Media Use as a Function of Identity: The Role of the Self Concept in Media Usage

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The Problem

Individuals are born into and live their lives in an environment that abounds with alternative sources of stimuli and information. Among these alternative sources are direct self-reflexive observation of the immediate environment, interpersonal face-to-face communication, and the various media. One of the central questions of communication theorists from the beginning of the discipline has been how and why any given individual chooses among these alternative sources.

Although researchers have considered many variables in the past half century, by and large the majority of studies in the communication discipline have taken one of two broad perspectives: The first of these, usually called the "Uses and Gratifications" approach, assumes that all human action is motivated by needs, drives, ambitions, hopes, desires or other internal psychological motives which impel people toward or away from goals and actions (Katz, Blumler, & Gurevitch, 1973; McQuail, 1984). Empirical research within this tradition typically attempts to identify the specific needs and gratifications that are provided by particular media sources.

While research from the Uses and Gratifications perspective abounds, empirical support is slim. A fair assessment of this research would indicate that needs and gratifications have been identified which are statistically associated with the use of various forms of media at significant levels (particularly in large samples), but that the amount of variance accounted for by these needs and gratifications is generally small and leaves most of the variance unexplained.

Cho and colleagues (Cho, Zuñiga, Rojas, & Shah, 2003), for example, examined the relationship between Internet use and gratifications gained within the context of the digital divide framework and used path-modeling techniques to test how different types of Internet use were related with various gratifications gained among four sub-groups of Internet users: high socio-economic status (SES)-young, high SES-old, low SES-young, and low SES-old. After controlling for demographics and basic pattern of Internet use, these findings showed that the use of the Internet explained 4% of variance in connection gratification, 8% of variance in learning gratification, and 12% of variance in acquisition gratification. In another study looking at Internet use and its motivations for political information, findings indicated that politically interested Internet users relied on the web mainly for guidance (27.2% of variance), with other Internet gratifications like entertainment and social utility, convenience and information seeking, explaining at or less than 10% of the variance for Internet use (Johnson & Kaye, 2003).

Consequently, in light of other possible factors accounting for media adoption, some recent research on human personality highlights the plausibility of altering the scope of Uses and Gratifications research from an emphasis on mass media meeting deficit needs, to aiding people in promoting and maintaining their social identities (Finn, 1997; Finn & Korukonda, 2004). Moreover, both classical and recent diffusion of innovation research suggests that the likelihood of adopting an innovation may be an aspect of personal identity; that is, that certain individuals might define themselves as the type of people who adopt certain innovations (Oksman & Turtiainen, 2004; Rogers, 2003; Vishwanath & Chen, 2006).

This second major approach, usually applied in the case of newly emerging communication media, is Rogers' "Diffusion of Innovations" model (2003). It is essentially an epidemiological model where innovations (or, in this case, new media) spread from adopter to adopter in a contagious way. Rates of diffusion for any innovation depend, in the original model, on both attributes of the innovation itself and attributes of the individual, with some persons more likely to adopt innovations than others. Recently Vishwanath and Chen (2006) have shown that people who have a history of using other innovations which are related to the specific innovation in question are more likely to adopt the new innovation than those who do not already use related innovations.

The notion that behavior is determined by personal identity, that is, by a person's self concept, is the cornerstone of a third alternative theory, symbolic interaction theory. Symbolic Interaction theory can best be characterized as a broad theoretical perspective rather than a specific, operational theory, since it encompasses widely varying philosophies and perspectives, not all of them scientific. In this paper, we investigate the role that individuals' self-concepts play in their use of various media, specifically as elaborated by Sewell (Sewell, Haller, & Portes, 1969), Haller (Haller, 1982) and their students Woelfel (J. Woelfel, 1993b; J. Woelfel & Haller, 1971) and Fink (Dinauer & Fink, 2005; J. Woelfel & Fink, 1980).

