



# Assessing the displacement effects of the Internet <sup>☆</sup>

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## Abstract

This study examines the “medium-centric” and “user-centric” approaches in investigating the displacement effects of the Internet. Results from a random sample survey support the “medium-centric” approach in displacement effect. The use of the Internet does displace traditional media use of television, newspapers, and radio. The Internet performs a substitutive rather than supplementary function. More important, the use of *absolute* time measures may lead one to draw the reverse conclusion, and the use of *relative proportions* of time based on people’s total media time budget allows one to better examine the displacement effects of new media.

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## 1. Introduction

Whenever a new medium arises, there are always concerns about its displacement effects on existing media. The idea is simple: people only have fixed amounts of time and money to spend, and if they spend more on one medium, then they will spend less on others. In examining the keen competition in the media market, McComb (1972) substantiated the principle of relative constancy. He found that financial budgets for various media are relatively constant over time. Without a rapidly growing economy, existing media can only compete with each other to survive and thrive. He pointed out that both time and money jointly constrain the growth of mass media in the marketplace.

Numerous studies have explored the displacement effects of newly emerging media, including radio (Lazarsfeld, 1940; Mendelsohn, 1964), television (Belson, 1961; Rubenstein et al., 1973; Williams, 1986), and the Internet (Althaus and Tewksbury, 2000; Finholt and Sproull, 1990; James et al., 1995; Kayany and Yelsma, 2000; Kaye and Johnson, 2002, 2003; Lin, 2001; Robinson et al., 1997; Tewksbury and Althaus, 2000). Nie and Ebring (2000) reported that the Internet reduces newspaper reading, but Kayany and Yelsma (2000) found that it does not displace newspapers in the provision of information. They also found that the entertainment functions

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of television and newspapers are not affected by the Internet. Similarly, [Stempel et al. \(2000\)](#) found a small but significant positive relationship between Internet use and newspaper reading, and between Internet use and radio news listening.

In fact, there is no definite conclusion about which medium or function is more likely to be displaced by the Internet. Studies have shown various, sometimes contradictory, findings. These inconsistent findings may be due to the fact that erroneous and mistaken measures of traditional media use were used. Motivated by this possible methodological fault in many past displacement studies, this research attempts to re-examine the displacement effects of the Internet if relative proportional time instead of absolute time measures were used. Furthermore, this study also explores two approaches in the study of displacement effects, the medium-centric vs. user-centric, and determines which approach is more applicable and valid.

## 2. Time displacement and functional displacement

The major focuses of displacement effects of emerging media studies usually involve time and functional displacement. For example, [Robinson \(1981\)](#) found that those who spent more time watching television spent less time listening to the radio and on non-media activities. [Kayany and Yelsma \(2000\)](#) reported that when people went online, television viewing experienced the most time displacement, followed by telephone use and newspaper reading.

It has been proposed that a new medium will displace an existing medium when it can serve the function of the existing medium in a better and more effective manner: that is, when it provides a *functional alternative* ([Himmelweit et al., 1958](#); [Schramm et al., 1961](#); [DeFleur and Ball-Rokeach, 1982](#)). Quite a few studies have shown that a new medium will displace traditional media that are functionally similar. [Himmelweit et al. \(1958\)](#) found that television displaced radio listening, movie attendance and comic reading because they all had a similar “escape” function. [Kaplan \(1978\)](#) found that cable television decreased local network television viewing and theater attendance. As the Internet and television share many similar functions, it was also found that 25% of Internet users watch less television, while 11% of them read fewer magazines and newspapers ([The Interactive Advertising Bureau, 2002](#)). [Ferguson and Perse \(2000\)](#) argued that the Internet “may be” a functional alternative to television because they found that students most frequently used the World Wide Web for entertainment. They reasoned that if the Internet could offer more entertainment, it could displace television viewing.

In studies of the displacement effects of the Internet, the consumption of news and information is a major area of concern. The typical features of the Internet are interactivity, multifarious information sources, hyperlinks, and instantaneity. The online audience is able to search for their own choice of in-depth information at their own pace. However, studies have shown that the Internet’s displacement effects on the news and information functions of traditional media are mediated by other factors. [Neuman et al. \(1992\)](#) suggested that people with higher levels of political knowledge will be drawn away from information-poor sources like television, rather than from information-rich sources like newspapers. [Althaus and Tewksbury \(2000\)](#) put this idea to the test and found that political knowledge has a significant positive relationship with the use of the Internet and newspapers for surveillance, but not with the use of television news. This finding suggests that the use of the Internet for surveillance supplements rather than displaces newspapers reading.

