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Affective (in)attention: Using physiology to understand media selection

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Abstract

There is a longstanding belief amongst scholars of psychophysiology that activation is positively associated with attention. However, recent work on news avoidance suggests that activation from negative content is linked to *decreased* attention. The current study seeks to investigate these different expectations and suggests that both increased and decreased activation can be linked to both attention and avoidance. Using an experiment that employs skin conductance levels and heart rate to evaluate subjects' media selection choices, the author finds that even as deactivation is most likely to precede the decision to turn away from content, roughly 30% of the time activation precedes turning away. These findings confirm prior conclusions from the psychophysiological communications literature, *and* in the news avoidance literature, but it also highlights the need for more nuanced expectations where activation and media selection are concerned.

Keywords: psychophysiology; affect; attention; media selection; news avoidance

Introduction

The evolution of a high-choice media environment over the last 30 years has drastically altered the ways in which information is disseminated and consumed. The mediums that characterize the current environment, such as cable, the Internet, and social media, have vastly increased the amount of content produced and available to consumers. The sheer volume of content has afforded consumers more choice than ever when it comes to media selection, leading to new and important changes in media consumption patterns.

One pattern of increasing concern amongst scholars is that of simply avoiding the news altogether. The act of avoiding news has important implications for civic engagement, political knowledge, and democracy. Democracy depends on engaged and informed citizens, after all; a substantial body of work makes clear that citizens get at least some of their political information from the news (Chaffee et al., 1970; De Vreese and Boomgaarden, 2006; Fraile and Iyengar, 2014; Beckers et al., 2021; Wlezien and Soroka, 2021). It follows that understanding the causes and consequences of news avoidance is of real significance for representative democracy.

The current study seeks to make two advances to the study of news avoidance. First, using psychophysiological methods, the current study examines one highly cited reason for news avoidance: negative emotional arousal. Many studies on news avoidance find that media consumers report avoiding the news because of the negative content and/or the negative emotions the content makes them feel (e.g.,

¹⁰⁰⁰ This article was awarded Open Data, Open Materials and Preregistration badges for transparent practices. See the data availability statement for details.

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Aharoni et al., 2021; Schafer et al., 2022; Toff and Neilsen, 2022; Villi et al., 2022; de Bruin et al., 2024; Edgerly, 2024; Schaefer et al., 2024).

None of this work directly observes negative activation; however,—while there has been work done to understand psychophysiological reactions to negative content, this approach has not been leveraged to understand news avoidance (Carbone et al., 2024). Second, with the notable exception of work by Arceneaux et al. (2012, 2013a, 2013b), work using psychophysiology has yet to afford subjects the option to turn away from, or avoid, content. The current study accordingly incorporates media choice into the study design. By affording subjects choice, the author is better able to observe activation and attention in the context of actual media choices (i.e., selecting a new video, or not) in real time.

Based on data from a month-long field experiment, the author finds that avoidance is generally preceded by deactivation. This finding corroborates the existing physiological literature, which emphasizes a positive correlation between activation and attention. At the same time, however, the author identifies a significant portion of avoidance that is associated with activation, as well. There are instances in which activation leads people to turn away from the content in front of them to some other content, in line with expectations in the news avoidance literature. Future theorizing about the drivers of news attentiveness or avoidance should, the author argues, take both these findings into account.

News avoidance and media selection

The concept of news avoidance is not new. An early paper by Van den Bulck (2006) discusses news avoidance as a behavior that can be understood in two categories: intentional and unintentional. Unintentional news avoidance describes those who do not consume news for some combination of reasons, such as different media preferences and lack of interest in politics (Prior, 2005, 2007; Van Alest et al., 2017). Unintentional avoiders may not be actively choosing to avoid news or fully aware of their avoidance. Intentional news avoidance, on the other hand, involves actively avoiding or opting-out of consuming news content. The literature points to three main drivers of intentional news avoidance: political interests and demographics, technological and contextual factors, and negative affect and emotion.

The role of political interest in news consumption requires little explanation, and demographics have been used largely as proxies for political interest. Work discussing technological factors mostly focuses on the evolving high choice media environment, which increasingly allows people to opt out of viewing news in favor of some content (e.g., Prior, 2005, 2007; Karlsen et al., 2020). This is one aspect of "context," but other contextually-focused research considers the nature of the political landscape and/or media system (e.g., Toff and Kalogeropoulos, 2020).

Much recent work on news avoidance has focused on the affective and emotional drivers of the behavior. The main implication of this literature is that the negative affect and emotions attributed to news by consumers is what leads them to consciously avoid it. It is the author's understanding that up to this point, most of the work that evaluates this mechanism has done so with interviews and surveys. Schäfer et al. (2022) suggest that self-reported emotional distress caused by news content is a driver of news avoidance, for instance. Villi et al. (2022) find that people say they opt out of news consumption because they feel overwhelmed by and overloaded with information and because they have a negative perception of news content. Other survey- and interview-based work has suggested that news overload (Goyanes et al., 2021), negative mood effects (Newman et al., 2017), and anxiety induced by news (Toff and Nielsen, 2022) lead people to intentionally avoid the news.

The current work seeks to look at media selection broadly since the affective and emotional drivers of avoidance will be relevant to many forms of media selection. That is, negative activation may not be deterring only when consuming news content, but when consuming all kinds of content. Additionally, to evaluate news avoidance in an externally valid experiment, subjects must have the choice to consume other kinds of content instead of news, as they do in the real world.

The psychophysiology of media consumption

This study uses psychophysiological methods to explore the role of emotion in media selection. Using psychophysiological methods has the advantage of capturing affective responses in real time, second-by-second, usually during video news or advertising content. These methods have real advantages where identifying the causal effect of negative affect is concerned since physiological methods capture respondents' reactions in the moment as content becomes more (or less) arousing. Self-reports, in contrast, vary in accuracy based on respondents' emotional self-awareness (e.g., Robinson and Clore, 2002; Salgado and Kingo, 2019); they also do not capture arousal directly, but rather respondents' perceptions of their affective or emotional state after some time of reflection. That being said, self-reports are still widely used, and can be helpful, accessible, and useful data, especially when used in tandem with other methods.

