JOURNAL OF COMMUNICATION

Journal of Communication ISSN 0021-9916

ORIGINAL ARTICLE

The Power of Narratives: The Effect of Entertainment Television Organ Donation Storylines on the Attitudes, Knowledge, and Behaviors of Donors and Nondonors

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*Drawing on theories of social learning, social representations and the organ donation model, online surveys were used to examine the impact of organ donation storylines of 4 U.S. television dramas (*CSI: NY, Numb3rs, House, *and* Grey's Anatomy*) on viewers' attitudes, knowledge, and behaviors. Results revealed that viewers acquired knowledge from the content of each drama, despite the fact that some content was inaccurate. Viewers who were not organ donors prior to exposure to the dramas were more likely to decide to donate organs if the drama explicitly encouraged donation, portrayed characters revealing how they had become donors and discussed the merits of donating. Viewers were also more likely to become an organ donor if they were emotionally involved in the narrative. Implications for using dramas to educate and motivate the public were discussed.*

doi:10.1111/j.1460-2466.2008.01408.x

With the U.S. transplant waiting list now approaching 100,000 people (www.unos.org), the importance of encouraging organ donation has never been greater. Unfortunately, consent rates have not kept pace with the continually growing demand. This need is in part due to high rates of some common diseases such as heart disease and diabetes, and thus affects members of minority groups disproportionately, particularly African Americans. Former U.S. Secretary of Human Services Tommy Thompson perceived the need to be so urgent that he launched several national incentives during his tenure in order to support public education about organ donation.

Unfortunately, even when members of the public understand the need for more people to become organ donors, perceived barriers prevent them from giving consent to donating their own or deceased loved ones' organs. Some barriers are simply a matter of perception that can be relatively easily resolved through more focused public education, such as the belief that organ donation leads to additional medical

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costs or that an open-casket funeral is not possible for organ donors (Morgan, Miller, & Arasaratnam, 2003). Other barriers are more difficult, however, and represent beliefs that cannot be easily countered through public campaigns, including the belief that people need all of their "parts" after they die in order to enjoy an afterlife existence (Braun & Nichols, 1997; Parisi & Katz, 1986; Rubens & Oleckno, 1998). A third set of barriers are the most insidious, not only because they represent widely held myths about donation, but because these beliefs are being fed almost constantly through entertainment media (Morgan, Harrison, Chewning, Davis, & DiCorcia, in press). These include beliefs that a black market for transplantable organs exists in the U.S., that doctors will kill patients for their organs, that people can recover after being declared brain dead, and that the organ allocation system favors the rich, the famous, or the well-connected (Horton & Horton, 1990; Morgan & Cannon, 2003; Spigner et al., 1999). The significance of these misrepresentations about organ donation can be clearly seen through the lens of several theories.

Theoretical framework

At the heart of our concern about representations of organ donation in the media is the fact that the public is able to witness "with their own two eyes" corruption in the medical and organ allocation systems, and worse, the consequences of becoming an organ donor. Unfortunately, although the public is obviously conscious that they are watching fictionalized accounts, these narratives nonetheless exert a powerful influence. This is exacerbated by the fact that the storylines of many medical and crime dramas are recognizable from newspaper headlines; it is no secret that scriptwriters draw inspiration from real life situations. In fact, the tagline from *Law and Order* is "Stories ripped from the headlines." It is highly unlikely that after viewing a black market storyline seeing a small-print disclaimer at the end of the show that the story was not based on a real situation, viewers will modify the attitudes created by their visceral experience of the story. Social learning theory, then, is a key theoretical framework that constitutes the warrant for our study and forms the basis of many of our hypotheses.

Briefly, social learning theory (Akers, 1998; Bandura, 1971; Rosenstock, Stretcher, & Becker, 1988) asserts that people will observe and then model the attitudes and behaviors of others under particular conditions. First, people must attend to and remember the behavior being modeled. Second, people must have the ability and motivation to act on what they have learned. Narratives, particularly those that are represented in highly absorbing television dramas, create excellent conditions that would likely enhance both attention and memory. Witnessing horrific events associated with organ donation would almost certainly motivate many people to protect themselves from these consequences, which is actually quite easy to do. In fact, simply failing to act to become a potential donor (by signing a driver's license or telling family members about the desire to become a donor) provides the greatest amount of protection from these consequences, whereas registering to become a donor exposes people to the "dangers" associated with donation. It is

difficult to imagine a behavior with greater self-efficacy than inaction, though it is possible that the media may persuade some people to take the step to inform family members that they do *not* want to be donors.

However, the influence of the media on modeling behaviors is likely to be dependent on how emotionally involving and absorbing people find a particular television episode. A series of experiments by Green (2004, 2006) and Green and Brock (2000, 2002) found that the greater the degree of transportation generated by a narrative, the more people reported story-consistent beliefs and evaluations, regardless of whether a narrative was labeled as fact or fiction (see also Slater, Rouner & Long, 2006). Emotional involvement in a narrative increases attention to the story elements, the amount of imagery viewers generate, and increases cognitive processes. As applied to an entertainment-education on organ donation, we expect that emotionally involving narratives will have a positive and significant impact on learning new information from the drama as well as perceived motivation to become an organ donor. Thus,

> H1: The more highly emotionally involving an episode, the more it influences (a) learning about organ donation issues and (b) perceived motivation to become an organ donor.

