International Journal of Communication 9(2015), 1229–1246 1932–8036/20150005

Communicative Affordances of Mobile Media: Portability, Availability, Locatability, and Multimediality

ANDREW RICHARD SCHROCK[1]
University of Southern California

Mobile technologies such as smartphones and tablets have been rapidly adopted worldwide. Mobile media are now the primary online connection for most individuals. Despite this rapid rise, theories of how mobile media relate to communication patterns and outcomes remain scarce. An affordances approach promises a high-level framework for researching how technologies such as mobile media are integrated into routines, affecting subsequent patterns of communication. In this article, I first consider the theoretical lineage of affordances and how this perspective demonstrates advantages from related theories. Second, I draw on affordances to define "communicative affordances," a perspective that takes communication as a central concern. Finally, I synthesize literature from mobile communication to formulate a typology of communicative affordances of mobile media: portability, availability, locatability, and multimediality. Suggestions are then made for research employing a communicative affordances framework.

Keywords: *mobile communication, mobile media, affordances, materialities, computer-mediated communication*

Introduction

Early research on cell phones found dyadic communication with close ties through voice and SMS texting (Ling, 2004). The "constantly on" connection of mobile media was conceptualized as a meaningful shift from previous genres of media (Katz & Aakhus, 2002). These devices evolved into smartphones and tablets that provided a wider variety of modes of communication. Most recently, interest has focused on

Andrew Richard Schrock: aschrock@usc.edu
Date submitted: 2014–09–18

[1] The author thanks two anonymous reviewers for their insight. In addition, the following individuals and groups assisted in developing concepts in this article: Bernie Hogan and participants in the 2013 Oxford Internet Institute Summer Doctoral Program (OII-SDP) gave helpful responses on an early version; attendees to the 2014 ICA Mobile Pre-Conference indelibly shaped this paper's argument. Finally, my advisor François Bar provided frequent and generous feedback.

location, enabling individuals to connect the physical and digital social spheres (de Souza e Silva & Frith, 2012; Farman, 2012; Gordon & de Souza e Silva, 2011) through features such as "geo-tagging" (Humphreys & Liao, 2011). It has become clear that mobile media have the *potential* to alter the form and function of communication. Individuals have considerable leverage in how they integrate technologies into everyday practices (Oudshoorn & Pinch, 2003), which arise in part out of particular contexts (Nardi, 1995). Which technologies impact communicative outcomes and why? How do users recognize and take advantage of actions that mobile media make possible? Why do possibilities for mobile communication differ from those of face-to-face or computer-mediated communication?

Some answers to these difficult questions can be addressed by taking an affordances approach to mobile-mediated communication. An affordance refers to the "mutuality of actor intentions and technology capabilities that provide the potential for a particular action" (Majchrzak, Faraj, Kane, & Azad, 2013, p. 39). It is derived from an interaction between an individual's subjective perception of utility and objective qualities of a technology (Gibson, 1986). An affordances perspective negotiates between poles of technological determinism (Peter, 2011) and social constructivism (MacKenzie, 1985) and evaluates technologies used in real-world contexts. A single technology can result in multiple action possibilities because individuals have agency in how they use it (Oudshoorn & Pinch, 2003). These possibilities are finite and relatively stable (Hogan, 2009), framing possibilities for action that are triggered *in situ*. An "affordances framework" in communication is therefore partly about how affordances "set limits on what it is possible to do with, around, or via the artefact" (Hutchby, 2001, p. 453).

A communicative affordances framework builds on recent work that applied affordances theory to describe how technologies such as social media (Majchrzak et al., 2013; Treem & Leonardi, 2012) and social network sites (boyd, 2010) alter communication. This article describes this framework in three movements. First, I draw on ecological psychology (Gibson, 1986) and communication (Majchrzak et al., 2013; Treem & Leonardi, 2012), demonstrating the advantages of a communicative affordances perspective as compared with other theories. The notion of an affordance has been a topic of interest in the last decade of mobile communication (Boase, 2008; Helles, 2013; Katz, 2007; Ruston, 2012). This literature is consolidated to propose a set of four communicative affordances of mobile media: portability, availability, locationality, and multimediality. Future directions of research involving communicative affordances are then suggested.

An Affordance Perspective

James Gibson (1986) defined affordances as related to perceptions of the utility of an object drawn from environmental cues. He conceptualized an affordance as relational, triggered by "the particular ways in which an actor, or set of actors, perceives and uses [an] object" (p. 145). For example, a single object could be interpreted to afford various different uses. A round inflated sphere the size of a ball could be said to have an innate quality of "ball-ness." Kicking or dribbling the ball would each be an equally correct interpretation of the affordances of a ball. Affordances in ecological psychology are latent and exist between subjective interpretation and objective qualities of an object (Schmidt, 2007). That is, they exist separately from perception but are activated by it. Individuals might creatively interpret affordances by perceiving different uses, but they do not create affordances in the act of perception. Gibson proposed

that perception was unique to particular animal species and derived from observing an object in its environment. Perception of utility was immediate—a lizard did not "see" a rock on a sunny day but rather "a place to sun myself." The rock would be said to "afford basking." A Gibsonian lineage considers seeing in one's environment to be automatically linked with perception of utility. By contrast, Gaver (1991) suggests there exist "hidden affordances" that are not perceived but alter utility (p. 80). Norman (1999) similarly distinguished between "affordances" and "perceived affordances," stressing that designers should maximize the latter.

