR codes to provide additional product information or promotions to consumers at the point of sale. The use of digital sensing technologies in brick-and-mortar retail settings (e.g. Amazon GO stores) opens the door to other phygital strategies that combine the benefits of in-person product experiences and touchless digital payment. What marks out each of these examples as instances of phygital marketing is that they involve an effort to create a more engaging and personalized experience for customers by using technology to blur the lines between physical and digital consumption environments (Banik, 2021; Batat, 2022). As such, phygital environments are neither completely physical nor completely digital and therefore represent a new form of human experience.

Researchers have at times lumped together phygital and omnichannel marketing approaches (Klaus, 2021; Mishra *et al.*, 2023). Yet, although both phygital and omnichannel approaches are designed to engage consumers through a blend of online and offline experiences, the two concepts are distinct (Akter, 2021; Bell *et al.*, 2014). While omnichannel aims to use technology as a means of unifying the customer experience across many different marketing channels, phygital marketing is distinguished by its integration of physical and digital experiences *within* channels to leverage the benefits of their combination for the consumer experience (Batat, 2023). Thus, phygital approaches are distinguished from more conventional omnichannel strategies in that (1) they describe consumer experiences that simultaneously combine digital and physical elements (whereas omnichannel focuses on unifying customer experiences across different channels), and (2) there is a particular focus on how these combinations impact the first-person experience of consumers and thereby influences their decision-making practices.

The successful implementation of phygital marketing cannot rely on a one-size fits all approach, but instead requires careful attention to the shared sources of meaning – including social, cultural and other sources – that will shape individual experience. Therefore, understanding the impact of phygital marketing tactics requires a multimethod approach that incorporates both positivist and interpretivist research methodologies.

A positivist approach to marketing research is *nomothetic,* meaning it typically involves using quantitative methods to identify general laws of consumer behavior that hold across groups or populations. By contrast, interpretivist approaches are *idiographic,* meaning they are generally less concerned with the identification of general laws and more concerned with understanding the sources and content of shared meaning that arise within different social and cultural contexts, and how such contingent factors shape the behavior of individual subjects and the groups to which they belong. Therefore, interpretivist research is more likely to draw on qualitative methods, including ethnography, discourse analysis, hermeneutics and phenomenology.

These approaches help increase our contextual understanding of consumer choices, including the subjective meaning of products and product messaging to consumers, and allow researchers to investigate complex and dynamic phenomena that cannot always be easily measured or quantified. The insights they produce are not merely academic: taken together, they can provide valuable knowledge about consumer preferences, needs and desires, which can inform marketing strategies, product development and communication efforts. In turn, this can help marketers to tailor their offerings and messages to align with the subjective meanings and interpretations that consumers attach to products and services, and to thereby design personalized consumer experiences and highly curated customer journeys.

Perhaps surprisingly, neuroscience offers a powerful new means by which to address these questions through more of an interpretivist lens. *Neurophenomenology*, a neuroscience methodology that connects experience – including self-reported experiences – with brain

specialization and function offers a potentially powerful candidate methodology through which these kinds of questions about individual consumer experiences may be understood. As a broader discipline, neuroscience has long been concerned with the underlying mechanisms that contribute to internal experience and conscious states (Dehaene and Naccache, 2001). Indeed, the burgeoning field of neuromarketing aims to use neuroimaging technologies to understand the underlying mechanisms that correspond to consumer preferences, brand impressions, decision-making and a range of outcomes relevant to marketing (e.g. Lee *et al.*, 2007).

To date, however, these investigations have almost exclusively taken a positivist perspective. They typically involve samples of indicative participants, an aggregation of neural data and a generalization to broad principles that may extend to explain consumer decision-making and experiences much more broadly. These investigations have proven fruitful in attempting to understand some of the general mechanisms of marketing psychology. However, it remains an open question as to if, and how, a neuroscience approach can be leveraged through an interpretivist lens for the purposes we have highlighted above.

The aim of this paper is to investigate the potential value of "interpretivist neuroscience," and its implications for phygital marketing research, which involves exposing consumers to entirely new and novel experiences, the design of which may have dramatically different consequences depending on the consumer's individual characteristics. We conclude that, as an interpretivist approach to neuroscience, neurophenomenology and its primary theoretical product, known as "Predictive Processing Theory," can potentially function as a third-personal window into the first-personal perspective of consumers confronted with phygital experiences. This integration can help marketers conceptualize impactful and effective phygital marketing experiences and to more efficiently undertake the classic market research aims of segmentation and targeting. We have also highlighted the promise (as well as the shortcomings) of neurophenomenology as a direct methodology for empirically testing the success of such an approach.

We begin with a brief overview of traditionally positivist approaches to neuroscience and introduce the concept of neuroconstructivism, which calls the generalizability of some existing neuroscience and neuromarketing findings in question. We propose that an interpretivist focus on neurophenomenology can help to address some of these concerns, and then introduce the concepts of "interpretive neuroscience" and "interpretivist neuromarketing." The paper culminates with an exploration of the unique contributions that the neurophenomenological perspective and "Predictive Processing Theory" can offer marketers who aim to design impactful and effective phygital marketing experiences. We contend that these approaches can potentially help marketers to project, measure and interpret the impact of first-hand phygital experiences on consumers more accurately and efficiently than existing approaches. These findings may be of particular value when assessing the impact of entirely novel techniques like those involved in phygital marketing. We conclude by highlighting the promise (as well as the shortcomings) of employing brain imaging as a direct methodology for empirically testing the success of such an approach.

The interpretation of neuroscience: positivist and interpretivist perspectives

Neuroscience as a scientific discipline is typically positivist in orientation. The general project has been to develop a kind of cognitive ontology whereby psychological mechanisms can be understood at the level of their biological signature (Poldrack and Yarkoni, 2016; Poldrack *et al.*, 2011). Functional magnetic resonance imaging (fMRI) is often at the forefront of these investigations, a widely used neuroimaging technique that measures changes in

blood flow in the brain to infer neural activity (Dubois and Adolphs, 2016). In this way, evoked neural data is aggregated across numerous participants to uncover a general pattern of neuronal activity that is selectively engaged by the experimental task, and understood to reflect the mental mechanisms of interest.

