Article

Native Advertising in Online News: Trade-Offs Among Clicks, Brand Recognition, and Website Trustworthiness

Anocha Aribarg and Eric M. Schwartz

Abstract
Native advertising is a type of online advertising that matches the form and function of the platform on which it appears. In practice, the choice between display and in-feed native advertising presents brand advertisers and online news publishers with conflicting objectives. Advertisers face a trade-off between ad clicks and brand recognition, whereas publishers need to strike a balance between ad clicks and the platform's trustworthiness. For policy makers, concerns that native advertising confuses customers prompted the U.S. Federal Trade Commission to issue guidelines for disclosing native ads. This research aims to understand how consumers respond to native ads versus display ads and to different styles of native ad disclosures, using randomized online and field experiments combining behavioral clickstream, eye movement, and survey response data. The results show that when the position of an ad on a news page is controlled for, a native ad generates a higher click-through rate because it better resembles the surrounding editorial content. However, a display ad leads to more visual attention, brand recognition, and trustworthiness for the website than a native ad.

Native advertising matches the form and function of the platform on which it appears. Native ads have become popular, particularly online. Online advertisers spent $17 billion on native ads in 2016 and $35 billion in 2018, with a projected $44 billion being spent in 2019 (eMarketer 2019). Wojdynski (2016) classifies native ads into three categories: (1) sponsored hyperlink listings, (2) sponsored content, and (3) sponsored social media posts. For sponsored hyperlink listings, the two common forms are in-feed, in which a web publisher inserts ads into lists of article headlines on news sites (e.g., USA Today, Yahoo News) and search, in which sponsored search listings are mixed with organic results (e.g., sponsored restaurant listings on Yelp) (Interactive Advertising Bureau 2013). In this research, we focus on in-feed native advertising in the online news context.

In managerial practice, the choice between display and in-feed native advertising presents brand advertisers and online news publishers with conflicting objectives. While native ads likely generate high ad clicks for advertisers because they resemble the publisher's content, display ads, which look distinct from editorial content, likely draw more attention and garner higher brand recognition than native ads. Whereas advertisers could still benefit from mistaken clicks on native ads when consumers find relevant information on the advertisers' landing pages, the publisher's revenues from such clicks may come at a high cost. When seeing native ads alongside editorial content, consumers may feel deceived, and such negative sentiment can lower trust and readership. In summary, advertisers face a trade-off between ad clicks and brand recognition, whereas publishers need to strike a balance between ad clicks and their platform's trustworthiness.

Solving this joint optimization problem is complex, and little is known about native ads' effectiveness. Although studies sponsored by a native advertising platform provider (Sharethrough 2016) suggest that in-feed native advertising garners higher click-through rates than display advertising, no academic research has provided direct empirical support for this claim. Beyond questions about its effectiveness, native advertising has also raised legal concerns. The U.S. Federal Trade Commission (FTC) requires all advertisement disclosures to be

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"clear and prominent," and the FTC has explicitly addressed native advertising, with Bureau of Consumer Protection Director Jessica Rich (2016) stating, "you must make clear that advertising is advertising" in order to prevent consumers from confusing ads with editorial content. But how might these policy guidelines affect practice and consumers' responses to native ads?

Prior academic research has focused primarily on sponsored content, previously known as advertorials (e.g., articles co-written by an advertiser and a publisher), instead of hyperlink sponsored listings. That research examines the extent to which consumers recognize sponsored content as advertising, as well as the sponsored content's persuasiveness (e.g., Becker-Olsen 2003; Kim and Handcock 2017; Tutaj and van Reijmersdal 2012). Ad clicks and brand recognition have not been primary outcomes of interest for sponsored content research. Some research related to sponsored hyperlink listings (Edelman and Gilchrist 2012; Sahni and Nair 2018) investigates the sponsored search format. Although search and in-feed ads appear closely related, conclusions regarding one may not translate to the other. Among the few papers related to in-feed native ads, Wang, Xiong, and Yang (2019) study how ad serial position can affect clicks and conversion, and Kim, Youn, and Yoon (2019) focus on consumers' attitude toward display versus native ads.

To answer questions for marketing practice and policy and to fill the void in the research literature, our work aims to (1) assess consumer responses to in-feed native ads compared to display ads, (2) examine how attention drives consumer responses, and (3) determine how best to disclose native ads. We focus on response metrics crucial to advertisers and publishers: click-through rate, brand recognition, and publisher's trustworthiness.

Researchers cannot rely on observational data to compare the effectiveness of native versus display ads or the effectiveness of different native ad disclosure formats; however, advertisers typically do not advertise in a randomized manner across multiple formats in the same campaign using comparable ad stimuli. Therefore, to compare native and display ads, we conducted two studies after creating a fictitious navigable website with real news articles. This enabled us to manipulate elements of the site across randomized experimental conditions to measure browsing behavior and conduct surveys. In both studies, we controlled for ad position by showing both native and display ads in-feed alongside editorial content. In Study 2, we replicated the effects in Study 1 with a repeated ad exposure design and examined how consumers' attention drives their responses by tracking the eye movements of participants as they browsed different news websites. To assess how consumers respond to different native ad disclosures, we conducted a field experiment in Study 3 with a business news publisher, sending a newsletter to 125,000 subscribers.

