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Smartphones as Metamedia: A Framework for Identifying the Niches Structuring Smartphone Use

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This article develops and applies a holistic approach to structure smartphone use. It builds on an understanding of the smartphone as a metamedium containing a multitude of "constituent media" that are applicable in an unprecedented range of contexts. We elaborate on the smartphone's structure and its uses from two theoretical venture points: an ecological understanding of the evolving media landscape within the metamedium and a mobile phone–centered perspective on differential uses and gratifications of the metamedium as a whole within different contexts. Gibson's affordance theory permits us to integrate these perspectives to account for smartphone structure and use in terms of niches that emerge out of embodiments and enactments of affordances in varying contexts of use.

Keywords: metamedium, mobile communication, theory of the niche, affordance theory, uses and gratifications

The smartphone can be understood as the latest manifestation of a decades-old phenomenon: the appearance of mobile counterparts to established stationary electronic devices by which the range of their uses multiplies. This phenomenon has been studied in detail for such preceding technologies as the transistor radio, the portable audio cassette player, mobile game consoles, and the cellular telephone (Goggin, 2010). However, the case of the smartphone as the mobile counterpart to the Internet-connected personal computer goes far beyond its precursors. The range of uses for PCs had already been broader and less clear-cut than that for radios and telephones. By multiplying this range of uses with the dramatically increased number of situational contexts in which mobile devices can be applied, smartphones involve an exponential leap in the range of possible uses compared with the increases for previous media technologies going mobile.

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Scholars have tried to catch up with this evolution with studies on various distinct forms of smartphone use, such as location-based gaming (Frith, 2013), social networking (Humphreys, 2007), and news consumption (Westlund & Färdigh, 2015). Others have claimed that no accumulation of such focused approaches on select uses can overcome the basic challenge posed by the boundlessness of the possibilities of mobile Internet use. Madianou and Miller (2012) have suggested shifting the perspective from a focus on the uses of distinct media to a holistic exploration of how and why users exploit affordances within the overall media ecology.

The goals of this article are to first theoretically ground such a holistic approach in perspectives on the media ecology and media use that are rooted in communication studies. We set out from an understanding of the smartphone as the most complete manifestation of a "metamedium" (Jensen, 2013, 2016; Kay & Goldberg, 1977). In the second theoretical section, we derive concepts for an integrative framework from ecological, media-centered (Dimmick, Kline, & Stafford, 2000), and phone use–centered perspectives (Frith, 2015; Wirth, von Pape, & Karnowski, 2008). We finally integrate these two approaches on the basis of Gibson's (1979) original formulation of the affordance concept. In particular, we emphasize an ecological understanding of affordances beyond that of just the technological (Hutchby, 2001; Norman, 2002). We integrate gratifications research into our structuring of mobile metamedia because gratifications shape the perception of affordances (Gibson, 1979). By bringing together the concepts of metamedia, affordances, and traditional uses and gratifications, we develop a framework for identifying usage patterns of smartphones—the most prominent metamedia in the world today. In doing so, we offer a way to integrate affordance theory with metamedia, arguing that the perception of affordances is shaped at the level of hardware (e.g., the metamedium of the smartphone), software (e.g., the constituent media of various mobile apps), and situation (e.g., the social, physical, and technological context of use). Integrating these theories, we draw on ecological understandings of media and reclaim the term *niche* to describe empirically identifiable patterns of smartphone use. Ultimately, we aim to bridge the gap in our understanding of metamedia, situational context, and affordances to enable future operationalization and empirical investigation of patterned structures of metamedia use.