## 3. Two approaches

There are two approaches to study the displacement effects of new media. The first approach is “medium-centric” and the second is “user-centric”. The first approach focuses on media attributes, and the second emphasizes user needs and gratification.

### 3.1. “Medium-centric” approach

Niche theory and media richness theory are variants of the medium-centric approach in the study of displacement effects while the user-centric approach stresses on “transcendental needs” and social influences in the use of media. Niche theory focuses on the medium’s niche, or its “position” in the multidimensional

resource space of the environment, including gratification, gratification opportunities, advertising, consumer time, and spending (Dimmick et al., 2000). For example, the niche of the telephone is different from that of television. The former is good at serving interpersonal needs, whereas the latter better serves entertainment needs. Gratification opportunities are properties of a medium that amplify or attenuate the opportunities for deriving gratification from the medium. In a study of the effect of the e-mail niche on the gratification and gratification opportunity dimensions, Dimmick et al. (2000) found that e-mail displaces long distance phone calls to some extent, although it may not replace or exclude them in its present technological configuration. The medium-centric approach leans toward a technological-deterministic stand.

Media richness theory (Daft and Lengel, 1984; Rice, 1992, 1993), another variant of the medium-centric approach, posits that people choose media largely according to attributes such as speed of feedback, channel variety, social presence, and richness of language. The media richness theory considers e-mail a less rich medium than the telephone because it has lower “social presence” features (Short et al., 1976). The new media, which are characterized by interactivity, hyperreality, anonymity, networking, and instantaneity (see Lievrouw and Livingstone, 2002), have been rated as more appropriate for fulfilling lean information exchange tasks, as opposed to socioemotional tasks (Rice, 1993).

However, other scholars disagree with this observation. Walther (1992, 1993) shows that e-mail, similar to telephone, provides an opportunity to form positive interpersonal relationships. It may take longer for e-mail users to acquire interpersonal knowledge of one another and develop their relationships than it does in face-to-face communication, but e-mail is increasingly used for socioemotional tasks. Flanagin and Metzger (2001) also found that new media are used for rich as well as lean tasks. One explanation is that new media will transition toward the roles of traditional media due to their capacity to improve the capabilities of existing technologies (Rice, 1993).

Under the medium-centric approach, researchers tend to examine the attributes of new media and their effects on existing media. The displacement, exclusion, and replacement of existing media are all possible outcomes (Flanagin and Metzger, 2001). The more time that a user spends on a new medium as a consequence of new features, the less time they will spend on old media. Grounded on niche theory, media richness theory, and the principle of relative constancy, the medium-centric approach puts forward a “more-less” hypothesis. As a result, it is proposed that:

H<sub>1</sub>: The more time Internet users spend on the Internet, the less time they will spend on traditional media.

### 3.2. “User-centric” approach

The view of “transcendental needs” is central to the user-centric approach, which stresses the satisfaction of user needs and defies the deterministic view of medium-centric approach. The user-centric approach, which is consistent with the uses and gratifications approach, posits that people are active and purposive; they select media to meet their needs. If people have a strong need for news and information, then they may use not only news web sites on the Internet to meet their needs, but also newspapers and news magazines. This approach conceives that no new medium can be a substitute for all of the uses and gratification of existing media, as demonstrated by the survival of traditional media despite the onslaught of radio and television in the past. In her studies, Lin (2001) pointed out the effect of “media supplementation”. Radio did not become a substitute for music recording, and television did not replace cinema and radio. As a matter of fact, the new media ended up supplementing rather than displacing the old media.

A user-centric approach focuses on the needs and gratifications of media users. Researchers are inclined to examine users’ needs across various media, be they old or new. Displacement occurs only in media that fail to meet those needs. If a traditional medium continues to satisfy specific needs of users, then a new medium will not be able to displace it. The user will curtail their consumption of traditional media only when they fail to meet their needs; and only under such circumstances, “more-less” scenarios may occur: i.e., the more time that the user spends on new media, the less time they will spend on traditional media.