Work in this positivist vein has often ascribed innate qualities to the human brain that hold across populations (Arcaro *et al.*, 2019; Mahon and Caramazza, 2011) and are often touted as reflecting universal human tendencies and mechanisms (e.g. Fodor, 1983; Marcus, 2001). Neuroscientists have often interpreted the meaning of these similarities to indicate that, at the basic levels of human perception and cognitive processing, the phenomenal experience of reality is shared across individuals and groups despite any differences in contextual factors like culture, social structure, gender norms, etc. (Collins, 2005).

The applications of these neuroscientific methodologies to explore marketing has spawned the discipline of neuromarketing, in which these methods have been applied to help understand the neural correlates of consumer behavior (Lee *et al.*, 2007). For example, in one of the more influential neuromarketing studies using these methods, Knutson and colleagues (Knutson *et al.*, 2007) used fMRI in a laboratory setting to investigate the neural mechanisms underlying the evaluation of different consumer products.

Like most neuroscience research in general, the bulk of neuromarketing research has employed positivist methodologies (Lim, 2018). By and large, this research has been designed to draw conclusions about general patterns of neural functioning and their connection with cognition and behavior without much detailed analysis of the broad range of contextual factors that may affect outcomes in particular cases. As a result, the lion's share of neuromarketing research has sought to identify the broad principles that account for the plurality of behavioral outcomes, leaving much to be discovered from an interpretivist perspective. Like most domains of natural science, these inquiries are nomothetic, meaning they identify population tendencies without necessarily providing concrete action guidance in particular cases.

These concerns have been raised from within the field of neuroscience itself. Laboratory experiments are often designed to isolate a handful of psychologically intuitive variables rather than addressing the true potential depth of causal intricacy involved in understanding the interplay of psychology, cognition and behavior. This tendency has been attributed to "The Flatland Fallacy" by Jolly and Chang (2019), who argue that it is based on the flawed belief among researchers that the human brain, as its currently understood, operates according to a limited set of universal principles or rules. Once unearthed, they claim, these general principles are expected to extend to and explain the intricate complexities of human behavior. However, the authors argue that this tendency to oversimplify has little to do with the actual functioning of our brains and far more to do with the social, cultural and evolutionary features of our existence, which compel us to simplified explanations in a manner not dissimilar to our everyday use of heuristics in the context of decision-making.

Given this legacy of positivist inquiry, neuroscience may appear to be an unlikely candidate for interpretivist forms of inquiry. However, neuroscientists increasingly recognize the brain as a dynamic organ whose specialization of function reflects the idiosyncratic experiences and sociocultural influences of its owner (e.g. Frith, 2019). This alternative approach, often termed "neuroconstructivism," has evolved to account for such differences (e.g. Karmiloff-Smith, 2009, Rinaldi and Karmiloff-Smith, 2017; Mareschal, *et al.*, 2007). Drawing heavily on research from developmental neuroscience (Anderson, 2016; Mundkur, 2005), neuroconstructivists argue that the specialization of the brain does not reflect inevitable, in-born traits, nor does it reflect a universal structure of mind-brain

mapping. Instead, the brain is recognized as a highly malleable organ, shaped by the realities and experiences to which it is exposed over a lifetime. The revealed specialization in the adult brain is seen to represent learning outcomes, such as in linguistic processes (e.g. Allen *et al.*, 2012; Fedorenko *et al.*, 2010; Scott and Monesson, 2010; Lipkin *et al.*, 2022), and embodies human uniqueness and the totality of one's individual experiences.

The extent to which there is consistency across human brains in their functional specialization does not necessarily indicate a universal, predetermined organization of mental life. Instead, neuroconstructivists argue that these similarities should be seen as reflecting shared lived experiences acting on common biological processes. What this approach entails is that each brain simultaneously shapes – but also reflects – a unique, individual experience of reality, and this idiosyncrasy is ultimately expressed in the specific ways by which each brain organizes and expresses mental processes.

From neuroconstructivism to phenomonology

A neuroconstructivist approach paves the way for an interpretivist perspective on the study of phygital marketing phenomena as it recognizes the brain as a malleable organ that (1) is forged by one's unique cultural, social and genetic endowments, and continues to be influenced in its development by a range of additional life experiences throughout one's life and (2) shapes one's idiosyncratic experience of the world. Taking these assumptions as our starting point, we propose an interpretivist approach to neuromarketing that involves evaluating the influence of subjective, social and cultural experiences in shaping consumers' neurological responses to phygital marketing phenomena.

Focusing research attention on identifying what these factors are and how these neurological differences may shape consumers' cognitive and behavioral responses to phygital experiences is crucially important if we are to design those experiences in ways that will appeal to specific target audiences. More generally, identifying who consumers are at a more personal level, and how these personal characteristics influence the way their brains operate can help researchers segment their audience by gaining a firmer grasp on how these factors influence the receptiveness of different consumers (and consumer types) to specific kinds of appeals, and to tailor marketing to the individual consumers whom they are targeting. We summarize these approaches in Table 1, below.

To this end, we can think of interpretivist neuromarketing as a kind of naturalized phenomenology in which the object of inquiry is the first-personal experiences of individual subjects. The aim, meanwhile, is to develop a more granular understanding of how individual participants receive, process and interpret marketing phenomena and how phenomenological experiences can be designed for and cultivated in consumer engagements. We illustrate this process by reference to the emergent practice of phygital marketing throughout the rest of the paper. These kinds of interpretivist questions have historically been evaluated through classical approaches to phenomenological inquiry. In the section to follow, we introduce phenomenology as a discipline and explore some of its more relevant permutations, before addressing the unique contribution of neurophenomenology and its potential impact for phygital marketing.

