VCR Attitudes and Behaviors by Length of VCR Presence

Bruce C. Klopfenstein

Sara C. Spears

and

Douglas A. Ferguson

Bowling Green State University

Department of Radio-Television-Film

Bowling Green, OH 43403

(419) 372-2138

BITNET: klopfenstein@bgsuopie

Internet: klopfens@barney.bgsu.edu

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Abstract

Previous research on the VCR has paid minimal attention to: (1) the time dimension, (2) differentiating groups of VCR owners, and (3) random probability samples. This study addressed these shortcomings by dividing a random sample of VCR adopters (n = 579) into four groups by length of VCR presence. Differences among VCR adopters by length of VCR presence were found in presence of other communication technologies, attitudes about VCR use, television viewing behaviors, VCR recording behaviors, and videocassette rental behaviors.

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The diffusion of new communication technologies over time has broad implications for the study of mass communication (Rogers, 1986), yet the literature on the temporal aspect of new media diffusion is lacking (Williams, Rice, and Rogers, 1988). The gradual evolution from established media systems to a new media environment challenges media research, economics, and policy (Webster, 1986; 1989). This study focused on the adoption of the videocassette recorder (VCR) because (1) the VCR provides a useful example of a recent communication technology that diffused rapidly (Klopfenstein, 1989b); (2) the VCR has potentially great impacts on television audience behavior and, therefore, the television industry (Klopfenstein, 1990; Levy, 1989); and (3) the VCR precedes impending digital technologies that will perform similar program storage and retrieval functions, including fiber-to-the-home (Klopfenstein, 1987).

Previous VCR research has paid minimal attention to (1) a time dimension, (2) differentiating VCR adopting groups, and (3) random probability samples. The present study has three corresponding objectives: (1) an investigation of how time since adoption of the VCR is related to both VCR attitudes and behaviors, (2) segmentation of groups of VCR households based on this time dimension, and (3) use of a random sample survey to describe a more representative population of VCR users than most previous research.

The Time Dimension

Time is an increasingly important variable in the study of new communication technologies (Williams, Rice, and Rogers, 1988; Rogers, 1986; Greenberg and Lin, 1989). Time has always been integral in diffusion of innovations research, yet much of the existing technology adoption research has not incorporated time into the analytical process (Rogers, 1983).[1] Williams, Rice, and Rogers (1988) noted several reasons for the limited study of new media over time. These include substantial cost and effort, respondent attrition over time, selection of appropriate time intervals for study, use of more obscure statistical methods, loss of research interest in the new medium being studied, and a relative lack

of theory about such processes. Although measuring changes at different points over time is the ideal way to examine the new media adoption process, looking at length of technology presence may provide an indication of longitudinal change.

Adopters may be classified based on the point in time at which the innovation is adopted (or rejected). Five categories of adopters proposed by Rogers (1983) are classified according to the relative point in time at which they adopt an innovation. Diffusion research indicates that there are important differences among various adopting groups in the use of a new media technology. For example, early adopters tend to be socioeconomic elites, more cosmopolite, and more exposed to mass media channels. They also exhibit personality traits such as greater empathy, less dogmatism, and more rationality (Rogers, 1986). The literature on differences in adopters' uses of and attitudes toward new media by length of its presence generally is limited because new media often have diffused more quickly than scholars have been able to study them (see Olshavasky, 1980).

Klopfenstein and Swanson (1987) found that VCR use was greater in the households in which the VCR had been adopted earlier, and Montesano (1986, as cited in Levy and Gunter, 1988) found an inverse relationship between length of VCR presence and prerecorded video rental and purchase behavior. Additionally, Lindstrom (1989) found that earlier adopters of VCRs watched more television and recorded more than later adopters. Kitchen and Yorke (1986) found that British VCR owners said they were recording more and viewing prerecorded tapes less over time. Such research raises questions about how length of presence of a new technology like the VCR affects attitudes and behaviors.

Segmenting VCR Households

Some studies have segmented VCR adopters using a variety of methods. Potter, Forrest, Sapolsky, and Ware (1988) categorized VCR users by behaviors: time shifters (17.8%), source shifters (12.0%), videophiles (14.7%), low users (14.0%) and the remainder as regular users (30.8%). Henke and Donohue (1989) identified and described two VCR groups, tapers and non-tapers. Lindlof and Shatzer (1989) divided 14 VCR families into three types by Q-sort: child-centered, convenience/control,

and competent/outer-directed.

Few studies segmenting VCR adopters by length of presence in the household have emerged. Levy & Gunter (1988) divided British VCR owners into six groups based on length of VCR presence to study behavioral and attitudinal differences, but there are differences between the television environment in Great Britain and the United States. For instance, there were only four television channels in England at the time of the study.

Greenberg and Lin (1989) studied two groups of students: "New VCR" (ownership two years or less) and "Old VCR" (ownership more than two years), but found a "disappointing" lack of significant differences between the VCR behaviors of their sample. Lindstrom (1989) divided VCR users by length of VCR presence in the household to examine VCR use in the general television environment and reported that earlier adopters of VCRs watched more television and recorded more than later adopters. No clear conclusions may be drawn from these results, and further investigation is warranted.