The two measures this paper focuses on are skin conductance levels (SCL) and heart rate (HR). Skin conductance is controlled by the sympathetic nervous system (SNS) or the "fight or flight" response system. Much of the literature associates SCL with activation, such that increased SCL reflects increased activation, and decreased SCL reflects decreased activation (Bradley et al., 1992; Mutz, 2007) and/or stronger affective responses (for a review, see Kreibig, 2010). HR is slightly more complex as it is controlled by both the SNS and parasympathetic nervous system (PNS), or the "rest and digest" branch of our nervous systems. It is regarded in the literature as signaling both activation and attention (Lang et al., 1996; 2000; Bakker et al., 2021). Importantly for the analyses that follow, while decreases in HR can signal attentiveness, increases in HR are typically interpreted as increased activation.

Note that this study requires that we rethink the likely consequences of physiological activation. The existing literature typically suggests—implicitly if not explicitly—that the activation caused by media content is associated with increased attentiveness (e.g., Kahneman, 1973; Lang, 1990; Reeves et al., 1999; Ravaja, 2004; Mutz, 2007). Indeed, some work explicitly uses physiological activation as a signal of attentiveness (Lang 1990; Lang et al., 1996, 2000; Reeves et al., 1999; Mutz, 2007; Soroka, 2014; Dunaway et al., 2018; Dunaway and Soroka, 2021; Dunaway and Searles, 2022).

The duration of this heightened attentiveness may or may not endure for the duration of a news story, however. Moreover, the claim that physiological activation in response to negative content is associated with increased attentiveness runs contrary to some of the arguments made in the literature on news consumption. Work focused on sex-based differences in news consumption provides a useful illustration of this fact. On the one hand, Soroka et al. (2016) find that women are more activated than men by negative news content. That activation would typically be associated with, in that literature, more focused news consumption. But in interviews conducted by Villi et al. (2022), women (more than men) report turning off the news when they are too negatively aroused. Toff and Palmer (2019) similarly find that women report avoiding news to maintain a "positive environment" (p. 1572). And, as previously discussed, much of the literature on news avoidance points to negative emotional activation as a driver of news avoidance behavior. Other literatures in psychology, such as that on mood management and optimal arousal, also note that when people are confronted with more or less activation than they desire in media selection, they may engage with new or different content (Svebak and Stoyva, 1980; Carrol et al., 1982; Zillmann, 1988; Anderson et al., 1996; Schmidt et al., 2013).

Thus, we see a juxtaposition between the findings in the news avoidance and psychophysiological literatures. News avoidance finds that activation is driving avoidant behaviors, while work using psychophysiology finds that activation is driving attentive behaviors. Grounded in the theory laid out in Carbone et al. (2024), the author suspects that both of these literatures' findings may hold true in different situations for different people.

Hypotheses

To review: this experiment is designed to reexamine the notion, common in the existing physiological literature, that negative activation leads to increased attentiveness—in large part because the literature

on news avoidance suggests an alternative possibility, namely, that people may turn away from content that arouses them too much. The study design and hypotheses are preregistered at OSF.io.¹

The author's first hypothesis is thus (H1) making a new selection will be preceded by either (H1a) an increase *or* (H1b) a decrease in SCL. An increase in physiological activation preceding a new selection will lend support to the argument common in the news avoidance literature. A decrease will lend support to the argument more common in the existing literature on physiology and news consumption. It is also possible that neither of these dynamics is dominant, perhaps because both occur for different people at different times, in which case (H2) there is no systematic relationship between SCL and making a new selection.

Similarly, for HR, the author's first hypothesis is that (H3) making a new selection will be preceded by (H3a) an increase *or* (H3b) a decrease in HR. As for SCL, an increase in HR supports the argument in the news avoidance literature, and a decrease in HR supports the argument in the literatures on physiology and news consumption. It is also possible neither of these dynamics is dominant, in which case (H4) there is no systematic relationship between HR and making a new selection.

Methods

Over the course of several weeks in Fall 2024 in [Los Angeles, California, USA], subjects were recruited via a combination of in-person solicitation throughout the city, flyers on campus at a large public institution, and snowball sampling. Previous studies (Bradley et al., 2007; Reeves et al., 1999; Soroka et al., 2019a, 2019b; Dunaway and Soroka, 2021; Mustafaj et al., 2022) have used as few as 40–60 participants for psychophysiological studies. In total, this experiment had 71 subjects—24 pretesters and 47 experiment subjects. Four subjects were dropped from the pretest analysis due to sensor issues, leaving the total number of pretest subjects at 20. One subject was dropped from the experimental analyses for reporting consumption of alcohol before the experiment in the survey, leaving us with 46 subjects (median age = 25, sd = 10.38, 63% female, 19.5% White, 28% Asian, 9% Black, 24% Hispanic, 19.5% other).

Once subjects agreed to participate, they received \$20 and were asked for 30–45 min of their time to come to a quiet room to complete a survey and then watch a series of media clips. They first completed a short survey that asked basic demographic questions as well as questions on participants' feelings about the news, their news viewing habits, their trust in media, and conflict aversion questions. After completing the survey, subjects began by first watching 40 seconds of a black screen to capture baseline physiological data. Then, each participant started on the same video—a clip from Barefoot Contessa, with Ina Garten making a croque monsieur. When the video was over or they decided they no longer wanted to watch, they clicked a button that said "Make next selection" and selected between a pair of clips from an assortment of 35 pre-tested video clips that were both positive and negative and cover recent news stories as well as general entertainment clips.

These clips were assessed for valence by the researcher and then pretested in the Summer of 2024 using a snowball and student sample² of the 20 pretest participants in [Los Angeles, California, USA] to verify their valence. Respondents watched a series of randomly selected videos all the way through and were then asked, "How would you rate this video?" and shown a thumbnail of the video. They responded from "very negative" to "very positive" on a seven-point Likert scale.

Table 1 shows the video titles, the mean valence of each video according to pretest participants (where -3 was "very negative" and 3 was "very positive" on a seven-point Likert scale), and the author's categorization of each video (news/entertainment, positive/negative).

Table 1 indicates that each video categorized as negative was rated below 0 by pretesters, and each video categorized as positive was rated above 0 by pretesters.³ A two-sample t-test indicates that the

¹https://osf.io/d5egx/?view_only=681a4aad40e84256ab440637551926f5.

