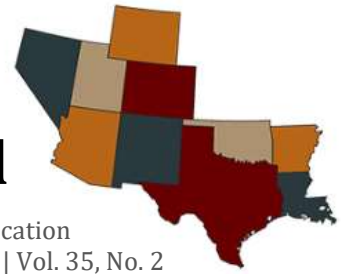


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Innovativeness, Interactivity, and the Adoption of Streaming Television

Alec C. Tefertiller & Kim B. Sheehan
Kansas State University
University of Oregon

Streaming television channels such as Netflix and Hulu have steadily grown in viewership, with many users abandoning traditional cable and broadcast sources of televised content. The purpose of this study was to assess whether personal innovativeness and perceived interactivity predict people's intentions to stream video. Using an online survey ($N = 790$), it was determined that while innovativeness was a significant predictor, the perceived interactivity of the streaming experience best predicted streaming television viewing.

Keywords: streaming television, innovation, interactivity, uses and gratifications

The last decade has seen the rise of a variety of streaming television channels that allow audiences to access television content through web-connected devices. Channels like Netflix, Amazon Prime, and Hulu have attracted large audiences, with predictions that more than 50% of video watched by 18-to-34-year-olds will be accessed via streaming in 2019 (Levin, 2018). In fact, many consumers have abandoned traditional television to rely exclusively on streaming channels for television programming, a process known as cord-cutting. Cord-cutting has accelerated recently, with over 3.2 million subscribers cutting the cord in 2018 (Roettgers, 2019). Streaming channels provide content comparable to traditional television outlets, including re-runs and continuations of popular cable and broadcast television programs.

Since streaming is a relatively new yet apparently popular way of accessing traditional content, it is worth examining why users are adopting this new technological means of watching television.

Research suggests that the innovative traits of users predict their adoption of new technologies (Hirschman, 1980; Midgley & Dowling, 1978; Rogers, 2003); however, it is also possible that the web-enabled interactive nature of the technology is an important predictor of new media use (Ruggiero, 2000; Sundar & Limperos, 2013). This study will examine the roles of individual innovativeness and the perceived interactivity of streaming television in determining use of streaming television technologies. In doing so, it will contribute to our understanding of why individuals adopt newer media technologies. Specifically, this study seeks to better understand whether individual traits or traits of the technologies better predict adoption.

LITERATURE REVIEW

Diffusion of Innovations and Innovativeness

Researchers have frequently employed the diffusion of innovations theory to understand how and why individuals adopt new ideas and technologies (Rogers, 2003). According to the theory, innovations (ideas or technologies that are new to the adopter) are diffused into the population via a distribution pattern that follows an s-curve. The earliest adopters, which represent the smallest category, are innovators, who are followed by early adopters, then the majority, and finally laggards, the final group to adopt the innovation after it has reached a saturation point in the population. While Rogers's work in diffusion focused on the adoption of rural farming technologies, his theory has been applied across technological domains, including examining the adoption of new technologies such as self-service consumer technologies (Kaushik & Rahman, 2016) and renewable energy innovations (Franceschinis et al., 2017).

Key to the diffusion of innovations is the efforts of innovators, who are first willing to try the innovation and create the possibility that the innovation will spread to the broader population. Early research suggested that a willingness for risk-taking and upward social mobility were common traits of innovators (Robertson & Kennedy, 1968). Further research argued that there is an innate sense of innovation that precedes actual innovative behaviors (Hirschman, 1980; Midgley & Dowling, 1978). In other words, innovativeness is a trait that can be defined separate from innovative behaviors. While Rogers's (2003) explication focused on innovators as a category of the earliest adopters of technologies and ideas, recent research suggests it is possible to assess innovativeness as an individual psychological trait that is not necessarily tied to early adoption behavior (Planing, 2015). Psychological measures may outperform behavioral measures, and there may not be a direct correlation between an individual's innovativeness and their adoption of a particular new idea. Not only is innovativeness a specific psychological trait, but the opposite trait may also exist; some individuals have an innate resistance to innovation that predicts laggard adoption behaviors (Heidenreich & Handrich, 2015).

