Revisiting Interpersonal Media Competition

The Gratification Niches of Instant Messaging, E-Mail, and the Telephone

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The theory of niche proposes that a new medium competes with older, more established media to fulfill users' needs. This study uses niche theory, a macrolevel theory, as well as social information processing theory and the theory of electronic propinquity, both microlevel theories, to examine the niche of instant messaging (IM) in providing general gratifications. Results indicate that IM is characterized by a broad niche, surpassed only by that of the cell phone. IM had substantial niche overlap with e-mail and the cell phone, indicating a degree of substitutability between them; the least overlap was with the landline telephone (LLP). The hierarchy that emerged indicated that the cell phone was superior to IM, which was superior to e-mail, followed by the LLP for providing general gratifications. Finally, displacement tests indicated that IM use displaced e-mail and LLP but not cell phone use. Implications and directions for future research are discussed.

Keywords: media competition; niche theory; social information processing theory; electronic propinquity; computer-mediated communication; gratifications

The mass diffusion of synchronous communication media has made the possibility of "real time" interaction with social network members commonplace. Just as personal e-mail aids in the sustenance of social ties (e.g., Stafford, Kline, & Dimmick, 1999), media such as instant messaging (IM) have emerged to fulfill similar functions (e.g., Lee & Perry, 2004; Nardi, Whittaker, & Bradner, 2000; Ramirez & Broneck, 2003). IM programs combine the type-written form of communication, associated with e-mail, with the synchronicity of message exchange that characterizes telephone conversations. Indeed, the growth of IM usage during the past few years has been impressive. According to Pew Internet & American Life Project's May-June 2004 tracking survey, the IM population has increased from 41 million in

the year 2000 to 53 million in the year 2004, exhibiting a growth rate of 29%. Jupiter Media Metrix reports that the amount of time spent on IM usage in the United States has risen from about 9 million to more than 13 million minutes total in one year starting from September 2000, indicating a growth of 48% (CyberAtlas, 2001). This widespread use of IM and its similarity to more established media (e.g., e-mail, telephone) suggest that the newer medium should compete with and perhaps displace use of these technologies for some social purposes.

The present study examines these potential impacts by assessing the niches of IM, e-mail, and the telephone. In doing so, this study replicates and extends prior research examining competition between new and traditional interpersonal media[1] (Dimmick, Kline, & Stafford, 2000). The article employs the landline telephone (LLP) as a baseline against which to benchmark the effect of IM, because earlier research (Dimmick et al., 2000) established that it was the oldest interpersonal medium, the LLP, that had been affected negatively by the adoption of newer communication technologies (e.g., e-mail). The contemporary cell phone no longer qualifies as simply a voice medium, as providers offer entertainment, messaging, Internet access, and information as well as "plain old telephone service" (POTS); it is this purely voice transmitted service that we wish to use as a benchmark. Thus, the cell phone is treated as a distinct and separate medium from the LLP. Earlier studies have mapped media niches on advertising or gratification utility dimensions (see Dimmick, 2003). This study assesses the niches of the IM, e-mail, and telephone on gratification utility and gratification opportunity dimensions.

Theories relevant to the study reside both at the macro- and the microlevels of analysis. At the macrolevel, the theory of the niche (Dimmick, 2003) provides an overall framework within which to examine hypotheses regarding competition and coexistence of new and traditional media. At the microlevel, theories pertaining specifically to interpersonal media attributes such as social information processing theory (SIPT; Walther, 1992) and the theory of electronic propinquity (TEP; Korzenny, 1978) are relevant to the explanation of gratification utilities pertaining to IM, e-mail, and the telephone (landline and cell). Therefore, we first present a general overview of niche theory, followed by a summary of the theoretical perspectives relevant specifically to interpersonal media. Following the overview of the theories, the hypotheses addressed by the study will be formulated and tested.

Theory of the Niche

At its most general, the theory of niche explains how media compete and coexist in limited resource environments (Dimmick, 2003). When members of the same population (e.g., groups of similar media comprising common attributes) vie for the same resources to support survival, competition results. The niche of a medium is derived from its pattern of resource use, represents its strategy for survival and growth, and ultimately determines its position in a multidimensional resource space.

Alternatively, the niche is the collection of resources a medium is accorded by agents such as consumers or advertisers. The macrodimensions of the resource space may include gratification utilities, gratification opportunities, advertising, consumer time, and consumer spending (Dimmick, 2003), of which only the first two macrodimensions are most relevant to this study. Each macrodimension can be subdivided into its constituent microdimensions. For example, the gratification utilities dimension can be divided into its constituent gratification–obtained statements or items. Both macro- and microlevel niche dimensions are used in the present analyses in order to provide a more complete picture of each medium examined.