A successive wave of interest, mainly among sociologists, was driven by an interest in describing how particular technologies shape social action. This work often built on a notion of "social affordances" (Bradner, 2001; Wellman et al., 2003). Jeff Boase (2008) defined social affordances as enabling research on "how the intrinsic properties of communication technologies may factor into their adoption and use" (p. 4). His formulation implies a cognitive process where individuals seek a congruency between potential actions and the relationships maintained through that technology. boyd (2010) similarly defined "structural affordances" as "properties of bits… [that] introduce new possibilities for interaction" (p. 39). Hogan (2009) is unique in his use of affordances as an inroad to a cycle of perception and use of technology. In brief, technologies are explored and outcomes predicted by individuals (Gaver, 1996), informing successive practices drawing on particular affordances. While many differences exist in the positions of these scholars, they productively situated affordances within human communication research and considered both perception and outcomes of affordances.

Communication scholars further emphasized a relational perspective on affordances (Fulk & Yuan, 2013; Leonardi, 2013; Majchrzak et al., 2013; Treem & Leonardi, 2012). Affordances are thought to exist in the interaction between an individual's subjective perception of utility and objective qualities of a technology. Majchrzak et al. (2013) define affordances as existing "not as latent capability innate to the technology, but as a potentiality" (p. 39) activated by certain groups. Indeed, the utility of affordances for communication research appears to lie in their intersubjectivity. According to Vitak and Ellison (2012), affordances are useful to inform a high-level framework to describe how technology alters communicative practices. Context is one factor that affects individuals' interpretation of technological utility, but it is not from context alone that actions (or communicative affordances) emerge. An affordances perspective in communication tends to be instrumental and relatively normative, where technologies frame potential actions.

Comparing Affordances with Other Theories of Technology Use

An affordance perspective highlights relationships between individuals and technologies in ways distinct from other theories. Medium specificity proposes that uses of technology stem from a medium's intrinsic qualities. That is, technology alters the reach and quality of our senses, as a medium alters "patterns of perception steadily and without any resistance" (McLuhan & Lapham, 1994, p. 18). Effects of technology are immediate and uniform, affecting perception rather than the reverse, leaving little room for discussing how individuals interpret technology for various purposes. The perspective of social constructivism or "social shaping" (MacKenzie, 1985) focuses on the inverse question: how do social and cultural forces influence technology's development? Generally this work shies away from positivism,

considering history too complex to be predictive. While this perspective has been useful for considering the dynamics of technological change, social constructivism has been criticized for having an "almost total disregard for the social consequences of technical choice" (Winner, 1993, p. 368).

While several quantitative social-scientific theories might be relevant, in the interest of space I primarily consider the technology acceptance model (TAM) (Davis, 1989, 1993). Perceived usefulness and perceived ease of use are factors developed in TAM that may inform an affordances framework. However, in crucial ways, affordances theory addresses several shortcomings of TAM. TAM has been criticized for simplicity and lack of a mechanism, relying on behavioral theories such as the theory of planned action (Bagozzi, 2007). The outcome of interest is adoption of innovations (leading to acceptance or rejection), whereas an affordances approach accepts that individuals can employ a single technology toward different goals. TAM tends to focus on cognitive processes resulting in adoption of a technology in particular ways such as job-office applications and e-commerce (King & He, 2006). In other words, the primary outcome of interest with TAM is how to get a particular population to use technology in a certain way. The question with affordances is how a particular technology leads to, or affords, actions that align with practices, resulting in altered communication (Treem & Leonardi, 2012).

In summary, medium specificity, social constructivism, and the technology acceptance model are not sufficient to explain the ways mobile media alter patterns of communication. Individual agency is downplayed in medium specificity theory, which suggests that effects of technologies are widespread and immediate. Typically social constructivism follows the social contexts through which technologies arise rather than more pragmatic questions of how technologies alter practices. The technology acceptance model focuses exhaustively on factors that affect perception of utility, but lacks a theoretical mechanism and has been "unable to account for the rich scenarios of local uses that unfolded in the field" (Sun, 2012, p. 96). By contrast, a communicative affordances approach pays equal attention to how possibilities for communication are perceived and interpreted as on qualities of technology.

Defining Communicative Affordances

Communicative affordances are defined as an interaction between subjective perceptions of utility and objective qualities of the technology that alter communicative practices or habits. Extending Hutchby (2001), they are "functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object" (p. 444). Similar to other scholars (Hutchby, 2001; Ruston, 2012; Treem & Leonardi, 2012), I focus on a domain of communication. Communication has been implicit in definitions of social affordances that describe how "perceptual cues" (Hogan, 2009, p. 22) enable individuals to interpret and act differently on their social networks. Communicative affordances are aligned with a relational perspective of affordances focused on actions—"coordinated movements, guided by information, in the service of some goal" (Michaels, 2003, p. 138). Communicative affordances involve communication in two ways: they are evaluated through communication and successively alter communicative practices.