Other factors contribute to learning about organ donation issues and perceived motivation to become an organ donor. Research demonstrates that perceived realism of television content can lead to attitude change and increase the impact of narratives. (Green, 2006; Potter, 1986). If viewers perceive the program to accurately represent health issues, then events depicted will appear more realistic. Green (2004) found that transportation was positively correlated with perceived realism of the story. Accuracy of information should operate to increase learning and motivation, while perceived inaccurate information may reduce learning and motivation to be a donor, or even reduce the emotional involvement with the storyline. Therefore,

> H2: The more accurately perceived an episode to be, the more it influences (a) learning about organ donation issues and (b) perceived motivation to become an organ donor.

Narratives on organ donation feature certain beliefs that may be accurate or inaccurate with regard to organ donation processes. The basic hypothesis is that viewers engaged in the narratives will learn to adopt and agree with the beliefs expressed in the narratives, whether or not the beliefs are considered accurate in the medical world. While there is some chance that viewers who are organ donors may have superior knowledge that facilitates resistance to adopting false beliefs, we nonetheless hypothesize the beliefs expressed in a recently viewed drama will be adopted by the viewers:

> H3: Knowledge and beliefs about organ donation are significantly correlated with the content presented in entertainment television storylines.

Another theoretical framework that is helpful in understanding the implications of the results of our analyses is social representations theory (Flick, 1998; Moscovici, 1998). This theory traces the development of social representations of a new or

relatively unknown phenomenon, like organ donation, through several stages. First, the media frame the phenomenon in one or more ways; these frames can evolve over time, as demonstrated by Maloney and Walker (2000). Second, these frames form the foundation of intrapersonal attitudes about the phenomenon. In the absence of other sources of information about organ donation (or biotechnology; see Gaskell & Bauer, 2001), as is the case for the general public, individuals rely heavily on the media to form their own personal opinions. In the third stage, social representations solidify as people engage in interpersonal communication about the issue.

Surprisingly few studies have been conducted on the media's impact on attitudes and behaviors regarding organ donation. Maloney and Walker (2000, 2002) tracked the development of social representations of organ donation by first content analyzing Australian media and then conducting focus groups to examine how the media affected interpersonal communication about the issue. A recent content analysis of U.S. entertainment media (Morgan et al., 2007) revealed almost universally negative depictions of organ donation. An analysis of how family members communicate about organ donation demonstrated that media plots are often used by nondonors to justify their lack of willingness to donate (Morgan et al., 2005).

Such results should hardly be surprising, given the large body of research on the effectiveness of entertainment education. HIV/AIDS prevention and treatment, family planning, and literacy have all been successfully promoted through well-constructed and highly engaging entertainment storylines (Singhal, Cody, Rogers, & Sabido, 2004; Singhal & Rogers, 1999). Studies conducted in the U.S. demonstrate that the public can learn factual information and are motivated to seek information on health topics featured on particular dramas like *ER* and daytime soap operas (Brodie et al., 2001; Kennedy, O'Leary, Beck, Pollard, & Simpson, 2004; Wilkin et al., 2007). However, the results of these entertainment education programs stand in stark contrast to studies demonstrating how the media encourages damaging health behaviors (Bushman & Anderson, 2001; Charlesworth & Glantz, 2005; Groesz, Levine, & Mumen, 2002; Sargent, Wills, Stoolmiller, Gibson, & Gibbons, 2006). Nonetheless, since the dramatic intent of the storylines studied here was to highlight the need for organ donors, we expect:

H4: The content of episodes positively affects nondonors' (a) knowledge level on how to become an organ donor and (b) willingness to become a donor.

H5: The content of episodes positively affects the willingness of donors to urge other people to become organ donors.

Method

Data collection

Hollywood, Health & Society contacted the authors and proposed the evaluation study in February of 2006. Surveys were created with the collaboration of the Public Education Branch Chief of the Division of Transplantation at the Human Resources and Services Administration. Surveys for the popular U.S. shows *House*, *Grey's*

Anatomy, *CSI: NY,* and *Numb3rs,* all of which had recently aired six organ donation storylines, were posted online on March 21, 2006, and data were collected through the third week of April 2006. A link to the *House* survey was posted on the *House* website, and permission to post the survey was secured from Fox network executives by Hollywood, Health & Society. Survey links for the other three programs were posted in online chat rooms and fan sites for the shows.

Stimuli

The six episodes viewed by participants included four highly rated shows: *CSI: NY*, *Numb3rs, House,* and *Grey's Anatomy*. The following summarizes the storylines:

CSI: NY: "Live or Let Die." In this episode, a transplant surgeon arranges for an organ transport team to be hijacked so his dying wife can get a transplant. In one scene, the pulsating organ is shown in the high-tech cooler that maintains its viability during transport. When the transplant surgeon is caught, he argues that his wife shouldn't have to wait on the transplant list because he has saved so many lives.

Numb3rs: "Harvest." Girls from India are flown to the United States to be living donors for wealthy Americans. Their organs are procured in the basement of a hotel and one girl is murdered for all of her organs which are said to be worth $300,000. Information about the number of people on the transplant waiting list and the computer system for organ matching is mentioned in the episode. At the conclusion of the episode, the detectives engage in a discussion about the importance of donation and four of the characters, who are already donors, convince a fifth that he should become a potential organ donor too.

House story #1: "Sex Kills." Dr. House convinces a man to donate his dead wife's heart to a man despite the hospital transplant committee's vote against his eligibility and a medical declaration that her organs were unusable. House looks for dying people to save his patient, enlisting the help of another surgeon. The storyline centers on curing a dead woman of a disease so she can be taken off "life" support to become an organ donor. This is one of the only episodes of any program to show an organ procurement coordinator, although this character has just a few lines and her function beyond treating "her organs with care and dignity" is not made clear. House repeatedly refers to potential organ donors in dehumanizing terms such as "dead meat" and broken machines.