Theory

Classical motivational psychological models – the models most characteristic of communication theory and research – are generally based on the idea that the "normal" or "default" condition of human individuals is to be at rest. In such models action or behavior takes place only when some "force", such as a need, drive, desire, motive or other impelling condition, presses the individual to action. A core principle of symbolic interaction theory, on the contrary, assumes that the normal state of individuals is behavior. Behavior is "ongoing" and continuous. Behavior never stops, and individuals are never "not behaving."

In the interactionist model, therefore, it is not necessary to explain why people are acting; the question from this perspective is why people are acting one way rather than another. Decisions about what to do occur only when ongoing behavior is blocked in some way, as when one's progress toward a destination is halted by a swollen river. When the ongoing stream of behavior is blocked, a symbolic process (thinking) ensues and a new course of behavior can be designated[1]; thinking generally involves the manipulation of symbols that represent objects in the situation in which the individual is embedded (Mead, 1934).

[1] In a sense, classical motivational psychological theory is like Aristotle's theory of motion in which the natural state of being of most objects is to be at rest and the causes of motion must be identified. Interactionist theory is analogous to Newtonian theory in that motion is assumed to be continuous and only changes in motion (accelerations) need to be explained.

The trajectory of ongoing behavior is assumed to be controlled by the self concept. The self concept is peoples' evolving understanding of who they are and how they are related to the situations in which they find themselves. Each "situation" consists of a set of symbolic "objects" whose meaning is defined only in relation to still other objects in peoples' experience. One object that is present in every situation is the self, which, as a symbolic object, is defined only in relation to the other objects of experience. Another important set of objects which may be found in any situation is a set of behaviors. Behaviors are also symbolic objects and are defined only in relation to the other objects.

Within this model, "beliefs" consist of relationships among objects and "attitudes" are beliefs about the self; that is, attitudes are the relationship between the self concept and other objects. These attitudes determine one's behaviors toward those objects. In general, one performs those behaviors that are most consistent with the self conception; that is, they do things that are appropriate for people like they believe themselves to be. If they believe themselves to be honest, they tell the truth; if they believe themselves to be cowardly they run from danger. In sharp contrast to the Uses and Gratifications approach, these behaviors may or may not be valued or gratifying; they may or may not fulfill needs, as in the case of the alcoholic (Denzin, 1997).

Not only does the self-concept guide behavior, including media and interpersonal behavior, but it is itself influenced by information from these sources. As suggested by Sewell, Haller, & Portes (1969) and Woelfel & Haller (1971), individuals are born into statuses (locations) within already existing social structures (often called social networks or communication networks by Communication researchers today). Placement in particular social structures selectively exposes individuals to information from their immediate environment, other people, and media, which then influence the self concept in an ongoing way. The self concept, in turn, guides the behavior of the individual.

One convenient representation of the concept of self and situation consistent with the symbolic interactionist model is the Galileo model (Dinauer & Fink, 2005; J. Woelfel, 1993b; J. Woelfel & Fink, 1980; J. Woelfel & Stoyanoff, 2007) In the Galileo model, objects are represented as points in a multidimensional space. Objects which are similar to each other are close to each other in the space. The self as object is also represented as a point in the space and it is located close to the objects that best define it. Behaviors, which of course are objects, are also located as points in this space, and behaviors closest to the self point are most performed, while those seldom or never performed are far from the self point; accordingly, media close to the self point would be expected to be utilized more and media further from the self point would be utilized less. In the Galileo model, ongoing behavior is represented by the trajectory of the self point through an evolving space of objects in more or less motion relative to each other.

Methods

Historically, interactionists have disagreed among themselves as to the measurability of the self concept. Herbert Blumer (Woelfel, 1967) considered the self too "volatile and evanescent" to measure, but Manford Kuhn (Kuhn & McPartland, 1951)

pioneered the development of such measurements with the "Twenty Statements Test" (TST).[2]

Perhaps the most precise measure of the self concept is provided by the Galileo model (Woelfel, 1993b; Woelfel & Fink, 1980; Woelfel & Stoyanoff, 2007), the same method used by Vishwanath and Chen (2006) to measure innovation clusters. Galileo improves on the TST in several ways. First, while the TST measures a general concept of self, the Galileo model can measure the situational character of the self. Second, while the TST provides only categorical information, Galileo provides precise quantification for attitudes and beliefs within the situation.