²The researcher used word of mouth amongst friends and colleagues to gather the snowball sample, and flyers on campus at a large, public university to gather the student sample.

³Table A1 in the Appendix shows video title, mean valence, and categorization, as well as a description of each video.

Table 1. Experiment stimuli

Video title	Mean valence	Category
Derek's Death—Grey's Anatomy	-1.25	Entertainment, negative
You Don't Need To Apologise': Connell's Therapy Session Normal People	-1.11	Entertainment, negative
Damar Hamlin remained down after nine minutes of CPR	-2	Entertainment, negative
Inglourious Basterds—The Bear Jew (2009)	-2.25	Entertainment, negative
Lost Opening Scene	-1.2	Entertainment, negative
The Horse Head—The Godfather	-0.29	Entertainment, negative
august: the longpond studio sessions	1.5	Entertainment, positive
Ina Garten's Croque Monsieur Barefoot Contessa Food Network	1	Entertainment, positive
Treblemakers Finals (Pitch Perfect)	2.17	Entertainment, positive
'Christmas (Baby Please Come Home)' Carpool Karaoke	1.83	Entertainment, positive
Abbott Elementary—Tariq F.A.D.E Performance	1.78	Entertainment, positive
New Girl 5x22 Ending Scene (Cece and Schmidt's wedding)	2.43	Entertainment, positive
Ted Lasso—Ted's "Believe" Speech	1.78	Entertainment, positive
The Office Wedding Dance—The Office	2.4	Entertainment, positive
Philando Castille killed by police	-2.67	News, negative
20 children killed in school shooting	-3	News, negative
Jan. 6 Committee Shows New Video of Capitol Riot	-2.67	News, negative
Supreme Court overturns Roe v. Wade	-1.64	News, negative
World reacts to U.S. overturning Roe v. Wade	-0.43	News, negative
Roe vs Wade overturned as US allows states to ban abortion ITV News	-1.18	News, negative
Protests and celebrations as US overturns Roe v Wade	-2	News, negative
Roe v Wade ruling: How will it impact sexual assault survivors?	-1	News, negative
Minneapolis Officers Fired After Death of Man Who Pled For Air NBC Nightly News	-2.21	News, negative
Mass protests and arrests across US over George Floyd death—BBC News	-2.6	News, negative
Supreme Court overturns Roe v. Wade abortion case LiveNOW from FOX	-1.57	News, negative
Military couple's emotional reunion after months apart caught on camera	2	News, positive
94-Year-Old Keith Davison Puts in Pool For Neighborhood Kids NBC Nightly News	2.33	News, positive
So no student eats alone	2.5	News, positive
Dallas nonprofit inspires future female architects GMA	2.33	News, positive
How a simple act of kindness transformed a boy's birthday	2.4	News, positive
NASA Shares Some Good News from the International Space Station	1.33	News, positive
Moments of Kindness and Solidarity Shine During George Floyd Protests TODAY	1.75	News, positive
Good news on climate change, for a change	0.8	News, positive
7-year-old finds inner strength riding horses at therapy farm	2	News, positive
Local soldier surprises his college graduate mother at nursing ceremony	1.57	News, positive

mean valence of negative videos is significantly different (more negative) than the mean valence of positive (p < .001). The same is true when the mean valence of negative versus positive entertainment stories is considered independently from news stories (p < .001 in both instances). T-tests also suggest that the mean valence of positive entertainment stories (1.86) is not different than the mean valence of positive news stories (1.90; p = -.87) and that the mean valence of negative entertainment stories (-1.91, p = -.17). The experiment thus appears to make comparisons between clearly negative and positive stimuli, with roughly equal variation in the valence of stimuli across entertainment and news stories.

The clips were shown to subjects on a custom-designed local webpage that resembled a YouTube viewing page. The screen showed the video in format similar to "theatre mode" on YouTube. 10 seconds into the video, in the bottom right corner of the screen, a button appeared that read "make next selection." This button brought participants to a new screen with two randomly selected "recommended" videos from the set of pre-tested clips which subjects chose between to watch next. This screen showed the title of each video and a thumbnail, both of which, along with the descriptions on the video viewing pages, were pulled directly from the YouTube link from which the videos were downloaded. Subjects were able to leave the video to view their other options and select a new clip to watch at any point after the first 10 seconds of the current video plays, or they could watch the video all the way through and then choose a new one by clicking "make next selection." This differs from previous studies, in which participants are forced to watch a video all the way through to the end, by allowing subjects to make real-time selections. Subjects made these decisions and navigated the video website for anywhere between 10 and 20 minutes, depending on time availability. If they opted not to make a new selection on their final video and the viewing went over 20 minutes, the author allowed the video to finish and then ended this portion of the experiment ended.

While they watched videos, subjects had sensors on the first three fingers of their non-dominant hand to capture skin conductance levels (SCL) and heart rate (HR), following the methods of Soroka et al. (2019a). These measures were gathered with Thought Technology Procomp5 Infiniti encoder. SCL is the most direct measure of arousal as noted in the literature on physiology and news avoidance outlined above. HR may nevertheless be a helpful indicator of some combination of arousal and attentiveness.

Following video selection and viewing, the author conducted a process tracing interview in which respondents were asked questions about each video they selected. Specifically, they were asked why they selected it and why they chose to watch the entire video or stop watching part way through depending on the choice they made.

Following the methods outlined in the preregistration, the following analyses evaluate the physiology (SCL and HR) of individuals in the moments leading up to making a new selection. Both skin conductance and heart rate are "normalized" based on individuals' baseline values, measured during a 40 second black screen at the beginning of the video portion of the study, and at the beginning of each individual video. The critical measure is then as follows:

$$A_{i,c} = p_{ev,i,c} - p_{bv,i,c},$$

where *A* captures physiology at the moment at which an individual makes a new selection (avoidance), and subscripts *i* and *c* represent the individual and "channel," or the selected video, respectively. *p* represents the relevant physiological measure (either SCL or HR), and subscripts *ev* and *bv* represent a time period at the end of viewing and the beginning of viewing, respectively.