Innovativeness has been shown to influence the adoption of information technologies, acting as a moderator between the perceived compatibility of a new technology and the adoption of the technology (Agarwal & Prasad, 1998). Perceived compatibility refers to the perception that a new technology is compatible with the technology it is complimenting or replacing, and "compatibility ... necessitates a significant change in the ... behavior of a potential adopter" (p. 213). Innovative users are more willing to attempt to integrate a new technology into their everyday behaviors: for example, innovativeness was identified as a key factor motivating the adoption of early video webcasting (Lin, 2006). As innovativeness is associated with the adoption of media technologies, including web streaming

technology, it is expected that innovativeness will positively predict the adoption of web streaming, and it will concurrently be negatively associated with use of older media technologies. Thus, the following hypothesis is proposed:

H1: Individual innovativeness a) positively predicts streaming viewing and b) negatively predicts traditional television viewing.

Television Motivations and Interactivity

While the diffusion of innovation theory has been frequently employed to help communication researchers better understand the adoption of new technologies, the uses and gratifications theory (U&G) has been frequently employed to explain why individuals consume media. U&G suggests that individual media consumption is active; individuals choose from a variety of media options (and other activities) in order to gratify psychological needs (Katz, Blumler, & Gurevitch, 1974). U&G has been employed to identify and categorize the various needs met by different media, with particular attention paid to television (Greenburg, 1974; Rubin, 1981, 1983), the Internet (Ko, Cho, & Roberts, 2005; LaRose & Eastin, 2004; Stafford, Stafford, & Schkade, 2004), and recent innovations such as social media (Ancu & Cozma, 2009; Cheng, Liang, & Leung, 2015; Quinn, 2016).

Audience Activity. Central to U&G is the idea of the active audience that seek out media to meet specific needs (Katz et al., 1974). This speaks to a sense of goal-orientedness in media selection and use, and implies that media consumption is an active process, not a passive one. Different levels of audience activity when seeking and consuming media produce different levels of specific gratifications obtained from those media (Levy & Windahl, 1984; Perse & Rubin, 1988; Rubin & Perse, 1987).

Audience activity has been examined in terms of three distinct phases of media consumption: pre-selection, attention, and elaboration (Blumler 1979). Pre-selection refers to the planning, selection, and gratification expectations of the audience prior to viewing. While selectivity has been associated with audience activity prior to viewing, the selection process can continue after an individual has already engaged with media, such as the act of choosing a new program that better meets a viewer's needs after viewing has already begun (Heeter, 1985; Heeter & Greenberg, 1988). Attention refers to the audience involvement with the media during viewing. Involvement has been described as personal participation with media content during viewing (Perse, 1990). Increased involvement with media predicts both knowledge gain (Hill, 1985) and attitude change (Petty, Ostrom, & Brock, 2014). Elaboration refers to the reflective process after viewing, which includes social discussion and mental absorption that takes place after media has been consumed. Audiences elaborate on what they have just consumed after experiencing media via social learning (Tan, 1986) and interpersonal reflection (Robinson & Levy, 1986).

The advent of new communication technologies have provided researchers with the opportunity to probe audience activity, as new technologies provide users new affordances regarding their selectivity, attention, and elaboration. For instance, the introduction of the video cassette recorder (VCR) and remote control device (RCD) in the 1980s provided the opportunity to examine the influence of new technology on audience selectivity while watching television. The use of the RCD has been shown to facilitate and increase selectivity (Walker & Bellamy, 1991). Television audiences use the RCD to find new programming, both prior to viewing and while viewing other programs. In addition, the RCD was found to assist audiences in increasing their channel repertoire. (Ferguson, 1994; Perse & Ferguson, 1993).