A notion of communicative affordances as developed here can be differentiated from previous work linking communication and affordances (Hsieh, 2012). Helles (2013) focused on medium

synchronicity and audience characteristics. By comparison, the formulation developed here considers the symbolic nature of communication as expressed in practices or habits that are often symbolically interpreted. That is, I discuss practices that technologies afford rather than focusing on "effects" of particular modalities (Daft & Lengel, 1986). It should also be noted that my typology of mobile media's affordances resembles Ruston's "critical affordances" of mobile media (2012), although his formulation is theoretically distinct; Ruston proposes that affordances "exist in the cultural imaginary" (p. 26) and should be used as "tools to critique and analyze" (p. 25). As employed in this article, the concept of communicative affordances is oriented towards empirical communication research. In other words, while the typology of communicative affordances of mobile media overlaps with Ruston, my formulation of affordances is quite different.

A communicative affordances perspective offers several advantages over previous literature for discussing the relationship between individual and technological agency. First, it does not privilege either technological determinism or social constructivism (Baym, 2010), instead highlighting micro-level interactions between social and technical actors (Neff, Jordan, McVeigh-Schultz, & Gillespie, 2012). Affordances help researchers navigate a middle ground between perspectives which posit that actions result from technology (Winner, 1989) or that social forces alone shape technology's development (MacKenzie, 1985). A communicative affordances approach also focuses on the impact of technology for communication beyond purely technological classification schemes or features. An "affordance" is broader than the buttons, screens, and operating systems of mobile devices. In other words, communicative affordances are high level and not simply "bundles of features" (Faraj & Azad, 2013, p. 255). While a focus on features may have advantages for some research (Fulk & Gould, 2009), single features may produce only minor meaningful differences in practices and subsequent effects. Features are also constantly in flux on platforms such as Facebook, complicating comparative research focused on features. A communicative affordances approach also invites historical comparisons between different technological forms. For example, Woodruff and Aoki (2004) argue that the rapid adoption of "push to talk" cellular radios is due to similar affordances as instant messaging on personal computers.

Communicative affordances provide an inroad to considering habitual use of technologies for certain goals. Gibson (1986) linked perception to intrinsic animalistic needs such as hunger and survival, which he referred to as being "directly perceived." A communicative affordances perspective deviates from a purely Gibsonian notion of automatically perceived "needs" and opens up discussion to factors affecting perception. I suggest that perception of utility is developed in relation to *goals* rather than animalistic *needs* (Ball-Rokeach, 1985). Communicative affordances likely do not create the goal an individual is trying to achieve. Rather, they enable a new way to accomplish it. For example, the practice of sending notices to announce the birth of a child used to be accomplished by mail or congregation. In the current day the broadcast affordances of social network sites (boyd, 2010) provide a new way to achieve this goal (Vitak & Ellison, 2012). Social network sites surely did not create the practice of introducing one's child to a community, nor the meaning that it has for individuals and families. However, it is a more efficient way to accomplish that introduction, even as it elicits concerns of visibility and appropriateness that were less present in the example of mail, which was not a broadcast medium.

Evaluating the utility of digital media for goals is not solely achievable by visual inspection alone. Communicative affordances can be uncovered by users (Hutchby, 2001) through learning and tinkering. This differs from Gibson's affordances, partly because he "rejected… external-physical and internal-mental processes" as explanatory mechanisms for perception (Greeno, 1994, p. 336). Opening up the question of what influences perception, we can conclude that utility for particular goals can be observed, learned, or discovered (Hutchby, 2001), affecting successive usage in an ongoing cycle of norms and usage that occurs around affordances. Bernie Hogan (2009) similarly suggests that social affordances are derived from "cues that connote social structure in such a way that individuals can act on this social structure differently" (p. 27). Trial-and-error has long been observed by users in mobile communication (Palen, Salzman, & Youngs, 2000). Hsieh (2012) suggests that skills are related to perception of utility and technology selection from multiple possible modes of communication. However, creative uses of technologies have limits, as users are generally not able to create affordances (Hutchby, 2001).

Affordances are relatively stable in comparison to user practices or habits. Altering communicative affordances requires radically altering technology. While a complete consideration of how affordances change over time is outside the scope of this article, the following discussion in the context of mobile media will help clarify the definition of communicative affordances. Communicative affordances generally change through a relatively long-term process related to political economy (Goggin, 2011a). Macro entities (such as device manufacturers) tend to control the mainstream adoption of technology and manage applications developed for their platforms (Goggin, 2011b). The communicative possibilities of a technology may change in response to market demands, technical advances, and feedback from consumers (Goggin, 2011a). Two exceptions can be noted: affordances can be created by the designer (Murray, 2011) or altered by a hacker (Jordan, 2008). Improving the responsiveness and effectiveness of technologies to better address individual needs has long been an interest among designers (Norman, 2002). While designers create technology from the ground up, hackers are an extreme example of technology appropriation (Elgash, Croissant, Di Chiro, & Fouché, 2002). They are able to structurally alter technologies—what Elgash et al. (2002) term "reinvention"—rather than just interpret their potential for creative uses. Tim Jordan (2008) describes hackers as "warriors of technological determinism" because their expertise enables them to alter material properties of technologies, which in turn shape social agency.