Thus, our study identified four relatively equally-sized groups of VCR homes by length of ownership: (1) three years or more (first adopters), (2) between two and three years (early adopters), (3) between one and two years (recent adopters), and (4) for less than one year (newest adopters). When this survey was conducted, the VCR had been available for more than a decade; thus, data could be collected from users who had owned their VCRs for a period long enough to no longer be considered "novelty" users (Von Hippel, 1986).

The advantage of segmenting VCR owners into four groups rather than just two (new and old adopters) is that there may be a curvilinear relationship between length of VCR presence and various VCR outcomes. For instance, it may be that adopters who have had the VCR long enough to have gained familiarity with the recording functions, but not so long that they lost interest in the device, may record more than either the first or the newest adopters.

Sampling Limitations of VCR Research

Although a comprehensive review of existing VCR research is beyond the scope of this paper,[2]

one limitation of much published VCR research is the lack of random sampling (due, in part, to limited VCR penetration in the past). Rubin and Bantz (1987) explored VCR gratifications, for example, by questioning a nonprobability sample of VCR users, one third of whom were students. Gunter and Levy (1987) used an "interlocking quota sample based on respondent sex, age, and social class" in England to investigate the social setting of home video viewing. Cohen (1987) observed renters in various Israeli video stores to learn more about how people selected prerecorded rental tapes. Greenberg and Heeter (1987) purposively surveyed 9th and 10th grade students in the Detroit area to investigate relationships between VCR and other media use. Roe (1987) also questioned 9th-year students in three areas in Sweden to learn about the relationship between achievement in school and VCR use. Kim, Baran, and Massey (1988) interviewed a convenience sample of parent-child pairs about their VCR use. These early studies sacrificed generalizability to gain sufficient number of VCR adopters, thus limiting the conclusions to the populations under study.

Even more recent research has not used randomly selected samples. Potter et al. (1988) and Henke and Donohue (1989) each based their studies on a sample of video club members. Like many investigations of children's media use, Lin and Atkin (1989) used a convenience sample of seventh and tenth graders to investigate parental mediation roles in video use. Lindlof and Shatzer (1989) used a purposive sample of fourteen families who were selected because they were two-parent, VCR families with at least one child 13 years of age or under.[3] Morgan, Shanahan, and Harris (1990) did a longitudinal study of adolescents (grades 7 through 12).

As far as we can determine, Lindstrom (1989) and Lin (1990) are the only articles to date that cite data clearly collected from randomly selected respondents.[4] The absence of more generalizable random sample surveys has left a void in VCR research, especially given the probable changing nature of the VCR audience. The random sample survey used for this study addresses that need.

Theoretical Framework

This research examines the question of how attitudes and behaviors related to one

communication technology, the VCR, varied depending on length of presence in the households. One possibility is that VCR use increases as owners gain mastery of the device. The concept of "familiarity" suggests that adopters learn, perhaps through a trial and error process, how to use the newly adopted technology. A related concept is "reinvention," the "degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (Rogers, 1983, p. 16). Diffusion researchers have pointed to reinvention as one example of how adopters in the process of gaining familiarity with an innovation may modify the innovation or its applications. Von Hippel (1986) similarly pointed out that "lead users" may discover product uses not anticipated by developers. Thus, VCR owners who initially purchase the device simply to playback tapes, for example, may modify their involvement with the machine to include the recording function. The concepts of familiarity and reinvention suggest that with the passage of time, VCR use may increase or diversify.

Conversely, the concept of "discontinuance" (Rogers, 1983) suggests that adopters may decide "to reject an innovation after having previously adopted it" (p. 186). If over time VCR owners lose interest in or become dissatisfied with the device, then VCR usage would decrease. "Disenchanted discontinuance" is a decision to reject an innovation because of dissatisfaction with its performance. Sparkes and Kang (1986), for example, used a panel study in Syracuse, New York to uncover disenchanted discontinuance of cable after initial adoption by some subscribers. Sparkes and Delbel (1989) further reviewed this research on the disenchanted discontinuance of cable television. Nielsen vice president Paul Lindstrom (1989) said that the "average" number of recordings in VCR households decreased from 1984 to 1987, and Nielsen reported that "average" VCR activity dropped slightly from July 1985 to July 1986 (Multichannel News, November 10, 1986). These data could be interpreted to mean that the VCR, like cable television before it, might be losing favor with adopters.

In our research, the concept of continuance represents the null hypothesis. If VCR users' attitudes and behaviors do not change over time, based on length of VCR presence, then there should be no differences between adopting groups. Conversely, if length of VCR presence *does* affect attitudes

and behaviors, then attitudinal and behavioral differences may be found.

The question remains: Which of these concepts (continuance, discontinuance, familiarity, or reinvention) applies to the VCR and under what conditions? Adopters who have owned a VCR for many years may differ from adopters who have only recently purchased a VCR. This study compared the attitudes and behaviors of VCR adopters based on four categories of length of VCR presence in the household.