Phenomenology as an interpretivist research methodology

At its most basic, phenomenology is a descriptive form of interpretivist research that focuses on conscious experience, including its structure, flow and dynamics (cf. Schutz 1970; Dastur, 1996; Moran, 2005; Gallagher and Zahavi, 2020). Edmund Husserl developed the concept as we understand it today around the turn of the 20th Century, associating the study

Table 1.
Approaches, subjects, and outputs for interpretivist and positivist research

Research approach	Research subjects	Approach to knowledge	Resulting output	Methodology
Positivist marketing research	Consumer behavior, market segmentation, advertising effectiveness, pricing research, brand management, product development and innovation	Nomothetic	Identification/comparison of group consumption tendencies, probabilistic and incomplete explanations of individual consumption behavior	Scientific method and quantitative tools of analysis
Interpretivist marketing research	Consumer narratives, symbolic meanings and brand associations, consumer subcultures and identities, consumer experiences and emotions and sociocultural influences on consumer behavior	Idiographic	Description and explanation of consumer perception, experiences and behavior in particular social and cultural environments or unique cases	Primarily qualitative (e.g. ethnography, discourse analysis/hermeneutics, phenomenology and biography/history), may deploy some quantitative tools of analysis
Positivist neuroscience	Neural mechanisms of perception, cognitive processes, emotional processing, neural correlates of behavior, neuroimaging and brain connectivity, neural plasticity and learning	Nomothetic	Functional mapping of brain activity, probabilistic and incomplete explanations of individual differences in brain function	Scientific method, neuroimaging and quantitative tools of analysis
Interpretivist neuroscience	Individual differences and neural processing, phenomenology of subjective experience, social cognition and neural processing, subjective interpretations of neural activity and cultural influences on neural responses	Idiographic	Context-sensitive identification of qualitative and quantitative individual differences in brain function and of how experiences influence these outcomes, links between processes of the brain and individual psychological phenomena	Qualitative (e.g. ethnography, phenomenology and biography/history) tools of analysis, neuroimaging, will deploy some quantitative tools of analysis

(*continued*)

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Research approach	Research subjects	Approach to knowledge	Resulting output	Methodology
Positivist neuromarketing	Neurophysiological responses to advertising, implicit and explicit measures of brand perception, neurometrics and consumer preferences, neuroeconomic studies of consumer decision-making, eye tracking and visual attention and psychophysiological responses to pricing and promotions	Nomothetic	Identification of general connections between marketing methods, brain activity and consumption tendencies; probabilistic and incomplete explanations of individual human behavior	Scientific method, neuroimaging, psychographic profiling and quantitative tools of analysis
Interpretivist neuromarketing	Social and cultural influences on neural responses to marketing, individual differences and their impact on consumer behavior, neurophenomenology of advertising and product experiences	Idiographic	Identification of how individual experiences including social, cultural and other influences shape neurological functioning and the impact of these differences on consumer perception and behavior; links between processes of the brain and individual consumer experiences	Qualitative (e.g. ethnography, phenomenology and biography/history) tools of analysis, neuroimaging, will deploy some quantitative tools of analysis

Source: Matt Johnson and Robert Barlow, 2023

of consciousness with the goal of apprehending the nature of experience and of knowledge itself.

Following Kant, he argued that the appearance of reality is always and inevitably organized through the human perceptual and cognitive faculties. The world is "disclosed" to us through those faculties but is fundamentally inaccessible to us apart from the first-personal perspective through which we experience it. Therefore, he urged that, in their philosophical practice, the phenomenologist should aim to provide a rigorous and systematic description of subjective experience without making any assumptions about the existence of external objects or the nature of reality. He believed that we can gain insight into the essential structures of consciousness by suspending our preconceived beliefs and focusing solely on the phenomena as they appear to us.

Colaizzi (1978) introduced phenomenology as a practical research methodology grounded on participant interviews in the 1970s, and versions of his model have since been deployed by researchers in disciplines ranging from psychology, education and medicine to marketing (see e.g. Thompson, 1997; Greenwood, 2020; Goulding, 2005). The method typically begins by interviewing subjects who have lived the experience in question to capture their perspectives and record them in ordinary language that is as close to "value free" as possible. This information is then treated as the initial substance or "phenomena" from which researchers construct a broader understanding of the intersubjective "lifeworld" of shared social understandings within which these experiences take place and through which they are meaningful to the consumer.

Researchers undertake to develop these understandings through a process of "bracketing" the naïve, taken-for granted preconceptions associated with the "natural attitude" or perspective through which they view the everyday world, a process that is sometimes referred to as the "reduction" or "epoche." Though specific details of method can and do vary, the aim of this research is generally the same: to take the self-reported experiences of subjects as material, unburdened by these native preconceptions, and to use that material to reconstruct the systems of belief through which the subjects under study experience the world and (often) to probe the origins of their behavior by viewing it through the lens of those structures.

From the standpoint of the individual subject, the lifeworld is the set of beliefs that structure one's everyday "natural attitude" toward the world and in terms of which one's beliefs and behaviors are justified to oneself. However, the concept also extends beyond the individual: when these categories and assumptions that frame human experience are shared, they constitute a common, intersubjective lifeworld through which the individual's potential horizons of experience and meaning are defined. These horizons provide the backdrop against which individuals anticipate and interpret the range of "normal" experiences available to them corresponding to different "possible worlds and environments" (Husserl, 1950).

Within the marketing discipline, this kind of phenomenological research focuses primary attention on how consumers experience and interpret the consumption environments with which they may be confronted in everyday life. Scholars and practitioners who do this kind of work use the self-reports generated by interviewing individuals about their experiences to uncover and map the beliefs and expectations that structure their lifeworld context (e.g. Goulding, 2005; Svensson, 2007). These constructs then serve as a foundation on which to design more effective marketing approaches that align with the meanings these consumers attach to their own market activities and to products themselves.