Gratifications have a long history in media research (Blumler & Katz, 1974; Rosengren, Wenner, & Palmgreen, 1985) and have been conceptualized as the utilities that explain consumer media choice (Dimmick, 2003; Picard, 1989). Gratification opportunities are properties of a medium that allow users to overcome time and space constraints and, in effect, amplify or attenuate the ability to derive satisfaction from a medium. Traditional media such as newspapers and broadcast television, for example, have a limited choice of content and rigid schedules to which the consumer must conform. In contrast, such media as cable, the VCR, or DVD player offer greater choice and control over the time of use. Thus, the gratification niche of a medium can be defined by its breadth on the gratification and gratification opportunities dimensions, the degree of overlap with other media, and its superiority in satisfying needs over other media within the same domain.

As stated earlier, a niche is the position of a medium in the multidimensional resource space of the environment. The gratification niche of a medium is defined within a domain of gratification and gratification opportunity measures common to a set of media. The position adopted here is that there is no universal set of gratifications applicable to all media, but there are domains of gratification utility particular to each set of competing media (see Dutta-Bergman, 2004; Eastin, 2005; Eastin & Cooper, 2003). The absence of universal gratification utilities dictates that pilot studies be conducted to define the domain of media. To date, gratification studies have been conducted to define domains for the news media, business news, electronic entertainment media, and interpersonal media (e.g., Dimmick, 2003; Li, 2001).

Three characteristics are central to understanding a medium's niche:

1. *Niche breadth*, or the degree to which a medium satisfies a relatively broad or relatively narrow spectrum of media-related needs. Niche breadth can be interpreted as relative specialism or relative generalism. Specialists gratify a relatively narrow set of needs, and generalists satisfy a broader spectrum.[2]
2. *Niche overlap*, or the extent to which media are perceived as similar, indicated by the "distance" between their gratification niches. Put differently, niche overlap is an index of the substitutability or complementarity of two media. High overlap indicates that media are substitutes or serve the same needs, whereas lower overlap indicates that different needs are being served. Thus, low overlap points toward the complementarity of the media, whereas high overlap indicates strong similarity or competition.[3]

3. *Competitive superiority*, or the extent to which one or the other of a pair of media provide greater gratification. Indices of superiority for gratification measures are defined as arithmetic means, and differences between two means on a dimension can be tested for significance using a *t* test for correlated groups. If the test yields a significant result, this is interpreted to mean that the medium that obtained the higher superiority score is better at providing gratification utility to consumers than the other medium. Conversely, media that do not differ significantly also do not differ in their ability to provide gratifications.[4]

A medium's niche breadth can render it to be a generalist or specialist relative to other media, which creates implications for niche overlap and competitive superiority. Dimmick et al. (2000) found that the telephone and e-mail were relative generalists when analyzed together. Both were used for a wide variety of gratification opportunities and sociability gratifications, leading to considerable overlap within those niche categories and competition between them. Although they were both found to be relative generalists, each was found to have competitive superiority in one of the two niche categories examined. Dimmick, Ramirez, and Feaster (2006) found that IM may be a relative specialist with regard to communication with friends compared to various other media through the use of a diary method aimed at investigating time and space niches. No investigation has been conducted that has focused on the gratification opportunities and/or sociability gratification niche structures of IM.

Overlap and superiority, together, define the conditions for a new medium to replace or displace an older one. First, the medium must gratify the same needs as the older medium: Overlap must be relatively high. Second, the newer form must be superior to the older form in supplying utility. The complete replacement of one medium by another is termed *competitive exclusion*, and partial replacement is termed *competitive displacement*.

The mathematical measures of niche breadth, overlap, and superiority were developed by Dimmick (1993; see Dimmick, 2003, for computational formulas) as interval equivalents of the bioecological measures that are appropriate for nominal scales. These formulae assume that the gratification utility and gratification opportunity dimensions have been identified using factor analysis; measures of each characteristic are computed separately on each dimension identified.

For a niche analysis of a medium among competitors to be warranted, there must be some evidence that as a newer medium, it is competing for the same resources as its proposed competitors. If competition is occurring, the use of competitor mediums should be affected by IM. Although the theory of niche is a macrolevel perspective, making it difficult to pose predictions about relationships between specific media, previous research suggests a hypothesis that may be proposed (Dimmick et al., 2000; Dimmick, Sikand, & Patterson, 1994). Previous niche studies on the aforementioned domains (electronic entertainment, news, and interpersonal) have found that newer media succeed because of their superior ability to provide gratification opportunities in a given domain (Dimmick, 2003; Dimmick et al., 1994; Dimmick et al., 2000; Li,

2001). Media that fail to do so eventually are partially replaced by other media; media may coexist if there is niche differentiation, if each is performing a distinct function. This suggests that IM, as a newer medium, should show evidence of displacing the older, more established media (telephone and e-mail) in furnishing utility.

> *Hypothesis 1:* IM will show evidence of displacement of the telephone (landline and cellular) and e-mail.

If evidence is obtained that indicates that displacement may be occurring, a niche analysis of IM among its competitors will be warranted. Although macrolevel predictions regarding displacement may be derived from previous research that employed the theory of niche, more specific, microlevel predictions require drawing on other perspectives that focus specifically on media attributes and uses.