The Smartphone as a Metamedium

The smartphone is, and can be considered for the foreseeable future, the most prominent metamedium in the world (Jensen, 2016). This understanding is grounded in Turing's (1937) original conception of the computer as a "universal computing machine" (p. 241). In their seminal 1977 article on the potentials of portable computers, Kay and Goldberg adopted Turing's computer concept into both media studies and media design by "turning the Universal Turing Machine into a Universal Media Machine" (Manovich, 2007, p. 43). Kay and Goldberg (1977) proposed:

> If such a machine were designed in a way that *any* owner could mold and channel its power to his own needs, then a new kind of medium would have been created: a metamedium, whose content would be a wide range of already-existing and not-yet-invented media. (p. 40; emphasis in original)

In the remainder of this article, we refer to these media contained in a metamedium as *constituent media*. Even if their concrete "dynabook" concept resembled a notebook, Kay and Goldberg's (1977) ultimate vision was closer to today's smartphone "as a device as small and portable as possible which could both take in and give out information in quantities approaching that of human sensory systems" (p. 31). Smartphones can host practically unlimited combinations of apps and include a wide range of sensors and interfaces. They can also be carried into an unprecedented range of situations, not the least through their global accessibility: about two-thirds of adults in advanced economies own a smartphone, and 37% of adults in emerging economies own one (Poushter, 2016).

Jensen (2016) emphasizes an apparent boundlessness of metamedia:

> Metatechnologies and metamedia allow for remarkable degrees of freedom, both when it comes to the designing of new genres and services, and when it comes to the embedding of these genres and services into the lives of individuals, groups, and entire societies and cultures. The smartphone is one recent example of the flexible affordances and end uses of a metatechnology. (p. 2)

Taking up this metaphor, we see the key challenge posed by metamedia is that they are underdetermined by the established parameters and relations as a function of which we have historically described both the media environment and media use. Therefore, their study is not only relevant in its own right but also contributes to a general understanding of a media environment marked by convergence and mobility: "Metamedia raise fundamental questions of what constitutes a medium in the first place . . . and how communication can be understood and studied under current technological circumstances" (Jensen, 2016, p. 2).

A metamedium is a structure into which constituent media are nested. While it would be easy to call these nested media apps (or mobile applications) in a smartphone context, we recognize that computers are also metamedia hosting various software programs. *Constituent media*, therefore, is a broad enough term to be applied across an ever-evolving metamedia landscape.

Unlike earlier physical devices, this bundling of constituent media within metamedia is not uniform in any evident way. Their nesting within a metamedium is configurable, but also programmable (Jensen, 2010). In a first step, this bundling of constituent media is set up by designers, but it remains "programmable, each in distinctive ways and to variable degrees, by administrators, regulators, and users" (Jensen, 2010, p. 75). Users ultimately configure their constituent media within these metamedia; however, various actors have influence over aspects of both the metamedia and constituent media.

That the smartphone is subject to so much user-sided configuration and programming poses a challenge to the study of its uses. We cannot observe the uses of a metamedium without some preconceptions of its overall structure, but we cannot assume a particular structure if the medium continues to be configured and programmed through use. To escape this chicken-and-egg problem, we argue that two views must be taken at once in an integrative perspective: an ecological view on the evolving structure of the metamedium "smartphone," and a view that embraces the various uses of the mobile phone over time.

An Evolving Ecology of Constituent Media

Several theoretical approaches have endeavored to describe media change as the evolution of a broad landscape of distinct media with their respective functions and contexts of use. This is the case for media ecology (McLuhan, 1964; Strate, 2004), the media repertoire approach (Hasebrink & Popp, 2006), theory of the niche (e.g., Dimmick et al., 2000), and domestication research (Silverstone & Haddon, 1996). However, these approaches have faced principle challenges with their basic units of analysis—a variety of distinct media distributed across the diverse contexts of users' everyday lives. Pool (1983) observed as early as 1983 that "a process called the 'convergence of modes' is blurring the lines between media" (p. 23), hence dissolving the unity of distinct physical devices being tied to distinct forms of media content and uses. For mobile media, this blurring of lines is taken a step further as stable situational contexts of use dissolve; as Quandt and von Pape (2010) put it, we observe a "blending of spaces brought about by mobile technologies" (p. 343). To illustrate this process with an example, some decades ago, a television was only able to distribute television content such as a specific TV show; at the same time, the TV show could only be viewed on a television. Over time, due to technological convergence, this unity faded such that we can both view TV shows using other devices and use a television to access content other than dedicated TV content (e.g., to play video games). Mobile media have added a third dimension to this blurring of lines: whereas watching TV was previously tied to a stable situational context (e.g., it was unlikely that a person would be in the company of a stranger while watching a TV show in his or her living room), this is no longer the case. Today an individual might watch a TV show on a smartphone while riding public transportation and therefore be in the presence of complete strangers; just as easily, the same person could watch the same show in his or her familiar living room.