Husserl's conception is often treated as the inspiration for modern phenomenological research methods, but much of this work has abandoned some of the more stringent

philosophical assumptions underlying the original concept. This has contributed to lively philosophical debate and to a somewhat splintered modern understanding of the methods involved in studying the world through a phenomenological lens and of what insights and knowledge phenomenology should produce. As a result, phenomenology research tends to fall along a spectrum.

On one end of the spectrum there are those who, like Husserl, deny the possibility of apprehending the world "as it is" beyond our first-personal interpretation of it. However, more recent interpretations (e.g. Van Maanen *et al.*, 2007) have all but abandoned this presumption while retaining phenomenology's emphasis on isolating and analyzing first-personal experiences. Taken to the extreme, the latter takes phenomenology some distance from its origins, treating self-reported experiences as data from which to develop a third-personal, empirical understanding of the internal processes through which we experience things. We believe that neuroscientists involved in phenomenology research can straddle this line: they may strive to develop third-personal knowledge about the connections between first-personal experiences and brain structure and function while at the same time acknowledging their own limited ability to escape the first-personal perspective, treating it as a continual source of precaution and internal questioning about how their experiences may be shaping their interpretation of results (Husserl, 1980).

Neurophenomenology and phygital

Phenomenology is well-suited as a methodology for helping us to understand how consumers perceive and engage with phygital marketing campaigns, and to explore the subjective meaning and significance they attribute to the fusion of physical and digital elements. To do so, the phenomenologist will draw on the first-personal experiences of users to reconstruct the specific social, cultural and environmental factors that shape their interactions with these hybrid marketing approaches. By adopting a phenomenological lens, researchers can capture the contextual nuances that influence customers' perceptions, preferences and behaviors.

Neurophenomenology is an approach to phenomenology that takes these first-personal experiences as a source of data through which to understand the relationship between subjective experience and neural activity. The approach is not concerned with how the brain produces consciousness in general, but with how neuroimaging and other techniques may be used to identify how an individual's brain state contributes to a specific, conscious state of mind.

Several studies have investigated the role of neurophenomenology in understanding the neural basis of consciousness. In an early and highly influential study, Varela (1991) explored the relationship between subjective experience and neural activity using a technique known as "microphenomenology." This involved training participants to introspectively analyze their own subjective experience while undergoing neuroimaging. The results of the study suggested that subjective experience can be correlated with neural activity in specific brain regions. Further research has helped to flesh out this individualized mapping between the brain and phenomenological states. Lutz *et al.* (2002) used a combination of first-person reports and EEG measurements to investigate the neural correlates of meditation. They found that experienced meditators showed increased gamma-band activity in the brain, which was associated with a state of focused attention and heightened awareness.

Overall, neurophenomenology offers a compelling means by which to connect first-person experiences (i.e. phenomenological states) with observable brain activity (i.e. evoked neural responses), providing a means of gaining third-personal perspective on those

experiences at an individual and group level (Gallager, 2008; Lutz *et al.*, 2015). This combination poses an intriguing set of possibilities for phygital marketing research by potentially providing researchers with a new and advantageous lens through which to interpret and develop strategy and tactics for the design of consumer experiences. Specifically, we will consider two ways that a neurophenomenological approach can contribute to our understanding of these first-personal consumer experiences here: by providing

- an *a priori* theoretical perspective through which to view their practical significance; and
- potential tools by which to assess the impact of our marketing interventions through direct measurements of brain activity.

Grounding phenomenology in theoretical neuroscience

Phenomenology is fundamentally concerned with understanding first-person, subjective states, which is an area of focus with natural connections to the disciplines of neuroscience and perceptual psychology. Neurophenomenology is a descendent within this tradition that is rooted in a modern neuroscientific interpretation of the lifeworld concept. As we have seen, the study of phenomenology involves developing an interpretation of the contextual factors that comprise the individual's lifeworld. Though the lifeworld concept has taken many forms since Husserl's writings on the subject, the role it plays within phenomenological theories has remained largely stable.

One interpretation of the lifeworld concept and its connection with perception has been particularly influential among neuroscientists and can be seen as the direct conceptual antecedent of modern neurophenomenology. Maurice Merleau-Ponty, a philosophical disciple of Edmund Husserl, focused particular attention on how the human perceptual apparatus depends on the expectations generated by our situation within a lifeworld context to function. He argued that human perception was not the direct causal product of sensory stimulation, but instead, was actively forged through the coupling of raw sense data with a "primordial openness" to the lifeworld (Merleau-Ponty and Smith, 1962).

While Merleau-Ponty's ideas about perception have been critiqued and refined over the decades, his general observation that subjective perception is not forged directly from sensation but is instead heavily influenced by contextual knowledge and meanings comprising the individual's lifeworld has been borne out by modern neuroscience (Gardner, 2007; Embree, 1981). The most prominent of these conceptual descendants is known as the "predictive processing" theory, which provides a new lens through which to understand the lifeworld concept.

Neurophenomenology: predictive processing theory

Predictive processing (PP) theory (Rao and Ballard, 1999; Friston, 2005; Hohwy and Seth, 2020) starts from the premise that activity within the brain gives rise to psychological processes, including subjective states, through a continual process of prediction and error minimization. Simply put, the theory proposes that our brains generate expectations or predictions based on our past experiences, and then use incoming sensory information to confirm or update those predictions.

According to these theories, the brain continually seeks to optimize its evolving "best guess" about the most probable causes of sensory inputs (Clark, 2013; Knill and Pouget, 2004; Lee and Mumford, 2003). This process of optimization takes place through a continual

back and forth exchange between top-down perceptual predictions and bottom-up prediction error signals. This then leading to a continual process of minimizing prediction errors (e.g. the discrepancy between top-down prediction and bottom-up sensory data), which approximates, via Bayesian inference, the best estimation for the cause of these sensory signals. In sum, PP suggests that our brains are constantly engaged in a process of predicting and updating based on sensory input. It helps us make sense of the world efficiently by prioritizing the most likely interpretations of our experiences.