Communicative Affordances of Mobile Media

Mobile media are a class of mobile devices including cell phones, smartphones, and tablets that integrate multimedia (typically a microphone and camera), an always-on network connection, and often, the running of mobile software or "apps." The following typology of communicative affordances was synthesized from the previous decade of literature in mobile communication, a sub-discipline of communication that has addressed how mobile media augment communication (Table 1). In the process I demonstrate how communicative affordances can be conceptualized. This is appropriate, as affordances have been suggested as an area of expansion in CMC (Bradner, 2001) and mobile communication (Helles, 2013). A communicative affordance "frames the practices through which technologies come to be involved in the weave of ordinary conduct" (Hutchby, 2001, p. 450). This typology is complementary to those proposed for social network sites (boyd, 2010), social media (Majchrzak et al., 2013; Treem & Leonardi,

2012), and new media (Hogan, 2009). Because technology may afford multiple uses, examples of practices are provisional and are intended to be exemplary rather than exhaustive.

Table 1. Mobile Media Affordances.

Affordance	*Communicative Practices*	*Examples from Literature*
Portability	• During commute or waiting	(Bayer & Campbell, 2012; Ito, Okabe, & Matsuda, 2005; Rheingold, 2002)
	• Domestic	(Haddon, 2006)
	• Workplace	(Wajcman, Bittman, & Brown, 2009)
Availability	• Multiplexity	(Boase, 2008)
	• Increased frequency	(Katz & Aakhus, 2002; Licoppe, 2004)
	• Directness	(Campbell & Park, 2008; Rainie & Wellman, 2012)
Locatability	• Coordination	(Ling, 2004; Ling & Yttri, 2002; Rheingold, 2002)
	• Surveillance	(Humphreys, 2007, 2011, 2012)
	• Locational identity	(de Souza e Silva & Frith, 2012)
Multimediality	• Screen sharing	(Brown, Green, & Harper, 2002)
	• Image production	(Ling, 2008b)
	• Synchronous video streaming	(Couldry, 2004; Thorson et al., 2013)

Portability

Mark Weiser (1994) famously wrote that "the world is not a desktop." In the early 2000s Howard Rheingold (2002) marveled at a spectacle that was quite unusual for the period: youth texting on the subway, while walking, and throughout the urban spaces of Japan. Portability is the most archetypically Gibsonian of the four mobile affordances because it is often evaluated through visual observation. Portability is defined as perception of physical characteristics such as size and weight, as well as those evaluated through use, such as battery life. These factors lead to use in different places and contexts, as mobile devices are easily transported and carried on the body (Ito et al., 2005). Smartphones may now have processing power on par with computers, but portability is what fundamentally differentiates mobile media from desktops. As Arnold (2003) puts it, "the very point of the mobile phone's affordances is that the user is able to move in the world" (p. 243).

Communicative affordances can range from high to low (Treem & Leonardi, 2012). A devices' affordance of portability similarly ranges from high (smartphone) to low (laptop)—qualities that lead to their integration in a variety of social contexts. Tablets are carried and brought out to take a picture, much as smartphones are. One might bring a laptop out to the post office, but using a trackpad, keyboard, and large screen while standing in line would be awkward, not to mention against social norms. "Wearable" technologies have been designed to be even more portable than mobile phones, fitting on the finger, around the neck, or on the wrist. Laptops, mobile phones, and wearable technologies can be considered to have low, medium, and high degrees of portability, respectively. Portability is most evident in the diverse contexts in which mobile media are used, such as in the car (Bayer & Campbell, 2012).

Connections can be drawn with other genres of media that afford portability. For example, the book permitted the written word to travel, and also to be used as an object to divide space and attention during transit (de Souza e Silva & Frith, 2012). However, media genres prior to cellular phones have not generally allowed for bidirectional communication. Portability can be considered to enable other communicative affordances. Hogan (2009) notes that affordances can be drawn upon in combination, and it might be rare for mobile media users to draw on just one at any given time. For example, a teenager might receive a push notification from Facebook's mobile messaging app as he is out at dinner and take a moment to reply, perhaps sharing his reply with a friend. In just this simple act he is drawing on communicative affordances of portability and availability.

Availability

Mobile phones were initially thought to enable the potential for "perpetual contact" (Katz & Aakhus, 2002) between individuals and their social networks. Yet, the negotiation of availability is more subtle (Licoppe, 2004). Strategies of disconnection or partial connection (Light & Cassidy, 2014) on mobile media become necessary to navigate being constantly connected. In other words, individuals navigate the affordance of availability for specific goals. Availability is, like a radio, "tuned" (Coyne, 2010) within a user's comfort zone. Affordances can make communication possible, but it is up to individuals to use these affordances in more or less strategic ways. For example, it's common for users to turn off push notifications from mobile Facebook while leaving voice calling on. In a more subtle example, Quan-Haase

and Collins (2008) refer to the technical affordance of availability to describe students' careful negotiation of instant messaging where an away message can be a form of communication (Hogan, 2009). Individuals strategically draw on the affordance of availability to produce gradations in how they might be reached. Rather than being an "on switch" to constant social interaction, availability is often negotiated and filtered in response to changing social contexts.

Mobile media's communicative affordance of availability can be thought of as a combination of multiplexity, direct contact, and increased frequency. Boase (2008) discusses the *multiplexity* of communication on mobile media—where texting, voice calls, and social media are all available simultaneously. Individuals maintain an awareness of their connections to different people and tend to use multiple modes to connect with individuals to whom they are close (Haythornthwaite, 2005). They may only be connected through Facebook with individuals to whom they are not close. Others have noted the *directness* of communication to individuals. That is, contacting individuals through mobile devices is a departure from calling from household to household with a landline phone. Finally, mobile media offer increased frequency of communication across different physical locations. Licoppe's (2004) notion of "connected presence" captures how mobile media alter the character of communication, which unfolds through frequent short bursts rather than longer immersive interactions.