Metamedia have played a major role in this process: The PC and the smartphone have absorbed an increasing range of communicative practices from other media that used to function through dedicated devices, such as television and radio. The smartphone is also the principal actor in the blurring of spaces through its mobility. The very principle of a metamedium challenges an ecological perspective on media change: the more uses one dominant metamedium affords and the more contexts it invades, the less media change can be described as a constellation of distinct media and contexts.

Several studies using the theory of the niche have provided a starting point to overcome this challenge by analyzing metamedia not in their entirety but focusing on particular constituent media. This perspective has produced detailed measures of the extent to which metamedia have transgressed into the domains of preexisting distinct media. Overlaps were identified between the gratifications of the landline telephone and those of the constituent media e-mail (Dimmick et al., 2000) and instant messaging (Dimmick, Feaster, & Ramirez, 2011) as well as between news in the traditional media of TV, newspaper, and radio and constituent news media on smartphones and PCs (Dimmick, Feaster, & Hoplamazian, 2011; Li, 2017; Struckmann & Karnowski, 2016). However, only in contexts where the opportunities to use the traditional media were limited were the constituent media deemed superior to their traditional counterparts (Dimmick, Feaster, & Hoplamazian, 2011). To describe this ability "to gratify a need in a particular time-space location," Dimmick, Feaster, and Hoplamazian (2011) used the term "gratification opportunities" (p. 27).

Certain insights from the theory of the niche can be applied to a metamedium. For example, one could start with an assumed set of distinct constituent media of the smartphone, the most obvious being the set of all available apps. One could then describe each of these apps through the particular pattern of gratifications and gratification opportunities that users find in it on the basis of survey data. For example, use of WhatsApp may provide the gratification of coordination to a high degree, but another gratification, entertainment, to a lower degree. In contrast, an app such as Spotify provides a limited extent of coordination but is strong on entertainment. Regarding gratification opportunities, one could expect, for example, gratification opportunities with WhatsApp to be low at nighttime or when driving but high while commuting on public transport. The metamedium smartphone could therefore be characterized as the sum of its constituent media (apps) with their respective sets of gratifications and gratification opportunities.

Dimmick's theory of the niche, however, is fundamentally limited in its application to a metamedium. The entire structure of a theory of the niche typology of smartphone use would rely on a preconceived division of the metamedium into distinct constituent media— namely, apps—conceptualized as mutually exclusive entities ("like plants and animals in nature"; Dimmick, Feaster, & Hoplamazian, 2011, p. 26). This a priori assumption cannot grasp the highly dynamic structure of metamedia in everyday use: some typical smartphone uses seamlessly span different apps and even categories of apps, such as taking a photo and then sharing and commenting on it on Facebook. These uses cannot be accounted for in an app-based perspective; rather, use of the metamedium must be considered in terms of larger sets of apps. And some apps are themselves structured into very diverse components that accommodate distinct uses. Thus, the Facebook app accommodates components for interpersonal exchange, consumption of mass media content, and online shopping, which has led scholars to observe that "not all Facebook use is the same" (Macafee, 2013, p. 2773). With these considerations in mind, we turn to a use-focused perspective.

Mobile Phone Research: Gratifications and Uses

A perspective on smartphone use that is deeply rooted in communication studies is the uses and gratifications approach. In this tradition, Leung and Wei (2000) identified gratifications of feature phone use in the late 1990s. Disturbingly, perhaps, the range of gratifications obtained by smartphone users in the 2010s (Grellhesl & Punyanunt-Carter, 2012; Lin, Fang, & Hsu, 2014) appears practically unchanged. The undeniable evolution of mobile phones seems to have elapsed the uses and gratifications approach's theoretical categories. In response to this shortcoming, two perspectives have refined the constructs for grasping the how and where of mobile phone use.