For example, frequent news users may curtail the time and money that they spend on cinema or VCRs after consuming more website news, or reduce the time and money they spent on sports or social activities. The

principle of relative constancy also applies in this instance, but the reduction of time and expenditure may be seen only in non-media activities or media that serve different needs. For media that serve similar needs, no displacement is to be expected under the user-centric approach. A “more-more” hypothesis underlies the user-centric approach.

The user-centric approach considers users’ needs as fundamental in their choice of media. If users have strong news and information needs, then they will choose both old and new media that serve news and information functions in various ways. Users of news and information on the Internet may continue to use newspapers, television and radio to obtain news and information. Similarly, users of entertainment on the Internet will continue to use television, VCR and cinema for relaxation and pleasure.

Some may point out that if the user’s needs were fully satisfied by the new medium, they would have no reason to seek out old media. This situation, however, is not likely because different media usually provide somewhat different content, in different formats, with different types of gratification. For example, despite having seen a movie at the cinema, many people still watch it again on television or DVD; the home experience and pleasure that are derived from repeat viewing are different. The user-centric approach argues that needs are usually better served by multiple media than a single medium.

Based on these considerations which inspired the present investigation, two more hypotheses are raised:

H<sub>2</sub>: The more time Internet users spend on news and information, the more time they spend on the functionally similar traditional media (e.g., newspapers, radio, and magazine) for their news and information needs.

H<sub>3</sub>: The more time Internet users spend on entertainment, the more time they spend on the functionally similar traditional media (e.g., television, CD/MP3, and VCR/VCD) for their entertainment needs.

#### 4. Measures of displacement effects

Few studies in the literature have used or reported the use of *relative proportions* of people’s time spent on various media to measure displacement effects; most studies use the *absolute* amount of time. A common method of achieving this is to correlate the absolute amount of time that Internet users spend on the Internet and television or newspapers. If there is a positive correlation at a statistically significant level, then the hypothesis of “more-more” is supported: i.e., when a user spends more time on the Internet, they also are the one who spends more time on television or newspapers, and a supplement effect is established. Another method is to compare the time spent on various media by Internet and non-Internet users. *t*-Tests are conducted on the mean differences in the time spent on various media by the two groups.

The use of the absolute amount of time to measure displacement effects is problematic because if people begin with different media time budgets, a comparison of absolute time is misleading. For example, if individual A’s time budget on media is 10 h a day, and he or she spends an hour on the Internet, then the proportion of their time allocation on the Internet is 10%. However, if individual B’s daily media time budget is 5 h and he or she also spends 1 h on the Internet, the proportion of time that he or she has spent is 20%. If the researcher only examines the absolute measures of A and B, then he or she will find no difference in the time spent on the Internet. However, in terms of proportion, individual B’s Internet time is much more than individual A’s. The researcher needs to standardize the time measure on the basis of total time budgets to make valid comparisons. Otherwise, the displacement effect may be concealed.

The use of absolute measurement is also misleading in comparing the means of Internet users and non-users. For various reasons, users of new media may start out with a larger media time budget than non-users. The comparison of the absolute means of these two groups may only reflect the original differences in their time budget rather than the displacement effects of new media. However, if the proportions of time out of the total media budget of the two groups are compared, then the displacement effects of the Internet may be inferred more accurately. Of course, an even better way to ascertain displacement effects is to obtain longitudinal data about the proportion of time that people spend on various media before and after the adoption of a new medium. However, like most social studies, longitudinal studies consume much time and resource, and are used only rarely.

In this study, the authors will test if the use of relative proportions of time spent on media to measure displacement effects and the use of absolute time would produce similar results. Therefore, a final hypothesis based on this methodological consideration is posed:

H<sub>4</sub>: Use of *relative proportions* of time and *absolute* amount of time in media use to assess displacement effects will produce inconsistent results.

## 5. Research method

### 5.1. Sample and sampling procedure

With the assistance of the Census and Statistics Department in Hong Kong, 1192 household addresses were randomly selected. Only one member aged between 15 and 64 in each household was interviewed. If more than one eligible person lived in the household, then the criterion for choosing the respondent was the “next birthday” rule: i.e., the member whose next birthday was closest to the interview date was chosen. The instrument used to gather data was a face-to-face structured questionnaire interview. An advance letter was delivered to each selected address, and the data collection period was from mid-October to mid-December 2002.