House story #2: "Sleeping Dogs Lie." House has to work fast when a woman comes in with a life-threatening case of insomnia. When the patient's liver is dead, she needs a transplant and there are only 6 hours to determine what's affecting her. The patient's girlfriend is a match, but the patient is about to break up with the girlfriend. House overrides concerns about the ethical dilemma. House goes to get permission for the transplant and the girlfriend goes along with it rather then let the patient die. House finally figures out what's going on – she has the Black Plague.

Grey's Anatomy story #1: "Enough is Enough (No More Tears)." An alcoholic, abusive husband/father is brought into the hospital after his road rage causes a fatal car accident. In the course of emergency treatment, it is discovered that the man will not live much longer if his son does not donate part of his liver. In a parallel storyline, a woman who is declared brain dead and about to be wheeled into an operating room to have her organs procured is discovered to still have brain function. The transplant surgeons argue that "she'll be dead by the time we get to the O.R." and argue against further tests because people needing her organs have already been prepped for transplant surgery. The only accurate information in the episode pertains to counseling of potential living donors as well as the ability of the remaining half of a donor's liver to regenerate.

Grey's Anatomy story #2: "Band-Aid Covers the Bullet Hole," "Under Pressure," and "17 Seconds" (three-part season finale). A young surgeon falls in love with a man who needs a heart transplant and illegally manipulates the urgency of his condition to ensure that he will receive a donor heart by cutting the electrical lines of his heart bypass machine (LVAD). Although the LVAD, UNOS system, and patient priority status and listing procedures are explained and referred to repeatedly, the episode demonstrates how the organ allocation system can be manipulated by doctors. In a parallel storyline, a pregnant woman with a signed donor card is declared brain dead. Her parents want her "kept alive" until the baby can be born. A surgeon tries to dissuade them with contradictory information, first arguing that it can't be done (then apparently conceding that it can be done) and then arguing that it would be unacceptable to use her "corpse" as an incubator. A doctor tries to persuade the family that their daughter would rather be an organ donor.

Sample

Two hundred and ninety individuals completed the *Numb3rs* survey, and 262 of these had viewed the organ donation episode. Three hundred and seventy-four individuals completed the *CSI:NY* survey, and 330 had viewed the organ donation episode. Three hundred and fifty-four individuals completed the *Grey's Anatomy* survey, and 340 had seen both episodes (253 viewed the first and 366 viewed the second). Five thousand and thirty-four individuals completed the *House* survey, and 3,541 viewed both episodes (3,720 viewed the first and 3, 542 viewed the second).

The majority of participants were female (79.1%) and the average age was 29.01 years of age ($Mdn = 25.0$). Most were Caucasian (81.5%), Asian American (4.9%), "other" (4.4%), Hispanic (3.6%) or African American (2.7%). The typical participant was a college graduate (28.1% of the sample) or had attended some college or trade school (27.9%); 13.9% had attended high school (or less), 11.2% completed high school, and 13.7% had attended graduate school. Most were single (54.7%) or married/living with partner (34.0%); 4.6% declined to answer, 4.1% were divorced or separated, and 2.6% reported "other." Many claimed to have been organ donors prior to viewing the storylines; 41.6% were organ donors and 58.4% were not.

Instruments

Key constructs measured in the survey included perceived emotional involvement in the story, perceived accuracy of health information communicated on the program, learning about the organ donation process, perceived persuasive quality of the narrative, knowledge of beliefs and myths about organ donation, learning about how to become a donor from viewing the program and action steps viewers can take after viewing the program. Emotional involvement was assessed with a single item: "I felt emotionally involved in this storyline" (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Perceived accuracy was measured with a single item: "How accurately do you think (show) portrays health issues in general?" (1 = *Not at all accurate*, 5 = *Totally accurate*). Two items were used to assess learning about the organ donation process: "I learned something about the organ donation process" and "I learned something about waiting lists for organs" (1 = *Strongly Disagree*, 5 = *Strongly Agree*) ($\alpha = .859$). Two items were used to assess the perceived motivation to become an organ donor: "This storyline made me think more about the importance of being an organ donor" and "I think this storyline empowered many people to sign up as organ donors" (1 = *Strongly Disagree*, 5 = *Strongly Agree*) ($\alpha = .767$). Knowledge of beliefs about organ donation was measured by asking viewers to rate agreement with seven specific health beliefs (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Two were accurate, truthful statements about organ donation ("Doctors work just as hard to save a patient who is an organ donor as one who is not," and "An organ is matched to a recipient through a national computerized system") and five were false statements about organ donation ("There is a black market for selling organs in the United States," "People can recover after being declared brain dead," "Doctors have personal pull in deciding which patient gets the organ," "A hospital's transplant committee determines priority of patients on the waiting list at that hospital," and "The rich and/or famous can pay their way for higher priority on a transplant waiting list or 'pull strings' to get a transplant faster").

Learning about how to become a donor from viewing the program and action steps viewers can take were measured by asking viewers to identify each specific way a person can become an organ donor (Yes or no): "One can sign a universal donor card to become an organ donor," "One can tell family members you want to donate organs when you are dead to become an organ donor," "One can sign up at a computer registry or when one renews a driver's license to become an donor" and "I do not know how to become an organ donor." Finally, viewers were asked if viewing the shows prompted specific actions (Yes or no): "I talked to someone about the story," "I urged someone to become a donor," and "I decided to become a donor."