The development of a Galileo scale follows the process by which Likert[3] scales were originally constructed, with several technical improvements. The original Likert scaling procedure required the construction of a Thurstone scale in the standard way and then added five-point scales to express degree of agreement or disagreement with the statements in the Thurstone scale (Likert, 1932; Thurstone, 1931). The whole procedure required developing a pool of possible items, usually by surveying people drawn from the population to whom the scale was meant to apply, then clustering the items through a q-sort procedure. Once the final items were determined, respondents would be asked not whether they agreed or disagreed with each item as in a Thurstone scale, but to what extent they agreed or disagreed with each item on the now-familiar five point scale[4] ranging from "strongly agree" to "strongly disagree."

Galileo scale development differs from this original Likert scale procedure in two ways: first, the q-sort procedure is replaced with an artificial neural network clustering algorithm (J. Woelfel, 1993b; J. K. Woelfel, 1998), and, second, the five point Likert scale assessing degree of agreement with each item is replaced by a complete paired comparison ratio scaling task in which each respondent is asked to judge how different or "far apart" each item is from all the others compared to some stipulated standard difference (J. Woelfel & Fink, 1980). One item always included in the scale is a self term, such as "yourself", so that respondents are asked to judge how far each item is from themselves (J. Woelfel, 1993b).

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[2] "'"The test (hereafter TST) is a sheet of paper, at the top of which are the instructions: 'There are twenty numbered blanks on the page below. Please write twenty answers to the question "Who am I?" in the blanks. Write the answers in the order they occur to you; don't worry about logic or importance.' Up to twenty responses to this generic question provided subjective definitions of the self for Kuhn, which he understood as internalizations of a person's objective social status"'" (Alm, Carroll, & Welty, 1972, p. 190).

[3] We are referring here to the original Likert scaling procedure (Likert, 1932) – not the Likert type scales that are ubiquitous in the social sciences today.

[4] When it was discovered that each five point item usually correlated quite highly with the entire scale, common practice became to use just the five point scale and forego the process of producing a true Likert scale, an unfortunate result which reduces precision of measure considerably.

The TST identifies up to 20 "objects" that best define an individual. The Likert procedure allows respondents to discriminate up to five levels of "closeness" to those objects but leaves the relationships among the objects unmeasured. Galileo procedures, however, allow respondents to judge closeness or distance from the objects on an unrestricted scale. The Galileo model also measures the relationships among all the objects, thus allowing a comprehensive, holistic and precise description of the self in any given situation. Perhaps most significant is the fact that Galileo measurements use the same measurement model as the physical sciences, and are completely consistent with physical science practice.

In the present study undergraduate students at the University at Buffalo responded to open-ended questions in an online[5] questionnaire about what media they used most, what it was about those media that made them useful, and what it was about themselves that made them use those media most. Three hundred sixty-five students responded to parts of this initial questionnaire; 270 of the open-ended question responses were complete and analyzed with Catpac II. Catpac II is an artificial neural network which passes a moving window through a text and learns the n-way interrelationships among the words in the text in the form of an NXN matrix of interneural connection weights (Woelfel, 1993a). These interconnections are then used as input for various clustering procedures, Ward's cluster analysis is the default procedure, and the resulting clusters are visualized in dendograms and perceptual maps. From this initial analysis[6], 20 objects were selected as the principle objects in the "situation", also referred to as a "neighborhood", which defines the self relative to media.

A second online questionnaire asked respondents to estimate the pair-wise dissimilarities among the 20 objects – one of which was "yourself" – on a ratio scale, where the standard distance that served as the basis of the ratios was "radio and magazines are 100 units apart." In addition to these 190 pair comparisons, respondents were asked several standard Uses and Gratifications items, personality items, and demographic items. Finally, all respondents were asked how many hours/minutes per day they typically spent with newspapers, television, radio, Internet, cellular phone, magazines, and face to face communication.