Interactivity and Audience Activity. With the advent of the Internet and associated technologies, uses and gratifications researchers were presented with the opportunity to examine new affordances offered by these newer media. Ruggiero (2000) proposed the concept of interactivity to be key to the future of uses and gratifications research, especially as it facilitates audience activity. Ruggiero's definition of interactivity was taken from Williams, Rice, and Rogers (1988), who described interactivity as "the degree to which participants in the communication process have control over, and can exchange roles in their mutual discourse" (p. 10). This definition suggests key aspects of interactivity are control and a two-way versus one-way discourse. The receiver can take control of the communication process and become the transmitter of information, providing direct feedback, a crucial distinction in defining interactivity in communication research (Kiousis, 2002). However, Kiousis's own more complex definition of interactivity addresses three domains: the technological properties, the communication context, and the perception of the user. While Kiousis emphasizes technological properties and two-way communication as key to interactivity, user perception is also a key aspect. As such, interactivity is as much a perception as it is a set of technical features enabling feedback. Media users' perception of interactivity has been shown to include factors beyond technical specifications and communication utility. For instance, being up-to-date, speedy, and saving effort are key to user perceptions of interactivity (Leiner & Quiring, 2008).

Pursuant to the current investigation, interactivity refers to television's ability to provide a technological experience involving feedback that is perceived as up-to-date and efficient by the user. Interactivity should contribute to the pursuit and gratification of needs (Ruggiero, 2000), which is tied to the three domains of audience activity: pre-selection, attention, and elaboration (Blumler, 1979). Sundar and Limperos (2013) have argued that interactive media may provide new categories of gratification related to the interactive affordances themselves, not just the nature of the media content. Whether through facilitating audience activity or providing new gratifications, it is expected that interactivity and interactive features contribute to the increased use of new media. Additionally, the technical affordances of streaming channels contribute to increased streaming use through cord-cutting (Tefertiller, 2018). It is expected, then, that perceived interactivity will contribute to the consumption of television technologies. Furthermore, this relationship will hold true regardless of the "newness" of the technology. For instance, a user may feel that their cable or dish technology provides sufficient interactivity, despite being an older technology than streaming. The following hypotheses are proposed:

- H2: Perceived interactivity of streaming a) positively predicts streaming viewing and b) negatively predicts traditional television viewing.
- H3: Perceived interactivity of traditional television a) positively predicts traditional viewing and b) negatively predicts streaming viewing.

While both perceived interactivity and innovativeness are expected to contribute to streaming use, it is unclear which factor will best explain increased streaming. Furthermore, it may be possible that innovativeness may increase perceived interactivity of streaming, as streaming is a newer, interactive technology. The following research questions are presented:

- RQ1: Does perceived interactivity or innovativeness better predict streaming viewing?
- RQ2: Do more innovative individuals perceive streaming as being more interactive than less innovative individuals?

METHODS

An online cross-sectional survey was conducted via Amazon's Mechanical Turk (M-Turk) system. M-Turk samples are comparable in quality to national panels and student samples (Kees, Berry, Burton, & Sheehan, 2017). The study employed workers based in the United States who had 95% HIT completion rates. 810 respondents completed the survey. Three responses were deleted due to missing data, and seventeen responses were eliminated due to fast response times (below one standard deviation of the average response time) and/or having even-odd, Spearman-Brown-corrected correlations below -1 (Meade & Craig, 2012). The resulting national convenience sample ($N = 790$) had an average age of 37 ($SD = 12.03$), was 53% female ($N = 418$), mostly Caucasian (74%, $N = 586$), with 9% Asian ($N = 72$), 8% African American ($N = 65$), 6% Hispanic or Latino, and 3% coming from other races ($N = 20$). About half ($N = 390$) made between \$20,000 and \$60,000 annually, with 14% ($N = 108$) making less than \$20,000 and 37% making more than \$60,000 ($N = 105$). Less than 1% did not finish high school ($N = 5$), 11% were high school graduates ($N = 86$), 40% ($N = 319$) had some college, 33% ($N = 259$) had bachelor's degrees, and 15% ($N = 121$) attended graduate school.