One possible difference between VCR household groups based on length of VCR presence may be related to demographics. Initial adopters of new communication technologies generally tend to be more educated and of higher income than later adopters (Rogers, 1986). Because VCR prices were higher in 1984 than 1987 (Klopfenstein, 1989b), earlier VCR adopters could be expected to be of higher income. Therefore, income and education need to be taken into account when explaining VCR attitudes and behaviors.

Rogers (1986) also speculated that there may be a group of innovators who are consistently the first to adopt each of the new communication technologies. Thus, first adopters of VCRs are expected to have adopted more communication technologies than later adopters.[5]

Earlier adopters may be more familiar with their VCRs, or may have found new uses for them, resulting in more positive attitudes about their machines' capabilities. Therefore, the longer the VCR presence, the more likely owners may: feel that watching network television is a waste of time, feel that recording network television is time-efficient, and feel happy with VCR ownership. There may also be a relationship between length of VCR presence and watching television to relax or enjoying network shows.

The finding that initial adopters of communication technologies are socioeconomic elites (Rogers, 1986) may be translated into television behaviors, both viewing and recording. Regarding viewing behaviors, broadcast television has been traditionally targeted to the "lowest common denominator" (Dominick, Sherman, & Copeland, 1990). Because earlier adopters were more likely to

be socioeconomic elites, they may also be lighter viewers of television than recent adopters. Another aspect of viewing is changing channels to avoid commercials. Because earlier VCR adopters may be more comfortable with other technologies like the remote control device (RCD), they may also be more likely to use the RCD to avoid commercials. Thus, the longer the VCR presence, the more likely users will be to avoid commercials by changing channels. Additionally, length of VCR presence may be related to the viewing of particular television genres (e.g., Tiedge and Ksobiech [1986] used eleven program types to study television viewing). Greenberg and Lin (1989) did not find significant differences in genre preferences based on their two groups of VCR adopters.

As for recording behaviors, the concept of familiarity may play a role in the way VCR users differ in recording behaviors. VCR owners who adopted earlier may be more familiar with the recording functions and may record more. Moreover, if earlier adopters dislike lowest common denominator programs and, accordingly, are more selective in their television viewing, they may see more utility in the recording function of the VCR. Thus, earlier VCR adopters may be expected to watch less television overall than later adopters, but to record more for greater utility. Once again, the genre of the shows recorded may reflect the dislike of lowest common denominator programs, suggesting that earlier adopters may be more likely to record news and public affairs.

With regard to cassette rental behaviors, the picture is less clear. Earlier adopters may be expected to rent because of familiarity. More recent adopters, however, may have been motivated to purchase their VCRs for the playback of rentals because of the increasingly large number of rental stores and videos available (Wiese, 1989). To investigate the possible relationships between length of VCR presence and cassette rental behaviors we examined the following: number of rentals, anticipated number of rentals, number of days per week the VCR is used for playback of rentals, renting with advanced planning, waiting for movies to come out on home video, and video club membership.

In summary, our research addressed the relationships between length of VCR presence and (1) presence of other communication technologies, (2) attitudes about the VCR and its use, (3) television

viewing behaviors, (4) VCR recording use behaviors, and (5) cassette rental behaviors.

Method

A 15-minute telephone survey instrument was constructed based on a pilot study (Klopfenstein and Swanson, 1987). The random survey was conducted during the first three weeks of October 1987, when the VCR had been adopted by the four groups in fairly equivalent numbers. The October time frame allowed measurement of television viewing behaviors at near average levels for the entire year (avoiding the high and low peaks in winter and summer respectively). A total of 1,000 interviews of television households in a medium-sized, midwestern market were completed (65.1% response rate). Telephone numbers were dialed at random according to standard procedures established and validated by a large, privately-held market research firm. Numbers were randomly drawn from the telephone directory with a single digit being added to all selected numbers to include unlisted numbers in the sampling frame (Wimmer & Dominick, 1987). Ten percent of the questionnaires were validated by the firm.

Of the 1000 households contacted, 58.3% owned a VCR and of those, 15% owned more than one VCR. Klopfenstein (1988) reviewed aspects of the total households including non-VCR households. The results presented in this paper are limited only to respondents from VCR households who also answered the question about length of VCR ownership (n = 579).

The instrument contained demographic variables and 101 items to address the research areas noted above; a copy is available from the authors.[6] Items included questions about presence of various communication technologies (e.g., cable television, personal computer, compact disc player, etc.) in the household. Attitudinal items measured respondents' level of agreement (strongly agree, agree, disagree, strongly disagree) regarding satisfaction with broadcast television and VCRs. Behavioral items included total hours of daily television viewing and frequency (regularly, occasionally, rarely or never) of viewing 11 broadcast television program genres: situation comedies, hour-long dramatic series, daytime soap operas, sports, local news, network news, news magazines, game shows, movies on broadcast television,

late night talk shows, and public television shows. VCR owners were asked how often they recorded each of these program genres as well as how often they practiced a variety of recording and commercial avoidance behaviors. Additional items asked respondents about videocassette rental behaviors and beliefs.