Results

Hypotheses 1 and 2 were first assessed by correlating perceived emotional involvement, accuracy, learning, and motivation to become a donor, followed by regression analyses among the four dependent variables, predicting perceived motivation to

become a donor. The hypotheses, and the impact of the four programs, were then assessed by conducting a 4 (TV Program) X 2 (Donor/Nondonor) MANOVA with perceived accuracy, emotional involvement, perceived persuasive quality, and learning as dependent variables. Hypothesis 3 was assessed by conducting a 4 (TV Program) X 2 (Donor/Nondonor) MANOVA with ratings of agreement with the seven specific belief statements discussed in the programs. Hypotheses 4 and 5, assessing programs' impact on knowledge of becoming an organ donor and whether or not viewers took a specific action based on the content of the program, were assessed by chi-square analyses.

Accuracy, emotional involvement, persuasive outcomes, and self-reported learning

Table 1 presents the correlations among the four dependent variables. Hypothesis 1was supported: Emotional involvement significantly predicted learning ($r = .365$, $p < .001$) and motivation to become an organ donor ($r = .460$, $p < .001$). Hypothesis 2 was supported: Perceived accuracy significantly predicted learning ($r = .252$, $p < .001$) and motivation to become a donor ($r = .242$, $p < .001$). A step-wise regression predicting motivation to become a donor from emotional involvement, learning and accuracy indicated that each of the three variables significantly predicted motivation. Motivation to become an organ donor was predicted from learning ($\beta = .418$), emotional involvement ($\beta = .294$), and accuracy ($\beta = .093$) ($R = .622$, adjusted $R^2 = .387$), (F (3, 4472) = 942.43, $p < .001$). Viewers believed that a narrative was persuasive and motivated viewers to be donors if viewers learned new information, found the narrative emotionally involving and perceived the program to provide accurate health information.

A 4 (TV Program) X 2 (Donor vs. Nondonor) MANOVA was conducted on the viewers' ratings of perceived accuracy, emotional involvement, perceived persuasive quality, and learning about the donation process. There was a significant main effect for TV Program (F (12, 11805.634) = 18.55, $p < .001$, $\Lambda = .952$), and for Donor Status (F (4, 4462) = 16.10, $p < .001$, $\Lambda = .986$). There was no significant interaction effect ($p = .467$). TV Program was significantly related to emotional involvement (F (3, 4465) = 16.98, $p < .001$), accuracy (F (3, 4465) = 19.00, $p < .001$), learning about the process (F (3, 4465) = 2.76, $p = .041$) and persuasive quality (F (3, 4465) = 11.01, $p < .001$).

Table 1 Correlations Between Dependent Variables: Accuracy, Emotional Involvement, Learning and Persuasive Quality

	Emotional Involvement	Accuracy	Learning Process	Motivation to be Donor
Emotional involvement	1.00			
Accuracy	.149**	1.00		
Learning process	.365**	.252**	1.00	
Motivation to be donor	.460**	.242**	.549**	1.00

**Denotes correlation is significant at the 0.01 level (2-tailed).

Table 2 presents the data for four TV programs. LSD posthoc tests revealed that *Grey's Anatomy* was rated significantly more emotionally arousing than *CSI: NY* ($p < .001$), *House* ($p < .001$) and *Numb3rs* ($p = .002$), while *CSI: NY* was rated significantly less emotionally involving than *Grey's Anatomy*, *House* ($p < .001$) and *Numb3rs* ($p = .001$). *Grey's Anatomy* was rated significantly less accurate than *CSI: NY* ($p < .001$), *Numb3rs* ($p < .001$) and *House* ($p < .001$). *Numb3rs* was rated as significantly more persuasive than *Grey's Anatomy* ($p < .001$), *House* ($p < .001$) and *CSI: NY* ($p = .011$), and *CSI: NY* was rated as more persuasive than *Grey's Anatomy* ($p = .006$) and *House* ($p = .023$). Viewers learned less about the process of organ donation from *CSI: NY* compared to *House* ($p = .023$).

Donor status was related to emotional involvement ($F(1, 4465) = 5.26$, $p = .022$), accuracy ($F(1, 4465) = 5.03$, $p = .025$), learning about the process ($F(1, 4465) = 8.64$, $p = .003$), and persuasive quality ($F(1, 4465) = 16.13$, $p < .001$). Nondonors rated accuracy higher ($M = 3.74$, $SD = .781$) than donors ($M = 3.61$, $SD = .719$) (t ($df = 4471$) $= 5.52$, $p < .001$). Nondonors also learned more ($M = 3.63$, $SD = .999$) than did donors ($M = 3.50$, $SD = 1.018$) ($t(4471) = 4.18$, $p < .001$). Donors, however, rated emotional involvement higher ($M = 3.76$, $SD = .958$ [donors], $M = 3.63$, $SD = 1.050$ [nondonors] (t ($df = 4471$) $= 4.07$, $p < .001$) and motivation to become a donor higher ($M = 3.48$, $SD = .879$ [donors], $M = 3.32$, $SD = .939$ [nondonors], (t ($df = 4471$) $= 5.67$, $p < .001$).

Knowledge and beliefs

Hypothesis 3 predicted that knowledge and beliefs about organ donation will be significantly correlated with the seven belief statements featured in the narratives.