The beginning of viewing, bv, and end of viewing, ev, are the windows of time at the beginning and end of an individual's exposure to a stimulus. bv is some window $a \rightarrow b$, i.e., some duration of time from the beginning of a video to number of seconds b. ev is a window $z \rightarrow y$, i.e., some duration of time from the moment one changes the channel, z, counting backwards to some number of seconds, y. Given that the author holds no a priori beliefs about the ideal values of y or b, she relies on 10 second windows below but runs robustness tests using both shorter and longer durations.⁴

What the distribution of *A* is, and whether it is systematically greater than 0 or less than 0, will be the test of the hypotheses; that is, the indication of whether people turn away from content because it is too arousing (A>0, H1a and H3a), not arousing enough (A<0, H1b and H3b), or if there is no systematic relationship (A=0, H2 and H4).

For the sake of clarity, Figures 1 and 2 illustrate two different trends in SCL, alongside p_{bv} and p_{ev} . Both figures are based on actual cases from the experiment. Figure 1 shows SCL for one respondent watching the opening scene of the popular TV series, Lost. This clip shows people stranded on an island

⁴I ran the same analysis using 5, 10, 15, and 20 s bv and ev windows, and each produced a mean below 0.



Figure 1. Activation and avoidance.



Figure 2. Deactivation and avoidance.

immediately following a plane crash. There are explosions, screaming pregnant women, and gore throughout. The video is 3 minutes 48 seconds long. This participant watched for about a minute before turning it off. The figure shows some important events in the video. The marked red line shows when they began to move their mouse to move on to a new video. This activation related to moving the mouse

is dropped from the analysis. The figure shows both p_{bv} and p_{ev} in the gray-shaded areas, in this case capturing the 10 seconds at the beginning of viewing, from seconds 2–12 to account for mouse movement, and the 10 seconds at the end of viewing, from the 10 seconds before the mouse moved until the red line. In this instance, in line with H1a, activation immediately preceding avoidance is high (i.e., *A* is positive).

Figure 2 shows SCL for one respondent watching one of James Corden's Carpool Karaoke series. It includes a group of stars and Corden himself singing a Christmas carol. Here, we see that throughout viewing, the participant experiences a steady decline in activation. The clip is 3 minutes 25 seconds in total, although we see this participant watches for only about a minute. The red dotted line denotes the moment in which the participant grabs the computer mouse and moves to the make next selection button. The figure shows both p_{bv} and p_{ev} again depicted in the gray-shaded area and capturing the 10 seconds at the beginning of viewing and the 10 seconds at the end of viewing, adjusted for mouse movement time. In this instance, in line with H1b, activation immediately preceding avoidance is low (i.e., A is negative).

Which of these dynamics is most prevalent in the data? This is the primary focus of the analyses that follow.

Results

In all, there were 286 choices made by the 46 participants. 153 of these included a decision to turn away from a video more than five seconds before it ended. People watched videos for 15 seconds or longer in 137 instances. About 53% of the time, then, people watched the video they selected all the way through. The analyses that follow are based on data only for those who watched videos for 15 seconds or more and navigated away from the video before it ended. Additionally, as in Figures 1 and 2, estimations of *A* omit the first two and final two seconds of each video from the analyses to account for movement of the mouse.

The first analyses consider whether the choice to make a new selection is preceded by an increase (H1a) or decrease (H1b) in skin conductance, and an increase (H3a) or decrease (H3b) in heart rate. The distribution of A for both SCL (top panel) and HR (bottom panel) when bv is the first 10 seconds of viewing and ev is the 10 seconds leading up to clicking "make next selection" are shown in Figure 3. The red dashed line in Figure 3 highlights where 0 falls on the *x*-axis.

Looking at the top panel of Figure 3, we see that *A* is roughly normally distributed. The mean of *A* is slightly negative, at -0.19, and the maximum is 0.92, while the minimum value is -1.66. A one-sample t-test suggests that the mean of *A* is significantly lower than 0 (p < .001). We see, then, that on average, the choice to watch a different video is preceded by decreased activation. This finding supports H1b broadly, yet there is clearly still variation in *A* leading up to making a new selection. There are, for instance, 41 cases in which A is greater than 0 in the top panel of Figure 3, and 96 cases when *A* was less than zero. This tells us that the majority of the time people turned away with lower activation, but about 30% of the time subjects experienced increased activation leading up to the choice to make a new selection. It also tells us that the degree to which people were less activated was less than the degree to which people were more activated.

The bottom panel of Figure 3 looks at the distribution of *A* for heart rate. The distribution of this panel shows nearly the same number of cases to the right and left of zero. The mean is still slightly negative at – 1.95, and a one-sample t-test suggests, again, that the mean is significantly lower than zero (p < 0.01). *A* was greater than zero 57 times and less than zero 80 times. Again, there are signs that activation was generally lower when respondents turned the video off compared to when the video started. This finding once again supports H1b even as it also shows considerable variation in *A* for heart rate before making a new selection.

Figure 3 depicts the distribution of *A* for skin conductance and heart rate amongst all participants who watched any video partially. Given that much of this project is rooted in the literature on news avoidance, it is important to evaluate *A* for both news and entertainment clips separately. Figure 4 shows the distribution of *A* for news clips in the top panels and for entertainment clips in the bottom panels.



Figure 3. Distribution of A, SCL, and HR.

The left panels show the distribution of *A* for skin conductance, and the right shows the distribution of *A* for heart rate.

Results in Figure 4 are not fundamentally different from results in Figure 3. Looking at skin conductance for news clips, in the top left panel of Figure 4, we see a roughly normal distribution. The mean is slightly less negative than in Figure 3, at -0.14, with a one-sample t-test suggesting it is



Figure 4. Distribution of A, SCL, and HR across news and entertainment clips.

significantly less than 0 (p < 0.001). It is nevertheless still the case that roughly 30% of participants experience increased activation before making a new selection, with an *A* above zero 23 times and below it 50.

Comparing these findings to the skin conductance for entertainment clips, in the bottom left panel, we see that the distribution is skewed a bit left, and the mean is a bit lower. The entertainment skin conductance distribution has a mean A of -0.25, which a one-sample t-test suggests is significantly lower than zero (p < 0.001). There are hints in these results, then, that the decision to turn off entertainment may be more about deactivation than news. This is also evident in the different minimum values of A: The minimum of the news distribution is -0.87, while the minimum of the entertainment distribution is -1.66. Deactivation is associated with making a new selection for both news and entertainment, but slightly more for entertainment⁵.