Media, Attributes, and Social Uses

A potentially fruitful approach to understanding the characteristics of media competition beyond displacement is offered by theories focusing on the specific attributes of interpersonal technologies. This approach is particularly relevant to the present study, as accumulated research reports that communicators employ interpersonal media to achieve social goals such as relationship formation and maintenance (e.g., Dimmick et al., 2000; Ramirez & Burgoon, 2004; Stafford et al., 1999), social support (Braithwaite, Waldron, & Finn, 1999), and information seeking (Ramirez, Walther, Burgoon, & Sunnafrank, 2002; Tidwell & Walther, 2002), among others.

In the present study, two primary characteristics help to differentiate IM, e-mail, and the telephone from each other and provide the basis for predictions of examining niche breadth, overlap, and superiority. The degree of cue richness, or the ability of a medium to transmit nonverbal and contextual cues, is a prominent attribute of the telephone but less so for text-based formats. The telephone has the ability to transmit vocalic cues, including tone, volume, and pitch, which has been shown to be a rich source of social information (e.g., Burgoon, Buller, & Woodall, 1996). Similarly, synchronicity, or the ability to exchange messages and provide immediate feedback, is a prominent attribute that distinguishes IM and the telephone from e-mail. IM and the telephone require users to exchange messages in real time, whereas e-mail does not.

Although cue richness and synchronicity distinguish interpersonal media from each other and provide a means for explaining how communicators employ them, the concepts do not directly address media competition, a macrolevel phenomenon. They may, however, provide insight into how distinct media may be used to fulfill similar social needs, which directly relates to macrolevel phenomena such as media niches. We draw on two such perspectives, SIPT (Walther, 1992; Walther & Burgoon, 1992) and TEP (Korzenny, 1978), in developing predictions regarding the remaining niche characteristics of breadth, overlap, and superiority.

SIPT. SIPT holds that although message exchange via computer-mediated means occurs at a slower rate than that through face-to-face interaction, computer-mediated communication (CMC) can be employed effectively for a wide variety of tasks under certain circumstances (Walther, 1992). Because messages are transmitted through a single channel, rather than the multiple ones present during in-person interaction, relational communication via CMC requires an extended period of time for messages to accrue and produce outcomes comparable to those achieved through face-to-face means. Thus, when users are allowed sufficient time to exchange social information, SIPT predicts that social outcomes (e.g., relationship development) pursued through CMC may reach levels equal to ("interpersonal") or surpass ("hyperpersonal") those achieved face to face. In instances in which time is limited, thereby forcing a greater task focus on communicators, SIPT predicts relational tone and social outcomes will be dampened ("impersonal"). Based on these tenants, SIPT would suggest that IM, e-mail, and the telephone should display substantial niche breadth and overlap in that they may be employed in a similar manner to fulfill social goals. This should be the case, particularly when they are used in established rather than new relationships (Walther & Parks, 2002).

The implications of SIPT for understanding media competition are twofold. First, because of its prediction that relational tone varies as a function of the communication channel used and the amount of interaction time allowed, SIPT suggests that specific interpersonal media can be used to fulfill a wide array of needs, tasks, and goals: Specific channel characteristics (e.g., cue-richness, synchronicity) become less important when temporal influences are taken into consideration and allowed to vary freely. An extended period of message exchange allows users to compensate for any limitations imposed on them by a medium. This suggests that the telephone, IM, and e-mail should each display substantial breadth (e.g., fulfill a broad spectrum of gratifications). Second, it follows that the greater the breadth of each medium on the same dimensions, the greater the likelihood for niche overlap. The ability to fulfill many of the same social needs, tasks, and goals suggest users will perceive the telephone, IM, and e-mail as at least partially substitutable technologies.

> *Hypothesis 2:* The telephone (landline and cellular), IM, and e-mail will display substantial niche breadth such that their breadth levels differ significantly from a threshold level of breadth indicating specialism.
> *Hypothesis 3:* The niches of the telephone (landline and cellular), IM, and e-mail will display substantial overlap significantly greater than U-L (value indicting the lowest possible overlap).

Although it is difficult to infer predictions beyond niche breadth and overlap from SIPT, another theory that addresses the role of media attributes and offers direction for explicating niche superiority in terms of media attributes is that of electronic propinquity (Korzenny, 1978).

TEP. TEP (Korzenny, 1978) addresses the role of cue richness and synchronicity in achieving positive social outcomes. Korzenny (1978) argues that perceived propinquity, or "electronic proximity . . . nearness, or . . . presence" is an essential yet taken-for-granted aspect of mediated communication that accounts for the degree of satisfaction individuals derive from mediated communication. The theory holds that factors such as greater bandwidth (i.e., perceived amount of information available, or channel capacity), mutual directionality of the channel (e.g., feedback), number of channel choices, and greater communication skills are associated with greater propinquity. Conversely, increasingly complex information and more communication rules are expected to be linked with reduced propinquity.

With respect to superiority, TEP suggests that communication technologies with greater channel capacity and near-immediate feedback will be perceived as more satisfying or as providing greater gratification to users than those with a restricted capacity and delayed feedback.[5] In terms of bandwidth or cue richness, the telephone should be perceived as superior to both IM and e-mail. The fact that both the telephone and IM are synchronous in nature and provide users with near-immediate feedback also suggests that they should be perceived as superior to e-mail (which provides delayed feedback). Such an expectation is consistent with earlier research by Dimmick et al. (2000) that found that the LLP was superior to e-mail on the sociability gratification dimension; IM and the cell phone were not examined in that study.