Results

Four hundred and nine undergraduates provided complete responses to the second questionnaire. Responses to the pair comparison items were analyzed with Galileo version 5.6 (v5.6), and additional analysis on all items including the pair comparisons was performed using SPSS. Galileo[7] provides a complete linear orthogonal

[5] All online questionnaires for this study were hosted on "The Galileo Matrix," a website created for that purpose; more recent surveys have utilized an opensource program called Limesurvey.

[6] In contrast to non-metric scaling methods, which provide only a partial decomposition of modified distances based only on their order relations, Galileo is often erroneously called *metric* multidimensional scaling; this is inaccurate. The term metric should be

decomposition of the centroid scalar products of the distances following the method of Young and Householder(1938) as modified by Torgerson (1952).

Figure One shows the first three dimensions of the Galileo solution:

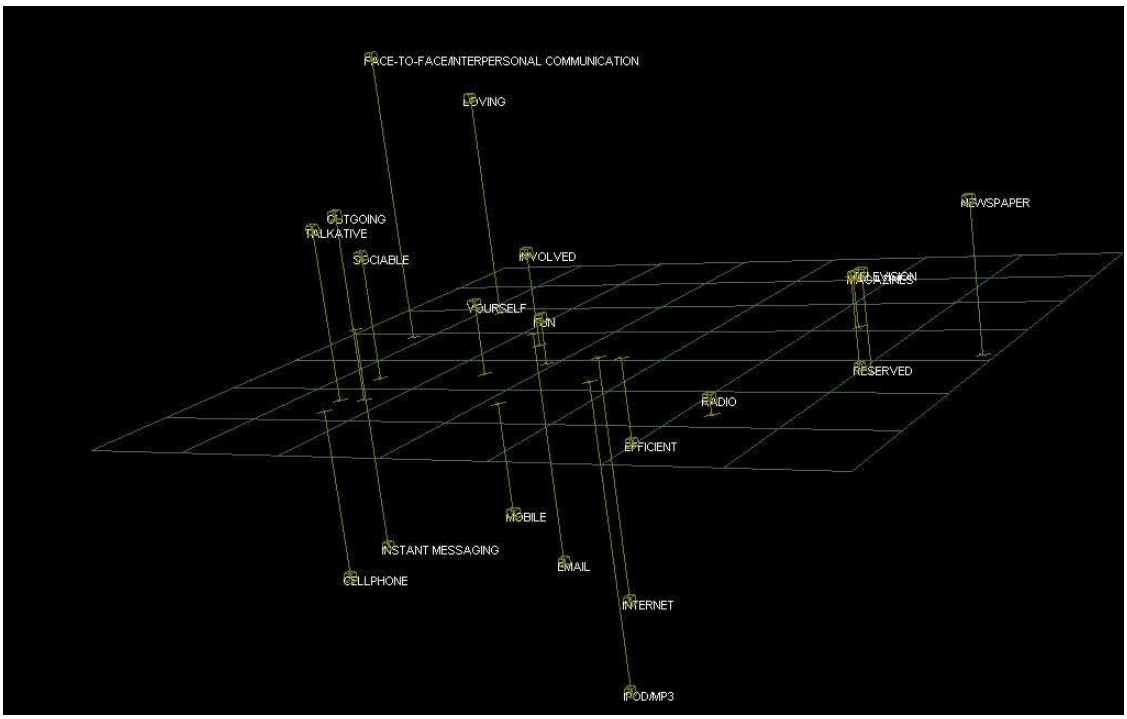

Figure 1: First three dimensions of media space

Precision of the pair comparisons

Precision of the pair comparisons was estimated in two ways. First, the means and standard errors of every pair were calculated. Percent relative error was then calculated as

$$(1) \qquad \% \text{ relative error} = 100(\sigma/\mu)$$

where σ = the standard error and μ = the mean. Percent relative error ranged from 3.4% to 11.14, which means that the mean values can generally be expected to be accurate to within +/- 3.1% to 11.6%. The average number of observations per cell was 400, and the mean of all observations was 55.77. The largest difference measured was the distance between instant messaging and newspapers (117.3) and the smallest distance measured was the distance between mobile and cell phone (16.0.)