Overall, the results from Studies 1 and 2 show that native ads can generate more clicks but result in lower brand recognition than display ads. Exposure to native ads can also lead to lower trustworthiness of the online news website serving the ads. With eye-tracking data, we find that display ads draw more consumer attention than native ads, but the difference goes away when participants see the ads in different positions across different versions of the online news site. Attention to the ad increases both ad click-through and brand recognition. Study 3 shows that advertisers can increase clicks by making native ad disclosures less prominent yet still minimally compliant with FTC guidelines. Alternatively, if advertisers want to adhere more closely to the guidelines, they are better off using even more prominent disclosures, like those that conspicuously feature the brand advertised, to benefit from improved brand recognition. Advertisers who seek a compromise solution by using medium levels of disclosure prominence for native ads can miss out on the benefits of both ad clicks and brand recognition.

The rest of the article is organized as follows. First, we review the relevant literature and discuss our expected results. Then, we describe the three main studies and present the experimental design and findings for each. We conclude with a discussion of our research contributions, managerial and public policy implications, research limitations, and avenues for future research.

Related Literature

Although display ad click-through rates have remained as low as .1% since 2010 (Chatterjee, Hoffman, and Novak 2003), studies show that traditional online display ads can increase brand recall (Dragansaka, Hartmann, and Stanglein 2014) and have positive consequences for brands (Briggs and Hollis 1997; Rutz and Bucklin 2012). Nonetheless, marketers have sought out in-feed native ads as an alternative. In-feed native ads, such as those on news websites, differ from traditional display ads in two important aspects: position and appearance. Display ads traditionally appear out-of-feed in the margins of the site (e.g., the side or top of the site), which puts them at a disadvantage (Dréze and Hussherr 2003; Hervet et al. 2011). In contrast, native ads are positioned in-feed along with other editorial content. A native ad is also designed to resemble surrounding content and may not be noticed, whereas the contrasting appearance of a display ad could give it the advantage of being seen. In this research, we control for ad position (Kim, Youn, and Yoon 2019) and focus primarily on comparing how the visual appearance of display ads versus native ads generates different consumer responses.

The visual search literature has shown that as a non-focal object exhibits more contrast with its surroundings, its visual signal strength increases (Steinman and Levinson 1990). More generally, consumer attention to competing stimuli is guided by a mental topographic map that captures the relative visual salience of stimuli (Parkhurst, Law, and Niebur 2002; Van der Lan, Pieters, and Wedel 2008). A stimulus that contrasts with its surroundings is more visually salient and can capture more attention (Pieters and Wedel 2004). Therefore, controlling for ad position, we expect that display ads, which have higher visual salience than native ads, will likely draw more attention and garner higher brand recognition.

At the same time, other literature suggests that resemblance between objects influences how consumers categorize and identify them (Nosofsky 1987; Snodgrass and McCullugh 1986). People use visual similarity between two objects as a cue to identify one as belonging to the same class as the other. Brand imitation research relies on the concept of visual similarity to explore how consumers may confuse private labels that use lookalike packaging with national brands, resulting in consumers purchasing the private labels unintentionally (Loken, Ross, and Hinkle 1986; Satomura, Wedel, and Pieters 2014). Visual similarity is also at the heart of the legal issue with native ads, as the FTC has voiced concerns about consumers confusing native advertising with editorial content (Bakshi 2015). Therefore, we expect the visual resemblance of native ads to the surrounding content to generate higher click-through rates.

Publishers should also be aware of the risk involved with revenues generated by mistaken clicks. Recent trade literature (Adler 2015; Larzuaskas 2014) suggests that native advertising can have a negative impact on publishers' credibility. Consumers' negative perceptions of native advertising could result from perceived deception (Jiang et al. 2019). Deceptive advertising can engender distrust and negatively affect consumers' subsequent responses to advertising from the same source (Darke and Ritche 2007). If consumers view native ads as being deceptive, such negative sentiments could lower consumer trust in the publisher.

In response to potential deception, the FTC enforces guidelines regarding the prominence of native ad disclosures by stating, "The disclosure that an ad is commercial content should appear near the ad's focal point...[even if the] native ad's focal point is an image or graphic" (Federal Trade Commission 2015). In line with how we consider native and display ads to differ in their degree of visual resemblance to the surrounding content, a more prominent disclosure could make a native ad appear more like a display ad. We test three levels of native ad disclosure prominence, ranging from meeting only the minimum FTC requirements to presenting a "clear and conspicuous" disclosure involving high brand prominence (Han, Nunes, and Dréze 2010).