Locatability

Business interest in location started in earnest after restrictions on GPS accuracy were lifted in 2000 (Goggin, 2011a). GPS-enabled mobile phones enabled new classes of location-based services (LBSs) (Wilson, 2012) such as locative and mobile social networks (LMSNs) (de Souza e Silva & Frith, 2010). These services were often positioned as enabling fundamentally different forms of communication; as Rheingold (2002) observed, "knowing our exact geographic location is one form of context awareness in which machines are better than humans" (p. 97). This triggered a wave of interest from scholars curious how location delivers new ways for individuals to form relationships and participate in place-making activities (de Souza e Silva & Frith, 2012). Location was "still defined by fixed geographical coordinates, but they now acquire dynamic meaning as a consequence of the constantly changing location-based information that is attached to them" (de Souza e Silva & Frith, 2012, p. 9). Eric Gordon (2008) made an ontological argument that location was able to give greater visibility to "local knowledge produced within the context of located information" (p. 4). Finally, Jason Farman (2012) used location to enable "site-specific storytelling"—narratives produced by small groups to encourage reflection.

Location was thought to enable new practices that drew on a layer of digital information that existed on top of the offline world. Some scholars were interested in how location enabled impromptu meetings (Wilken, 2010) that could scale up to groups or communities. For example, Lee Humphreys (2007) suggested check-ins on Dodgeball were a mode of "social molecularization" where individuals come together to commune with those around them without previously being close friends. Yet, as Goggin (2011a) observes, "many of the enterprises and applications spearheading mobile social software in its first decade simply have not survived" (p. 122). They were absorbed by larger companies and their locative functionalities incorporated into larger social network platforms and apps that leveraged locative

features but were not exclusively oriented around the thrill of locative discovery or socialization in new groups.

Individuals were interpreting the affordance of locationality quite differently than an industry-sponsored vision, often aligning with pre-existing practices more so than entirely new ones. Jordan Frith's (2014) work on Foursquare revealed a diverse set of meanings that individuals attach to location. We might conclude that individuals maintain a more heterogeneous set of practices with location than previously anticipated because the affordance of locatability can be leveraged in a wide variety of ways. Further, location is not defined exclusively defined by GPS coordinates. Individuals can and do say where they through SMS texting and phone calls (Laurier, 2000) to coordinate meetings (Ling & Yttri, 2002). Yet, locative services have not risen to the level of mainstream popularity. Using a locative service to signal a desire for informal socialization may be technically possible but cumbersome if location can be easily communicated through a statement like "Meet me at 7th and Spring." Indeed, surveys of everyday practices with mobile media indicate that people prefer to informally coordinate with others through voice or text (Laursen & Szymanski, 2013) combined with mapping services.

Multimediality

Taking pictures and videos through mobile devices are now a commonplace activity (Lenhart, Ling, Campbell, & Purcell, 2010). People judge smartphones on the quality of their cameras, which was first noted in an early study on *Keitai* in Japan (Ito et al., 2005). Practices with multimedia slowly shifted with the introduction of higher-quality cameras. Van Dijck (2008) notes how the "increased deployment of digital cameras—including cameras integrated in other communication devices—favours the functions of communication" (p. 58). Okabe and Ito (2006) describe three types of practices with images: those for personal enjoyment, everyday reporting, and intimate pictures between couples. Even though one might have the potential to communicate an image immediately, many prefer to accumulate a larger set of images from which to select before posting. The integration of cameras with connected devices corresponds with a rise in emotive (Hjorth, 2007) and communicative (Koskinen, 2007) visual communication that supplements and extend existing practices. Despite this rise, with few exceptions (Koskinen, 2007; Okabe & Ito, 2006) interest from social scientists on visual communication practices has been on either its interpretation or its dark side (Ling, 2008b). Notably, mobile multimedia platforms such as Vine and Instagram have yet to be fully investigated in communication studies.

Conclusions

This article outlines a theoretical lineage of affordances that can be applied to empirical communication research. Mobile media have relatively stable communicative affordances of portability, availability, locatability, and multimediality. Communicative affordances are defined as an interaction between subjective perceptions of utility and objective qualities of the technology that alter communicative practices. That is, communicative affordances are framings for action activated by individuals in pursuit of strategic goals. Perceptions of the utility of particular technologies are affected by experimentation, social norms, and learned understandings. Over time these may solidify and develop into long-term practices. In this way, a communicative affordance perspective balances subjective

interpretation and objective qualities of technology in habitual use. Communicative affordances also permit discussion of distinctions between mobile media and other forms, as well as continuities with historical precedents. As devices become smaller and services increasingly seamless, connecting mobile media to communicative practices and subsequent outcomes while taking into account social and historical contexts will gain critical importance.

Discussion

Communicative affordances describe the relationship between subjective perception of utility and objective qualities of a technology that results in altered communication and subsequent patterns of behavior. Affordances help address a theoretical shortcoming in computer-mediated communication (CMC) as a whole; as Bradner (2001) has observed, "empirical studies of CMC use which explicitly associate social behavior with design features are largely absent" (p. 67). Interest in connecting affordances to particular outcomes is gaining traction in communication. A communicative affordance framework might form the base of "activity-centric analyses" (Ellison & boyd, 2013) that frame the relationship between technologies, practices, and successive outcomes.