A 4 (TV Program) X 2 (Donor/nondonor) MANOVA was conducted with belief statements featured in the programs. There was a significant main effect for TV Program ($F(21, 12798) = 8.60$, $p < .001$) and for donor status ($F(7, 4457) = 14.32$, $p < .001$, $\Lambda = .978$), and the interaction effect was significant ($F(21, 12798.65) = 1.85$, $p = .010$, $\Lambda = .991$). The interaction effect was due solely to ratings regarding "There is a black market for selling organs in the United States" ($F(3, 4463) = 3.63$, $p = .012$). TV Program was significantly associated with all seven beliefs: "Doctors work hard…." ($F(3, 4463) = 3.93$, $p = .008$), "An organ is

Table 2 Ratings of Perceived Accuracy, Emotional Involvement, Perceived Persuasive Quality, and Learning About the Donation Process by TV Program

	Numb3rs	CSI: NY	House	Grey's Anatomy
Emotional involvement	3.74 (.974)	3.43 (1.038)	3.67 (1.008)	3.99 (1.026)
Accuracy	3.64 (.803)	3.80 (.702)	3.71 (.759)	3.39 (.711)
Learning process	3.54 (1.111)	3.46 (1.144)	3.60 (.989)	3.52 (.978)
Motivation to be donor	3.67 (.937)	3.48 (.927)	3.36 (.906)	3.29 (.983)

Note: Numbers in parentheses are standard deviations. Ratings were made on a 5-point scale where 1 = *Strongly Disagree*, 5 = *Strongly Agree*.

matched…" (F (3, 4463) = 5.67, $p < .001$), "A hospital committee…. (F (3, 4463) = 12.57, $p < .001$), "There is a black market…." (F (3, 4463) = 17.10, $p < .001$), "People can recover…." (F (3, 4463) = 4.43, $p = .004$), "Doctors have pull…" (F (3, 4463) = 15.43, $p < .001$), and "The rich and famous…" (F (3, 4463) = 3.87, $p = .009$).

Table 3 presents the data for four TV Programs. Viewers of *CSI: NY* were more likely to agree with "Doctors work just as hard" than viewers of *Numb3rs* ($p < .001$) and *House* ($p = .002$), and viewers of *Numb3rs* were less likely to agree with the statement than viewers of *CSI: NY* ($p < .001$), *House* ($p = .038$), and *Grey's Anatomy* ($p = .039$). Viewers of *House* were least likely to agree with the statement that "An organ is matched…through a computerized system," compared to viewers of *Numb3rs* ($p = .001$), who were most likely to agree with the belief, or *Grey's Anatomy* ($p = .013$). Viewers of *House* were more likely to agree with the statement that "A hospital's transplant committee" compared to viewers of *Numb3rs* ($p = .050$), *CSI: NY* ($p = .003$), and *Grey's Anatomy* ($p < .001$). And viewers of *Numb3rs* were significantly more likely to agree with the statement than viewers of *Grey's Anatomy* ($p = .046$).

Belief in a "black market" was endorsed by *Numb3rs* viewers more so than viewers of *CSI: NY* ($p < .001$), *House* ($p < .001$), or *Grey's Anatomy* ($p < .001$); viewers of *Grey's Anatomy* were least likely to agree with the statement compared to *Numb3rs* ($p < .001$), *CSI: NY* ($p < .001$), and *House* ($p < .001$). However, the significant Program X Donor interaction indicated that among the viewers of *Grey's Anatomy* donors were more likely to agree with the "black market" belief ($M = 3.83$) than nondonors ($M = 3.55$) (t ($df = 338$) = 2.54, $p = .011$), although there was no difference between donors and nondonors among viewers of *Numb3rs* ($M = 4.35$ [donors], $M = 4.22$ [nondonors]($p = .208$)), viewers of *House* ($M = 3.84$ [donors], $M = 3.89$ [nondonors]($p = .104$)), and viewers of *CSI: NY* ($M = 4.01$ [donors], $M = 3.88$ [nondonors]($p = .244$)).

Table 3 Ratings of Belief Statements About Organ Donation, by TV Program

	Numb3rs	CSI: NY	House	Greys' Anatomy
True statements:				
Doctors work hard	4.11 (.988)	4.42 (.933)	4.24 (.987)	4.28 (.978)
Matched through computer	4.09 (.697)	3.97 (.813)	3.89 (.913)	4.02 (.809)
False statements:				
Hospital committee	3.74 (.899)	3.69 (.967)	3.85 (.897)	3.59 (.951)
Black market	4.27 (.776)	3.93 (.933)	3.87 (1.038)	3.65 (.994)
Recover from brain dead	2.77 (1.207)	2.52 (1.149)	2.48 (1.229)	2.70 (1.133)
Doctors personal pull	2.71 (1.053)	2.40 (1.131)	2.77 (1.112)	2.56 (1.081)
Rich and/or famous	3.31 (1.321)	3.10 (1.384)	3.11 (1.352)	2.91 (1.187)

Note: Numbers in parentheses are standard deviations. Ratings of the belief statements were made on a 5-point scale where 1 = *Strongly Disagree*, 5 = *Strongly Agree*.

Viewers of *House* were least likely to agree that people can recover from being declared brain dead compared to viewers of *Numb3rs* ($p < .001$), who rated the belief higher than others, and *Grey's Anatomy* ($p = .001$); and viewers of *CSI: NY* were less likely to agree with the belief compared to viewers of *Numb3rs* ($p = .012$). Viewers of *House* were more likely agree with the belief that "doctors have personal pull" compared to viewers of *CSI: NY* ($p < .001$) and viewers of *Grey's Anatomy* ($p = .001$); and viewers of *CSI: NY* were less likely to agree with the belief compared to the viewers of *Numb3rs* ($p = .001$). Viewers of *Numb3rs* were more likely to agree that the "rich and famous" are treated differently than viewers of *House* ($p = .023$) and *Grey's Anatomy* ($p < .001$), and viewers *House* were more likely to agree with the belief than viewers of *Grey's Anatomy* ($p = .008$). Hypothesis 3 was accepted.