Most prior research focuses on disclosures of sponsored content (Krouwer, Poels, and Paulussen 2017; Wojdynski and Evans 2016; Wojdynski et al. 2017). Closer to our work, Sahni and Nair (2018) show that more prominent disclosures on sponsored search listings generate higher ad clicks, and subsequent conversion can come from consumers seeing ads but clicking on their corresponding organic listings. In contrast to those researchers' context in which the consumer's browsing goal (e.g., searching for restaurants) is congruent with the information contained in native ads (e.g., restaurant information), the consumer's goal in our context is to read online news, and exposure to native advertising is incongruent with that goal. We expect our results to be more in line with the previous research related to prominently branded display ads (Baltas 2003; Chandon, Chtourou, and Fortin 2003). That is, we expect native ads with high disclosure prominence to suffer lower click-through rates but generate greater brand recognition.

Study 1: Consumers' Responses to Native and Display Ads

Our first study presented participants with both display and native ads in-feed. This allowed us to control for position and to examine whether the display ads' contrast with the editorial content and the native ads' resemblance to it differentially affect ad click-through and brand recognition. We also explored how consumers evaluate the trustworthiness of the news website in the presence of ads in each format.

Method

We conducted a survey of 1,299 participants (52.5% female, 40% age 40 or younger, 43.7% completed college or higher) recruited from a commercial online panel, Lucid. The survey evaluated their experience viewing a navigable online news website. We showed a fictitious but functional news website, Newsday Gazette, which we created with real current articles, and we allowed participants to navigate freely by clicking on homepage headlines to read the full articles and by browsing back to the homepage. We used actual news articles collected from national sites at the time of the study in 2017–18. When participants clicked on an ad, they were directed to a brand landing page, which we also created. Participants could browse only between the homepage, news articles, and brand landing pages. To allow display and native ads to appear in the same in-feed position, we adopted a tiled design common for news websites (e.g., usatoday.com, wsj.com, nytimes.com) on desktop and mobile platforms. (See Web Appendices A1–A3 for industry examples and A4 for the fictitious website.)

We designed ads for six brands (AT&T, Chevrolet, GoPro, Kohl's, Microsoft, and Skinny Cow), mimicking the style appearing on tiled-layout websites. The ads used images and messages from the brands' actual campaigns and product websites when possible. We used nearly identical images for the native and display ads for the same brand, but we included more text and a headline in the native ads to blend them into the surrounding content (Figure 1).

Our study employed a between-subjects design with 13 conditions: 6 (brands) × 2 (ad formats: display vs. native), plus one control condition in which neither display nor native ads appeared. Figure 2 shows all 12 brand and ad format combinations used. Newsday Gazette featured ten tiles, and the display and native ads appeared in a tile in the middle (second from the bottom) row in the far-right position (see Figure 1). We allowed participants to browse the news site as long as they wished. On average, participants spent two minutes and 52 seconds browsing. After exploring the news website, they were asked to rate it on its trustworthiness using a multi-item scale (Casaló, Flavián, and Guinalíu 2011). We then asked participants to indicate which of the article headlines they "remember seeing" and which they were "most interested in."

Figure 1. Navigable news website, created for this research, featuring GoPro ads in native and in-feed display formats (screenshots from website stimuli used in Studies 1 and 2).

We measured brand recognition by asking whether participants remembered seeing the brand advertised on the news page. We included the names of all six brands plus six decoy brands that were each from the same category as the six focal brands (e.g., Verizon was a decoy for AT&T). We also included other brands that always appeared on the page in other contexts. For example, Facebook and United Airlines were subjects of article headlines but not sponsors of native ads. The brand recognition measure equals 1 when participants identified the focal brand correctly and did not select any other brand that was not shown to them. Next, we asked the participants to rate their familiarity with the focal brand and a corresponding competitor's brand.

In addition, as a manipulation check of whether the native ads we designed resembled editorial content more than display ads, we showed participants the version of the ad that they had seen on the news site and asked if they initially thought it was an article or an ad (a binary variable). We also asked

participants to rate the ad on two separate seven-point Likert scales: (1) to what extent they agreed that the ad resembles the article headlines on the news site and (2) to what extent they agreed that the ad resembles a traditional display ad. The average of the score from the first question and the reversed score of the second question was our measure of resemblance to editorial content.

Finally, participants rated the visual appeal of the ad on a seven-point scale. We collected information about participants' internet behavior, familiarity with different online ad formats, use of ad-blocking tools, skepticism toward advertising (Obermiller and Spangenberg 1998), previous experience being confused by ads appearing to be editorial content, and demographics. The data were collected through our website (Newsday Gazette) and a Qualtrics survey. The website used analytics software (Heap) to track individuals' browsing behavior within a session and link each session to a unique survey participant ID, allowing us to measure ad clicks.

Figure 2. Native and display ads used as stimuli in Studies 1 and 2.

Results

Of all participants, 83% reported they had mistakenly clicked on an ad thinking it was an article at least once, and 34% used an ad blocking service. More than half were familiar with the terms "banner ad" (66%) and "sponsored content" (58%), but fewer were familiar with the term "native ad" (6%). About half of the participants (42%) had spent more than 20 hours on the internet in the previous week. We find that native ads are better at generating clicks whereas display ads are better at garnering brand recognition, on average (Figure 3). Including the control condition, we do not find significant differences in website trustworthiness across ad formats.