Communication scholars should be judicious with their theory building to apply affordances to situations involving mediated communication not easily addressed with other theories. That is, affordances describe a particular relationship between perception, properties of technologies, and uses. One cautionary tale is the uses and gratification approach, which has become a catch-all mass communication approach to "active use" of technology (Ruggiero, 2000). Further, an affordances approach should retain an emphasis on comparative work and intersubjectivity rather than descend into contextual specificity (Suchman, 1987). While affordances might be interpreted in differing ways across sites, cultures, and contexts, communication research embraces a search for patterned behavior. Yet, neither should affordances refer exclusively to qualities or features of technologies at the expense of real-world practices. The power of an affordances approach is in the "fit" between practices and qualities of technologies, as interpreted in particular contexts.

Communicative affordances provide a theoretical lineage and framework for empirical research on mediated communication more generally, and mobile media specifically. My examples draw on the significant lineage of social cohesion in mobile communication. That is, I tend to focus on how communicative affordances relate to the creation, maintenance, and dissolution of relationships. This decision is not intended to overshadow mobile communication's interdisciplinarity—spanning mobilities, humanist geographies, and infrastructure studies. The typology I have suggested can be traced through these areas. It also provides concepts and terminology to discuss adoption of "wearable" technologies such as watches and armbands. Rather than assume these forms are entirely new, we should be attentive to which affordances carry over from mobile media. A communicative affordances framework provides a productive bridge so we can cease treating each shift in form as a radical break from previous technologies. Accordingly, a final area of research could be historical. Affordances emerge, are perceived by individuals, decline, and even re-emerge in different forms (Woodruff & Aoki, 2004). Practices or habits might be traced across time periods to further illuminate how affordances are perceived and integrated into technologies.

References

Arnold, M. (2003). On the phenomenology of technology: The "Janus-faces" of mobile phones. *Information and Organization, 13*(4), 231–256.

Bagozzi, R. P. (2007). The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems, 8*(4), 244–254.

Ball-Rokeach, S. (1985). The origins of individual media-system dependency. *Communication Research, 12*(4), 485–510.

Bayer, J. B., & Campbell, S. W. (2012). Texting while driving on automatic: Considering the frequency-independent side of habit. *Computers in Human Behavior, 28*(6), 2083–2090.

Baym, N. K. (2010). *Personal connections in the digital age*. Cambridge, UK: Polity Press.

Boase, J. (2008). Personal networks and the personal communication system. *Information, Communication & Society, 11*(4), 490–508.

boyd, d. (2010). Social network sites as networked publics: Affordances, dynamics, and implications. In Z. Papacharissi (Ed.), *Networked self: Identity, community, and culture on social network sites* (pp. 39–58). New York, NY: Routledge.

Bradner, E. (2001, March). *Social affordances: Understanding technology mediated social networks at work.* Paper presented at the CHI 2001 Conference on Human Factors in Computing Systems, Seattle, WA.

Brown, B., Green, N., & Harper, R. (2002). Local use and sharing of mobile phones. In B. Brown, N. Green, & R. Harper (Eds.), *Wireless world: Social and interactional aspects of the mobile age* (pp. 92–107). London, UK: Springer-Verlag.

Campbell, S. W., & Park, Y. J. (2008). Social implications of mobile telephony: The rise of personal communication society. *Sociology Compass, 2*(2), 371–387.

Couldry, N. (2004). Liveness, "reality," and the mediated habitus from television to the mobile phone. *The Communication Review, 7*(4), 353–361.

Coyne, R. (2010). *The tuning of place: Sociable spaces and pervasive digital media*. Cambridge, MA: MIT Press.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies, 38*(3), 475–487.

de Souza e Silva, A., & Frith, J. (2010). Locative mobile social networks: Mapping communication and location in urban spaces. *Mobilities, 5*(4), 485–505.

de Souza e Silva, A., & Frith, J. (2012). *Mobile interfaces in public spaces: Locational privacy, control, and urban sociability*. New York, NY: Routledge.

Elgash, R., Croissant, J. L., Di Chiro, G., & Fouché, R. (2002). *Appropriating technology: Vernacular science and social power*. Minneapolis, MN: University of Minnesota Press.

Ellison, N., & boyd, d. (2013). Sociality through social network sites. In W. H. Dutton (Ed.), *The Oxford handbook of internet studies* (pp. 151–172). Oxford, UK: Oxford University Press.

Faraj, S., & Azad, B. (2012). The materiality of technology: An affordance perspective. In P. Leonardi, B. A. Nardi & J. Kallinikos (Eds.), *Materiality and organizing: Social interaction in a technological world* (pp. 237–258). Oxford, UK: Oxford University Press.

Farman, J. (2012). *Mobile interface theory: Embodied space and locative media*. New York, NY: Routledge.

Frith, J. (2014). Communicating through location: The understood meaning of the Foursquare check-in. *Journal of Computer-Mediated Communication, 19*(4), 890–905.

Fulk, J., & Gould, J. J. (2009). Features and contexts in technology research: A modest proposal for research and reporting. *Journal of Computer-Mediated Communication, 14*(3), 764–770.