Imagine the scenario, for example, of a familiar friend approaching from a distance. Your brain starts making predictions based on past encounters with that friend, expecting to perceive certain facial features and body language, and even anticipates the friend's typical greeting. These predictions are encoded by the brain from previous experiences, and generated in that moment from the sensory cues which retrieve them. As a result, you perceive the person approaching as your friend. As your friend gets closer, the signal from the sensory information (visual and auditory cues) becomes stronger. If the incoming sensory information matches your brain's predictions, the prediction error is low. However, if something fails to match your predictions – perhaps it's actually a stranger that looks like your friend – this surprising sensory information triggers a prediction error, indicating a mismatch between the prediction and the actual sensory input. The brain then updates its predictions by adjusting the existing models to account for this new information. As a result, in the mind's eye, the person you are perceiving ceases to be your friend, and your expectation is updated to reflect a new percept.

Notably, The result of this process of inference hinges on the interplay between Bayesian predictions and bottom-up prediction errors. This delicate equilibrium is regulated by the estimated accuracy or trustworthiness of sensory signals compared to perceptual predictions in the brain (Friston and Kiebel, 2009; Fletcher and Frith, 2009; Yuille and Kersten, 2006; Zarkali *et al.*, 2019). There is an antagonistic tension between the bottom-up sensory signals and the top-down predictions. In the above example, the signal strength of the bottom sensory cues increases as the friend approaches, increasing the pressure to confirm or deny these prior predictions.

Importantly, the PP account stipulates that one's internal subjective state is itself the generative prediction. That is, what we perceive is what we predict we will perceive. Over time, as the prediction is optimized by virtue of its continual comparison to bottom-up sensory input, so too does the percept and the two become one and the same (Seth and Hohwy, 2021).

This explanation of the process of perception has deep implications for understanding subjective phenomenological states more broadly. In understanding emotional processing for example, PP stipulates that what we subjectively feel at any moment reflects how we expect to feel given the relevant Bayesian priors associated with the sensory inputs we are currently experiencing. As with sensory perception, the subjective experience is the brain's best prediction in that moment. This account helps explain a range of seemingly anomalous or unintuitive response to sense data, such as instances in which a sense of emotional relief can take place prior to, or in the absence of, any actual physiological changes (Critchley and Garfinkel, 2018; Seth and Critchley, 2013). For example, one will feel immediately refreshed when they take a sip of cool water, even though the water has not yet actually rehydrated us. This is owed to our internal emotional models, which are predicting that we will soon feel better, a prediction that becomes the emotional experience itself.

PP is not without its detractors (e.g. Walsh *et al.*, 2020; Colombo *et al.*, 2021), with some arguing that the ideas have been over-extended (Litwin and Miłkowski, 2020). A full evaluation of the claims of predictive processing theory is beyond the scope of the paper.

Nonetheless, the model is not only compelling and grounded in established neuroscientific theory but has been validated to a considerable degree through rigorous research.

In the following section, we outline how such an approach can be leveraged to help understand the first-person account of phygital marketing experiences. We argue that the power of PP theory for phenomenological research in marketing, and research on phygital marketing in particular, is two-fold. First, it provides a clear research agenda for conceptualizing the lifeworld of consumers, which is information that can inform customer segmentation and targeting strategies and facilitate the design of increasingly effective marketing interventions. Second, it provides a potential framework for quickly and more accurately measuring the relative impact of these interventions in practice, which could be of particular help to marketers who aim to design novel consumer experiences like those typified by the phygital environment.

Structuring market research for understanding the lifeworld

All forms of practical phenomenology presuppose the possibility of using the data gathered through interviews and other engagements to assemble an understanding of the lifeworld context within which the individual finds meaning and takes action. Grounding our understanding of the lifeworld in PP theory offers new possibilities for penetrating the limitations of our own preconceptions and uncovering access to the systems of expectation and meaning within which research subjects interpret and understand the world. In other words, it provides a new interpretation of the individual's phenomenological "natural attitude." On this interpretation, understanding lifeworlds becomes an exercise in understanding the systems of prediction to which they give rise. Specifically, it involves uncovering patterns of expectation produced by previous exposure to stimuli and experiences, and decoding how those expectations manifest as predictions through which perception itself is made possible and on the basis of which actions and behaviors may be motivated.

Neurophenomenology research can then be thought of as seeking to understand how the structures of systems within individual brains manifest in these cognitive and behavioral effects. These structures determine what the predictions are, their relative impact on cognition and behavior, and what will incite them, and their functioning is theoretically accessible – and comparable across individuals – through brain imaging methods. In this way, the vast problem space of the "lifeworld" and its impact on perception can be conceived in terms of the brain's role as a predictive engine, a concept we will refer to as the "predictive lifeworld" to differentiate it from other lifeworld conceptions.

The insights generated by this outlook point toward new ways of conceptualizing and measuring the relative success of marketing experiences. Consider a phygital marketing campaign for a new style of luxury watch in which users are not only shown images of the watch, but can use augmented reality through an app on their phone to experience what it looks like on their wrist. Suppose the researchers are interested in understanding whether and to what extent this experience triggers a sense of *psychological ownership*, defined as a customer's emotional attachment to a given product or brand, which has been found to reliably increase a customer's willingness to pay (Jussila *et al.*, 2015; Morewedge *et al.*, 2021).

Research has consistently found that physical interaction with a good increases a consumer's feelings of psychological ownership (Reb and Connelly, 2007; Shu and Peck, 2007). These interventions leverage the well-known endowment effect (Tom *et al.*, 2006; Apicella *et al.*, 2014; Morewedge and Giblin, 2015), whereby consumers value an item more, the longer and more saliently, it is in their possession. In fact, more recent investigations have found that some simulations using augmented reality/virtual reality technology can in

fact be leveraged to drive reports of psychological ownership, which, in turn, drive purchase likelihood (Song *et al.*, 2020; Haumer *et al.*, 2020). But what if we want to know more about whether the effect has been induced *in this case*? What if experience designers aim to understand and improve the performance of their model? Neurophenomenology rooted in PP theory provides us with some advantages that can help marketers understand how to do so.