Turning to heart rate, the top right panel of Figure 4 shows a slightly less normal, slightly more leftskewed distribution for news clips. The mean of *A* is once again negative, at -2.05, with a one-sample t-test demonstrating the mean is significantly less than zero (p = 0.03). In looking at the bottom right panel of Figure 4, we see a similar story for *A* during entertainment clips. The mean of *A* is slightly less negative, at -1.83, with a one-sample t-test showing a similar outcome of a mean significantly less than zero (p = 0.04). For both news and entertainment, the number of instances of *A* falling below zero and above zero is much closer than for skin conductance. For example, for news, *A* is greater than zero in 31 instances and below it in 42.

⁵While the analyses in this article focus on some simple two-way categorizations of the data, when looking at A for just *negative news* stories, the mean value of A is closer to zero (-0.12) than any of all of the means for SCL reported in the text. Given that news avoidance literature claims increasing activation leads to avoidance, it may be especially telling that A is least negative in this instance.



Figure 5. Distribution of A, SCL, and HR across negative and positive clips.

For entertainment, *A* is greater than zero in 26 cases and below it in 38. This result may well be driven by the complex nature of HR, reflecting a combination of activation and attentiveness, the former of which should increase HR and the latter of which should reduce it. Part of what we observe in these HR results may be attentiveness, then. Either way, there is no clear evidence here that heightened activation leads respondents to turn away from content. On balance, this is not the case, but again, sometimes it is.

Given the focus on negative activation in prior work, Figure 5 reconsiders the results by separating distributions of A for negative stimuli and positive stimuli. The distribution of A for negative content is in the top panels and positive content is in the bottom panels. It shows the distribution of A for skin conductance in the left panels and heart rate in the right.

First, looking at the top left panel at the distribution of *A* for skin conductance across partially viewed negative stimuli, we see another somewhat normal distribution. The mean of *A* is -0.15. A one-sample t-test implies that this mean is significantly below zero (p = 0.002).

Again, roughly 30% of respondents make a new selection with an increase in activation (21 cases) and the rest do so with a decrease in activation (43 cases). For positive stimuli, in the bottom left panel of Figure 5, there are a few more cases of deactivation and a more negative mean. The mean of *A* for positive stimuli is -0.23, with a one-sample t-test suggesting the mean is significantly below zero (p < .001). A more negative mean for positive stimuli suggests that deactivation is more prevalent for positive than for negative stimuli. Even so, the practice of making a new selection happened for both positive and negative stimuli at fairly similar rates, with *A* reaching greater than zero in 20 cases and less than zero in 53 cases.

Turning to the right side of Figure 5 for heart rate, the distribution of *A* for negative stimuli is skewed a bit to the left of zero. The mean of *A* is -2.72. A one-sample t-test suggests that the mean is significantly below zero (p = 0.004). For positive stimuli, we see a bit of a more normal distribution, with a mean of -2.72.

1.27. A one-sample t-test on this mean indicates that it is not significantly lower than zero (p = .16). Essentially, these findings tell us that participant's heart rate decreased by about one and a half beats more before making a new selection during a negative video than a positive one. Again, this may reflect some degree of attentiveness, which would be in line with the psychophysiological literature positing that people pay more attention to negative stimuli. That this appears to be associated with turning *away* from content may be of some significance.

Discussion and limitations

Findings from literature that utilizes psychophysiological methods has told us that activation is positively correlated with attention. This study shows that on average, this tends to be the case. The means of activation, *A*, throughout this study are negative. This is the case in analyses combining entertainment and news, and positive and negative stories, and it remains true when entertainment and news, and positive and negative stories are analyzed independently. The author accordingly rejects the null hypothesis for H1b and H3b, which posited that making a new selection would be preceded by a decrease in activation. The author cannot do the same for H1a and H3a, or H2 and H4. These hypotheses expected an increase in activation before the choice to watch new content or no systematic relationship between activation and making a new selection, respectively.

There is however a good deal of variation around the mean for *A* in all the preceding analyses. In each case, a significant minority of cases reflected increased activation before a new video selection. Even as H1b and H3b reflect the average physiology preceding a new video selection, there is more to investigate. In line with the storyline suggested in the news avoidance literature, nearly 30% of the cases analyzed above show a new video being selected in the midst of increased physiological activation.⁶

That there is more to this story may be partly reflected in the complex results for heart rate throughout this article. While the mean for heart rate was negative in every analysis, heart rate is simultaneously correlated positively with activation and negatively with attentiveness. The implications of a negative mean for heart rate captured in tandem with a negative mean for skin conductance are unclear. Further evaluation of heart rate as an indication of attentiveness is one avenue for future work.

Another area for future studies stems from the fact that this work captures the physiology of leaving and making the decision to leave, not that of not watching at all. Indeed, this work does not delve into the selection process through which participants chose which videos to watch. Future work may want to dive deeper into the selection process of which clips are selected, beyond what is done here in looking at the selection of when to leave a clip.

This study also only uses one avenue of analysis—the *A* measure described above. There are certainly other ways in which to analyze these physiological data. It may be the case that focusing on the existence of an upward (or downward) slope in activation preceding the decision to make another selection would be informative. In this instance, the baseline would not be the beginning of the story, but the moments preceding p_{ev} . The author's analyses have focused on one relatively straightforward (and pre-registered) measure. Others may be a useful focus for future work.

There are, of course, other limits to this study. Perhaps the most glaring is the sample size and population. While small samples are common amongst work utilizing psychophysiological methods, it is nonetheless something that makes results difficult to generalize. Further, this sample is a hodge-podge of subjects recruited via snowball sampling, on the street recruitment, and student recruitment at a large public university—it is not a representative sample. The author sets out to recruit a representative sample via recruitment on the street. However, this proved to be an arduous task and people were not interested in participating as this study was time intensive.

⁶It is notable that this is the case not just for negative stories—results for positive stories, too, suggest that avoidance may be preceded by increased physiological activation—albeit less so than for negative stories.