Manipulation check. First, a significantly larger proportion of participants initially mistook native ads for article headlines (37.1% native vs. 11.2% display, $\chi^2 = 108.69$, $p < .001$). Second, the average editorial resemblance rating for native ads was also significantly larger than that for display ads (4.368 vs. 3.075, t $= -16.53$, $p < .001$ in independent samples t-test). The correlation between the two measures was .47.

Impact on ad click and brand recognition. Excluding the control condition, we ran a Bayesian multivariate probit regression jointly modeling ad clicks (Table 1, M1) and brand recognition (Table 1, M2) to account for their correlated error. We included brand fixed effects, brand familiarity, visual appeal, and attitude toward advertising as control variables. We also added browsing time, as participants could view the news sites as long as they wanted and the probability of ad exposure increased with browsing time. Because prior research suggests potential carryover effects of attention across different visual
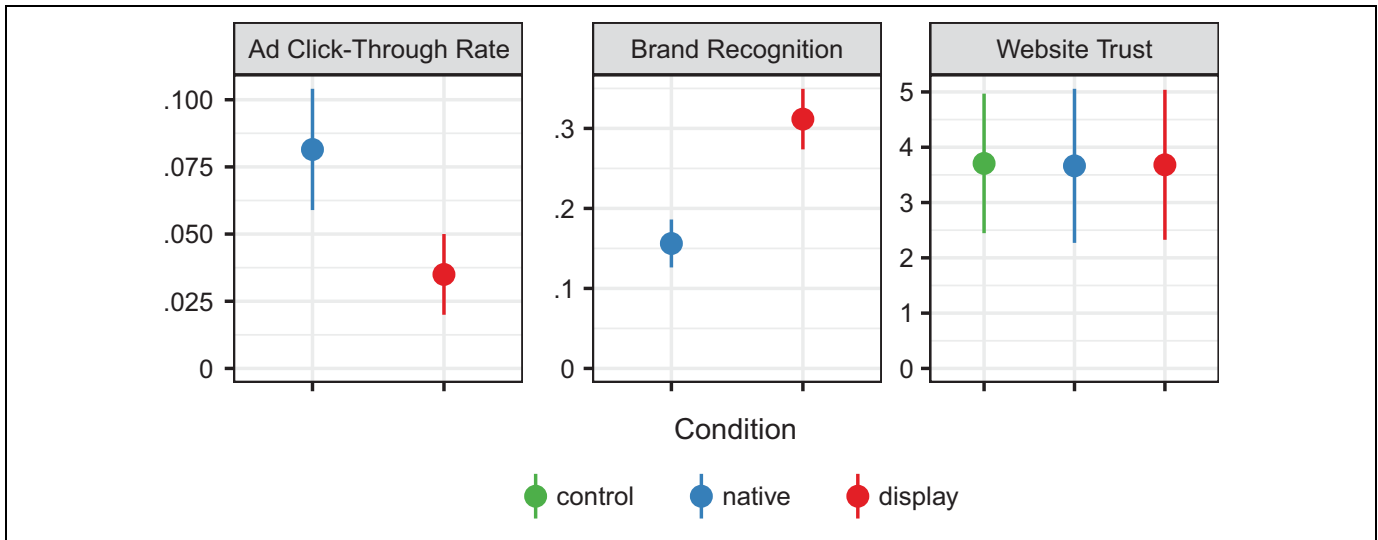
Figure 3. Ad click-through rate, brand recognition, and website trustworthiness for native ads versus in-feed display ads (Study 1).
Notes: For each condition and response, the mean (point) and 95% confidence interval (line) around it are shown. Across all six brands and ad formats, ad click-through rate is higher for native ads (8.1% for native vs. 3.5% for display, $\chi^2 = 10.919$, $p < .001$, Cramér's V = .099). Brand recognition is higher for display ads (15.6% for native vs. 31.2% for display, $\chi^2 = 39.142$, $p < .001$, Cramér's V = .183). For website trustworthiness, there are no significant differences in mean rating across conditions, including the control (3.66 for native vs. 3.68 for display vs. 3.71 for control, ANOVA F = .238, $p = .789$). There are no significant differences in visual appeal between the native and display ads of each brand.

Table 1. Impact of Native Versus Display Format on Ad Click-Through Rate, Brand Recognition, and Website Trustworthiness (Study 1).