Theoretical understanding

To begin, a neurophenomenological approach informed by PP theory provides deep insight into the process through which perception itself occurs within the brain, which can potentially grant marketers greater power to understand the range of factors that may influence behavioral outcomes. Understanding phenomenological states is about understanding how similar experiences have been perceived, and the network of predictions and expectations that have been formed based on those experiences. Therefore, as we grow our understanding of the predictive lifeworld and of how these processes within the brain work to produce perception, it will lead to insights that could refine existing methodologies. For example, it could drive change in the phenomenological approach to interviewing practices, motivating greater focus on how prior beliefs, experiences and expectations create predictions about the future that will influence perception. By engaging in dialogue about anticipated events, practical phenomenologists can gain insights into how individuals project themselves into the future and the subjective meanings they attribute to those anticipated experiences.

Furthermore, it provides a renewed focus on understanding how these predictions will interact with the senses to drive perception, which will allow market researchers to segment their audience with greater precision and design interventions that induce, subvert, or otherwise interact with the brain's prediction-engine to generate the desired effect. For example, in the case above, if we want to create an experience that induces the same psychological ownership effects as actually interacting with a product, then we may be able to use our knowledge of a customer type's predictive lifeworld contexts to do so by shaping the experience to invoke or evade certain associations for particular types of users, and thereby influence their direct perception of the product.

Customer segmentation and targeting

Ultimately, this approach paves the way for a new perspective on customer segmentation and targeting aimed specifically at the cultivation of subjective states. Above and beyond classic demographic features, marketers may use this approach to segment consumers into distinct subgroups based on the relevant features of their predictive lifeworld, which can in principle be measured and compared at the level of signaling within the brain. To this end, marketers will be empowered to identify users according to the characteristics of their predictive lifeworlds and their prospective impact on perception. This change in perspective will help marketers narrow in on the specific customer characteristics that affect the prediction framework through which they will experience the marketing intervention. It is worth noting that the application of this concept within the realm of phygital research will not necessarily require a comprehensive and exhaustive understanding of an individual's entire predictive lifeworld. Instead, it will in most cases entail grasping the predictive framework most likely to be activated by the phygital experience itself.

Take the case mentioned above of a phygital encounter where a digital representation of a wristwatch is overlaid on a consumer's arm, thereby simulating the act of wearing it. The phenomenological understanding of how this encounter is perceived may depend on various

factors, such as past experiences with digital interfaces, simulations, attitudes toward simulation technology, psychological attachment to possessions and prior encounters with augmented reality. These factors from the user's past, which define their outlook on the present and future, will affect the likelihood they experience the intervention as sufficiently "real" to induce the desired effects.

For some individuals, this experience may trigger predictive mechanisms rooted in their psychological frameworks of actual ownership of a watch, leading to an experience that subjectively "feels" authentic. On the other hand, individuals who are more familiar with augmented reality and have a greater propensity to distinguish such experiences as distinct from physical reality may perceive the encounter differently, adopting an alternative structure of perception altogether. In this conception, the divergence in phenomenological responses ultimately stems from the relevant predictions invoked during the experience. Thus, the marketing team could segment consumers based on the relevant elements of their predictive lifeworlds, which can be traced back to the structures through which perception occurs within the brain. This, in turn, could lead to the development of distinct, targeted approaches to each of these segments aimed at producing the desired effects.

As an oversimplified example, consider the possibility that, through such an approach, two distinct customer types are identified: Type A and Type B. Type A, via their lived experiences, is familiar with augmented reality, and regularly embraces this technology both as entertainment and as a practical tool to make more informed decisions. Type B on the other hand, is composed of individuals who have yet to experience augmented reality directly, and whose previous experiences have led them to be generally apprehensive about technology. For Type A, using augmented reality to induce a feeling of psychological ownership may be as simple as merely providing them the opportunity to use the technology, unprompted. For Type B, however, the experience may need to be framed much differently, with the aim of dramatically shifting their predictive engines to produce a similar feeling of psychological ownership. The approach, for example, may require the practitioner to tell the customer something specific (e.g. "this is *just* like shopping for a watch"), to alter the relevant predictions for the experience at hand. It may then become possible to test the immediate power of these interventions through brain imaging that will allow market researchers to identify whether the desired psychological state has ultimately been achieved. We propose a range of experimental design possibilities for this case that might be deployed within different research paradigms in (Potential experimental designs in different research paradigms), below.

(1) Positivist marketing research:
   - *Example experiment:* Conduct a controlled online survey with a large sample of potential watch buyers. Randomly assign participants to two groups: one group uses the augmented reality system for virtual watch try-ons, and the other group does not. Measure and compare the conversion rates and purchase intent between the two groups. Use statistical analysis to determine if the augmented reality system positively impacts consumer purchasing decisions.

(2) Positivist neuroscience:
   - *Example experiment:* Use functional magnetic resonance imaging (fMRI) to measure brain activity in consumers while they interact with the augmented reality system for virtual watch try-ons. Analyze the neural responses to specific watch designs and features. Use statistical analysis to identify brain regions associated with positive emotional responses. Determine if certain design elements trigger consistent neural patterns indicative of purchase intent.

(3) Interpretivist neuroscience:
   - *Example experiment:* Combine ethnographic observations of the target watch market with neuroimaging techniques. Study a small group of these target consumers from diverse cultural backgrounds using the augmented reality system. Observe their interactions and collect qualitative data on their experiences and emotions. Concurrently, use neuroimaging to capture neural responses. Analyze the data holistically to uncover connections between individual experiences, cultural influences and neural signatures.

(4) Positivist neuromarketing:
   - *Example experiment:* Recruit a large sample of participants and use electroencephalography (EEG) to measure brain responses while they use the augmented reality system to try on virtual watches. Collect demographic and psychographic data to create consumer profiles. Use machine learning algorithms to correlate specific neural patterns with consumer profiles and preferences. Develop a predictive model to forecast consumer reactions based on brain activity.