Thus, The author relied a good deal on a combination of student and snowball sampling to ensure the number of participants met the norms of similar studies. Snowball and student sampling have their own limitations, as well, related to representativeness. This study's population is notably young and mostly women. Some of the participants also alerted the researcher that they were not American citizens, which may also influence responses.

It is nevertheless the case that, as one of the first studies to use physiological measures of activation in the context of an open-choice video selection environment, this research offers novel information on the nature of news avoidance and media selection more generally. Results suggest that decreased activation tends to precede selecting new content on balance, but the relationship between activation and attention is not one-size-fits-all. A sizable number of cases showed increased activation preceded making a new selection.

As our media environment continually evolves, understanding the choices that people make and the way these habitual choices impact democracy is crucial. The choice to turn away from certain content, especially news, can have important effects on our world. It is thus of great importance that we continue to try and understand what it is that drives people to and from content and how we can apply this knowledge to content production and our own everyday choices.

Data availability statement. This article earned the Open Data, Open Materials, and Preregistration badges for open science practices. The data and replication code for this study are available at https://dataverse.harvard.edu/dataset.xhtml?persisten tId=doi%3A10.7910%2FDVN%2FPF7A5T.

References

- Aharoni, T., Kligler-Vilenchik, N., & Tenenboim-Weinblatt, K. (2021). "Be less of a slave to the news": A texto-material perspective on news avoidance among young adults. *Journalism Studies*, 22(1), 42–59.
- Anderson, D. R., Collins, P. A., Schmitt, K. L., & Jacobvitz, R. S. (1996). Stressful life events and television viewing. Communication Research, 23(3), 243–260.
- Arceneaux, K., & Johnson, M. (2013a). Changing minds or changing channels?: Partisan news in an age of choice. University of Chicago Press.
- Arceneaux, K., Johnson, M., & Cryderman, J. (2013b). Communication, persuasion, and the conditioning value of selective exposure: Like minds may unite and divide but they mostly tune out. *Political Communication*, 30(2), 213–231.
- Arceneaux, K., Johnson, M., & Murphy, C. (2012). Polarized political communication, oppositional media hostility, and selective exposure. *The Journal of Politics*, 74(1), 174–186.
- Bakker, B. N., Schumacher, G., & Roodiujn, M. (2021). Hot politics? Affective responses to political rhetoric. American Political Science Review, 115(1), 150–164.
- Beckers, K., Van Aelst, P., Verhoest, P., & d'Haenens, L. (2021). What do people learn from following the news? A diary study on the influence of media use on knowledge of current news stories. *European Journal of Communication*, **36**(3), 254–269
- Bradley, M. M., Greenwald, M. K., Petry, M. C., & Lang, P. J. (1992). Remembering pictures: pleasure and arousal in memory. Journal of experimental psychology: Learning, Memory, and Cognition, 18(2), 379.
- Bradley, S. D., Angelini, J. R., & Lee, S. (2007). Psychophysiological and memory effects of negative political ADS: Aversive, arousing, and well remembered. *Journal of Advertising*, 36(4), 115–127.
- Carbone, M., Soroka, S., & Dunaway, J. (2024). The psychophysiology of news avoidance: Does negative affect drive both attention and in attention to news?. *Journalism Studies*, 25, 1–16.
- Carrol, E. N., Zuckerman, M., & Vogel, W. H. (1982). A test of the optimal level of arousal theory of sensation seeking. *Journal of Personality and Social Psychology*, **42**(3), 572.
- Chaffee, S. H., Ward, L. S., & Tipton, L. P. (1970). Mass communication and political socialization. *Journalism Quarterly*, 47(4), 647–666.
- de Bruin, K., Vliegenthart, R., Kruikemeier, S., & de Haan, Y. (2024). Who are they? Different types of news avoiders based on motives, values and personality traits. *Journalism Studies*, 25, 1–19.
- De Vreese, C. H., & Boomgaarden, H. (2006). News, political knowledge and participation: The differential effects of news media exposure on political knowledge and participation. *Acta Politica*, **41**, 317–341.
- Dunaway, J., & Searles, K. (2022). News and democratic citizens in the mobile era. Oxford University Press.
- Dunaway, J., & Soroka, S. (2021). Smartphone-size screens constrain cognitive access to video news stories. Information, Communication & Society, 24(1), 69–84.