Fulk, J., & Yuan, Y. C. (2013). Location, motivation, and social capitalization via enterprise Social Networking. *Journal of Computer-Mediated Communication, 19*(1), 20–37.

Gaver, W. (1991, April). *Technology affordances.* Paper presented at the SIGCHI Conference on Human Factors in Computing Systems, New Orleans, LA.

Gaver, W. (1996). Affordances for interaction: The social is material for design. *Ecological Psychology, 8*(2), 111–129.

Gibson, J. J. (1986). *The ecological approach to visual perception*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Goggin, G. (2011a). *Global mobile media*. New York, NY: Routledge.

Goggin, G. (2011b). Ubiquitous apps: Politics of openness in global mobile cultures. *Digital Creativity, 22*(3), 148–159.

Gordon, E. (2008). Towards a theory of network locality. *First Monday, 13*(10). Retrieved from http://firstmonday.org/article/view/2157/2035

Gordon, E., & de Souza e Silva, A. (2011). *Net.Locality: Why location matters in a networked world*. Malden, MA: Wiley-Blackwell.

Greeno, J. G. (1994). Gibson's Affordances. *Psychological Review, 101*(2), 336–342.

Haddon, L. (2006). The contribution of domestication research to in-home computing and media consumption. *The Information Society, 22*(4), 195–203.

Haythornthwaite, C. (2005). Social networks and internet connectivity effects. *Information, Communication & Society, 8*(2), 125–147.

Helles, R. (2013). Mobile communication and intermediality. *Mobile Media & Communication, 1*(1), 14–19.

Hjorth, L. (2007). Snapshots of almost contact: The rise of camera phone practices and a case study in Seoul, Korea. *Continuum, 21*(2), 227–238.

Hogan, B. (2009). *Networking in everyday life.* Retrieved from http://individual.utoronto.ca/berniehogan/Hogan_NIEL_10-29-2008_FINAL.pdf

Hsieh, Y. P. (2012). Online social networking skills: The social affordances approach to digital inequality. *First Monday, 4*(2). Retrieved from http://firstmonday.org/article/view/3893/3192

Humphreys, L. (2007). Mobile social networks and social practice: A case study of Dodgeball. *Journal of Computer-Mediated Communication, 13*(1), 341–360.

Humphreys, L. (2011). Who's watching whom? A study of interactive technology and surveillance. *Journal of Communication, 61*(4), 575–595.

Humphreys, L. (2012). Connecting, coordinating, cataloguing: Communicative practices on mobile social networks. *Journal of Broadcasting & Electronic Media, 56*(4), 494–510.

Humphreys, L., & Liao, T. (2011). Mobile geotagging: Re-examining our interactions with urban space. *Journal of Computer-Mediated Communication, 16*(3), 407–423.

Hutchby, I. (2001). Technologies, texts and affordances. *Sociology, 35*(2), 441–456.

Ito, M., Okabe, D., & Matsuda, M. (2005). *Personal, portable, pedestrian: Mobile phones in Japanese life*. Cambridge, MA: MIT Press.

Jordan, T. (2008). *Hacking: Digital media and technological determinism*. Cambridge, UK: Polity Press.

Katz, J. E. (2007). Mobile media and communication: Some important questions. *Communication Monographs, 74*(3), 389–394.

Katz, J. E., & Aakhus, M. (2002). *Perpetual contact: Mobile communication, private talk, public performance*. Cambridge, UK: Cambridge University Press.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management, 43*(6), 740–755.

Koskinen, I. K. (2007). *Mobile multimedia in action*. London, UK: Transaction.

Laurier, E. (2000). Why people say where they are during mobile phone calls. *Environment and Planning D: Society and Space, 19*(4), 485–504.

Laursen, D., & Szymanski, M. H. (2013). Where are you? Location talk in mobile phone conversations. *Mobile Media & Communication, 1*(3), 314–334.

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010, April 20). Teens and Mobile Phones. Retrieved from http://www.pewInternet.org/2010/04/20/teens-and-mobile-phones

Leonardi, P. (2013). When does technology use enable network change in Organizations? A comparative study of feature use and shared affordances. *MIS Quarterly, 37*(3), 749–775.

Licoppe, C. (2004). Connected presence: The emergence of a new repertoire for managing social relationships in a changing communication technoscape. *Society and Space, 22*(1), 135–156.

Light, B., & Cassidy, E. (2014). Strategies for the suspension and prevention of connection: Rendering disconnection as socioeconomic lubricant with Facebook. *New Media & Society, 16*(7), 1169–1184.

Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. San Francisco, CA: Kaufmann.

Ling, R. (2008a). *New tech, new ties: How mobile communication is reshaping social cohesion*. Cambridge, MA: MIT Press.

Ling, R. (2008b, September). *Trust, cohesion and social networks: The case of quasi-illicit photos in a teen peer group*. Paper presented at the Hungarian Academy of Sciences Conference, Budapest.

Ling, R., & Yttri, B. (2002). Hyper-coordination via mobile phone in Norway. In J. E. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 139–169). Cambridge, UK: Cambridge University Press.

MacKenzie, D. (1985). *The social shaping of technology: How the refrigerator got its hum*. Milton Keynes, PA: Open University Press.

Majchrzak, A., Faraj, S., Kane, G. C., & Azad, B. (2013). The contradictory influence of social media affordances on online communal knowledge sharing. *Journal of Computer-Mediated Communication, 19*(1), 38–55.