> *Hypothesis 4:* When compared on gratification dimensions, the telephone (landline and cellular) will be perceived as superior to IM, which in turn will be perceived as superior to e-mail.

Method

Pilot Study

A pilot study was conducted to identify the gratifications and gratification opportunities associated with IM use, which were then included in the primary study examining media competition. One hundred self-identified IM users drawn from communication classes were asked to report on their "personal use" of IM.[6] Respondents were told to focus on their use to fulfill personal needs and obtain gratifications but not to report on any business or work-related uses. Respondents were instructed to list as many needs or reasons why they use IM as possible and were allowed as much time as needed to complete the task. Afterward, respondents were told to reexamine their list to ensure they had listed their full range of uses. After eliminating redundant statements, 282 usable statements were obtained.

Two trained coders performed content analysis on the gratification statements.[7] Previous research by Dimmick et al. (1994) and Stafford et al. (1999) identified and validated gratifications and gratification opportunities related to personal telephone

and e-mail use. In both earlier analyses, the primary categories that emerged encompassed "sociability gratifications" and "gratification opportunities" (see the appendix). The present study used those 19 statements as an initial set of categories for coding of the pilot study statements. Using established inductive coding protocols (as specified by Blumer, 1979), 20% of the statements were selected and coded accordingly. New categories were created to accommodate statements that could not be placed into a preexisting grouping. The remaining 80% of the statements were then coded accordingly. Although the majority of statements could be properly classified, four previously unidentified categories emerged (three sociability gratifications and one gratification opportunity). Representative statements of the new categories were selected on the basis of face validity and added to the initial 19 statements (Dimmick et al., 1994; Stafford et al., 1999), which served as gratification measures in the primary study (see the appendix for items).

Primary Study

Participants. Data were collected from 255 participants (101 males, 154 females) recruited from communication classes at a large Midwestern university to participate in a study on interpersonal media use in exchange for extra class credit. The average age was 20.52 (*SD* = 4.53). Eighty-one percent of the sample self-identified as White (*n* = 207), 8.3% African American (*n* = 21), 5.8% Asian (*n* = 15), 2.3% Latino/Hispanic (*n* = 6), and 2.0% Other (*n* = 5). One participant did not provide this information. Given that IM has been shown to be a particularly attractive form of communication among younger populations, including adolescents, teenagers, and college students (Pew & Internet Life Project, 2002), the use of the latter as participants was appropriate for the present study.

Procedure and measures. Participants were provided a consent form and the study materials in an envelope and allowed 1 week to complete and return the materials. The survey contained three sections. The first section asked participants a series of demographic questions, including age, sex, and ethnic background, as well as several items asking their level of experience using the Internet, IM programs, and e-mail. The second section asked participants to identify the role of interpersonal technologies (landline and cellular telephone, e-mail, and IM) in completing personal tasks during the course of a typical day and week.

In addition, the second section included three items used to measure any displacement effects on the telephone (landline and cellular) and e-mail because of IM use. For example, for each type of telephone, participants were asked, "Since you started using IM for personal messages, indicate below if you make more long distance calls, fewer long distance calls, or about the same number of long distance calls?" The accompanying 7-point Likert-type scale reflected three anchors, consistent with the

wording of the item (1 = *more long distance calls*, 4 = *same amount*, 7 = *fewer long distance calls*). A parallel procedure was used to assess displacement effects on e-mail. The items were reverse coded for ease of interpretation.

The third section addressed media competition. Participants were asked to respond to the 23 items derived from the pilot study for each technology. Specifically,

> we are interested in how people use different communication technologies to fulfill different needs and functions. For each statement below, think about your own uses of each technology (telephone [landline and cellular], e-mail, IM), and please indicate the extent to which you perceive each one as helpful in accomplishing that given need or function. Be sure to respond to each statement for all of the tools.

Participants were then presented each statement accompanied by 7-point Likert-type scales (1 = *not helpful at all*, 7 = *extremely helpful*), one for assessing each technology. For example, participants were presented with the statement "to give and receive advice on personal problems" and then asked to report how helpful each technology is for fulfilling the statement.

Results

Preliminary Analysis

Prior to the hypothesis tests, the underlying structure of the gratification items, which previously exhibited a sociability factor and a gratification opportunities factor (Dimmick et al., 1994; Stafford et al., 1999), was examined for each medium. The 23 items were entered into a principal axis factor analysis with oblique rotation. The results indicated that a one-factor solution was appropriate, with all items producing primary loadings of at least .45 and no cross-loadings above .30 on secondary factors. The eigenvalues associated with each analysis also supported the one-factor solution, with a value above 1.0, as did the associated scree plots. As a result, contrary to Dimmick et al.'s (2000) analyses, this general gratifications (or sociability/gratification opportunities) dimension was employed.