(5) Interpretivist neuromarketing:
   - *Example experiment:* Conduct ethnographic fieldwork in different cultural settings where consumers use the augmented reality system for virtual watch try-ons. Combine qualitative interviews and participant observation to understand how social and cultural factors influence individual neural responses. Use neuroimaging to complement qualitative findings by identifying neurological patterns associated with cultural influences. Explore how these factors collectively shape consumer experiences.

(6) Interpretivist marketing research:
   - *Example experiment:* Conduct in-depth interviews with a diverse group of consumers who have used the augmented reality system. Explore their personal narratives and experiences with the technology. Employ thematic analysis to identify common themes and unique stories related to their perceptions of the virtual watch try-on experience. Contextualize findings within the cultural and social backgrounds of participants.

Source: Matt Johnson and Robert Barlow, 2023

It is worth noting that while classic demographic features such as age, gender, education level etc. may relate to a customer's segmentation insofar as they may systematically bias one's previous experiences (and therefore their predictions), these features are in principle orthogonal to their predictive lifeworlds. Observed relationships between these features may, nonetheless, assist in the market research process, enabling practitioners to generalize their approach to novel groups.

Neurophenomenology as a nascent methodology

We have argued here that a neuroscientific approach informed by predictive processing theory may help us unlock new potential for guiding approaches to shaping first-person, phenomenological experiences and have particularly important implications for the practice of phygital marketing. Ultimately, this approach paves the way for a new perspective on customer segmentation and targeting, aimed specifically at the cultivation of subjective

states. Above and beyond classic demographic features, marketers can use this approach to segment consumers into distinct subgroups based on the relevant features of their predictive lifeworld.

At the same time, neurophenomenology also holds potential as a methodology for interpreting and reacting to first-personal accounts and for formally testing interventions like the ones we have described above. Traditionally, researchers have evaluated the success and impact of consumer experiences on psychological states by drawing inferences from their behavior or relying on subjective self-reports. While self-report and analyses of subjects' subsequent behavior may get us some ways toward, for example, understanding how experiential factors affect the sense of psychological ownership induced through the experience, neurophenomenology may help us to make more accurate and timely assessments of how they are influencing or will in the future influence cognitive and behavioral outcomes. The direct measurement of evoked neural responses combines the best of the two available alternatives: relying on consumer self-report is fast but notoriously unreliable, while using behavioral outcomes as our test is accurate, but it will take considerably longer to detect results.

In the sections to follow, we briefly review what current insights are possible using interpretivist neuroscience methodologies and the future opportunities and challenges for these methodologies.

Insights from interpretivist neuroscience: intersubject correlation studies

As described above, the majority of neuroscientific investigations are positivist, of which most involve reporting results that generalize across diverse subgroups. However, there are some notable exceptions to this pattern that leverage novel analyses to deliver more granular insights about subgroups and individual participants.

For example, Hasson *et al* (2004) used a method called intersubject correlation (ISC) analysis to assess such differences. ISC involves measuring the evoked neural responses across the brains of each participant in a trial and tracking the degree to which they are correlated with those of other participants. Doing so provides a measure of similarity among the neural responses of two or more individuals. This method has been used to help understand the heterogeneity of mental processes across participants when presented with the same stimuli, such as a feature length movie (Hasson *et al.*, 2008; Hasson *et al.*, 2010) or speech (Silbert *et al.*, 2014; Schmälzle *et al.*, 2015). Overall, these investigations have helped to uncover the sources of such heterogeneity within samples of participants and to explain why certain stimuli lead to more or less consistent mental responses by identifying the individual difference variables that contribute to these distributions.

In the phygital domain, such analyses may prove especially fruitful for understanding the diversity of participant responses to be found within different sensory environments. Do all participants have a similar interpretation of the phygital experience? Or does it produce a broad distribution of responses? The heterogeneity of a consumer experience has significant consequences. When developing a firm, consistent brand personality, for example, a homogenous experience is often most desirable (Liu *et al.*, 2017). In contrast, a more personalized, and unique experience for each consumer may better serve the aims of performance marketing (Chandra *et al.*, 2022).

Marketers may also have specific hypotheses they want to test about the sources of this heterogeneity that ISC could also help address. Consider the example of trying on a watch before buying it, as discussed above. What precedes this event may have a significant impact on how consistency of the experience across consumers. For example, a generic welcome message (as compared to a personalized welcome message) may lead to a more consistent experience across participants. Relatedly, marketers could use ISC to examine the

heterogeneity of responses across different consumer personas or different marketing scenarios.

An additional extension of ISC has been applied to study the correlations in neural activity between speakers and listeners engaged in discourse, finding that a synchrony underlies meaning encoding (by the former) and speech comprehension (by the latter) (Stephens *et al.*, 2010). While little work has examined the implications of this for marketing practice, Liu *et al.* (2023) recently demonstrated that the degree of such "neural coupling" predicted persuasiveness during dyadic conversation. Such an approach could be used in the phygital environment to better understand, for example, the degree of neural coupling between an individual consumer and a brand's messaging.

A similar methodology has been adopted in social neuroscience, where Chavez and Wagner (2020) pioneered a "round-robin" methodology for examining how people represent other people to themselves during contemplation. In this investigation, the researchers scanned a close-knit group of friends with fMRI and observed a significant correlation between the neural activity patterns observed when individuals contemplated their own identities and those observed when fellow network members directed their thoughts toward the same individual. Follow-up work (Stendel *et al.*, 2023) has found that measures of individual self-esteem can be explained by an incongruence in self-other representation within such groups, suggesting that feelings of low self-worth are driven by a discrepancy between the way one reflects on their own identity and the way that others think about them.

Applying this to the phygital world could help unpack all-important social factors in marketing. The round-robin approach could, for example, be used to better understand the individual closeness felt toward marketing representatives, and fellow brand loyalists. Work in consumer psychology has found that the connection between consumers of the same brand can be an important factor for long-term loyalty and lifetime value (Cova and Pace, 2006; Fournier and Lee, 2009). As an interpretivist approach, the round-robin methodology could help uncover individual difference variables that underly these differences in brand-community closeness.