Of the 579 VCR owners in the sample, 28.3% had owned them three years or more (first adopters, n = 164), 21.8% had them between two and three years (early adopters, n = 126), 24.5% had them between one and two years (recent adopters, n = 142), and 25.4% had them less than one year (newest adopters, n = 147).[7] There was a significant difference between groups in household income ($F [3, 559] = 5.8$, $p < .001$). A Tukey test revealed that the two groups with two or more years of ownership had a significantly higher income than the two groups with less than two years of ownership. No significant differences were found between various adopters on measures of the respondent's age or education, nor the principle income earner's age or education.

Results

Presence of Other Communication Technologies

As indicated in **Table 1**, there was a significant relationship between length of VCR presence in the home and presence of a number of other communication technologies. The longer the VCR presence, the more likely the presence of multiple television sets ($\chi^2 = 36.4$, $p < .001$) and multiple VCRs in the household ($\chi^2 = 54.2$, $p < .001$). The longer the VCR presence, the more likely the household was to subscribe to cable ($\chi^2 = 14.29$, $p < .01$); of all cable subscribers, earlier adopters were more likely to purchase pay channels ($\chi^2 = 16.8$, $p < .05$). Furthermore, the longer the VCR presence, the more likely the presence of a personal computer ($\chi^2 = 9.41$, $p < .05$), a compact disc player ($\chi^2 = 10.83$, $p < .01$), a video camera ($\chi^2 = 32.31$, $p < .01$) and a stereo television set ($\chi^2 = 8.53$, $p < .05$). No relationship was found between length of VCR presence and ownership of a phone answering machine or a television remote control device.

A "technology ownership" score ranging from 0 to 10 was calculated. Respondents were

assigned one point for ownership of each of the following: more than one TV, more than one VCR, personal computer, compact disk player, video camera, stereo TV set, phone answering machine, remote control device, subscription to cable, and subscription to a pay cable channel. Cronbach's alpha on this 10-item index was a moderate .53, suggesting that a modest interpretation is appropriate. An analysis of variance showed a significant main effect of length of VCR ownership on technology ownership ($F [3, 573] = 20.21$, $p < .001$). A Tukey test revealed that first adopters owned significantly more technologies ($\underline{m} = 4.62$) than either early adopters ($\underline{m} = 4.10$) or recent adopters ($\underline{m} = 3.71$). These latter two groups did not differ significantly from each other and, in turn, owned significantly more technologies ($\underline{m} = 3.17$) than newest adopters. As Table 2 shows, a three-way analysis of variance of technology ownership by length of VCR ownership, education and income further revealed that length of VCR ownership ($F [3,416] = 15.26$, $p < .001$) and income ($F [2,416] = 8.94$, $p < .001$) were significant main effects. The two-way interaction between income and education was significant ($F [4,416] = 2.79$, $p < .05$). For lower education households, those with more income were more likely to own a greater number of technologies; for higher education households, those with more income were more likely to own fewer technologies. The remaining interactions were not significant.

Attitudes

Length of VCR presence was significantly related to attitudes about television viewing and VCR use (see **Table 3**). When asked whether watching network television is a waste of time, 28% of first adopters and 27% of early adopters agreed or strongly agreed, whereas only 17% of recent adopters and 19% of newest adopters agreed or strongly agreed ($\chi^2 = 7.86$, $p < .05$). When asked whether recording network television is an efficient way to use one's time, 77% of all VCR owners agreed but adopters differed in their level of agreement. That is, strong agreement that recording network television is time-efficient was expressed by 33% of first adopters, 23% of early adopters, 15% of recent adopters and only 12% of newest adopters ($\chi^2 = 12.46$, $p < .01$). Length of VCR presence was not significantly related to expressed happiness with VCR ownership (which was quite high for all adopters), enjoyment of

primetime network shows, nor watching television to relax.

Television Viewing Behaviors

Before being asked about VCR behaviors, respondents were asked general questions about television viewing behaviors. No relationship was found between length of VCR presence and self-reported hours of average daily television viewing. Length of VCR ownership was positively correlated with frequency of using a remote to change channels during broadcast commercials ($r = .10$, $p < .01$); the longer the VCR presence, the more likely respondents were to use the remote control to avoid commercials. Two significant relationships were found in reported viewing of 11 program genres (see **Table 4**): the longer the VCR presence, the less likely respondents were to report viewing of soap operas ($r = -.123$, $p < .01$) and hour-long dramas ($r = -.078$, $p < .05$).[8]

VCR Recording Behaviors

There was a significant relationship between length of VCR presence and various VCR recording behaviors (see **Table 5**). The longer the VCR presence, the more likely respondents were to record television shows. Specifically, 80% of first adopters, 72% of early adopters, 73% of recent adopters and only 58% of newest adopters ($\chi^2 = 17.6$, $p < .001$) used the VCR to record television shows. Length of VCR presence was positively correlated with recording a program while watching a different program ($r = .119$, $p < .01$), recording a program while not at home when the show airs ($r = .128$, $p < .01$), recording a program while sleeping when the show airs ($r = .111$, $p < .01$), and deleting the commercials while recording programs ($r = .098$, $p < .05$); the longer the VCR presence, the more likely respondents were to perform these behaviors. Regarding expected use of the VCR to record "in the coming year," 33% of newest adopters expected to record more than they did at the time, whereas only 20% of recent adopters, 23% of early adopters and 18% of first adopters expected to record more than their present amount ($\chi^2 = 17.3$, $p < .01$).