Trained interviewers, all of whom were university students, were sent to the selected households unless rejection telephone calls or letters were received beforehand. The household addresses were only ignored when they were found vacant, in non-residential use, occupied by ineligible people (all household members were over 64 or foreigners), or had been visited at least three times with no response or two times with refusal to participate. All respondents, who finished the questionnaire and were willing to leave their contact numbers for later random quality checks, received HK\$50 supermarket cash coupons.

Two hundred and thirty-eight addresses were found to be invalid. Of the 954 valid addresses (1192 – 238), 696 questionnaires were successfully completed for a response rate of 73%. Of the 696 respondents, 388 (i.e., 56%) were Internet users.

### 5.2. Measurement

#### 5.2.1. Internet use

Respondents were asked how much time on average they spent on the Internet in minutes per day.

#### 5.2.2. Media use

The authors used the relative proportion of time spent on various media as the measures. A list of items asked about time spent on various forms of media in minutes per day, including mass media (i.e., newspapers, television, radio, and magazine), telephone, ICQ, and e-mail in minutes per day. VCR/VCD/DVD, CD/MD/MP3, electronic games, general books, and comic books were also assessed in minutes per week. The time spent on these items was added up to form a total media time budget. The time spent on each item was then divided by the total time budget to obtain the relative proportion of time spent on each medium.

#### 5.2.3. Internet use for news/information and entertainment

To assess how often Internet users use the Internet for news, information and entertainment, respondents were asked to give their frequency of use in (a) searching for information and (b) reading online news on a 5-point Likert scale ranging from 1 = “never” to 5 = “very often”. “News” was defined strictly as news reports, newscasts, spot, hard, and soft news, news commentaries, and editorials. “Information” is all non-entertainment material other than “news”. Similarly, “entertainment” includes using the Internet to (a) play online games and (b) surf the web for fun. Following conventional methods in displacement studies, the authors examined the research hypotheses by correlational analyses among Internet users.

## 6. Findings

### 6.1. Hypotheses testing

H<sub>1</sub> hypothesizes that the more time Internet users spend on the Internet, the less time they will spend on traditional media. Using self-assessed degrees of increases or decreases in media use, Table 1 shows that 35% of the Internet users considered themselves as having reduced their time spent on reading newspapers by “a lot” or “some” after using the Internet, while 40% reported the same reduction of time for radio, and 53% for television. These results confirm previous findings (Cole, 2001; IAB, 2002; Nie and Ebring, 2000), which reported that television is displaced most and newspapers the least among the three traditional media.

Using proportional time measurement, correlational results in Table 2 show that the time spent on the Internet is negatively related to the time spent on television ( $r = -0.47$ ,  $p < 0.001$ ), radio ( $r = -0.40$ ,  $p < 0.001$ ), newspapers ( $r = -0.39$ ,  $p < 0.001$ ), and magazines ( $r = -0.23$ ,  $p < 0.001$ ). All are statistically

Table 1  
Self-impression of the time displacement of traditional media after using the Internet

	Reduce some/a lot (%)	Same (%)	Increase some/a lot (%)	N
Newspapers	35	61	4	387
Radio	40	57	3	387
Television	53	45	2	387

Table 2  
Correlations between Internet and other media usage using *Proportional* and *absolute* time measures (Internet users;  $N = 388$ )

Internet usage			
Use of traditional media using relative proportions of time measure		Use of traditional media using absolute time measure	
“More-Less”	$r =$	“More-Less”	$r =$
Television	$-0.47^{***}$	Nil	
Radio	$-0.40^{***}$		
Newspapers	$-0.39^{***}$		
Magazines	$-0.23^{***}$		
Telephone	$-0.22^{***}$		
VCR/VCD/DVD	$-0.21^{***}$		
Books	$-0.14^{**}$		
CD/MD/MP3	$-0.12^*$		
“More-More”		“More-More”	
Computer	$0.59^{***}$	Television	$0.19^{***}$
ICQ	$0.31^{***}$	Telephone	$0.10^*$
E-mail	$0.21^{***}$	Comic books	$0.24^{***}$
E-games	$0.13^*$	E-mail	$0.28^{***}$
		ICQ	$0.59^{***}$
		Computer	$0.81^{***}$
		E-games	$0.45^{***}$
		VCR/VCD/DVD	$0.10^*$
		CD/MD/MP3	$0.18^{***}$
<i>Insignificant</i>		<i>Insignificant</i>	
Comic books	0.08	Newspapers	$-0.02$
		Radio	$-0.01$
		Magazines	0.01
		Books	$-0.02$