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reserved for spaces which are fully Euclidean, that is, spaces in which all the metric axioms are satisfied. Galileo provides a solution which may lie in Euclidean space, depending on the actual data, but in general is a non-Euclidean Riemann space.

A second method used was to split the Galileo data into two random halves, construct two Galileo spaces, and compare them. This was accomplished using the *comparison of spaces* option of Galileo v5.6. Results showed differences in location between corresponding concepts in the two spaces ranged from 3.2 to 28.5 units, with a mean difference of 13.47.

Table One compares the orientation of the position vectors of the concepts in the two spaces along with the distances moved:

Concept	r	angle (degrees)	Distance moved
Newspaper	.99	2.5	2.1i*
Television	.99	9.1	7.1
Radio	.99	7.1	8.1i
Internet	.93	20.2	12.2
Cell phone	.99	8.0	6.0
Yourself	.99	6.0	2.0i
Fun	.97	14.9	4.9
Magazines	.99	7.6	7.1
Email	.99	8.4	6.7
Instant Messaging	.99	4.9	4.1
IPOD/MP3	.99	8.2	7.3
Face-to-face	.99	5.6	4.0i
Sociable	.99	1.4	.8
Mobile	.93	21.1	12.3i
Outgoing	.98	11.4	7.6
Efficient	.99	7.6	10.8
Talkative	.98	11.4	6.9
Loving	.99	6.4	5.4
Reserved	.99	9.9	9.2
Involved	.95	18.6	7.2

Table 1: Comparison of spaces between split halves of Galileo space.
* indicates distance moved is imaginary.

Only six of the 20 correlations between corresponding position vectors across the random split halves were below .99, the lowest being .93. The average distance between concepts in the random split halves was 6.6.

Table Two shows the correlations and angles among the corresponding dimensions of the Galileo space across the split halves:

Eigenvector	r	Angle (degrees)	Magnitude 1	Magnitude 2
1	.99	6.5	111.6	113.0
2	.99	4.3	96.3	100.5
3	.99	8.0	73.9	77.6
4	.99	8.2	70.1	66.8
5	.98	11.2	59.0	57.3
6	.98	12.7	49.4	53.9
7	.90	26.4	41.3	44.0
8	.89	26.8	32.7	35.0
9	.90	26.4	31.7	38.0
10	.88	28.0	25.1	25.6
11	.67	48.0	21.4	27.7
12	.79	38.0	11.9	24.9
13	.49	60.5	8.3	6.4
14	1.0	0.0	0.0	12.0
15	.1	83.9	.2	7.8
16	.77	39.6	15.4	20.9
17	.69	46.1	26.7	22.9
18	.74	42.2	33.4	31.6
19	.89	27.0	42.6	46.1
20	.97	12.4	46.6	42.5

Table 2: Magnitudes of eigenvectors across split halves, correlations, and angles between corresponding pairs of eigenvectors across splits.

Tables One and Two show clearly that the Galileo pair comparison measures are very precise; they also show that the neighborhood of the media is reliably multidimensional, with eleven eigenvectors showing split half correlations above .9.

Eigenvectors 16 through 20 are imaginary (corresponding to negative eigenvalues), and at least one shows a split halves correlation of .97, one is .89, and two others are above .6, which indicates that the media space is reliably non-Euclidean. This high degree of precision indicates that the Galileo v5.6 algorithm is appropriate for such analysis, especially since it does not alter the data as do non-metric algorithms.