In terms of recording the 11 program genres, Table 4 shows that significant positive correlations were found between length of VCR presence and recording of sports programs ($r = .166$, $p < .001$), news magazines ($r = .164$, $p < .001$), local news ($r = .106$, $p < .05$), network news ($r = .117$, $p < .01$), and public television shows ($r = .107$, $p < .05$). The earlier the adoption, the more likely VCR users were to record shows in these genres. Although the correlations were also positive, no statistically significant differences among adopters were found in their recording of situation comedies, hour-long dramas, soap operas, game shows, movies, or late talk shows.

More than three-fourths of the respondents (77%) from all VCR households agreed or strongly agreed that having a VCR to skip commercials is appealing, but no relationship was found between this perception and length of VCR presence. Similarly, no relationship was found between length of VCR presence and responses to "avoiding commercials is an important reason to use a VCR": 47.8% of all VCR respondents agree or strongly agree with the statement.

Videocassette Rental

No relationship was found between length of VCR presence and number of tapes rented or number of days a week the VCR was used to watch rented tapes. When asked about expected use of the VCR for rented tapes in the coming year, 12% of all VCR owners said they expected to use the VCR less, 72% said they expected to use the VCR the same amount, and 16% said they expected to use the VCR more; no relationship was found between these responses and length of VCR presence. Positive correlations, however, were found between length of VCR presence and reported frequencies of knowing "what tape I am after when I go to the video store" ($r = .144$, $p < .01$), and waiting for "movies to come out on video rather than go to the movies" ($r = .089$, $p < .05$). The longer the VCR presence, the more likely VCR owners were to report purposeful tape selection and to delay movie viewing. Additionally, no relationship was found between length of VCR presence and video club membership.

Discussion and Conclusions

Differences among VCR adopters by length of VCR presence were found in presence of other

communication technologies, attitudes about VCR use, television viewing behaviors, VCR recording behaviors, and videocassette rental behaviors. Because our results are based on a random sample survey of a medium-sized market, the findings are more generalizable than most previous VCR research.

Our results support past research that demographics predict communication technology adoption only some of the time. For example, we found that adoption of new technologies tends to begin with higher income households (Rogers, 1986). Unlike past research, however, education level was not a factor in this study of VCR adoption, suggesting that desire for the VCR transcends this important demographic variable.

The finding that first VCR adopters own significantly more communication technologies ("technophiles") supports Rogers (1983) contention that first adopters are unique.[9] The two-way interaction between income and education was significant in predicting number of technologies owned. Among the less educated, as might be expected, those with low income were likely to own fewer technologies. Among the higher educated households, however, those with low income were likely to own more technologies. This intriguing finding suggests that those with high education but low income (e.g., academics, social workers, teachers) may own more technologies than those with high education and high income (e.g., doctors, lawyers, MBAs). Although the 10-item communication technology index had a modest Cronbach's alpha (.53), the results provide potential insight for future research regarding the relationship between demographics and technology-haves.

Significant differences were not found between adopters on most attitudinal measures. Nevertheless, the longer the VCR presence, the more likely the expression of attitudes that watching network television is a waste of time but that recording network television is time-efficient. Although this may appear contradictory, it makes sense that viewers who were concerned about wasting time would view the VCR as a time-saving device. Additionally, because all adopters were very satisfied with their VCR, there is no evidence to suggest that Rogers' (1983) notion of discontinuance applies to the VCR. This conclusion contradicts the notion by Lindstrom (1989) that the VCR's impact is likely to be waning.

Adopters differ on several behavioral measures. Evidence from this study supports the notion of socioelites as first adopters; these selective elites may eschew mass appeal television fare. The longer the VCR presence, the less likely adopters were to watch soap operas and hour-long dramas. Length of VCR ownership was positively correlated with commercial avoidance behaviors. If these behaviors are learned over time with the VCR, and commercial methods are perfected to measure it, then the economic base for advertiser-supported television is threatened. Length of VCR ownership was positively correlated with the use of a remote to change channels during broadcast commercials; the longer the VCR presence, the more likely respondents were to use the remote control to avoid commercials. If this is a learned behavior, then more commercial avoidance behaviors may be expected in the future, to the detriment of advertiser-supported broadcasting. No relationship was found between length of VCR presence and hours of television viewing. Although Lindstrom (1989) found that earliest VCR adopters in May 1987 were heavier viewers of television in general, this inconsistency between findings may reflect differences between measurement techniques.