Mobile Phone Appropriation Model

The mobile phone appropriation model by Wirth et al. (2008) combined the uses and gratifications approach with theories on the restrictions and norms of mobile phone use, such as the theory of planned behavior (Ajzen, 1985), but also more qualitative approaches (e.g., domestication theory [Silverstone & Haddon, 1996] and frame analysis [Goffman, 1974]). Arguing from an innovation theory perspective, Wirth et al. (2008) did not refer to the mobile phone as a metamedium but as a "basic innovation" (Schumpeter, 1912) and a "technology cluster" (Rogers, 2003). They nevertheless made the analogous observation that "with every new generation of mobile end devices, new services and functionalities are embedded into the

basic innovation of 'mobile telephone'" (Wirth et al., 2008, p. 600). To grasp the ensuing complexity of use, they complemented the traditional gratification-based distinction of uses with a second distinction of the features of the mobile phone as a technological object that are being engaged in various uses (Wirth et al., 2008, p. 599). In contrast to gratifications, such as distraction or relational maintenance, object-oriented aspects of (pre-smartphone) use included voice calling, text messaging, and using screensavers and ringtones, each of which is clearly defined by the feature of the phone on which it relies. Following an update to the model (Lee, Karnowski, von Pape, & Cionea, 2016), new object-oriented uses have been defined for various types of apps, such as playing games and browsing the Web.

The procedure through which Wirth et al. (2008) categorized mobile phone use deviates from the theory of the niche approach. Rather than starting with media and asking which gratifications were achieved through which constituent medium, the mobile phone appropriation model starts with gratifications and asks *across* which constituent media they exist. The same patterns of mobile phone gratifications emerge from different and multiple app uses. For example, a pattern centered on entertainment could involve mobile phone uses that involve playing games (e.g., the use of Candy Crush) and listening to music (e.g., the use of Spotify; cf. Wirth et al., 2008). These apps do not necessarily compete, but both contribute to the gratification of entertainment.

However, the mobile phone appropriation approach also has a blind spot: because the typology builds on gratifications only, it cannot distinguish uses that resemble one another in their gratification structures but differ in constituent media use. Thus, uses in which the gratifications of entertainment and sociability are obtained by browsing one's Facebook feed fall in the same category as uses in which they are sought by a telephone conversation.

Context Matters

As an additional limitation, the mobile phone appropriation model does not account for the variance in situational contexts that is essential for *mobile* phone use and that had been represented by the concept of gratification opportunities in the theory of the niche approach (Dimmick, Feaster, & Hoplamazian, 2011). The factors of gratifications, norms, and restrictions that Wirth et al. (2008) assumed to determine mobile phone use are only considered on the level of individual users, not with respect to the highly diverse time and space structures that constitute situations of use throughout users' everyday lives. There is, however, ample evidence for the influence of contexts on all three factors. Regarding the gratifications of mobile media, Dimmick Feaster, and Hoplamazian (2011) have shown that at least the relative gratifications compared with alternatives depend largely on the context of use, making mobile media less interesting in domestic contexts, where TV screens and PCs can beat them on screen size and sound quality. Nevertheless, they argue that mobiles "free the consumer from the space-time constraints of traditional media use" (Dimmick, Feaster, & Hoplamazian, 2011, p. 25). Focusing on news consumption, Struckmann and Karnowski (2016) found that "news consumption via mobile devices serves as an extension of news consumption via a PC or notebook in situations where this is not possible" (p. 315). However, scholars of location-based smartphone applications have demonstrated the dependence of their gratifications on the context, with the utility of these services often being strongly linked to the environment's physical features (for an overview, see Frith, 2015). In this vein, they have criticized the idea of an "annihilation of space and

place" (Frith, 2015, p. 3) through mobile technologies and instead emphasized the idea that mobile services create a hybrid space of the physical and the digital, thereby enhancing the perception of space.

Zhang and Zhang (2012) have classified several of the aforementioned factors into three main contextual influences on digital media use: physical environments (e.g., technological restrictions related to network access), social dynamics (for cognitive restrictions as well as norms and social gratifications), and access to alternative media (e.g., a notebook on one's desk as an alternative to more comfortable Internet access). This classification has already proven to be useful to describe specific aspects of mobile media use (Struckmann & Karnowski, 2016).