- Dunaway, J., Searles, K., Sui, M., & Paul, N. (2018). News attention in a mobile era. Journal of Computer-Mediated Communication, 23(2), 107–124.
- Edgerly, S. (2024). Avoiding news is hard work, or is it? A closer look at the work of news avoidance among frequent and infrequent consumers of news. *Journalism Studies*, **25**(12), 1385–1403.
- Fraile, M., & Iyengar, S. (2014). Not all news sources are equally informative: A cross-national analysis of political knowledge in Europe. *The International Journal of Press/Politics*, 19(3), 275–294.
- Goyanes, M., Ardèvol-Abreu, A., & Gil de Zúñiga, H. (2021). Antecedents of news avoidance: Competing effects of political interest, news overload, trust in news media, and "news finds me" perception. *Digital Journalism*, **11**, 1–18.
- Kahneman, D. (1973). Attention and effort (Vol. 1063, pp. 218-226). Englewood Cliffs, NJ: Prentice-Hall.
- Karlsen, R., Beyer, A., & Steen-Johnsen, K. (2020). Do high-choice media environments facilitate news avoidance? A longitudinal study 1997–2016. Journal of Broadcasting & Electronic Media, 64(5), 794–814.
- Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. Biological Psychology, 84(3), 394-421.
- Lang, A. (1990). Involuntary attention and physiological arousal evoked by structural features and emotional content in TV commercials. *Communication Research*, 17(3), 275–299.
- Lang, A., Newhagen, J., & Reeves, B. (1996). Negative video as structure: Emotion, attention, capacity, and memory. *Journal of Broadcasting & Electronic Media*, 40(4), 460–477.
- Lang, A., Zhou, S., Schwartz, N., Bolls, P. D., & Potter, R. F. (2000). The effects of edits on arousal, attention, and memory for television messages: When an edit is an edit can an edit be too much?. *Journal of Broadcasting & Electronic Media*, 44(1), 94–109.
- Mutz, D. C. (2007). Effects of "in-your-face" television discourse on perceptions of a legitimate opposition. American Political Science Review, 101(4), 621–635.
- Mustafaj, M., Madrigal, G., Roden, J., & Ploger, G. W. (2022). Physiological threat sensitivity predicts anti-immigrant attitudes. Politics and the Life Sciences, 41(1), 15–27.
- Newman, N., Fletcher, R., Kalogeropoulos, A., Levy, D. A. L., and Nielsen, R. K. (2017). Reuters Institute Digital News Report 2017.
- Prior, M. (2005). News vs. entertainment: How increasing media choice widens gaps in political knowledge and turnout. American Journal of Political Science, 49(3), 577–592.
- Prior, M. (2007). Post-broadcast democracy: How media choice increases inequality in political involvement and polarizes elections. Cambridge University Press.
- Ravaja, N. (2004). Contributions of psychophysiology to media research: Review and recommendations. *Media Psychology*, 6(2), 193–235.
- Reeves, B., Lang, A., Kim, E. Y., & Tatar, D. (1999). The effects of screen size and message content on attention and arousal. *Media Psychology*, 1(1), 49–67.
- Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, 128(6), 934–960.
- Salgado, S., & Kingo, O. S. (2019). How is physiological arousal related to self-reported measures of emotional intensity and valence of events and their autobiographical memories? *Consciousness and Cognition*, 75, 102811.
- Schäfer, S., Aaldering, L., & Lecheler, S. (2022). "Give me a break!" Prevalence and predictors of intentional news avoidance during the COVID-19 pandemic. *Mass Communication and Society*, 26, 1–24.
- Schäfer, S., Betakova, D., & Lecheler, S. (2024). Zooming in on topics: An investigation of the prevalence and motives for selective news avoidance. *Journalism Studies*, 25, 1–18.
- Schmidt, B., Mussel, P., & Hewig, J. (2013). I'm too calm—Let's take a risk! On the impact of state and trait arousal on risk taking. *Psychophysiology*, 50(5), 498–503.
- Soroka, S. N. (2014). Negativity in democratic politics: Causes and consequences. Cambridge University Press.
- Soroka, S., Fournier, P., & Nir, L. (2019a). Cross-national evidence of a negativity bias in psychophysiological reactions to news. *Proceedings of the National Academy of Sciences*, **116**(38), 18888–18892.
- Soroka, S., Fournier, P., Nir, L., & Hibbing, J. (2019b). Psychophysiology in the study of political communication: An expository study of individual-level variation in negativity biases. *Political Communication*, **36**(2), 288–302.
- Soroka, S., Gidengil, E., Fournier, P., & Nir, L. (2016). Do women and men respond differently to negative news?. *Politics & Gender*, **12**(2), 344–368
- Svebak, S., & Stoyva, J. High arousal can be pleasant and exciting. Biofeedback and Self-Regulation, 5, 439-444 (1980).
- Toff, B., & Palmer, R. A. (2019). Explaining the gender gap in news avoidance: "News-is-for-men" perceptions and the burdens of caretaking. *Journalism Studies*, 20(11), 1563–1579.
- Toff, B., & Kalogeropoulos, A. (2020). All the news that's fit to ignore: How the information environment does and does not shape news avoidance. *Public Opinion Quarterly*, 84(S1), 366–390.
- Toff, B., & Nielsen, R. K. (2022). How news feels: Anticipated anxiety as a factor in news avoidance and a barrier to political engagement. *Political Communication*, **39**(6), 697–714.

Van Aelst, P., Strömbäck, J., Aalberg, T., Esser, F., De Vreese, C., Matthes, J., ... & Stanyer, J. (2017). Political communication in a high-choice media environment: a challenge for democracy? *Annals of the International Communication Association*, 41(1), 3–27.

Van den Bulck, J. (2006). Television news avoidance: Exploratory results from a one-year follow-up study. Journal of Broadcasting & Electronic Media, 50(2), 231–252.

Villi, M., Aharoni, T., Tenenboim-Weinblatt, K., Boczkowski, P. J., Hayashi, K., Mitchelstein, E., ... & Kligler-Vilenchik, N. (2022). Taking a break from news: A five-nation study of news avoidance in the digital era. *Digital Journalism*, 10(1), 148–164.

Wlezien, C., & Soroka, S. (2021). Trends in public support for welfare spending: how the economy matters. British Journal of Political Science, 51(1), 163–180.

Zillmann, D. (1988). Mood management through communication choices. American Behavioral Scientist, 31(3), 327–340.

Appendix

Table A1 Detailed stimuli information

Video title	Description	Mean valence	Category
Derek's Death—Grey's Anatomy	Meredith Grey says her final goodbyes to Derek Shepherd.	-1.25	Entertainment, negative
You Don't Need to Apologise': Connell's Therapy Session Normal People	Connell decides to go to therapy and speak about his mental health issues.	-1.11	Entertainment, negative
Damar Hamlin remained down after nine minutes of CPR	Damar Hamlin collapses on the field and remains down for 9 min before being taken away by an ambulance.	-2	Entertainment, negative
Inglourious Basterds—The Bear Jew (2009)	When Sgt. Werner Rachtman (Richard Sammel) refuses to disclose information to the Basterds, he is introduced to Sgt. Donny Donowitz (Eli Roth) a.k.a. The Bear Jew.	-2.25	Entertainment, negative
Lost Opening Scene	The beginning of the hit series, "Lost."	-1.2	Entertainment, negative
The Horse Head—The Godfather	Mr. Woltz (John Marley) wakes up to find his prize horse's severed head in bed next to him.	-0.29	Entertainment, negative
august: the longpond studio sessions	august live at the longpond studio sessions with Jack Antonoff and Aaron Dressner.	1.5	Entertainment, positive
Ina Garten's Croque Monsieur Barefoot Contessa Food Network	Ina makes a rich and creamy cheese sauce for her classic French sandwich made up of ham and Gruyere!	1	Entertainment, positive
Treblemakers Finals (Pitch Perfect)	The Treblemakers performance at the national collegiate acapella competition.	2.17	Entertainment, positive
'Christmas (Baby Please Come Home)' Carpool Karaoke	James Corden and Michael Buble kick off a holiday mashup of "Christmas (Baby Please Come Home)" with the musicians who joined James for Carpool Karaoke in 2018.	1.83	Entertainment, positive
Abbott Elementary—Tariq F.A.D.E Performance	Tariq performs at a school assembly to warn students about drugs.	1.78	Entertainment, positive
New Girl 5x22 Ending Scene (Cece and Schmidt's wedding)	Cece and Schmidt get married.	2.43	Entertainment, positive
Ted Lasso—Ted's "Believe" Speech	From S03 E05 "Signs," Ted gives the team a pep talk.	1.78	Entertainment, positive
The Office Wedding Dance—The Office	At Jim (John Krasinski) and Pam's (Jenna Fischer) wedding, the office gang surprises them with a spontaneous wedding entrance dance to "Forever" by Chris Brown.	2.4	Entertainment, positive
Philando Castille killed by police	At a traffic stop, Philando Castille is killed by police with his daughter and girlfriend in the car.	-2.67	News, negative