	Ad Click		Brand Recognition		Website Trustworthiness		Website Trustworthiness	
	M1		M2		M3		M4	
Intercept[a]	−2.206	**.000**[c]	−.871	**.000**	3.724	**1.000**	3.724	**1.000**
Native ad format	.489	**1.000**	−.575	**.000**	−.033	.335	−.026	.370
Display ad format					−.010	.458	−.016	.413
Brand familiarity	.024	.760	.103	**1.000**				
Visual appeal	.137	**.998**	.029	.818				
Positive ad attitude	−.135	**.006**	−.026	.232	.254	**1.000**	.254	1.000
Attention spillover[b]	.163	.838	.362	**1.000**				
Browsing time (min)	.073	**1.000**	.033	**1.000**	.015	**1.000**	.014	1.000
Ad click							.203	.930
Native ad format × ad click							−.271	**.041**
SD of the error term					.589	**1.000**	.589	**1.000**
Correlation between click and recognition			.640 **(1.000)**					

[a]We included five brand fixed effects in the model but did not report their parameters in the table for brevity.
[b]Attention spillover is measured as whether participants remembered seeing an article above or to the left of the ad.
[c]For each model parameter, posterior mean estimates are shown (left) and one-tail posterior probabilities (right) indicate strength of evidence. The table indicates if the 90% posterior interval excludes zero (boldface). All estimates represent summaries of posterior draws from Bayesian models (Model M1 and M2 are estimated jointly with a bivariate binary probit; M3 and M4 is Gaussian).

stimulus components (Ellis and Smith 1985; Pieters, Rosbergen, and Wedel 1999), we measure attention spillover according to whether participants remember seeing an article to the left of or above the ad (in accordance with cultural writing systems; Nielsen 2006; Shrestha and Lenz 2007). To obtain posterior draws of the model parameters, we implemented Markov chain Monte Carlo sampling (Allenby and Edwards 2003), removed 10,000 burn-in draws, and kept 1 in 10 from an extra 10,000 draws for statistical inference. To report strength of evidence in all the tables, we relied on one-tailed posterior

probability (prob), which was computed as the proportion of all posterior draws of each parameter that were greater than zero. For example, the value .95 indicates that 95% of posterior draws were positive, and .05 means that 95% were negative.

The native format had a significantly positive effect on ad click-through (.489, prob = 1; Table 1, M1) but a significantly negative effect on brand recognition (−.575, prob = 0; Table 1, M2). Ad clicks were positively influenced by visual appeal and browsing time. Participants with a more positive attitude toward ads were less likely to click on ads of either format in

the study. Brand familiarity, browsing time, and attention spill-over positively affected brand recognition. The two outcomes' error correlation was .64 (prob = 1).

Impact on trustworthiness of the news website. Unlike the analysis for click-through rate and brand recognition, the analysis for website trustworthiness (Table 1, M3) includes the control condition; therefore, we had to exclude some control variables that were not relevant to the control condition. M3 showed no significant main effect of native format on website trustworthiness. Nonetheless, when we included the interaction between ad click and native ad format (Table 1, M4), we found that clicking on native ads could lead participants to perceive the news website as less trustworthy (−.271, prob = .041). Participants perceived the online news to be more trustworthy when they had more positive attitudes toward adverting and browsed the website longer.

Study 2: Eye-Tracking Study with Repeated Site Exposure

Existing research uses eye movements to provide reliable information about consumers' visual attention to print and television advertising (Rayner 1995; Wedel and Pieters 2008). Fewer papers use eye-tracking to study web searches and online advertising attention (Dréze and Hussherr 2003). Study 2 examines the role of attention in native advertising's effectiveness. Because native ads resemble their surrounding content, they may not attract attention as effectively as display ads that have higher visual salience.

Chatterjee, Hoffman, and Novak (2003) show that repeated exposure to display ads from the same advertiser over time negatively impacts click-through rates. Even for different advertisements, web usability studies show that once consumers attend to and recognize a display ad, they can learn to ignore subsequent ads (Benway 1998; Schroeder 1998). Therefore, we exposed participants to different sequences of ad formats to create randomized variation in exposure to native versus display ads. In this study, we explore the moderating role of repeated exposure and ad sequence characteristics on the effectiveness of native and display ads.

Method

We recruited 156 undergraduate students (43% female; 30% spent more than 20 hours on the internet in the previous week) from (1) an introduction to marketing class at a large Midwestern university to participate in the study for class credit and (2) a paid subject pool for a $7 monetary reward. We asked the participants to evaluate the same news website from Study 1 (all ads in-feed). Each participant was asked to browse four versions of the news site in order. Each version of the website featured different articles and advertised different focal brands. We chose four of six brands from Study 1 for Study 2: AT&T, Chevrolet, GoPro, and Kohl's. The four website versions were

shown to each participant in random order. Study 2 participants were also allowed to browse each site as long as they wanted.

To explore the potential impact of repeated exposure, we manipulated the ad format each participant would see on each news site, as well as the position of the ad. We created a between-subjects design with eight conditions: 2 (first three ads: DDD- [Display, Display, Display] vs. NNN- [Native, Native, Native]) × 2 (fourth ad: display —D vs. native —N) × 2 (ad position: fixed vs. varying). The design resulted in participants browsing a series of websites with one of these four ad sequences: DDDD (n = 39), DDDN (n = 38), NNND (n = 40), and NNNN (n = 39). Participants randomly saw ads appearing in either (1) the "fixed position condition" (n = 75), with each ad in the same position (the middle row on the right) or (2) the "varying position condition" (n = 81), with ads in four different positions: the left, middle, and right positions in the middle row and the middle position in the bottom row.