Measures

The study's main independent variables were measured on seven-point, Likert scales ranging from "strongly disagree" to "strongly agree." Perceived interactivity was measured using Leiner and Quiring's (2008) six-item scale. The scale was repeated twice: once for traditional television, defined as viewing via antenna or cable, and once for streaming television, defined as channels such as Netflix, Amazon, and Hulu. Statements included, "Cable television requires little effort," and, "Streaming television is up-to-date." Both scales, perceived interactivity of traditional television ($M = 4.57$, $SD = 1.22$, $\alpha = .85$) and perceived interactivity of streaming television ($M = 5.79$, $SD = .95$, $\alpha = .87$), were reliable. Innovativeness was measured using Hurt's, Joseph's, and Cook's (1977) 20-item innovativeness measure. Scale items included, "I am generally cautious about accepting new ideas" (reverse coded), "I am an inventive kind of person," and, "I feel that I am an influential member of my peer group." The entire scale was reliable ($M = 4.75$, $SD = .83$, $\alpha = .90$).

The main dependent variables, average viewing time of streaming and traditional cable, were measured using Perse and Ferguson's (1993) approach, where survey respondents were asked to indicate how much time they spent viewing both traditional cable and streaming in the past week as well as how much time they spent viewing using each technology in a typical week. Respondents' most recent week and typical week totals were averaged to produce their average weekly viewing for both traditional cable ($M = 7.70$, $SD = 11.26$) and streaming television ($M = 9.83$, $SD = 9.20$).

The survey concluded by collecting basic demographic data, including age, gender, and ethnic background. In addition, income was measured via eight choices in \$20,000 increments ranging from \$0 to \$140,000+. Education was measured via nine choices ranging from "did not attend high school" to "doctoral degree."

RESULTS

H1, H2, H3, and RQ1 were concerned with the influence of perceived interactivity and innovativeness on streaming and traditional television viewing. To address these hypotheses and research question, hierarchical regressions predicting streaming viewing and traditional viewing were performed. The first step of each regression entered control variables, in particular age, income, and

education level, as each of these controls have been considered in previous innovativeness and adoption studies (e.g. Lin, 2006). The second step of the regressions entered the perceived interactivity and innovativeness variables. No tolerance was less than .20 and no variance inflation factor exceeded 4.0 for any variable in either regression, suggesting a lack of multicollinearity. Table 1 presents correlations between all variables in the regressions, and Table 2 presents the results of the regressions.

Table 1:
Pearson Correlations of Independent and Dependent Variables (N = 790)

	1.	2.	3.	4.	5.	6.	7.
1. Age							
2. Income	-.04						
3. Education Level	.06	.29**					
4. Perceived Interactivity – Traditional TV	.16**	.11*	.04				
5. Perceived Interactivity – Streaming TV	-.27**	.003	.001	.05			
6. Innovativeness	.02	.07	.12*	.08 ⁺	.20**		
7. Average Weekly Streaming Viewing	-.12**	-.10*	-.08 ⁺	-.06	.30**	.11*	
8. Average Weekly Traditional Viewing	.27**	-.02	-.06	.26**	-.13**	-.05	-.14**

Note: ** $p < .001$ (2-tailed), * $p < .01$ (2-tailed), ⁺ $p < .05$ (2 tailed).

The entry of the study variables in step two of each regression was significant for both streaming viewing, $F(3,782) = 17.01$, $p < .001$, and television viewing, $F(3,783) = 20.44$, $p < .001$. The variables explained 9% of the variance for streaming and 6% of the variance for traditional viewing.