Hypothesis 1

Hypothesis 1 predicted that IM would show evidence of displacement of the LLP, cell phone, and e-mail. This prediction was addressed with student t tests conducted on each item using the midpoint of the scale (4 = *same amount of use*) as the point of comparison. The hypothesis was supported on two of three comparisons. The t tests comparing IM with LLP use, $t(254) = 17.03$, $p < .001$, e-mail use, $t(253) = 5.70$, $p < .001$, and cell phone use, $t(251) = -4.26$, $p < .001$, respectively, emerged as significant. Consistent with prior research suggesting that new media survive because of their

ability to provide gratifications in a defined domain (Dimmick, 2003), participants reported making relatively fewer long-distance calls ($M = 2.43$, $SD = 1.48$) and using e-mail less often ($M = 3.38$, $SD = 1.73$) as a result of adopting IM. In contrast, participants also reported slightly increased use of their cell phones ($M = 4.40$, $SD = 1.49$) since adopting IM. Thus, the prediction was supported for LLP and e-mail use but not cell phone use.

Hypothesis 2

Hypothesis 2 predicted that the LLP, cell phone, IM, and e-mail would display substantial niche breadth such that each breadth differs significantly from a threshold level of breadth indicating specialism. The breadth values reported in Table 1 show that the niche of the cell phone emerged as the broadest niche, followed by that of IM, which was broader than that of e-mail, which in turn emerged as broader than that of the LLP. To provide a more detailed interpretation of the breadth of each medium, two supplemental tests were conducted. The first test assessed the breadth values against the value representing upper bounds of the measure (or a value of 1), which tests the null hypothesis that the medium lacks any breadth at all within a specific domain. As shown in the second column, each medium was significantly different than the test value. A second test was conducted against the midpoint of the scale (or a value of .5), which represents the minimum threshold for testing a claim of substantial breadth within a domain. The third column shows that each medium was significantly different from the threshold value, with only the LLP failing to surpass it (indicated by a negative t statistic). The results provide support for the prediction.

Hypothesis 3

Hypothesis 3 proposed that the niches of the LLP, cell phone, IM, and e-mail will display substantial overlap significantly greater than U-L or the lowest possible overlap. The overall results show a moderate to moderately strong level of competition between the four technologies (see Table 1). The lowest level of niche overlap is between the LLP and IM, followed by the LLP and cell phone, indicating a degree of complementarity between each pair. The greatest niche overlap emerged between IM and e-mail, followed by IM and the cell phone, indicating a degree of substitutability between each pair for fulfilling sociability/gratification opportunities.

As with niche breadth, the overlap values were also tested against a theoretical value, in this case that representing the upper minus the lower bounds of the scale (U-L, or a value of 6) and the null hypothesis that no overlap exists between the four media. Table 1 reports the appropriate values and shows that in each case, the null was rejected. The values associated with each set of comparisons differed significantly from the test value. Hypothesis 3 was supported.

Table 1
Niche Breadth and Overlap Values for Landline Phone (LLP), E-Mail,
Instant Messaging (IM), and Cell Phone ($N = 255$)

Niche Breadth	Values	t^a	t^b
LLP	0.326	19.48	−10.38
E-mail	0.575	46.80	6.11
IM	0.669	49.39	12.47
Cell phone	0.787	78.94	28.80
Niche Overlap for Media Pairs	Values		$t(254)$
LLP—e-mail	3.124		−43.21
LLP—IM	3.482		−33.60
LLP—cell phone	3.411		−27.58
E-mail—IM	2.250		−61.31
E-mail—cell phone	2.724		−55.59
IM—cell phone	2.316		−55.97

Note: All t values are significant at a minimum of $p < .01$. The test value of t^a is 1. The test value of t^a is 0.5.

Hypothesis 4

Hypothesis 4 predicted a superiority hierarchy such that, when compared on grat-ification dimensions, the LLP and cell phone will be perceived superior to IM, which in turn will be perceived as superior to e-mail. The overall results show that the mag-nitude of the cell phone's superiority over the other technologies is significantly greater than that of the three technologies over the cell phone (see Table 2). In turn, the magnitude of IM's superiority in comparisons with the LLP as well as with e-mail significantly exceeds the superiority of each over IM. Finally, e-mail emerged superior to the LLP. Taken together, the findings support the predicted pattern, with the exception of the LLP.

Because superiority is calculated across all 23 items in the sociability/gratifica-tion opportunities dimension, which does not reflect the relative contribution of indi-vidual items to the overall value computed, a series of repeated measures Analysis of Variance (ANOVA), with medium treated as a repeated factor, were conducted. Table 3 shows the cell phone emerged superior on most of the items. IM emerged superior on two gratifications ("pass" and "different") and shared superiority with the cell phone on two others ("fun" and "fast"). E-mail also emerged superior on two gratifications ("economical" and "zone") and shared superiority with the cell phone on one other ("fit"). The LLP failed to emerge superior on any of the items.