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

significant at the 0.001 level. The time spent on the Internet also correlates negatively with telephone, VCR/VCD/DVD, books, and CD/MD/MP3. In contrast and as expected, the time spent on the Internet is positively related to computer activities such as ICQ, e-mailing, playing online games, and using computers (Table 2). However, no significant relationship was found between level of Internet use and comic book reading. Thus, these findings support  $H_1$  and that Internet does, by large, displace traditional media and the “more-less” scenario is confirmed.

## 7. Functional supplement vs. substitution

$H_2$  hypothesizes that the more time Internet users spend on the Internet for news and information, the more time they will spend on functionally similar traditional media (i.e., newspapers, radio, and magazine) for their news and information needs. Table 3 shows the correlations between the use of the Internet for news/information and entertainment and the use of functionally similar traditional media for news/information (i.e., newspaper, radio, and magazine) and for entertainment (i.e., television, CD/MP3, and VCR/VCD). Again, using relative proportional time measures, the use of Internet for news/information is negatively related to the use of functionally similar traditional news media of newspapers ( $r = -0.19, p < 0.001$ ). This suggests that the more frequently one uses the Internet for news/information, the less time one spends on newspapers. In other words, Internet news substitutes, rather than supplements, newspapers. It is interesting to note that the relationship between use of the Internet for news/information and television use was also significant. This suggests that although television is generally considered an entertainment medium, many do get news/information from TV news. Again, the negative relationship also indicates a substitutive effect on TV’s news/information function by Internet news/information. As for magazine and radio, no obvious supplementary effect is apparent. As a result,  $H_2$  was rejected.

The substitution effects of the Internet on functionally similar traditional media are also evident for entertainment use. The use of the Internet for entertainment is negatively linked to the time spent on television ( $r = -0.15, p < 0.01$ ). This contradicts the “more-more” hypothesis again. Interestingly, not only did the use of the Internet for entertainment displaces functionally similar traditional medium television for entertainment, data also showed that newspapers ( $r = -0.27, p < 0.001$ ), magazine ( $r = -0.11, p < 0.05$ ), and radio ( $r = -0.21, p < 0.001$ ) were all correlated negatively and significantly with the use of Internet for entertain-

Table 3

Correlations between the use of the Internet for news/information and entertainment and the *Proportional* time spent on other media (Internet users  $N = 387$ )

Proportions of time spent in functionally similar traditional media <sup>a</sup>	Use of Internet for	
	News/information <sup>b</sup>	Entertainment <sup>c</sup>
<i>News/information oriented media</i>		
Newspapers	-0.19***	-0.27***
Magazine	-0.05	-0.11*
Radio	-0.09	-0.21***
<i>Entertainment oriented media</i>		
Television	-0.16**	-0.15**
CD/MD/MP3	0.09	-0.05
VCR/VCD/DVD	-0.05	-0.04

<sup>a</sup> Respondents were asked to report how often in minutes per day they use the 6 functionally similar traditional media – newspaper, magazine, and radio for news/information and television, CD/MD/MP3, and VCR/VCD/DVD for entertainment.

<sup>b</sup> Respondents were asked to report how often they go online to (a) search for information and (b) read online news on a scale of 1–5 with 1 = never and 5 = very often. These two items were combined into one single measure to assess the level of Internet use for news and information.

<sup>c</sup> Respondents were asked to report how often they go online (a) for games and (b) to surf for fun on a scale of 1–5 with 1 = never and 5 = very often. These two items were combined into one single measure to assess the level of Internet use for entertainment.

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

ment. This suggests that use of the Internet for entertainment would also substitute secondary entertainment functions from newspaper, radio, and magazine.

All the above results show that users of Internet for news/information and entertainment do not spend more time with functionally similar traditional media for news/information and entertainment. All evidences in this study reject the “more-more” hypothesis as suggested by the user-centric approach. The Internet does not have a supplementary effect on traditional media in their news/information and entertainment functions. Thus  $H_3$  was also rejected.