After participants browsed the first news website, they were asked to rate its trustworthiness using the same multi-item scale used in Study 1 and to indicate which article(s) they remembered seeing on the page. They then saw the next website with the same layout but a different set of articles and a different advertised brand. Participants browsed again and were asked the same questions. After the fourth and final version, we asked the same questions plus an additional set of questions, similar to those used in Study 1. We measured brand recognition for all news sites together in the last question set, as measuring brand recognition after each website evaluation would have artificially directed participants' attention to advertising. We used eye movement data to measure participants' attention to ads and articles near the ads to account for attention spillover.

Instructions and stimuli were presented on a full-color HP E231 monitor with a 23-inch diagonal, LED-backlit display with a resolution of 1920 × 1080. We used a Tobii Pro X2-60 compact eye-tracker at an average sampling rate of 16 milliseconds to collect the data, and we used iMotions 6.3 software to process the data. All participants had either normal or corrected-to-normal vision. We used fixation counts as a measure of attention. The duration of an individual fixation is 200 to 400 ms (Rayner 1998).

Results

Manipulation check. A significantly larger proportion of participants initially mistook native ads for article headlines (50.0% native vs. 22.0% display, χ^2 = 54.743, p < .001). The average editorial resemblance rating for native ads was also significantly larger than that for display ads (4.473 vs. 3.382, t = −7.188, p < .001). The correlation between the two manipulation check measures was .63.

Impact on attention. We estimated a Bayesian negative binomial regression model of ad fixation, controlling for unobserved heterogeneity across individuals with random effects in the model intercepts, as well as for observed differences with the same control variables used in Study 1 (Table 2, M1). We used

Table 2. Impact of Native Versus Display Format on Attention, Ad Click-Through Rate, Brand Recognition, and Website Trustworthiness with Repeated Exposure (Study 2).

|	Attention		Ad Click		Brand Recognition		Website Trustworthiness	
	M1		M2		M3		M4	
Intercept[a]	2.188	**1.000**[c]	−4.074	**.000**	−.621	**.004**	3.579	**1.000**
Native ad format	−.250	**.022**	2.608	**1.000**	.096	.709	−.129	**.008**
Brand familiarity	.027	.842	.020	.546	.240	**1.000**	.011	.728
Visual appeal	.014	.726	−.042	.320	.012	.599	.015	.856
Positive ad attitude	.047	.807	.223	.858	−.026	.415	.082	**.968**
Browsing time	.071	**.998**						
First news site browsed[b]	.081	.836						
Different format on the last news site	.220	**.976**						
Attention spillover	.028	**1.000**						
Ad in middle row in the middle	−.686	**.000**						
Ad in middle row to the right	−.830	**.000**						
Ad in bottom row in the middle	−.711	**.000**						
Ads in varying positions	.028	.559						
Ads in varying positions × native format	.240	.938						
Attention			.055	**1.000**	.025	**.984**	−.001	.408
SD of the random intercept	.364	**1.000**	1.358	**1.000**	.639	**1.000**	.434	**1.000**
Correlation with Brand Recognition			.763	**1.000**				
Correlation with Website Trust			−.048	.378	−.213	.121		

[a]All estimates represent summaries of posterior draws from Bayesian models (Model M2 probit, M3 probit, and M4 Gaussian are estimated jointly with correlations among individual-specific intercepts; M1 is a negative binomial distribution model). M1 has a mean over-dispersion parameter of 1.883 (prob > 1 = 1.000); M4 has a mean of the SD of the error term of .486 (1.000).
[b]To characterize the eight between-subjects conditions (4 format sequences × 2 fixed versus varying ad positions), we included the following additional control variables: whether the news site was the first in the sequence (i.e., one of four), whether the ad format on the last (fourth) news site differed from what appeared on previous news sites (i.e., the last site in the DDDN and NNND conditions was 1 and the last site in the DDDD and NNNN conditions was 0), indicator variables to capture the position of the ad shown on the news site, and whether ads across the news websites were shown in varying (as opposed to fixed) positions.
[c]For each model parameter, posterior mean estimates are shown (left) and one-tail posterior probabilities (right) indicate strength of evidence. Boldface indicates that the 90% posterior interval excludes zero.

the R package, brms (Bürkner 2017), which implements Bayesian multilevel regression models using Hamiltonian Monte Carlo and requires fewer iterations than Markov chain Monte Carlo for convergence. Each of two chains converged after 1,000 draws, and an additional 1,000 of each were kept for statistical inference. The dispersion parameter had a posterior mean of 1.876, which is significantly greater than 1 (prob = 1), indicating that the negative binomial distribution reflected the distribution of fixation counts better than the Poisson (dispersion parameter fixed to 1). We explored all interaction effects between native ad format and each of the repeated exposure characteristics and find the only meaningful interaction to be between native ad format and whether ads are shown in varying ad positions. For more descriptive results by experimental conditions, see Web Appendix B.