Table 2
Pair-Wise Comparisons of Media Superiority for Landline Phone (LLP),
E-Mail, Instant Messaging (IM), and Cell Phone ($N = 255$)

Media pairs	Value	$t(254)$
LLP > e-mail	26.102	–12.61
E-mail > LLP	72.451	
LLP > IM	22.769	–16.46
IM > LLP	87.847	
LLP > cell phone	5.348	–31.00
Cell phone > LLP	100.290	
E-mail > IM	29.133	–7.78
IM > e-mail	56.161	
E-mail > cell phone	26.373	–18.13
Cell phone > e-mail	81.145	
IM > cell phone	32.918	–8.74
Cell phone > IM	63.047	

Note: All t values are significant at a minimum of $p < .01$.

Discussion

The hypotheses tested in this study reflect both niche theory—a macrolevel theory of media competition and coexistence—as well as niche characteristics and microtheories of media attributes, such as SIPT (Walther, 1992) and TEP (Korzenny, 1978). Overall, the hypotheses received strong support. The data were largely consistent with predictions derived from the aforementioned microlevel theories regarding the breadth of the newer medium—IM—and, in addition, overlap among the four technologies. Displacement and superiority predictions that IM would displace e-mail and phone use and that the superiority measures would show a clear rank order also received support.

From the perspective of niche theory, the comparative utility of a medium to fulfill users' needs and provide them with gratification opportunities is essential to its survival and growth in a resource space (Dimmick, 2003; Kayany & Yelsma, 2000). The implication of the breadth values is that IM serves a broader spectrum of needs than the LLP and e-mail. IM's breadth of the sociability/gratification opportunities dimension is greater than that of the latter media. However, these three media display a narrower niche than that of the cell phone, which appears to be the generalist among this group and serves a broader spectrum of needs, probably because of the mobility it provides. Mobility is a primary feature of the cell phone that distinguishes it from not only the two text-based media but also its landline counterpart.

The results associated with niche overlap suggest that users perceive e-mail and the cell phone as most substitutable for IM for fulfilling needs. As a substitute for

Table 3
Statistics Associated With Repeated Measures Analysis of Variance (ANOVAs) of the 23 General Gratification Statements ($N = 255$)

	Landline Telephone		E-Mail		IM		Cell Phone		ANOVA	
	M	SD	M	SD	M	SD	M	SD	F	η^2
1. Personal	2.96	2.14	4.72	1.94	4.92	1.95	5.64	1.64	98.93	.28
2. Touch	3.24	2.31	5.02	1.99	5.67	1.89	6.17	1.37	146.38	.37
3. Time	2.43	1.90	4.76	1.95	5.33	1.92	6.14	1.38	221.88	.47
4. Far	2.60	2.00	5.56	1.75	5.79	1.85	5.90	1.57	217.49	.46
5. Information	3.18	2.14	5.18	1.85	5.41	1.81	5.84	1.47	128.63	.34
6. Close	3.64	2.37	3.95	1.96	4.36	1.96	6.06	1.41	88.09	.26
7. Share	3.38	2.22	4.92	1.78	5.32	1.77	5.84	1.44	101.76	.29
8. Fun	3.04	2.12	4.28	1.93	5.60	1.82	5.62	1.60	126.02	.33
9. Care	3.84	2.38	3.92	1.77	3.80	1.82	5.93	1.42	80.44	.24
10. Companionship	3.25	2.29	3.50	1.88	4.51	1.97	5.90	1.36	119.25	.32
11. Advice	3.48	2.38	3.45	1.90	4.27	2.02	6.09	1.37	109.50	.30
12. Resolve	3.41	2.37	3.16	1.95	4.20	2.04	5.66	1.67	92.03	.27
13. Coordinate	3.20	2.21	4.53	2.05	5.11	1.90	6.11	1.37	113.20	.31
14. Pass	2.72	2.06	4.07	2.08	6.03	1.64	5.12	1.96	165.16	.39
15. Economical	2.80	2.06	5.31	1.83	4.56	2.35	4.92	1.94	82.68	.25
16. Fast	2.44	1.86	3.65	2.17	5.75	1.81	5.78	1.69	199.99	.44
17. Simple	3.03	2.18	4.78	1.85	5.78	1.65	5.98	1.47	159.53	.39
18. Hold	2.47	1.84	3.34	1.93	4.44	2.08	6.18	1.29	200.51	.44
19. Fit	2.19	1.64	5.48	1.83	4.28	1.99	5.53	1.69	216.89	.46
20. Zone	2.15	1.62	6.12	1.53	4.98	1.90	4.47	2.10	238.35	.48
21. Conversational	3.09	2.25	3.60	2.01	4.29	2.19	5.14	1.90	53.46	.17
22. Convenient	2.33	1.77	3.97	1.98	5.38	1.91	6.25	1.38	250.35	.50
23. Different	3.15	2.21	5.11	1.86	5.49	1.83	5.36	1.71	108.63	.30

Note: IM = instant messaging. Statement labels shown correspond to those shown in the appendix. All p values are equal to or less than $p = .001$. Degrees of freedom associated with significance tests are 3 and 762.