Integrating Constituent Media and Gratifications

Both the ecological, media-centered and the mobile phone, use-centered approaches departed from points where the established parameters (i.e., distinct media; gratifications) were revealed to be insufficient to determine the complex use structures of the contemporary media landscape in general and of smartphones in particular. Remarkably, their respective advancements have brought the two approaches closer together: The media-centered perspective has integrated the analytical level of constituent media (i.e., with smartphone apps) that determine ways of using the metamedium. And with the mobile phone appropriation model, the use-oriented perspective has added another analytical layer of object-oriented uses that refer to the features of the constituent media and can also be described as uses of apps in the smartphone era. But even if both approaches integrate the gratification concept, they guard their respective foci on the different kinds of constituent media on the one hand and uses on the other hand by integrating the other factor only in a secondary, descriptive step.

Linking to Affordances

A means to overcome both the remaining shortcomings and differences is partially provided through the concept of polymedia, which Madianou and Miller (2012) proposed as a description of the emerging media environment. "In conditions of polymedia, the emphasis shifts from a focus on the qualities of each particular medium as a discrete technology to an understanding of new media as an environment of affordances" (Madianou & Miller, 2012, p. 170). Thus, the concept of polymedia emphasizes a broader context of multiple affordances across a multimedia, multiplatform environment. Madianou (2014, p. 667) argues that polymedia differs from affordance theory in that it focuses on users and the multiple sets of affordances that contemporary media such as smartphones embody: "Rather than focusing on discrete technologies and platforms and their associated affordances . . . polymedia shifts our attention to how users treat media as integrated environments of affordances."

While we agree that the contemporary smartphone can be understood as polymedia, we differ in that we understand communication technology *and* the environment in which they are situated to each have sets of affordances. Madianou (2014) suggests that polymedia are not necessarily situated in geographic places. Based on interviews with Filipino immigrants and descriptions of their smartphone use, Madianou argues that place-based systems do not matter in understanding the polymedia environment where participants describe using smartphones in ways that are not at all place-specific. Instead she focuses on

the internal and micro sets of affordances that enable both emotional management and social change. Therefore, polymedia describes an object-oriented affordance lens but misses our focus on the various context-enabled affordances, as highlighted by scholars of location-based smartphone applications (e.g., Frith, 2015).

Additionally, the concept of polymedia is fundamentally grounded in interpersonal communication (Madianou & Miller, 2012). Understanding smartphones as a metamedium, however, includes many different kinds of constituent media, including media consumption of entertainment and information, which may or may not be part of interpersonal communication. Therefore, the emotional and relational management that are central to polymedia become but two potential gratifications within a metamedia framework.

Nevertheless, the analytic emphasis on an *environment of affordances* suggested by the concept of polymedia helps integrate the concepts of constituent media features and of uses and gratifications.

Affordances as Embodied and Enacted

While much has been written recently about communication affordances (e.g., Davis & Chouinard, 2016; Evans, Pearce, Vitak, & Treem, 2017; Nagy & Neff, 2015; Samson & Soon, 2015; Schrock, 2015), we return to Gibson's (1979) original writings. Gibson suggests that features are discernable components or attributes of the environment and its objects that embody particular sets of affordances. Thus, he wrote with respect to a hut that "its usual features are, first, a roof that is 'get-underneath-able' . . . second, walls, which afford protection from wind . . . and third, a doorway to afford entry and exit" (Gibson, 1979, p. 38). The hut's features reflect its design, and they structure its affordances by embodying certain units or sets of affordances (protection from wind, cold, surveillance). These sets are also more likely to be exploited together in a given use, such as secluding oneself. The features hence arguably also structure use, even though they cannot determine it, because use is also subject to other user-sided factors such as the gratifications sought by the user (e.g., comfort), which are independent of an object's design features. This perspective corresponds to the media-centered perspective in the tradition of the theory of the niche described above. It is of high heuristic value to describe the uses of objects that are strongly structured through their features, such as the early feature phones.