The estimated model parameters suggest that native ads receive less attention than display ads (−.250, prob = .022; Table 2, M1). However, the significant effect is qualified only by the interaction between native ad format and whether ads are shown in varying positions (.240, prob = .938). In Figure 4, we further show the simple effects of native ads in the fixed versus varying conditions (the top two bar graphs). These results provide evidence that native ads receive less attention than display
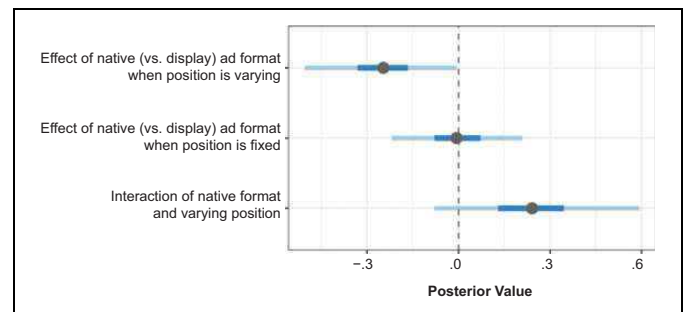
Figure 4. Impact of ad format and position sequence on attention (Study 2).
Notes: This figure summarizes the parameters' posterior median (black point) and posterior intervals for the middle 50% (dark blue) and 95% (light blue).

ads when they are shown in the same position across news websites.

The significant control variables indicate that participants attend to an ad more when they browse for a longer time and when they fixate on an article above it or to its left (i.e., positive attention spillover). Participants browsed an average of three minutes and 17 seconds across all four sites, and a significantly shorter average of two minutes and 51 seconds on the first site.

Participants also attend less to ads on the first news website, and they attend more to ads on the fourth website when the ad format differs from the ones they saw on the first three sites. In addition, participants attend more to ads in the middle row on the left than to ads in any other position. Notably, this attention-catching position is not the position of ads shown in the fixed-position conditions (middle row far right).

Impact on ad click and brand recognition. We ran a joint Bayesian multivariate generalized linear mixed model with a binary probit specification for ad click and brand recognition and a Gaussian specification (i.e., linear regression) for website trust-worthiness. The model (Table 2, M2–M4) allows the random effects of individual intercepts to be correlated and includes attention (fixations) as an independent variable. We first discuss results pertaining to ad click (Table 2, M2) and brand recognition (Table 2, M3).[1]

The native ad format continues to significantly increase ad click-through rates (2.608, prob = 1) but does not significantly affect brand recognition (−.096, prob = .709). We measured brand recognition for all brands at the end of the study, which may have weakened the relationship between ad format and brand recognition. Despite the weak measurement, our brand recognition measure is positively influenced by brand familiar-ity, which is consistent with earlier results. Attention also leads to significant increases in both ad click-through rate (.055, prob = 1) and brand recognition (.025, prob = .984). Although we cannot establish the impact of native format on brand recogni-tion, we find that native format draws more attention, and attention subsequently increases brand recognition. The posi-tive effect of attention on ad click, coupled with the negative effect of native format on attention, also suggests a counter-effect of native format on ad click due to decreased attention. The correlation between the individual-level random intercepts of ad click and brand recognition is large and significant (.763, prob = 1).

Impact on trustworthiness of the news website. Unlike the results of Study 1 (Table 1, M3), these results show that native ad format has a significantly negative impact on website trust-worthiness (−.129, prob = .008; Table 2, M4). Positive attitude toward advertising also marginally increases website trust-worthiness. The correlations between the individual-specific random intercepts of trustworthiness and ad click and brand recognition are small and not significant. Notably, unlike ad click and brand recognition, attention does not influence trust-worthiness (−.001, prob = 0.408).

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[1] We include fewer variables in this joint model (Table 2, M2–M4) than in the attention model (Table 2, M1) because many variables, particularly those describing patterns of repeated exposure, are not significantly different from zero after attention is included. The full model appears in Web Appendix C. It includes the same variables in M1–M4 and allows the random intercepts across the four models to be correlated.

Effectiveness of display versus native ads. Studies 1 and 2 show that when we control for position, native ads garner higher ad click-through rates but lower attention and brand recognition than display ads. The impact of native format on attention, however, is significant only when ad position varies. Also, exposure to native ads, particularly repeated exposure (Study 2), can lead to lower ratings of trustworthiness for news web-sites. Whereas advertisers have to trade off between clicks and brand recognition in choosing each of the ad formats, publish-ers have to trade off between revenues from clicks and their reputation.

Study 3: Native Ad Disclosure Prominence Field Experiment

Display and native ad formats may be viewed as two ends of a continuum that ranges from visually contrasting with surround-ing content to resembling surrounding content. Similarly, native ad disclosures may also be viewed on a continuum according to how prominently they appear in the ad. So, taking this continuum into account, how does the prominence of ad disclosure in the native format affect consumers' click-through rates and brand recognition? To answer this question, we con-ducted a field experiment (after a pretest study, which is reported in Web Appendix D) to provide guidance to managers and show them the direct implications of the FTC guidelines. Given that more prominent disclosures make native ads more like display ads, we expected to find effects analogous to our earlier findings.