IM, it may be that e-mail, which shares the text-based format, is used under circumstances in which a partner is unavailable because of physical distance or time zone differences, whereas the cell phone, which shares the attribute of synchronicity, is used when the user is away from a computer. In contrast, the overlap results also indicate that both IM and the cell phone are complementary media to the LLP for fulfilling general gratifications. That is, the needs fulfilled by the LLP are least similar, and thus least substitutable, to those provided by IM and the cell phone and together provide a degree of balance for each other in satisfying users' wishes. Given that the overall niche overlap results provide support for the presence of competition between the four technologies, the remaining hypotheses help to determine the nature of that competition.

With respect to the superiority hierarchy among the interpersonal communication technologies, the LLP, the oldest, was perceived as inferior to the two newer technologies, IM and e-mail, and its mobile counterpart the cell phone, in fulfilling users' needs. The detailed follow-up analysis conducted on each item helps clarify the superiority findings; these differences indicate users differentiate the four media and may explain, despite the presence of overlap and competition, why each continues to exist. Users perceived the cell phone as superior to the other media on most items, supporting the results associated with niche breadth, which suggested it to be the generalist relative to the other media. Nonetheless, users perceived IM as superior on two items, "to pass time" and "communication that is different than face to face." The fact that IM emerged as superior on these items is consistent with findings reported by Lee and Perry (2004) that indicate, for some users, IM may be a more attractive form of interaction than face to face and consequently devote a substantial amount of time to its use for social purposes.

If the cell phone is considered an extension of the traditional LLP in terms of gratification provision, the pattern of results is consistent with previous niche studies. For example, Dimmick et al. (2000) contend that the rich base of nonverbal cues provided by phone conversations make it (LLP) especially useful for fulfilling affectively oriented needs: "The phone is no doubt superior for these purposes because of the efficacy of a familiar human voice in conveying affect or emotion in real time" (Dimmick et al., 2000, p. 241). Expressions of caring, provision of companionship and advice, and resolution of conflicts, as reflected among the gratification items, suggest more emotionally laden or intense forms of communication. This appears to have also emerged in the present study. Most items on which both IM and e-mail emerged superior are not affect laden; only one, "for fun or pleasure of communicating," reflects a degree of affect, and superiority on it was shared. In contrast, users perceived the cell phone as superior for fulfilling most needs, irrespective of the degree of affect involved.

Ultimately, the extent to which users perceive a newer technology to be superior to older ones may lead to the latter's displacement. The findings of the present study show evidence of such effects on both e-mail and LLP but not cell phone use. This

suggests that the niche of IM is being created by a shift of communication activities from e-mail and LLP use to IM. This finding is consistent with previous research that reports similar displacement effects created by the adoption of newer technologies (e.g., Dimmick et al., 2000; Kayany & Yelsma, 2000; Li, 2001). In contrast, cell phone use appears virtually unaffected, which was reported to have increased slightly but significantly since IM adoption.

Beyond the insight obtained from finding the fit of IM among its competitors, the present study has implications for the theories that were used to predict the microlevel relationships between the media. First, the uses and gratifications approach has been traditionally limited by the means through which it conceptualizes media use. Essentially, the approach advocates that users consider the use of a medium based on the satisfaction it provides with little regard for other options available. Certainly, multiple media have been investigated within single treatments, but no mechanisms have ever been proposed in a traditional uses and gratifications study that describes how satisfactions obtained from one medium affect the use of another. The application of the theory of the niche to gratification constructs as done in this study and others before it (e.g., Dimmick et al., 1994; Dimmick et al., 2000) has enhanced their usefulness by providing such mechanisms. In an as yet unpublished study by the third author, these points are discussed in greater detail. Second, the media attribute theories have been strengthened through their use to explain and predict patterns of superiority. Using the characteristics of cue richness and synchronicity as an explanation as to why greater satisfaction may be derived from the media has painted a clearer picture as to why these constructs have an affect on selection and use. Because such characteristics have been found to vary among users (Carlson & Zmud, 1999), future studies should investigate the potential relationships that may exist between relative degrees of these media characteristics, satisfaction derived from the media, and ultimately selection and use.

Two potential limitations regarding conclusions to be drawn from this article pertain to the sample and measures of displacement. Although college students are a model population for media economic research in that they use the greatest variety of interpersonal media among any population and have been used for several investigations in the topic area (e.g., Baym, Zhang, & Lin, 2004; Lee & Perry, 2004), they do not represent all users. It is likely the case that competition occurs differently among populations that use fewer options. Examinations of this population, however, serve as a basis of comparison for future studies of populations with lesser degrees of media competition in place.

With regard to measures of media displacement, to capture change, longitudinal measures of niche breadth, niche overlap, and superiority are required. In longitudinal studies, changes in niche breadth and niche overlap can be used as evidence of displacement; however, in cross-sectional studies, it is necessary to use measures of superiority. The measurement used in the preceding analysis, to the authors' knowledge, is the most effective means of capturing displacement within a cross-sectional

sample, and this measurement and variants have been used for a variety of displacement investigations (e.g., Dutta-Bergman, 2004; Kayany & Yelsma, 2000).