McLuhan, M., & Lapham, L. H. (1994). *Understanding media: The extensions of man*. Cambridge, MA: MIT Press.

Michaels, C. F. (2003). Affordances: Four points of debate. *Ecological Psychology, 15*(2), 135–148.

Murray, J. H. (2011). *Inventing the medium: Principles of interaction design as a cultural practice*. Cambridge, MA: MIT Press.

Nardi, B. A. (1995). Studying context: A comparison of activity theory, situated action models and distributed cognition. In B. A. Nardi (Ed.), *Context and consciousness: Activity theory and human-computer interaction* (pp. 69–102). Cambridge, MA: MIT Press.

Neff, G., Jordan, T., McVeigh-Schultz, J., & Gillespie, T. (2012). Affordances, technical agency, and the politics of technologies of cultural production. *Journal of Broadcasting & Electronic Media, 56*(2), 299–313.

Norman, D. A. (1999). Affordance, conventions, and design. *Interactions, 6*(3), 38–43.

Norman, D. A. (2002). *The design of everyday things*. New York, NY: Basic Books.

Okabe, D., & Ito, M. (2006). Everyday contexts of camera phone use: Steps toward technosocial ethnographic frameworks. In J. Höflich & M. Hartmann (Eds.), *Mobile communication in everyday life: An ethnographic view* (pp. 79–102). Berlin, Germany: Frank & Timme.

Oudshoorn, N., & Pinch, T. J. (2003). *How users matter: The co-construction of users and technologies*. Cambridge, MA: MIT Press.

Palen, L., Salzman, M., & Youngs, E. (2000, November). Going wireless: Behavior & practice of new mobile phone users. Paper Presented at the ACM Conference on Computer Supported Cooperative Work, Philadelphia, PA.

Peter, J. D. (2011). *Two cheers for technological determinism*. Paper presented at the Conference on Media Histories: Epistemology, Materiality, Temporality, Columbia University, NY.

Quan-Haase, A., & Collins, L. J. (2008). "I'm there, but I might not want to talk to you": University students' social accessibility in instant messaging. *Information, Communication & Society, 11*(4), 526–543.

Rainie, L., & Wellman, B. (2012). *Networked: The new social operating system*. Cambridge, MA: MIT Press.

Rheingold, H. (2002). *Smart mobs: The next social revolution*. Cambridge, MA: Perseus Publishing.

Ruggiero, T. (2000). Uses and gratifications theory in the 21st century. *Mass Communication & Society, 3*(1), 3–37.

Ruston, S. (2012). Calling ahead: Cinematic imaginations of mobile media's critical affordances. In A. P. Kavoori & N. Arceneaux (Eds.), *The mobile media reader* (pp. 23–39). New York, NY: Peter Lang.

Schmidt, R. C. (2007). Scaffolds for social meaning. *Ecological Psychology, 19*(2), 137–151.

Suchman, L. A. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge, UK: Cambridge University Press.

Sun, H. (2012). *Cross-cultural technology design*. Oxford, UK: Oxford University Press.

Thorson, K., Driscoll, K., Ekdale, B., Edgerly, S., Thompson, L. G., Schrock, A., Swartz, L., Vraga, E. K., & Wells, C. (2013). Youtube, Twitter and the Occupy movement: Connecting content and circulation practices. *Information, Communication & Society*, *16*(3), 421–451.

Treem, J., W. , & Leonardi, P. (2012). Social media use in organizations: Exploring the affordances of visibility, editability, persistence and association. *Communication Yearbook, 36*, 143–189.

van Dijck, J. (2008). Digital photography: Communication, identity, memory. *Visual Communication, 7*(1), 57–76.

Vitak, J., & Ellison, N. B. (2012). 'There's a network out there you might as well tap': Exploring the benefits of and barriers to exchanging informational and support-based resources on Facebook. *New Media & Society, 15*(2), 243–259.

Wajcman, J., Bittman, M., & Brown, J. (2009). Intimate connections: The impact of the mobile phone on work/life boundaries. In G. Goggin & L. Hjorth (Eds.), *Mobile technologies: From telecommunications to media* (pp. 9–22). London, UK: Routledge.

Weiser, M. (1994). The world is not a desktop. *Interactions, 1*(1), 7–8.

Wellman, B., Quan-Haase, A., Boase, J., Chen, W., Hampton, K., Díaz, I., & Miyata, K. (2003). The social affordances of the Internet for networked individualism. *Journal of Computer-Mediated Communication, 8*(3). Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2003.tb00216.x/abstract

Wilken, R. (2010). A community of strangers? Mobile media, art, tactility and urban encounters with the other. *Mobilities, 5*(4), 449–468.

Wilson, M. W. (2012). Location-based services, conspicuous mobility, and the location-aware future. *Geoforum, 43*(6), 1266–1275.

Winner, L. (1989). *The whale and the reactor: A search for limits in an age of high technology*. Chicago, IL: University of Chicago Press.

Winner, L. (1993). Upon opening the black box and finding it empty: Social constructivism and the philosophy of technology. *Science, Technology & Human Values, 18*(3), 362–378.

Woodruff, A., & Aoki, P. M. (2004, November). *Push-to-talk social talk*. Paper presented at the ACM Conference on Computer Supported Cooperative Work, Chicago, IL.