Past studies have shown that the traditional media of newspapers, magazine, and radio are still major sources of news and information, whereas television, VCR/VCD/DVD, and CD/MD/MP3 are used mostly for entertainment. Flanagin and Metzger (2001) found that some media fulfill some needs best. For example, e-mail, telephone and face-to-face communication are used heavily in relationship maintenance, persuasion, and social bonding. In contrast, television best serves entertainment needs: if the supplementary effects of the Internet are there, the authors will see a “more-more” relationship in the correlations between Internet use and television use. However, the results show a “more-less” pattern across both functions, and the Internet is shown to have an overall displacement effect on television and newspaper.

Finally,  $H_4$  proposed that use of *relative proportions* of time and *absolute* time in media use to assess displacement effects will produce inconsistent results. To demonstrate the contrasting results, the same statistics on the relationships between Internet use and traditional mass media use using *absolute* measures were used (as shown in Table 2). It is interesting to note that the use of *absolute* time measures led us to an opposite conclusion about the displacement effects of the Internet. Using absolute time measures in correlational analyses between Internet and traditional media use, little displacement effects of the Internet on traditional media was found. The results show that the more time a user spends on the Internet, the more time they spend on almost all traditional media, except newspapers, radio, magazines, and books. It is also important to point out that the time spent on these four media does have negative correlations with the time spent on the Internet, but the relationships are all statistically insignificant. In short, supplementary or neutral rather than displacement effects was found in the influence of the Internet on traditional media when *absolute* time measures were used. Thus, these data strongly support  $H_4$  that using relative proportional time vs. absolute time measures would produce conflicting results on displacement effects.

The contrasting results in Table 2 highlight the importance of using *proportional* time measures to study displacement effects. Without using proportional time measures, i.e., the relative proportion of time spent on each medium out of the total media time budget, the results will be reversed. The reverse results are due to the unreliability of the measures, which fluctuate with varying bases (the total amount of time spent on media) of different individuals, contexts, and societies. This instability may partly explain why no definite conclusions have been drawn about the displacement effects of new media despite the numerous studies that have been done.

## 8. Discussion and conclusion

From the foregoing analysis, the authors conclude that the medium-centric approach is more appropriate than the user-centric approach when studying the displacement effects of newly emerging media. It may be too simple to translate all media uses discretely into only two scenarios: i.e., medium-centric or user-centric; “more-less” or “more-more” scenario. Media attributes have to “interact” with user needs, as well as other psychological attributes such as lifestyles and personalities, in shaping media choices. Such choices may be a result of both user needs and media attributes. However, there is a basic difference in the two approaches. The medium-centric approach tends to stress how the technological advantage of a new medium serves people’s needs, while the user-centric approach tends to emphasize the predominant influence of needs across different media. As the results show that new media tend to displace traditional media that serve similar needs for news, information, and entertainment, the “more-more” scenario that is predicted by the user-centric approach is not verified.

This study also found that supplementary effects may occur as a result of measurement errors: i.e., when the *absolute* amount of time spent on media is used as the measure for displacement effects rather than *relative proportions* of time out of a total media time budget. Some people may question the use of *proportional* mea-



sure to examine displacement effects of new media because this measure seems to always result in a tautological claim about the displacement effect of a new medium. It may seem that the addition of a new medium in the media habit equation which uses proportions would result in a reduction of percentages in a zero-sum relationship. The so-called displacement effect may just be a statistical artifact. For example, if a person, prior to going online, spent 1 h each on newspaper, radio, and television, the proportion taken by each medium is one-third of the person's total media time. Now, if the person spends one more hour on the Internet, and at the same time spends one more hour on each of the previous three media, the proportion shared by each old medium will still be lower, i.e., two-seventh of the total, despite the fact that the *absolute* amount of time spent on previous media has increased. This demonstrates that if *relative proportions* were used as the measures, it will always produce an artificial "displacement" effect.