H1 posited that innovativeness would a) positively predict streaming and b) negatively predict traditional viewing. Innovativeness was a significant positive predictor of streaming viewing ($\beta = .07$, $p < .05$), but the relation with traditional viewing was not significant ($\beta = -.05$, $p > .05$). H1a was supported, but H1b was not supported.

H2 suggested the perceived interactivity of streaming would a) positively predict streaming and b) negatively predict traditional viewing. The perceived interactivity of streaming was a significant positive predictor of streaming viewing ($\beta = .28$, $p < .001$) and a significant negative predictor of traditional viewing ($\beta = -.07$, $p > .05$). H2a and H2b were both supported.

H3 posited the perceived interactivity of traditional television would a) positively predict traditional viewing and b) negatively predict streaming use. The perceived interactivity of traditional viewing was a significant positive predictor of traditional viewing ($\beta = .24$, $p < .001$), but the relation with streaming viewing was not significant ($\beta = -.06$, $p > .05$). H3a was supported, but H3b was not supported.

RQ1 asked whether perceived interactivity or innovativeness better predicted streaming viewing. The perceived interactivity of streaming best predicted streaming viewing ($\beta = .28$, $p < .001$) when controlling for the other variables. While innovativeness was a significant predictor of streaming ($\beta = .07$, $p < .05$), income ($\beta = -.08$, $p < .05$) explained more variance. Younger viewers and viewers with lower incomes were more likely to engage in streaming than highly innovative users. However, to address RQ1, the best predictor of streaming viewing was the perception that streaming was interactive.

RQ2 asked if more innovative individuals perceive streaming as being more interactive than less innovative individuals. To address this research question, an independent samples t-test was performed

to compare the means of perceived interactivity between more and less innovative individuals, with more innovative individuals having innovativeness scores above the mean and less innovative individuals having innovativeness scores below the mean. There was a significant difference in the perceived interactivity of streaming for more innovative ($M = 5.96$, $SD = .85$) and less innovative ($M = 5.60$, $SD = 1.00$) respondents; $t(743.37) = 5.41$, $p < .001$, $d = .39$. More innovative respondents perceived streaming as more interactive than less innovative respondents.

Table 2

Summary of Hierarchical Regression Analyses Predicting Streaming and Traditional Television Viewing (N = 790)

Variables	Average Weekly Streaming Viewing			Average Weekly Traditional Viewing		
	B	SE B	β	B	SE B	β
Step 1						
Controls						
Age	-.10	.03	-.13**	.25	.03	.27**
Income	-.48	.20	-.09 ⁺	.09	.23	.01
Education	-.30	.22	-.05	-.55	.26	-.08 ⁺
	R^2	.03		R^2		.08
	F	7.76**		F		21.72**
Step 2						
Controls						
Age	-.03	.03	-.04	.20	.03	.21**
Income	-.44	.20	-.08 ⁺	-.09	.23	-.01
Education	-.38	.21	-.07	-.49	.25	-.07
Study Variables						
Perceived Interactivity – Traditional TV	-.47	.26	-.06	2.20	.31	.24**
Perceived Interactivity – Streaming TV	2.74	.35	.28**	-.86	.42	-.07 ⁺
Innovativeness	.78	.39	.07 ⁺	-.72	.47	-.05
	ΔR^2	.09		ΔR^2		.06
	ΔF	25.54**		ΔF		17.77**

Note. ** $p < .001$, * $p < .01$, ⁺ $p < .05$.

DISCUSSION

The purpose of this investigation was to determine how individual innovativeness and the interactive nature of the technology itself predicted the use of streaming television technology. Using a cross-sectional online survey, it was determined that the perceived interactivity of streaming best predicted streaming television viewing. While innovativeness was a significant predictor, its influence did not exceed the influence of study controls (income level), and perceived interactivity exerted the most influence on streaming viewing.