Table A1. Continued

Video title	Description	Mean valence	Category
20 children killed in school shooting	CNN's Ashleigh Banfield reports from the scene of the Sandy Hook elementary school shooting.	-3	News, negative
Jan. 6 Committee Shows New Video of Capitol Riot	During the first hearing of the January 6 select committee, Rep. Bennie Thompson played out a series of videos from the Capitol riot. This video contains explicit language and graphic images some may find offensive.	-2.67	News, negative
Supreme Court overturns Roe v. Wade	The Supreme Court has overturned Roe v. Wade, ruling that the Constitution does not protect the right to an abortion.	-1.64	News, negative
World reacts to U.S. overturning Roe v. Wade	People around the globe are reacting to the Supreme Court's decision to overturn Roe v. Wade. Some government leaders rebuked the decision, fearing the landmark decision could influence abortion laws in their countries as well. Ian Lee has more.	-0.43	News, negative
Roe vs Wade overturned as US allows states to ban abortion ITV News	The U.S. Supreme Court has ended constitutional protections for abortion that had been in place nearly 50 years in a decision by its conservative majority to overturn Roe vs Wade.	-1.18	News, negative
Protests and celebrations as US overturns Roe v Wade	The U.S. Supreme Court has overturned the constitutional right to choose abortion which has existed for almost 50 years, paving the way for half the country to ban or severely restrict the practice. Crowds gathered outside the court in Washington DC when the ruling emerged—with some there to celebrate while others rallied against what they see as an attack on women's freedoms. Sky's Martha Kelner reports.	-2	News, negative
Roe v Wade ruling: How will it impact sexual assault survivors?	The decision by the U.S. Supreme Court to overturn Roe v Wade after nearly 50 years ultimately leaves decisions over whether to restrict access to abortions up to individual states. Some have laws in place which immediately ban most abortions—and in 11 states if a woman is raped or a victim of incest, she will no longer be able to terminate a pregnancy resulting from the assault. Sky's Mark Stone reports.	-1	News, negative
Minneapolis Officers Fired After Death Of Man Who Pled For Air NBC Nightly News	George Floyd died Monday after he was pinned down by a police officer who put his knee on Floyd's neck. Mayor Jacob Frey called the incident "wrong on every level."	-2.21	News, negative
Mass protests and arrests across US over George Floyd death— BBC News	Protests over the death of George Floyd in Minneapolis have spread to at least 30 US cities. Reeta Chakrabarti presents BBC News at Ten reporting from Barbara Plett Usher in Minneapolis and from North America Editor Jon Sopel.	-2.6	News, negative
Supreme Court overturns Roe v. Wade abortion case LiveNOW from FOX	The U.S. Supreme Court has overturned the Roe vs. Wade landmark case that legalized abortion nationwide, which will likely be leading to many states enacting restrictive laws or full abortion bans. Protesters had gathered outside the Supreme Court in anticipation of the ruling	-1.57	News, negative

Table A1. Continued

Video title	Description	Mean valence	Category
Military couple's emotional reunion after months apart caught on camera	When 2nd Lt. Jamie Douglas returned from eight months in Iraq, she decided to surprise her husband, who is also a 2nd Lt. Their emotional reunion was caught on camera. Mark Strassmann has their story.	2	News, positive
94-Year-Old Keith Davison Puts in Pool for Neighborhood Kids NBC Nightly News	Keith Davison lost his wife Evy last year. To combat his loneliness, he built an in-ground pool in his backyard and offered it up to the neighborhood kids. KARE11's Boyd Huppert reports.	2.33	News, positive
So no student eats alone	Last March, we were introduced to Denis Estimon, a high school student in Boca Raton, Florida, who knew all too well the isolation kids face during lunch period when they find themselves eating alone. So he started a club called We Dine Together, dedicated to making sure no student is starved for company. Steve Hartman catches up with Estimon and his mission.	2.5	News, positive
Dallas nonprofit inspires future female architects GMA	Women Leading Technology is helping to build up the next generation of female architects, as women are underrepresented in the field.	2.33	News, positive
How a simple act of kindness transformed a boy's birthday	When 13-year-old Gavin Mabes and some friends went to a skate park, nobody was there except Carter Bruynell, who was celebrating his 5th birthday with his mom. That's when something unexpected happened. Steve Hartman has their story on the road.	2.4	News, positive
NASA Shares Some Good News from the International Space Station	NASA astronauts from the International Space Station joined John Krasinski this week in sharing Some Good News!	1.33	News, positive
Moments of Kindness and Solidarity Shine During George Floyd Protests TODAY	Across the nation, while much of the attention of the protests has been on violence and looting, there were moments of kindness and solidarity that brought people together. NBC's Erin McLaughlin reports for Weekend TODAY.	1.75	News, positive
Good news on climate change, for a change	The impact of changes we make now could take many years to see and that can be difficult to process. We look at whether improvement is in reach in Colorado.	0.8	News, positive
7-year-old finds inner strength riding horses at therapy farm	Horses help humans and humans help horses at this farm in Chester County, which lives up to its name as a place where "Hope Springs."	2	News, positive
Local soldier surprises his college graduate mother at nursing ceremony	Local soldier surprises his college graduate mother at nursing ceremony.	1.57	News, positive

Cite this article: Carbone, M. (2025). Affective (in)attention: Using physiology to understand media selection. *Politics and the Life Sciences*, 1–17. https://doi.org/10.1017/pls.2025.5