The above example shows that whenever a new medium is introduced, the proportions of time spent on all media will become smaller than before. This "constant reduction" phenomenon, however, is based on an assumption of "even distribution" of the newly increased time across all media. The "constant reduction" phenomenon will *not* stand when no assumption of "even distribution" is made. The proportions of time spent on old media after a person goes online can in fact increase. Using the above example again, the increase of 4 additional hours in one's media time budget (i.e., from 3 h to 7 h) after going online needs not be distributed evenly across the four media, namely, the Internet, newspapers, radio, and television in a ratio of 1:2:2:2. It can be, say, 3 h on the new medium of Internet, 3 h on newspapers, and 0.5 h each on radio and television, making a ratio of 3:3:0.5:0.5. In this case, the proportion of time spent on newspapers will be three-seventh, while that on radio and television will be one-fourteenth. These results indicate that after going online, the person spends more proportion of his or her time on newspapers (3/7) than before, while much less time on radio (1/14) and television (1/14).

The point is that using *relative proportion* as a measure needs not always result in a reduction of percentages across all media in the equation when a new medium is introduced. The "displacement" effects of a new medium, as reflected in the decrease in the proportion of time spent on old media after using a new medium, is not a statistical artifact.

The above example also points out why researchers should use *relative proportions* rather than *absolute* amount of time as a measure for displacement effects. In the example of spending one extra hour each on the Internet, newspapers, radio, and television after a person goes online, granted the assumption of an equal distribution of the newly increased time across all media, the person indeed spends *relatively* less (proportion-wise) on the conventional media as compared with the period before. In the two periods before and after going online, the person starts out with different bases, i.e., 3 h before and 7 h after going online. It would be misleading to compare these two periods without "standardizing" the bases.

According to the Principle of Relative Constancy (McComb, 1972), a dramatic increase in a person's total money or time budget after using a new medium is not likely. The dramatic increase of 4 h in a person's total media time budget after going online as in the above example is improbable. If a person spends a lot more money or time on the old media after using a new medium, daily life experience tells us that it is usually not a result of the new medium. It will be more likely due to the upswing of the economy as McComb found out, or due to the introduction of some great time-saving inventions. Given that computers have been around for quite some time, the time saved by the use of computers for various activities, including the Internet, should not be that dramatic nowadays. The use of the Internet, on the other hand, may in fact squander a lot of people's time in surfing, playing games, chatting in forums, and playing ICQ, among others.

When a person chooses to adopt a new medium, the most likely scenario is a downward adjustment of some money or time in the old media or non-media activities. It is important to emphasize that the use of *relative proportions* of time spent on each medium can reflect more accurately the impact of the new medium in displacing or supplementing the old media. On the other hand, the use of *absolute* amount of time as a measure for displacement effect is misleading because this measure represents the impact of the new medium *in addition to* the influence of different bases of people's media time budget.

In this study, the displacement effects of the Internet on traditional media are clear. The "more-less" scenario is seen across all traditional media. The "more-more" scenario occurs only in the use of computers, ICQ, e-mail, and electronic games (Table 2) – all of which are part and parcel of the Internet. Contrary to common

expectations, not a single instance of a “more-more” situation occurred in the use of traditional media among Internet users.

The authors have no intention of downplaying the importance of people’s needs in the choice of media, or the active and conscious roles of media users. Nevertheless, the data show that the Internet can meet various needs that are usually served by traditional media. Due to digitization, the media attributes of text, voice, and images have converged on the Internet. As the Internet possesses the attributes of traditional media with additional or enhanced capabilities, it intrinsically serves the functions of traditional media better, or at least has the potential to provide better services. Therefore, the Internet is in a position to displace rather than supplement the traditional media, and as it is still an emerging medium, the full array of its effects is yet to be seen. With further penetration and realization of potential, the Internet may displace traditional media even more in years to come.

## 9. Suggestions for future research

A contribution of this study is to show that the use of *proportional time* measure to examine the displacement effects of the Internet is better than *absolute time measure*. We have demonstrated that when the *absolute time* measure was used, misleading supplementary effect might occur as a result. In future research, one may want to extend the use of relative proportions of time measure to study the displacement effects of the Internet on non-media related leisure activities, such as chatting with friends, visiting libraries or museums, attending seminars or lectures, and going window shopping, etc. This will confirm if the “more-less” scenario still holds when more and more of these offline leisure activities are becoming available online. The Internet provides multiple leisure spaces that support a variety of leisure activities. This suggests that a change in the interactional, spatial, and temporal experience of leisure is taking place. These changes call for more research in the multiplicity of uses of the Internet in leisure. The implications of these changes for individuals’ social, psychological, and physical well-being merit our close attention.

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