In summary, the overall picture that emerges in the present study is that IM's niche is characterized by competition with the LLP, e-mail, and cell phone in providing general gratifications. First, IM has substantial niche breadth, surpassed only by the cell phone. Second, IM's niche overlaps substantially with the LLP, cell phone, and e-mail, members of the interpersonal domain, indicating substitutability among them. Finally, IM emerged as superior to both the LLP and e-mail, all of which were surpassed by the cell phone, the generalist in the study. The consequence of the latter two findings is they provide evidence of displacement of two older media by IM. All things being equal, the new medium serves some of the same communication needs as the older media and, in some cases, serves them better.

Appendix
Sociability Gratifications and Gratification Opportunity Statements

Sociability Gratifications

 1. To send and receive personal messages . . . (PERSONAL)
 2. To keep in touch with people . . . (TOUCH)
 3. To keep in contact with people you don't have enough time to see in person . . . (TIME)
 4. To keep in contact with others who live far away . . . (FAR)
 5. To give and receive information with people you know . . . (INFORMATION)
 6. To communicate personal messages with those closest to you . . . (CLOSE)
 7. To share ideas and opinions . . . (SHARE)
 8. For fun or pleasure of communicating . . . (FUN)
 9. To feel or express caring . . . (CARE)
10. For a feeling of companionship with people you know . . . (COMPANIONSHIP)
11. To give or receive advice on personal matters or issues . . . (ADVICE)
12. To resolve conflicts . . . (RESOLVE)*
13. For coordinating social events with people you know . . . (COORDINATE)*
14. To pass time . . . (PASS)*

Gratification Opportunities

1. For communication that is economical . . . (ECONOMICAL)
2. For communication that is quick and fast . . . (FAST)
3. For communication that is simple and easy . . . (SIMPLE)
4. For ease in getting a hold of someone . . . (HOLD)
5. For communication that fits people's work schedules . . . (FIT)
6. For communication with people in different time zones . . . (ZONE)
7. For communication that is conversational . . . (CONVERSATIONAL)
8. For communication that is convenient . . . (CONVENIENT)
9. For communication that is "different" than face to face . . . (DIFFERENT)*

Note: Asterisks denote new categories developed from the pilot study on instant messaging use described in the text.

Notes

1. Previous studies have referred to communication technologies used facilitate one-to-one interaction between individuals as "interactive media." We argue that this is a problematic term to describe the media of interest because of the use of the construct of "interactivity" to describe characteristics of media that are not at all within the current communication domain of interest. Although arguments could be made to the contrary, given that our domain of interest primarily lies within the realm of interpersonal communication, we feel the term *interpersonal media* is more appropriate.

2. The niche breadth of a medium is calculated with the following equation:

$$B = \frac{\sum\limits_{n=1}^{N} \frac{\left(\sum\limits_{k=1}^{K} GO_n\right) - Kl}{K(u-1)}}{N}$$

where u, l = the upper and lower bounds of a scale, GO = a gratification obtained rating on a scale, N = the number of respondents using a medium, n = the first respondent, K = the number of scales on a dimension, and k = the first gratification scale.

3. The niche overlap among two mediums is calculated with the following equation:

$$O_{i,j} = \frac{\sum\limits_{n=1}^{N} \sqrt{\sum\limits_{k=1}^{K} \frac{(GO_i - GO_j)^2}{K}}}{N}$$

where i, j = medium i and medium j, GO = a gratification obtained rating on a scale for i and j, N = the number of respondents who use both i and j, and n = the first respondent.

4. The superiority of two mediums is calculated using the following equations:

$$\text{SUPERIORITY} \qquad S_{i>j} = \frac{\sum\limits_{n=1}^{N} \sum\limits_{k=1}^{K} \left(m =_{i>j}\right)}{N}$$

$$\text{SUPERIORITY} \qquad S_{j>i} = \frac{\sum\limits_{n=1}^{N} \sum\limits_{k=1}^{K} \left(m =_{j>i}\right)}{N}$$

where i, j = medium i and j, $m_{i>j}$ = the value of a respondent's rating for those scale items on which i is rate greater than j (the sum of the actual values), $m_{j>i}$ = the value of a respondent's rating for those scale items on which j is rate greater than i (the sum of the actual values), K = the number of scales on a dimension, k = the first gratification scale, N = the number of respondents who use both i and j, and n = the first respondent.

5. It could be argued that media richness theory (MRT; Daft & Lengel, 1986) might have been a better basis on which to form arguments of superiority given its greater recency and use. MRT takes a focus on premedia selection knowledge/perceptions that drive choice. In contrast, the theory of electronic propinquity puts greater emphasis on outcomes of media usage in a given environment with varying media options available, giving it a greater degree of relevance to the current discussion.

6. The pilot study sample comprised 54 female and 46 male current instant messaging (IM) users, with an average age of 21.69 ($SD = 3.24$). The sample was predominantly Caucasian (84%) and had used IM programs for approximately 5 years ($M = 5.13$, $SD = 2.01$).

7. Scott's Pi estimates across the 23 categories ranged from .80 to the mid-.90 range, indicating an acceptable level of coder reliability.

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