Given the findings that first adopters were more selective in their viewing, and that they felt recording network television was time-efficient, it makes sense that they were also more likely to record. A key finding of this study was that the longer the VCR was in the home, the greater the reported frequency of various recording behaviors such as recording a program while watching a different program, while not at home, or while asleep. Nielsen data also showed heavier recording use in earlier adopting households (Lindstrom, 1989). The evidence supports the proposition that VCR recording use increases over time as the adopter gains familiarity with the technology. Another finding was that the longer the VCR presence, the more likely adopters were to record sports programs, news shows, and public television.

The differences in recording behaviors is in contrast to the lack of differences in cassette rental behaviors. The newest adopters rented cassettes as frequently as first adopters. Although Lindstrom (1989) found differences in 1984 and 1985 regarding the number of tapes rented based on length of

ownership, his 1987 data corroborated the lack of differences among VCR adopting groups in our study. These results support the proposition that newest adopters (who are more likely than first adopters to be "technophobes") may be more interested in the technically simpler playback function of the VCR than the more complex recording function. An alternate explanation is that all VCR adopters may have been at a heightened state of rental activity based on the rapid growth of video outlets, the increasing number of titles available, and decreasing rental costs up to the time of the survey.

Our results support Potter et al.'s (1988) contention that VCR adopters should not be thought of as a monolithic group. Future new media research ought to include the time dimension. Although the findings in this study were limited by the use of "length of presence" data instead of longitudinal data, the time dimension remains important. Aggregate studies are useful but inadequate in portraying the dynamics of adoption. It should not be assumed, for example, that a newest adopter of a video-on-demand service, a picture-in-picture video monitor, or videotex service would use the innovation in ways similar to earlier adopters of those same technologies. More attention should be directed at time-sensitive research techniques and efforts to encourage longitudinal research.

In general, the results suggest that length of VCR presence may explain specific behaviors more than it explains attitudes about the VCR. Adopters tend to express very positive attitudes about their machines regardless of time of adoption. VCR adopters, however, differ in viewing and recording behaviors based on time of adoption. Because first adopters are probably more familiar with the various functions of the device, they use them more than later adopters. This supports previous research on innovativeness that indicates earlier adopters are also more technically-oriented.

In sum, behavioral differences based upon length of VCR presence may be explained by familiarity with the technology. No support was found for the concept of discontinuance as it relates to the VCR. VCR adopters clearly have not rejected the innovation, and instead may find more uses over time. Although newest VCR adopters were less likely to record tapes than earlier adopters, familiarity may cause the newest adopters to "reinvent" the way they use the VCR by recording more. Although we

cannot reject the "continuance" null hypothesis in all conditions, we can reject it in many of the situations we compared because differences were found between VCR adopting groups by length of VCR presence.

Endnotes

1. Sparkes and Kang (1986) is a notable exception in the area of cable television diffusion.

2. A meta-analysis of current VCR research is in progress by one of the authors.

3. The small sample was appropriate for the authors' employment of Q methodology.

4. A. C. Nielsen Company, whose data Lindstrom used, has been criticized for its sampling techniques (e.g., Heighton, 1989).

5. Marketing researchers have been fascinated by new product adoption by innovators (Midgley and Dowling, 1978; Gatignon and Robertson, 1985).

6. Self-report measures were used. Although there are acknowledged weaknesses with such measures, this method of survey research provides the most efficient way to collect data from a large sample of respondents in a community. Furthermore, both marketing and government policy decisions rely on similar self-report research.

7. In survey research, unequal *n* often results from the nature of the population. The four groups here are relatively similar in size and the sample size is sufficiently large to permit a one-way between subjects analysis of variance which is relatively robust with unequal cell sizes (Tabachnick and Fidell, 1989).

8. Although both variables were ordinal level, the partial correlation was used instead of Spearman Rho because it is more conservative (Gravetter & Wallnau, 1985). Also, the length of ownership data resembled interval level data, and verbal frequency responses are often treated as interval level data.

9. In our study 28% of the VCR adopters were designated as first adopters. These respondents

represent 16% of all households including non-adopters. This group would include the 5-10% of the population Rogers (1986) has suggested may be the first to adopt each new communication technology.

References

Cohen, A. A. (1987). Decision making in VCR rental libraries. American Behavioral Scientist, 30(5), 495-508.

Dominick, J., Sherman, B. L., & Copeland, G. (1990). Broadcasting/cable and beyond (pp. 185-186). New York: McGraw-Hill.

Gatignon, H., & Robertson, T. S. (1985). A propositional inventory for new diffusion research. Journal of Consumer Research, 11, 849-867.

Gravetter, F. J., & Wallnau, L. B. (1985). Statistics for the Behavioral Sciences. St. Paul: West Publishing.

Greenberg, B. S., & Heeter, C. (1987). VCRs and young people: the picture at 39% penetration. American Behavioral Scientist, 30(5), 486-494.

Greenberg, B. S., & Lin, C. (1989). Adolescents and the VCR boom: Old, new and non-users. In M. R. Levy (Ed.), The VCR Age: Home Video and Mass Communication. Newbury Park, California: Sage, pp. 73-91.