Opportunities and challenges for interpretivist neuroscience and neurophenomenology

Apart from ISC and round-robin methodologies, interpretivist neuroscience within a naturalistic setting is somewhat limited. However, such approaches may broaden in scope as neuroimaging technologies and analyses improve. The full promise of neurophenomenology, while ambitious and yet unrealized, is to provide direct insights into first-personal experiences by translating them into third-personal description (Varela, 1996; Olivares, 2015). To this end, methodological orientations to neurophenomenology take varied forms. Since the 1990s, there has been a systematic effort to establish a connection between the empirical sciences, particularly neuroscience and phenomenology (Varela and Shear, 1999; Schmicking and Gallagher, 2009). At its core, this project primarily centers on the effort to integrate phenomenology into the realm of the empirical sciences (Petitot, 1999; Roy *et al.*, 1999; Zahavi, 2013; Ramstead, 2015; Gallagher, 2012), aligning it with their theories, methodologies and procedures.

Overall, neurophenomenological research has made substantial headway on the prospect of confidently inferring individual phenomenological states from measured brain states. However, the current capabilities are limited in scope, and are restricted to specific psychological states as opposed to one's entire inner landscape. And while these examples indicate the promise of neurophenomenology as a potential tool of measurement, several challenges will need to be overcome for it to reach maturity as a practical methodology.

One main challenge is the maintenance of ecological validity. Even if it becomes fully possible to infer specific phenomenological states from individual brain states, the artificiality of the experimental set up may preclude any kind of valuable insight. However, existing phygital research has demonstrated the effectiveness of experience sampling methods (ESM), particularly when implemented through smartphones, in providing valuable phenomenological insights into phygital experiences (e.g. Miel, 2022). By leveraging modern mobile technologies, ESM enables researchers to investigate aspects of participants' experiences that might otherwise go unnoticed or be forgotten over time, while enhancing the ecological validity of the findings.

Traditionally, neuroimaging methodologies, are restricted to a laboratory setting. However, mobile neuroimaging technologies, such as mobile electroencephalography (mEEG) and functional near-infrared spectroscopy (fNIRS) allow data to be gathered while participants walk around, explore their environments and engage in a range of real-world scenarios (Stopczynski *et al.*, 2014, Krampe *et al.*, 2018). The degree to which this data could be used and potentially combined with ESM methods to reveal and map phenomenological states remains an open question. However, these technologies represent a set of potentially valuable tools for sampling neuroscientific processes in real world settings. These tools have been successfully used to measure real world neural responses related to e-commerce (Nissen *et al.*, 2019) and brand preference (Krampe *et al.*, 2018).

While the aforementioned studies have involved collecting and aggregating data from many subjects over multiple trials, Goto *et al* (2019) have recently proven capable of predicting purchase intent based on EEG data gleaned from a an individual single trial. To date, single-trial EEG has not yet been tested via mobile technology and within a real-world setting, but these recent findings suggest that such an approach may soon be possible. And while concerns of ecological validity remain, including the risk that the mere knowledge that one's data is monitored will influence psychological processes, these technologies have significantly assuaged concerns (Ladouce *et al.*, 2022), paving the way for their potential use in neurophenomenology.

Overall, these methodologies represent an exciting, though currently unrealized, set of possibilities for understanding phenomenological states, and for testing the direct psychological effects of experiential events. Future work will be needed to further develop these methods, and ensure that their insights follow from valid measurement of phenomenological states generated by real-world environments.

Discussion and conclusion

Phygital marketing is unique among marketing perspectives in its focus on first-hand experiences. In this pursuit, it shares a deep commonality with the discipline of neuroscience, which has long sought to understand its biological basis. Despite this affinity, few investigations to date (though see Johnson and Barlow, 2021) have sought to probe how neuroscience could be harnessed as a tool for understanding the first-personal experiences of phygital engagements.

In this paper, we have attempted to address this lacuna. We have proposed that, despite its tradition as a largely positivist discipline, neuroscience holds immense and underappreciated potential for better understanding phygital consumer experiences. Specifically, we have sought to describe how neurophenomenology can potentially function as a window into first-hand phygital experiences, by integrating theoretical neuroscience (e.g. predictive processing theory) to reform the classic market research aims of segmentation and targeting. We have also highlighted the promise (as well as the shortcomings) of

neurophenomenology as a direct methodology for empirically testing the success of such an approach.

Beyond its potential use for phygital marketing practitioners, it is our hope that this account can provide a helpful theoretical foundation for future work. Subsequent research will be needed for the full promise of neurophenomenology to be realized, and for its ready application for designing phygital consumer experiences. For example, what are best practices for understanding the predictive lifeworld? What is the role of developmental and cognitive science in improving our understanding of how previous experiences lead to future predictions? While it is largely understood that experiences *do* inform future predictions, there is evidence suggesting that the nature and schedule of the experiential input has a significant impact on the strength of the prediction, and subsequent impact on perception. In language acquisition, for example, it is often observed that the variance within a set of exemplars has a large impact on learning outcomes (McDonough and Trofimovich, 2013) and therefore on the predictions one makes from these experiences.

While addressing such questions will be necessary to evaluate the full potential of the neurophenomenological approach, at the same time, researchers and marketing professionals will also need to consider ethical consequences that will arise should the promise of the approach reach its scientific potential. Recall that the full promise of neurophenomenology is to infer individual phenomenological states, which naturally raises a host of serious ethical considerations. Considered in tandem with the ability to intervene and shape these states of mind, the ethical stakes are high, and it will be important to consider if and when these tools are manipulative. Though they lie beyond the scope of the current paper, these are crucially important questions that will need to be addressed. Ultimately, an ethical approach to deploying these tools and practices will ensure their impact is consistent with consumer autonomy and well-being.

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