Donor status was significantly associated with four beliefs: "Doctors work hard…" (F (1, 4463) = 26.05, $p < .001$), "An organ is matched…" (F (1, 4463) = 14.74, $p < .001$), "People can recover…" (F (1, 4463) = 53.99, $p < .001$), and "Doctors have pull…" (F (1, 4463) = 19.68, $p < .001$). Donors correctly agreed with two of the accurate beliefs, compared to nondonors: "Doctors work just as hard…" ($M = 4.41$, $SD = .886$ [donors], $M = 4.14$, $SD = 1.032$ [nondonors], t ($df = 4469$) = 9.18, $p < .001$) and "An organ is matched…." ($M = 4.06$, $SD = .833$ [donors], $M = 3.82$, $SD = .913$ [nondonors], t ($df = 4469$) = 8.78, $p < .001$). Donors were significantly more likely to disagree with two false beliefs: "Doctors have personal pull…." ($M = 2.62$, $SD = 1.117$ [donors], $M = 2.79$, $SD = 1.121$) [nondonors], t ($df = 4469$) = 5.19, $p < .001$), and "People can recover after being declared brain dead" ($M = 2.27$, $SD = 1.169$ [donors], $M = 2.69$, $SD = 1.222$ [nondonors], t ($df = 4469$) = 11.49, $p < .001$).

Effects of TV program on knowing how to become a donor, taking specific action steps

Hypothesis 4 predicted that the content of episodes will positively affect nondonors' (a) knowledge level on how to become an organ donor and (b) willingness to become a donor. Table 4 presents the percentages of nondonors who indicated correctly how to become an organ donor and who indicated that they were motivated to take specific action. Nondonors learned from some programs specific ways to become an organ donor: "sign a universal donor card" (χ^2 (3, $n = 2653$) = 13.14, $p = .004$), "computer registry/DMV" (χ^2 (3, $n = 2653$) = 11.33, $p = .010$), and "register in one's state" (χ^2 (3, $n = 2653$) = 15.81, $p = .001$). Comparisons of specific pairs of cells in Table 4 indicated that *House* was more effective in informing viewers than other programs. Viewers of *House* were significantly more likely than viewers of *Numb3rs*' to know that one can become an organ donor by signing a universal donor card (χ^2 (1, $n = 2227$) = 4.50, $p = .034$) and by registering in one's state (χ^2 (1, $n = 2227$) = 4.04, $p = .045$). Viewers of *House* were significantly more likely than viewers of *CSI: NY* to know that one can sign up at the DMV (χ^2 (1, $n = 2267$) = 9.95, p = .002) and register in one's state (χ^2 (1, $n = 2267$) = 9.12, $p = .003$). Viewers of *House* were significantly more likely than viewers of *Grey's Anatomy* viewers to know that one

Table 4 Percentages of Nondonors Who Indicated Correctly How to Become an Organ Donor and Who Indicated Motivation to Take Specific Action by TV Program

	Numb3rs	CSI: NY	House	Grey'sAnatomy
How does one become an organ donor?				
Sign universal card	62.1%	66.8%	69.8%	59.4%
Tell family members	48.3	49.1	51.2	45.3
Computer registry/DMV	64.4	58.9	69.4	66.5
Registry in state	52.9	50.0	60.6	52.4
The program motivated me to				
Talk to someone	35.1	35.0	43.3	46.2
Become a donor	10.3	9.8	3.8	2.8
Urge another to be a donor	4.0	4.7	2.9	0.0

can sign a universal donor card (χ^2 (1, n = 2265) = 9.62, p = .002) and register in one's state (χ^2 (1, n = 2265) = 5.49, p = .019). Hypothesis 4a was supported.

All three action steps were significantly affected by viewing programs: "talk to someone" (χ^2 (3, n = 2653) = 10.46, p = .015), "decided to become an organ donor" (χ^2 (3, n = 2653) = 31.24, $p < .001$), and "urged another to be a donor" (χ^2 (3, n = 2653) = 9.50, p = .023). Generally speaking, viewers of *Numb3rs* and *CSI: NY* were more likely to decide to become an organ donor and to urge others to be donors compared to viewers of *House* and *Grey's Anatomy*, but viewers of *Grey's Anatomy* and *House* were more likely to discuss the program with others. For example, viewers of *Numb3rs* were significantly more likely to decide to become an organ donor than viewers of *House* (χ^2 (1, n = 2227) = 17.08, $p < .001$) or viewers of *Grey's Anatomy* (χ^2 (1, n = 386) = 9.25, p = .002). Viewers of *CSI: NY* were more likely to decide to become an organ donor than viewers of *House* (χ^2 (1, n = 2267) = 17.22, $p < .001$) and *Grey's Anatomy* (χ^2 (1, n = 426) = 8.75, p = .003). Viewers of *Grey's Anatomy* were significantly less likely to urge others to become a donor compared to viewers of *Numb3rs* (χ^2 (1, n = 386) = 8.69, p = .003), *CSI: NY* (χ^2 (1, n = 426) = 10.14, p = .001) or *House* (χ^2 (1, n = 2265) = 6.36, p = .012). However, viewers of *Grey's Anatomy* were significantly more likely to discuss the narrative with others compared to viewers of *Numb3rs* (χ^2 (1, n = 386) = 4.92, p = .027) and *CSI: NY* (χ^2 (1, n = 426) = 5.52, p = .019), and viewers of *House* were significantly more likely to discuss the narrative compared to viewers of *Numb3rs* (χ^2 (1, n = 2227) = 4.41, p = .036) and *CSI: NY* (χ^2 (1, n = 5.34, p = .021). Hypothesis 4b was supported.