Gunter, B., & Levy, M.R. (1987). Social contexts of video use. American Behavioral Scientist, 30(5), 486-494.

Heighton, E. J. (1989). TV ratings: Evolution, revolution, and privacy. Television Quarterly, 24(2), 31-39.

Henke, L. L., & Donohue, T. R. (1989). Functional displacement of traditional TV viewing by VCR owners. Journal of Advertising Research, 29(2), 18-23.

Kim, W. Y., Baran, S., & Massey, K. K. (1988). Impact of the VCR on control of television viewing. Journal of Broadcasting & Electronic Media, 32(3), 351-358.

Kitchen, P. J., & Yorke, D. A. (1986). Commercial television breaks, consumer behaviour, and new technology: An initial analysis. European Journal of Marketing, 20(2), 40-53.

Klopfenstein, C. A. (1990). Audience measurement in the VCR Environment: An examination of ratings methodologies. In J. R. Dobrow (Ed.) Social and cultural aspects of VCR use (pp. 45-72).

Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Klopfenstein, B. C. (1989a, November). Looking toward future VCR use: An examination of VCR use in four household adopting groups. Paper presented to the annual convention of the Speech Communication Association, San Francisco.

Klopfenstein, B. C. (1989b). The diffusion of the VCR in the United States. In Mark Levy (Ed.), The VCR Age: Home Video and Mass Communication (pp. 21-39). Newbury Park, California: Sage.

Klopfenstein, B. C. (1987). New technology and the future of the media. In A. Wells (Ed.). Mass Media and Society (pp. 15-36). Lexington, Massachusetts: D.C. Heath and Company.

Klopfenstein, B. C., and Swanson, D. A. (1987). An analysis of VCR adopter characteristics and behavior. Paper presented to the International Communication Association, Montreal, May.

Levy, M. R. (Ed.). (1989). The VCR age: Home video and mass communication. Newbury Park, CA: Sage.

Levy, M. R. (1988). Why VCRs aren't pop-up toasters: Theoretical issues in VCR research. Paper presented to the annual convention of the Broadcast Education Association, Las Vegas, April 7, 1988.

Levy, M. R. (1987). Some problems of VCR research. American Behavioral Scientist, 30(5), 461-470.

Levy, M. R., & Gunter, B. (1988). Home video and the changing nature of the television audience. London: John Libbey.

Lin, C. A. (1990). Audience activity and VCR use. In J. R. Dobrow (Ed.) Social and cultural aspects of VCR use (pp. 75-92). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Lin, C. A., & Atkin, D. A. (1989). Parental mediation and rulemaking for adolescent use of television and VCRs. Journal of Broadcasting & Electronic Media, 33(1), 53-67.

Lindlof, T. R., & Shatzer, M. J. (1989). Subjective differences in spousal perceptions of family video. Journal of Broadcasting & Electronic Media, 33(4), pp. 375-395.

Lindstrom, P. B. (1989). Home video: The consumer impact, 1984-1988. In Mark Levy (Ed.), The VCR age: Home video and mass communication. Newbury Park, California: Sage.

Midgley, D. F., & Dowling, G. R. (1978). Innovativeness: The concept and its measurement. Journal of Consumer Research, 3, 31-41.

Montesano, R. J. (1986). VCRs in the USA marketplace. Paper presented at the Television Research--International Symposium, Tarrytown, New York, October.

Morgan, M., Shanahan, J., & Harris, C. (1990). VCRs and the effects of television: New diversity or more of the same? In J. R. Dobrow (Ed.) Social and cultural aspects of VCR use (pp. 107-123). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Olshavasky, R. (1980). Time and the rate of adoption of innovations. Journal of Consumer Research, 6, 425-428.

Potter, W. J., Forrest, E., Sapolsky, B. S., & Ware, W. (1988). Segmenting VCR owners. Journal of Advertising Research, 28(3), 29-39.

Roe, K. (1987). Adolescents' video use. American Behavioral Scientist, 30(5), 522-532.

Rogers, E. M. (1986). Communication Technology: The New Media in Society. New York: The Free Press.

Rogers, E. M. (1983). Diffusion of Innovations. New York: The Free Press.

Rubin, A. M., & Bantz, R. (1987). American Behavioral Scientist, 30(5), 471-485.

Sparkes, V. M., & Delbel, J. P. (1989). United States: Changing perceptions of television. In L. B. Becker and K. Schoenbach (Eds.). Audience Responses to Media Diversification (pp. 333-352). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Sparkes, V. M., & Kang, N. (1986). Public reactions to cable television: Time in the diffusion process. Journal of Broadcasting and Electronic Media, 30(2), 213-229.

Swanson, D.A., and Klopfenstein, B.C. (1987, December). Forecasting VCR penetration to 1990. American Demographics, 43-44.

Tabachnick, B. G., & Fidell, L. S. (1989). Using Multivariate Statistics. New York: Harper and Row.