Figures 2 and 3 give a good visual expression of the degree of precision across the split halves of the data:

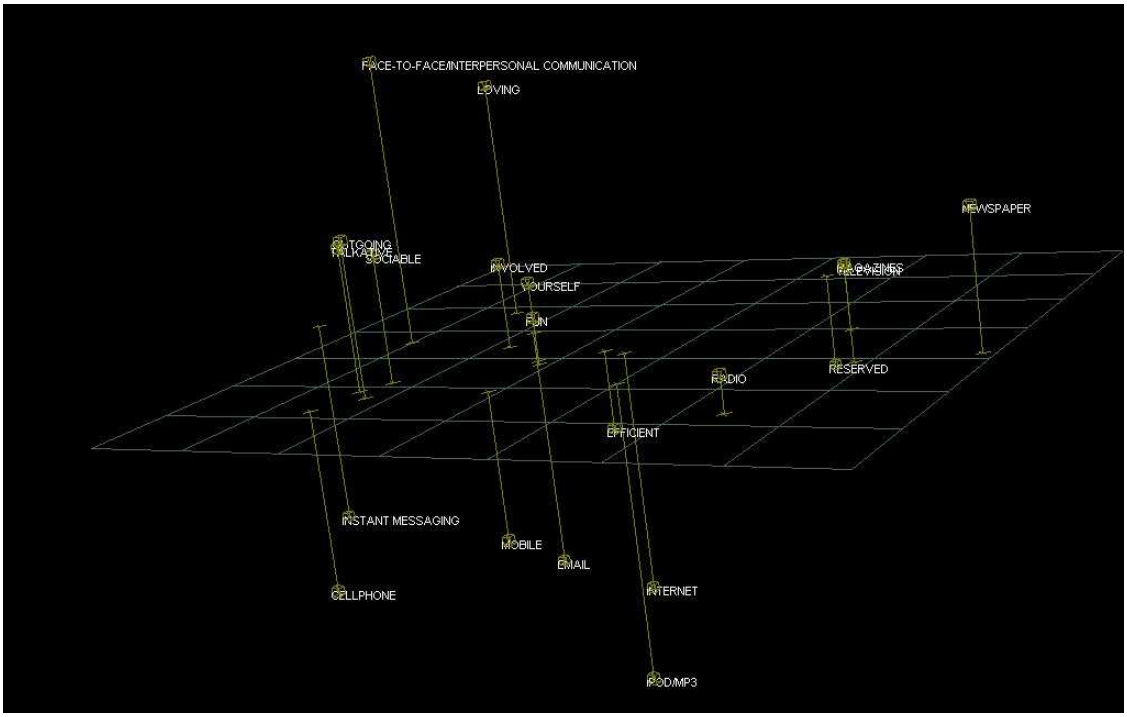


Figure 2: Media space first random half.