Hypothesis 5 predicted that content of programs would motivate donors to urge others to become organ donors. Donors were significantly more likely to urge others to become an organ donor based on the content of some programs (χ^2 (3, n = 1820) = 9.26, p = .026), supporting hypothesis 5. Viewers of *Grey's Anatomy* were significantly less likely to urge others to become organ donors (0% urged others to become donors) compared to viewers of *CSI: NY* (6.9% urged others to become an organ donor) (χ^2 (1,

$n = 244) = 9.13$, $p = .003$), *Numb3rs* (6.8% urged others to become a donor) (χ^2 (1, $n = 216) = 8.98$, $p = .003$), or *House* (4.2% of *House* viewers who were donors urged others to become an organ donor) (χ^2 (1, $n = 1616) = 5.55$, $p = .019$).

Discussion

In this study, we examined the impact of four different television shows with organ donation storylines on participants' attitudes, knowledge, and behaviors relating to organ donation. The results of the study support the hypotheses, indicating that that emotional involvement in the narrative influences learning and motivation, perceived accuracy influences learning and motivation, and show content is reflected in viewers' beliefs about donation.

The findings demonstrate how social learning theory can be applied to entertainment television. The theory posits that under certain conditions people observe and model attitudes and behaviors of others. This is the first study to demonstrate the application of SLT to the impact of entertainment television narratives on attitudes and behaviors relevant to organ donation. Because entertainment television dramas are highly emotionally involving and absorbing, they provide the prime conditions to, first, enhance attention to behaviors modeled, and second, to motivate people to act on such behaviors. Indeed, viewers attended to and remembered organ donation related attitudes and behaviors and claimed motivation to take action.

Entertainment television shows had such impact because of the power of narratives. As predicted by Green and Brock's (2000) research, narrative has powerful impacts because viewers become emotionally involved. The extent of this narrative absorption is dependent on storyline appeal, production quality, and the unobtrusiveness of educational messages (Slater et al., 2006). Primetime dramas, such as the four studied here, are thus an ideal means through which narrative transportation may occur, as they contain all of these factors.

The still emerging evidence for utilizing narrative communication is rather small in size. Thus, this study provides further evidence of the power of narrative to motivate television viewers to change health behavior and to learn information from health storylines. Furthermore, the study of television viewers provides evidence that absorption in the narrative functions across different media, since the majority of research has been conducted with written texts. Future research could compare effects of narrative on health behavior through different media.

This study also demonstrated that the capacity of an episode to transport viewers into the story had an important impact on viewers' attitudes and behaviors pertaining to organ donation. The model of transportation posits that persuasion through narratives occur because viewers are so absorbed and emotionally involved in the story, and are therefore less likely to counterargue messages. This in turn leads to viewers believing the story propositions (Green, 2004). Participants in this study were more influenced by programs that they rated as high in transportation than

storylines in programs low in transportation. Thus, this study offers further support for transporation theory.

However, the content of the episodes may trump the effect of emotional involvement on potentially important organ donation-related outcomes. For example, a careful review of the data (see Table 3) shows that although viewers of the *Grey's Anatomy* episodes rated the episodes as highly emotionally involving, they were the least likely to report that they learned new facts about donation or to believe that the episodes would empower others to donate, and were the second-least likely to report an increased perception of the importance of donating organs. However, *Numb3rs* was an episode that was rated as highly emotionally involving and viewers reported high levels of belief in the importance of donation, perceived empowerment of other viewers to become donors, and the belief that they had learned new facts about donation. This demonstrates that emotional involvement and episode content may complexly interact, and further research is needed to understand under what conditions one factor may lead to greater impact on viewers' behavior.

Episode content correlated with viewers' knowledge and beliefs about organ donation. Specifically, the two shows that emphasized UNOS's computer matching system also had the highest accuracy scores on the item pertaining to computer matching between donors and recipients. However, also as expected, we discovered that when an episode focuses on a particular myth about organ donation, viewers of this episode were the most likely to report accepting that myth as an accurate fact. Perhaps one of the most striking findings, however, is that positive and negative content can influence viewers' responses simultaneously. For example, *Numb3rs* was the only episode to provide social modeling for signing up to be an organ donor, which in turn exerted considerable influence on viewers' perceptions of the importance of becoming a donor, their willingness to become a donor, and whether they urged others to become organ donors. The storyline, however, centered on a supposed black market for organs sold to rich people. Not surprisingly, viewers of this episode were the most likely to believe in the existence of a black market for organs in the U.S. and that rich people can get transplants faster than ordinary people.

There are some significant limitations to this study that are important to note. First, self-selection bias is always an issue when a true random sample is not procured. Although the initial solicitation was to respond to a survey about the show (rather than a specific episode regarding organ donation), it is nonetheless true that respondents who were uncomfortable with the topic of organ donation could have discontinued the survey.