Von Hippel, E. (1986). Lead users: A source of novel product concepts. Management Science, 32(7), 791-805.

Williams, F., Rice, R. E., & Rogers, E. M. (1988). Research methods and the new media. New York: The Free Press.

Webster, J. G. (1989). Television audience behavior: Patterns of exposure in the new media environment. In J. L. Salvaggio and J. Bryant (Eds.), Media Use in the Information Age (pp. 197-216). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Webster, J. G. (1986). Audience behavior in the new media environment. Journal of Communication, 36(3), 77-91.

Wiese, M. (1989). Film and Video Marketing. Studio City, California: Michael Wiese Productions.

Williams, F., Rice, R. E., & Rogers, E. M. (1988). Research methods and the new media. New York: The Free Press.

Wimmer, R.D., & Dominick, J.R. (1987). Mass Media Research. Belmont, CA: Wadsworth.

Yorke, D.A., & Kitchen, P.J. (1985). Channels flickers and video speeders. Journal of Advertising Research, 25(2), 21-25.

Table 1
Association Between Length of Household VCR Presence and Other New Technologies

"Please tell me if anyone in your household owns the following items:"

Technologies	Length of VCR Presence: First 3+ years n=164 28.3%	Early 2-3 years n=126 21.8%	Recent 1-2 years n=142 24.5%	Newest < 1 year n=147 25.4%	χ^2
Number of TV Sets (mean)	2.67	2.64	2.32	2.19	36.4***
Number of VCRs (mean)	1.39	1.17	1.11	1.04	54.2***
Cable Television	82.9%	87.3%	81.0%	70.1%	14.29**
Pay Cable	39.0%	37.3%	31.7%	23.8%	9.48*
TV Remote Control	78.0%	79.4%	77.5%	74.1%	1.19
Personal Computer	37.2%	30.2%	25.4%	22.4%	9.41*
Phone Answering Machine	25.6%	18.4%	19.7%	16.3%	4.61
Compact Disk Player	22.0%	16.7%	12.0%	9.5%	10.83*
Stereo TV Set	34.1%	23.0%	27.0%	20.4%	8.52*
Video Camera	22.0%	13.5%	4.9%	4.1%	32.31*

* p < .05 ** p < .01 *** p < .001

Note: Yes was coded as 1 and no was coded as 2. Degrees of freedom = 3. Responses to stereo TV set ownership may reflect respondent confusion because stereo TV penetration nationally was around 7% at the time of the survey.

Table 2

Analysis of Variance of Technology Ownership by Length of VCR Ownership, Education and Income

Source of Variation	Sum of Squares	DF	Mean Square	F
Main Effects				
Ownership	116.327	3	38.776	15.264***
Education	4.981	2	2.490	0.980
Income	45.434	2	22.717	8.943***
2-Way Interactions				
Ownership X Education	16.469	6	2.745	1.081
Ownership X Income	12.973	6	2.162	0.851
Education X Income	28.380	4	7.095	2.793*
3-Way Interactions				
Ownership X Education X Income	34.87412	2.906	1.144	
Explained	295.736	35	8.450	3.326***
Residual	1056.768	416	2.540	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 3

Association Between Length of Household VCR Presence and VCR Attitudes

	Length of VCR Presence				
	First 3+ years	Early 2-3 years	Recent 1-2 years	Newest < 1 year	χ^2
ATTITUDES:	n=164	n=126	n=142	n=147	
Percent agreeing that watching network television was a waste of time	28%	27%	17%	19%	7.86*
Percent strongly agreeing that recording network television was time-efficient	33%	23%	15%	12%	12.46**

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 4

Pearson Correlations between Self-Reported Frequency of Watching or Recording Television Program Genres and Length of VCR Presence

	WATCH n=579	**RECORD** n=410
Program Genres	r value	r value
Sitcoms	.000	.047
Hour Dramas	-.078*	.017
Soap Operas	-.123**	.053
Sports	.065	.166***
Local News	-.005	.106*
Network News	-.044	.117**
News Magazines	.067	.164***
Game Shows	-.013	-.022
Movies	-.003	.011
Late Talk Shows	.009	.039
Public TV Shows	.020	.107*

*p < .05 **p < .01 ***p < .001

NOTE: Regularly was recoded as 4, occasionally as 3, rarely as 2 and never as 1. Length of VCR presence was coded < 1 year as 1, 1 to < 2 years as 2, 2 to < 3 years as 3, and 3 + years as 4.

Table 5

Association Between Length of Household VCR Presence and VCR Behaviors

	Length of VCR Presence				
	First 3+ years	Early 2-3 years	Recent 1-2 years	Newest < 1 year	χ^2
BEHAVIORS:	n=86	n=104	n=90	n=130	
Percent who record television shows	80%	72%	73%	58%	17.6***
Percent who plan to record more in the coming year	18%	23%	20%	33%	17.3**

* $p < .05$ ** $p < .01$ *** $p < .001$

NOTE: The N for VCR owners dropped from 579 to 410 when the filter question "Do you use your VCR to record?" was asked.