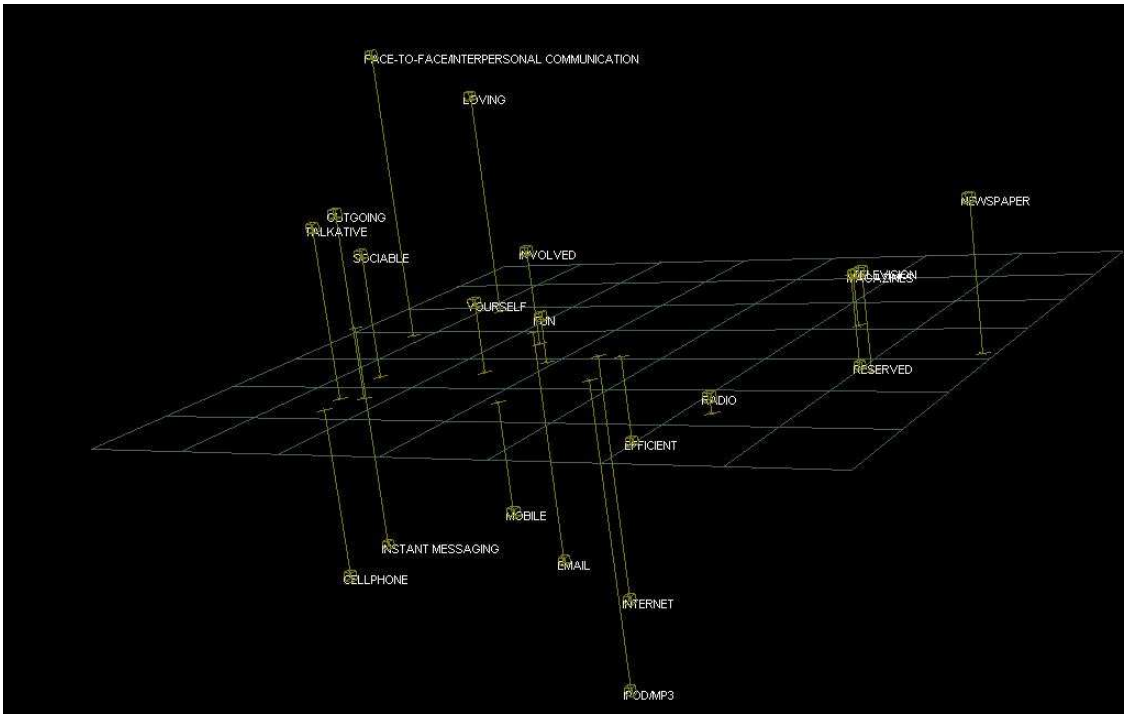


Figure 3: Media space second random half.

Precision of the media use variables

Table Three shows the mean number of hours per day spent attending to the nine media considered. They range from a low of .61 hours per day reading magazines to a high of 8.48 hours per day for face-to-face communication.

Medium	mean	std. Error	% relative error
Newspapers	0.64	0.05	7.8
Television	2.58	0.12	4.6
Radio	1.77	0.15	8.6
Internet/email	4.30	0.18	4.2
Cell phone	3.26	0.22	6.9
Magazine	0.61	0.05	8.2
Instant Messaging	3.72	0.25	6.7
IPOD/MP3	1.86	0.15	8.2
Face to face	8.48	0.27	3.1

Table 3: Media use (hours per day). N=409

Percent relative errors range from a low of 3.1 for face-to-face communication to a high of 8.6 for radio. The mean percent relative error was 6.47; while quite low that is actually slightly higher than the mean percent relative error for the self-concept measure, which was 5.16. Since these calculations also contain all true variability of beliefs and media use, they are conservative estimates of the precision, which is actually somewhat better than the numbers indicate.

Relationship of the self concept to media use

Figure One, shown earlier, was a ThoughtView plot (visualization) of the first three dimensions of the self concept media neighborhood. Galileo theory predicts that the number of hours spent each day with each medium will vary inversely with the distance of that medium from the self point.

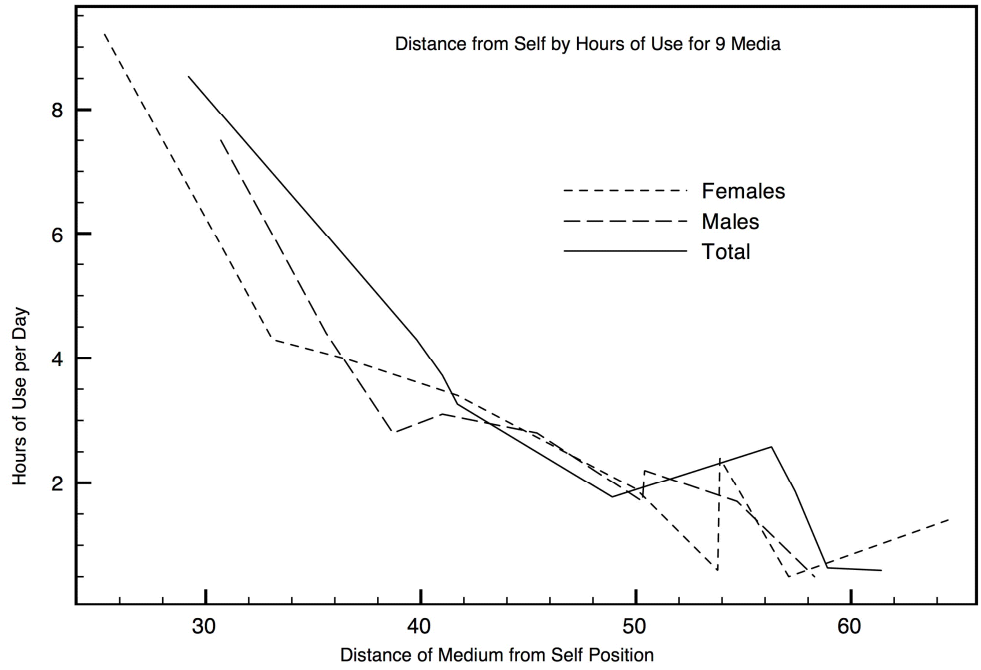
Table Four shows the distances of the media from the self-point along with the number of hours of use per day.