The opposing reasoning of the use-centered approach can also be articulated in terms of affordance theory: the sets of affordances that come into play are constituted not solely through an *embodiment* in features but also through particular types of use in a process that we call an *enactment* of affordances. The uses are then principally determined by user-sided factors such as the gratifications sought. And just as embodied sets of affordances can structure uses, enacted sets of affordances can structure perceived features. Two girls seeking to entertain themselves in a park with a game of soccer may enact the shoot-in-between-ability that is provided by two trees. In absence of this soccer game, it would not occur to anyone to consider the two trees a feature of the park—at least no more than any other of the unlimited possible combinations of trees or other objects present. In this point we slightly disagree with the assertion that "features are static while affordances are dynamic, emerging from the relationship between the user, the object, and its features" (Evans et al., 2017, p. 6). When considering a broader ecology, features, too, can be understood as dynamic, selectively perceived based on gratifications sought. We therefore agree

with Madianou and Miller's (2012) analytic focus on "how users exploit these affordances in order to manage their emotions and their relationships" (p. 172).

Leaving aside extreme cases of sets of affordances being strongly embodied or enacted, the affordances exploited in most objects are generally both embodied and enacted to some extent. To integrate both perspectives, we therefore suggest subsuming features and uses under the term *niches*, as suggested by Gibson (1979): "a niche refers more to *how* an animal lives not *where* it lives . . . a niche is a set of affordances" (p. 128, emphasis in original).

Resituating Niche

The term *niche* has been used in several communication and media-related research contexts. Sometimes niche describes a subcultural genre of media. For example, diasporic media are sometimes referred to as niche media (e.g., Budarick & King, 2008). Most prominent, however, is Dimmick and Rothenbuhler's (1984) theory of the niche. The theory was developed to provide a framework for understanding competition and coexistence between media industries in the late 20th century. Before we can resituate a concept of niche in conjunction with metamedia, a closer examination of the context in which it was developed is warranted.

Dimmick (2003) suggests that the theory of the niche is situated in "media economics and management" (p. xi). In particular, he applied ecological notions to 20th-century media industries such as newspaper, television, and radio. In his theory of the niche, industries are populations, where competition emerges when two populations try to occupy the same niche within an environment—that is, when they depend on the same resources within an environment (Dimmick & Rothenbuhler, 1984). Where there are limited resources, competition can lead one population to displace another. However, when populations rely on different kinds of resources, then coexistence among populations is possible. "The niche of each industry or population—newspaper, TV, radio, and the outdoor advertising industry—is its proportion utilization of local, national spot, network or national, or classified advertising" (Dimmick & Rothenbuhler, 1984, p. 109).

Dimmick's (2003) theory of the niche does not draw on Gibson's (1979) ecological model, nor does it draw on the notion of affordance. As a theory of media economics and management, Dimmick's ecological model positions industries in the ecological role of the animal. Instead, we suggest a much more traditional approach to an ecological model that positions metamedia as part of the environment in which animals (i.e., humans) live. We situate our use of the term *niche* on Gibson's (1979) definition as the set of affordances, not just resources. Therefore, we argue that by identifying sets of affordances of constituent media, we can identify how people incorporate metamedia into their everyday lives through patterned niches.

Contextual Factors

As discussed above both on the basis of the theory of the niche's gratification opportunities (Dimmick, Feaster, & Hoplamazian, 2011) and on the basis of context-based research (Frith, 2015; Struckmann & Karnowski, 2016), gratifications sought and obtained depend on the situational context of media use. This dependence is also elaborated in Gibson's (1979) ecological affordance theory. Affordances

are attributed primarily to the environment and only secondarily to objects in their nature as more or less detachable components of the environment, because these objects' affordances generally depend on the co-occurrence of other environmental and situational affordances. Thus, Gibson (1979, p. 274) emphasized that the presence of a suitable surface is necessary for a stylus to afford traceability. On this point we therefore suggest expanding Evans et al.'s (2017) appeal "for conceptually defining communication affordances in terms of the multidimensional relationship between the object or technology and the user" (p. 39) by including the situational context into the equation as a constitutive third component. From this perspective, an object's mobility is not just another affordance in the sense of portability but a constitutive part of the embodiment and enactment of all kinds of affordances based on—and varying with—the respective situational contexts.