While innovativeness was a significant predictor of streaming, its relation was rather weak in comparison to perceived interactivity and controls. This may be explained by diffusion of streaming technologies. It is worth noting that Netflix unveiled its streaming service in 2007, which means that streaming technology has been available for over a decade. According to diffusion of innovation theory,

the earliest adopters are innovators (Rogers, 2003). Perhaps innovativeness exerts less influence once the innovation has moved beyond the initial phases of diffusion. This finding suggests streaming has moved beyond the early phases of innovation diffusion and entered the majority phase. However, it is worth noting that not only was innovation a significant if small influencer, but more innovative users were more likely to consider streaming to be an interactive technology than less innovative users. While the date of adoption is an important determinant of who could be considered an innovator, this research supports earlier research that identifies innovativeness as its own trait that should be measured separately from adoption behaviors (Planing, 2015).

It should also be noted that not every produced series or movie is available via streaming, and some video content that may be considered innovative is only available through more traditional channels (examples include *Game of Thrones* and *Westworld*, both available on HBO). Innovativeness may extend beyond technology use to program selection, which may explain the lack of support for H1b.

According to the current investigation, perceived interactivity was the best predictor of television use, both for streaming and traditional television. This finding lends credence to the idea that the technological affordances of a technology may be important predictors of its use, as argued by Sundar and Limperos (2013). Of note, the perceived interactivity of the newer technology – streaming – not only predicted streaming use, but it also had a negative association with the use of older, traditional television technologies. As streaming technology is built on web-enabled platforms, the use of innovative technologies may lead to a more positive experience than accessing television through traditional means. In support of Ruggiero's (2000) argument, interactivity should be considered an important variable in future uses and gratifications research, if not considered as its own gratification, than perhaps serving as an important moderator between gratification seeking and media consumption.

For media providers, the results of this study suggest the interactivity of platforms is important, no matter the nature of the content provided. While the content of streaming television is for the most part licensed directly from traditional channels and producers, the interactivity of the technological context of the platforms provides incentive for engagement. In other words, streaming provides an interactive experience that is of value to users, and it may be considered superior to traditional means of accessing televised content. Furthermore, while innovativeness may not influence the decision to adopt media technologies once they already have a foothold, it is an important trait to consider in future adopters of new technologies, and it may influence the perceived interactivity of the technology throughout the adoption cycle. Consideration should be given to innovative consumers when releasing new media technologies and while promoting interactive features.

Limitations and Future Research

As the current study employed a cross-sectional survey to address its hypotheses and research questions, care should be taken in interpreting the directionality of observed relations. Future research should employ longitudinal and/or experimental methods to more strongly establish the directionality of the relations between variables. Furthermore, as streaming is quickly becoming an established technology, future research should seek to determine the role innovativeness plays across the diffusion cycle, from innovator adoption near the introduction of the innovation to laggard adoption once the innovation has reached saturation. A longitudinal study that examines innovativeness among adopters throughout the process will shed light on the importance of this variable in adoption processes. Finally,

the current study focused on perceived interactivity, which represents only one of three dimensions identified as being key components of interactivity (Kiouisis, 2002). Future research should seek to more fully understand the interactivity of streaming through its technological context and facilitation of two-way communication.

Streaming services have changed the way people watch television, and this study provides initial evidence to explain that adoption process. While no one can predict what the next innovation in content viewing will be, this study provides a clear framework to assess the innovation process.

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About the Author(s)

Alec C. Tefertiller (Ph.D., Oregon) is an assistant professor in the A.Q. Miller School of Journalism and Mass Communications at Kansas State University. His research explores new media audiences, technology adoption, and social media.

Kim B. Sheehan (Ph.D., Tennessee) is a professor and the Advertising and Brand Responsibility Master's Program Director in the School of Journalism and Communication at the University of Oregon. Her research explores a range of topics in the digital sphere including privacy, self-certifications, and brand mission.

Online Connections

To follow these authors in social media:

Alec C. Tefertiller: @alecteefer

Kim B. Sheehan: @kbshee