Medium	hours/day	distance
Newspapers	0.64	58.9
Television	2.58	56.3
Radio	1.77	48.9
Internet/email	4.30	39.8
Cell phone	3.26	41.7
Magazine	0.61	61.4
Instant Messaging	3.72	41.0
IPOD/MP3	1.86	57.4
Face to face	8.48	29.2

Table 4: Media use (hours per day) by distance from self

Figure Four shows the same data graphically.

Figure Four: Distance from Self by Hours of Use for all media



As Table Four and Figure Four show, the relationship between the distance from the self and the hours of use is inverse and close to linear. The equation

$$2) \qquad y = -.2x + 12.78$$

fits the data with r =. 91, and r^2 = .83, sig. < .01.

Gender differences in self concept and media use.

Table Five presents the hours of media use per day by distance from self for females:

Medium	hours/day	distance
Newspapers	0.5	57.1
Television	2.4	53.9
Radio	1.9	50.0
Internet/email	4.3	33.1
Cell phone	3.4	41.7
Magazine	0.6	53.8
Instant Messaging	4.0	36.4
IPOD/MP3	1.4	64.5
Face to face	9.2	25.3

Table 5: Media use (hours per day) by distance from self for females

Table Five shows that there is a similar negative linear relationship between distance from self and number of hours of use. The equation

3) $y = -.18x + 11.6$, sig. $< .01$.

fits the data with $r = -.882$, and $r^2 = .78$, sig. $> .01$.

Table Six presents the hours of media use per day by distance from self for males:

Medium	hours/day	distance
Newspapers	1.7	54.7
Television	2.8	45.4
Radio	1.7	50.3
Internet/email	4.4	35.6
Cell phone	2.8	38.7
Magazine	.5	58.3
Instant Messaging	3.1	41.0
IPOD/MP3	2.2	50.4
Face to face	7.5	30.7

Table 6: Media use (hours per day) by distance from self for males.

Table Six shows that there is a similar negative linear relationship between distance from self and number of hours of use. The equation

$$4) \qquad y = -.2x + 11.9$$

fits the data with $r = -.90$, and $r^2 = .81$, sig. $<.01$.

Discussion

Previous research into the determinants of media exposure has relied primarily on two major theories, Uses and Gratifications and Diffusion of Innovations. The Uses and Gratifications approach has shown some empirical support, but the relationships found are virtually always quite small. The Diffusion of Innovations approach has shown considerable success, but is mainly applicable to new and emergent media.

This paper has shown that the process can be more accurately described using a sociological model developed by Mead and others, formalized by Sewell, Haller and their students, and operationalized with the Galileo model. Initial results based on a sample of 409 undergraduate Communication students show substantial relationships between the self concept measured with the Galileo model and use of various media. These relationships are several orders of magnitude larger than the typical correlations shown by the Uses and Gratifications approach and, unlike the Diffusion of Innovation model, can be applied to any medium, including older, established media.

Perhaps most important, all the procedures involved in implementing the Galileo model are consistent with measurement and analysis procedures in the physical science. No special measurement models unique to the social sciences are involved in any way. The idea that the application of physical science procedures to the measurement of the cognitive processes determining selection of media use yields results several orders of magnitude more precise than special social-science models is of special significance to future research.

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