Structuring Metamedia

We propose a model to structure metamedia by identifying their niches. Figure 1 depicts on one side the structuring influences between metamedia hosting various constituent media with their respective features embodying specific sets of affordances; on the other side are gratifications leading to uses that enact sets of affordances. This double-sided process of structuration is both limited and enabled by characteristics of the specific situational context. Niches can then be understood as patterns of smartphone affordances, which are shaped by gratifications, constituent media features, and characteristics of the situational context. The situational context shapes both the availability of constituent media as well as the perception of various features of each constituent medium. Gratification opportunities then become subsumed into the influence of situational context on gratifications themselves. In this way, situational context contributes to imagined affordances (Nagy & Neff, 2015) in that they shape norms and assumptions about the various constituent media. Importantly in our model, sets of affordances actually become latent variables that are not measured or operationalized but inferred from the interactions of the features of the constituent media, the gratifications, and the situational context.

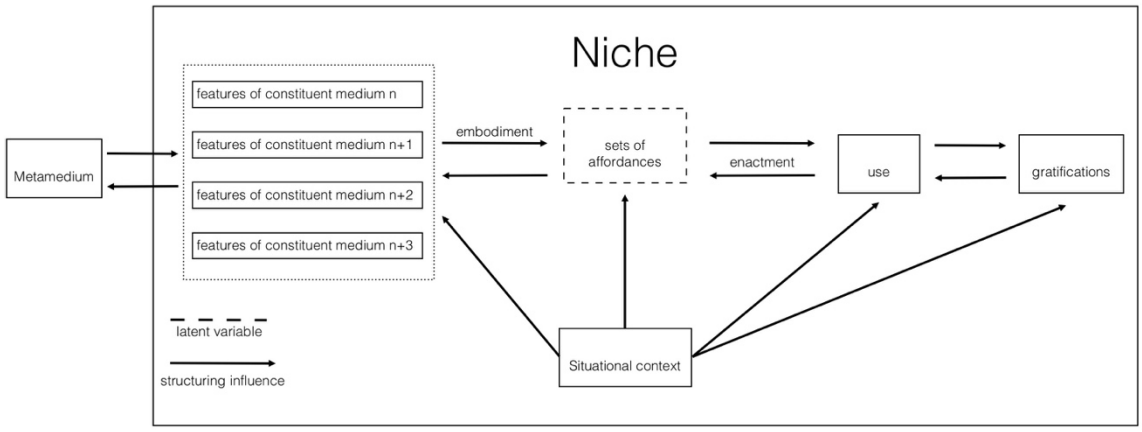

Figure 1. Niches of metamedia are sets of affordances embodied through constituent media and enacted through uses in situational contexts.

In many ways, our framework is in accordance with Evans and colleagues' (2017) definition of communication affordances as the "multidimensionality between the object or technology, and the use, and how that relationship offers possible (and actual) outcomes" (p. 39). However, this definition presumes a singularity of technology or object. We argue that for a metamedium such as the smartphone, the object or technology itself is never singular but either one constituent medium bundled together with other constituent media or one metamedium nesting several constituent media. Therefore, there is never *an* affordance for the smartphone or any constituent media within it; rather, there are sets of affordances.

Additionally, we argue that to study or identify these sets of affordances, situational context must be taken into account. Sets of affordances become perceivable and enacted in particular social, physical, and technological contexts. As Evans et al. (2017) argue, affordances are dynamic and can lead to multiple outcomes. We suggest that the situational context is one way of empirically examining when and why multiple outcomes are possible for the same sets of affordances.