Second, the nature of our online survey (which was linked to entertainment show websites) means that we cannot generalize to the general population. It is possible that our findings are limited only to largely female viewers of medical and crime shows who are more likely to be organ donors than the general public, and who are intense enough fans of the shows to visit entertainment show websites. However, given that the principles demonstrated in this study have been supported by many other studies on a wide variety of health and social issues, this seems somewhat unlikely.

In addition, because we compared the responses of the same type of population (viewers of shows who voluntarily clicked on our survey link) that did not view the same episodes, concerns about generalizability should be mitigated. The large sample size of this study allows relatively small differences to be statistically significant, although the degree of the correlations between variables (unaffected by sample size) and the magnitude of test statistic results are a relatively clear indication that our conclusions are warranted. Finally, while it would have been highly desirable to compare viewers and nonviewers of the same episode of the same show, this proved impossible because there were too few nonviewers to allow statistical analysis. This study, then, creates a warrant for experimental studies in laboratory settings that randomly assign participants to exposure to episode content, controls for different sample sizes and permits rigorous tests of underlying mechanisms affecting media outcomes.

Conclusion

Although there have been many studies of the impact of the media on health-related attitudes and behaviors, none have examined the influence of storylines revolving around organ donation on organ donation-related behaviors and attitudes. As there are no accurate central storylines on organ donation aired on any major network programs (see Morgan et al. [2007] for a summary of content), we had to compare the effects of different stories on viewers. The most important results of our online surveys demonstrate that viewers' responses reflect the content of the episodes that they view, even when those episodes were aired months prior to the survey. Because we have focused only on entertainment media, it is not clear whether narratives that appear in the print or news media have the same kind of impact on organ donation-related outcomes.

This study provides further evidence of the power of entertainment media narratives to shape knowledge, attitudes, and behaviors, as well as the moderating effect of emotional involvement on these outcomes. Unfortunately, "good" narratives—those that are well-produced, with an emotionally absorbing storyline whose persuasive agenda is not apparent to viewers—can have unfortunate consequences, particularly in the case of factually inaccurate and sensationalistic storylines involving organ donation. It remains to be seen, of course, whether this evidence can have a positive impact on the tenor and content generated by Hollywood scriptwriters.

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El Poder de las Narrativas: El Efecto de las Historias de Donación de Órganos en la Televisión de Entretenimiento sobre las Actitudes, el Conocimiento, y los Comportamientos de Donadores y No-Donadores

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Resumen

Tomando de las teorías de comportamiento social, de representaciones sociales y el modelo de donación de órganos, encuestas online fueron usadas para examinar el impacto de la donación de órganos en las historias de 4 dramas de televisión de los EE.UU. (*CSI: NY*, *Numb3rs*, *House*, y *Grey's Anatomy*) sobre las actitudes, el conocimiento, y los comportamientos de los televidentes. Los resultados revelaron que los televidentes adquirieron conocimientos del contenido de cada drama, a pesar del hecho de que algún contenido era incorrecto. Los televidentes que no eran donadores de órganos antes de su exposición a los dramas, estaban más inclinados hacia la decisión de donar sus órganos si el drama estimulaba explícitamente la donación, representado por los actores revelando como ellos se convirtieron en donares de órganos y discutiendo los meritos de donar. Los televidentes estaban más inclinados a convertirse en donadores de órganos si estaban emocionalmente involucrados con la narrativa. Las implicancias para el uso de dramas para educar y motivar al público son discutidas también.

叙述的力量：

娱乐电视中器官捐赠故事对捐赠者及非捐赠者之态度、知识、行为的影响

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摘要

以社会学习理论、社会代表理论和器官捐赠模式为理论基础，我们通过网上调查检验了四个美国电视剧（CSI: NY, Numb3rs, House 和 Grey's Anatomy）中的器官捐赠故事对观众的态度、知识和行为的影响。结果显示，尽管有些内容不准确，观众还是从每个电视剧中获得了知识。如果电视剧明确鼓励捐赠，所刻画的角色揭示了他们如何成为捐赠者，并讨论捐赠的好处，那么在接触电视剧之前不是器官捐赠者的观众更有可能捐赠器官。如果观众在情感上融入了故事中，他们也更有可能成为一个器官捐赠者。我们最后讨论了用电视剧教育和鼓励观众的涵义。

이야기의 힘: 장기 기증자와 비기증자의 태도, 지식, 그리고 행위에 대한 오락 텔레비젼의 장기기증 이야기 효과에 관한 연구

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요약

사회학습이론, 사회적 대표성, 그리고 장기기증 모델을 이용, 4가지의 미국 텔레비젼 드라마(*CSI: NY, Numb3rs, House,* 그리고 *Grey's Anatomy*)의 장기기증 이야기가 시청자들의 태도와 지식, 그리고 행위들에 미치는 영향을 조사하기 위해 온라인 설문조사를 실시하였다. 결과들은 시청자들은 비록 일부 내용이 정확하지 않더라도 각 드라마의 내용으로부터 지식을 얻는다는 것을 보여주고 있다. 드라마들을 보기전에 장기 기증자가 아니었던 시청자들의 경우, 만약 드라마가 명백하게 장기기증을 격려하고, 어떻게 등장인물들이 장기 기증자가 되었으며, 장기 기증의 장점이 무엇인지에 대해 논의할 경우, 장기기증을 결심할 가능성이 높은 것으로 나타났다. 시청자들은 또한 그들이 이야기에 감정적으로 몰입될수록 장기 기증자가 될 가능성이 높은 것으로 나타났다. 마지막으로, 본 논문은 대중에 대한 교육과 동기로서 드라마를 사용하는 것에 대한 함의들이 논의되었다.