An example that illustrates a niche structuring smartphone use can be seen in the following scenario: Imagine a man is sitting in a lecture and receives a call from his partner. Because of the situation, the man cannot answer the phone. Therefore, he discretely sends a message on WhatsApp asking what the caller needs. The caller/partner immediately sends a message back indicating that she is at the store and wants to know what to pick up for dinner. The man switches over to his Pinterest app, copies an ingredient list, and pastes it into the WhatsApp exchange. In this scenario, a specific set of affordances is embodied in multiple constituent media and their features (e.g., phone app, WhatsApp, and Pinterest). At the same time, this set of affordances is enacted as multiple uses are enabled (e.g., calling, texting, and reading), and consequently multiple gratifications are fulfilled (e.g., relational maintenance, information seeking, coordination). Hence, a specific niche structuring smartphone use can be described based on constituent media and their features, uses, gratifications, and the specific situational context.

Empirically Identifying the Niches Structuring Smartphone Use

As argued above, the use of the smartphone as a metamedium is structured not solely through constituent media nor through uses and gratifications, but through niches. These niches combine the perceived features of constituent media as embodiment of sets of affordances and uses as enactments of these sets of affordances in particular situational contexts. These niches can be explored empirically. But to avoid the shortcomings of the use- and object-oriented approaches presented earlier, neither the constituent media nor the gratifications should have primacy in this empirical investigation. In other words, the procedure to inductively identify smartphone niches must draw on patterns that equally combine constituent media and use and context.

Hence, we need to empirically measure these constitutive parts of smartphone niches—that is, situational characteristics, perceived features of constituent media, and their uses and gratifications. The experience sampling method and its mobile enhancement (Struckmann & Karnowski, 2016) seem well situated to perform this task (Hektner, Schmidt, & Csikszentmihalyi, 2007). Because the experience sampling method samples situations in their natural context, it provides access to the various enactments and embodiments of sets of affordances throughout users' everyday lives that constitute the niches

structuring smartphone use. Even before the smartphone emerged, Kubey, Larson, and Csikszentmihalyi (1996) argued that the experience sampling method is particularly well suited for studying communication because "much communication takes place rapidly, in short bursts, repeatedly, and over highly variable periods of time" (p. 99). The mobile experience sampling method enhances ecological validity because experiences are reported in situ rather than retrospectively (Gergle & Hargittai, 2018). Therefore, details of situational contexts are more readily examinable, which log data alone cannot account for (Boase, 2013). The niches structuring smartphone use can then be identified by clustering the situational measurements of the various parts of smartphone niches—situational characteristics, perceived features of constituent media, and their uses and gratifications measured.

Discussion

Our framework makes three contributions to the field of communication. First, we provide a framework for empirically investigating the smartphone as a metamedium. Second, we expand on recent advances in the communication affordance literature to further integrate metamedia and constituent media to better reflect today's multiplatform media environment. Third, our framework expands the notion of affordances not just to objects but to situational contexts as well.

In a next step, our approach might be helpful to empirically investigate what is described as intermediality. As Helles (2013) writes:

> Even though individual media have particular affordances with respect to e.g., the sensor modalities that they support, actual communicative processes often involve the combination of several media, requiring that the affordances of all the media involved are taken into account in order to accurately describe the choices that have resulted in the given process. (p. 16)

Our framework suggests an empirical path toward the intermediality of constituent media, which is inherent to their nestedness in metamedia. However, even the smartphone is reliant on and embedded in a broader ecology of other metamedia. As Jonathan Donner (2015) points out, one cannot (yet) program apps for a smartphone *on* a smartphone; for that, we still need computers. Taking our approach one step further and using it to structure the intermediality of metamedia is a potential area for future empirical and theoretical exploration.

In a concluding response to Jensen's (2016) broader question about how communication can be understood and studied under the current technological circumstances, we want to emphasize the inductive nature of our approach. Taking note that the media landscape is no longer structured by distinct media and their uses is only a first step, and shifting the perspective to sets of affordances as the new, more granular building blocks of this landscape can be but a second step. Little is gained if we proceed by deducing inventories of distinct constituent media and their various features or lists of uses and their gratifications. This would amount to describing a Lego playscape through an inventory of the blocks that have been used to build it. We need instead to deduce meaningful niches structuring smartphone use. This means observing how sets of affordances are embodied and enacted in everyday contexts using specific sets of constituent

media. Only the dynamic interactions of these components will reveal meaningful types of smartphone niches that structure overall smartphone use and that had been overseen by previous app-centric or gratification-focused perspectives.

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