Method

To test the effects of native ad disclosure prominence on ad clicks and brand recognition in a real-world setting, we ran a randomized controlled field experiment in collaboration with Morning Brew (morningbrewdaily.com), an online media com-pany delivering a business-focused newsletter. Morning Brew delivers a summary of daily economic and financial news stories from mainstream sources such as the *Financial Times* and *Wall Street Journal* in a conversational tone through weekday emails to over one million subscribers as of February 2019 (roughly 150,000 at the time of this study). Morning Brew's revenue relies on partnerships and on advertisers who largely use native advertising. The majority of the newsletter's subscribers are millennials aged between 18 and 35 years (in 2017), and approx-imately 45% are female. Morning Brew emails are delivered in rich HTML format and contain several sections (e.g., main head-lines, interview tips, financial term of the day). At the time, the newsletter contained only one sponsored section, which is the only part of the email we manipulated for this study.

We developed three disclosure formats for a native ad for a job training and recruiting company, Wall Street Oasis, and we included a control condition. We used a between-subjects design with four conditions: one without an ad (control) and three with native ads with low, medium, and high disclosure prominence (Figure 5). All three disclosure formats were legal,

Figure 5. Design of randomized field experiment (Study 3) shows screenshots of the experimentally manipulated portions of three different emails sent by Morning Brew to its newsletter subscribers. The emails only differed by the prominence of the native ad disclosures: low prominence (Panel A), medium prominence (Panel B), and high prominence (Panel C).

were at least minimally compliant with FTC rules, and contained the text "Sponsored by Wall Street Oasis" at the bottom of the ad in the same font style and size as the ad content and email text. Only the top of the ad beneath the headline differed by condition: the low prominence condition had no additional disclosure, the medium prominence condition contained "Sponsored" in blue font between the headline and the advertisement's main body, and the high prominence condition included "Sponsored by Wall Street Oasis" and the brand's logo at the top of the ad. The control condition had no ad or mention of the brand. All other parts of the email were identical across all four conditions.

Table 3. Impact of Disclosure Prominence on Ad Click, Brand Recognition, and Overall Experience in Field Experiment Using Email Newsletter (Study 3).

| | | Disclosure Prominence | | |
	Control	Low	Medium	High
Newsletter recipients	31,454	43,446	31,454	32,082
Open rate (openers/recipients)	28.0%	25.5%	28.0%	27.7%
Ad click (ad clickers/openers)	–	2.55%	1.20%	0.69%
Survey participants[a]	297	463	331	368
Summary statistics:				
Ad click (only among survey participants)	–	10.4%	3.6%	2.7%
Brand recognition	15.5%	44.9%	49.8%	57.1%
Experience rating	8.75	8.82	8.78	8.74
Parameter estimates[b]:				
Ad click	–	.699 **(1.000)**	.188 (.890)	–
Brand recognition	–	−.365 **(.000)**	−.268 **(.001)**	–
Experience rating	.008 (.528)	.074 (.815)	.034 (.645)	–

[a]Model estimation was performed only among the survey participants who opened the initial experimental email within 24 hours of its delivery and answered both brand recognition and website experience questions. The survey was sent out on two consecutive days, and all responses are included here.

[b]For brevity, we omit the intercept. The baseline is high disclosure prominence. The correlation between the ad click–brand recognition error terms is .33 (1.000). We report posterior means and one-tail probability in parentheses. The joint ad click–brand recognition model does not include the control condition. No control variables are available to be included in these models.

[c]For each model parameter, posterior mean estimates are shown (left) and one-tail posterior probabilities (right) indicate strength of evidence. Boldface indicates that the 90% posterior interval excludes zero.

Morning Brew successfully delivered emails, randomly choosing one of the four conditions, to each of the 138,436 subscribers on April 19, 2017, at 5:45 A.M. EDT using Mailchimp. That day, 37,592 opened the email, 5,201 clicked at least one link, and 458 clicked on the native ad. Over the next two days (April 20 and 21), Morning Brew sent two more emails, each of which included a survey at the end of the newsletter that participants were able fill out. The surveys contained two questions: one that measured brand recognition ("Which of the following brands do you remember seeing advertised?") and one that measured overall newsletter experience ("Rate your experience"). To increase response rates, we used a simpler overall experience scale instead of a multiple-rating scale of website trustworthiness. When asking about brand recognition, we included the target brand and four other competing firms (BrokerHunter, Doostang, Investopedia, and Training the Street), one of which (Investopedia) had been featured in the newsletter in prior weeks. Participants answered the questions by clicking on a response in the email. As an incentive for participating, we offered Amazon gift cards worth $50 each to five randomly chosen participants. We collected data from 2,233 users who opened the email on the day of the experiment and who also answered the survey in either of the two days after the experiment.

Results

Table 3 first shows the number of subscribers who received the email, opened it, clicked on the native ad, and answered survey questions for each of the four conditions. The open rate was typical for emails sent on the weekday of the test, and every recipient saw the same subject line. In a randomization check,

we noted that open rates did not significantly differ across all four conditions (they were approximately 28%). Although ad click-through can be analyzed using data from all the recipients who opened the email, we conducted the following analyses using only the participants who responded to both brand recognition and website experience rating questions. Consistent with Study 1, we also estimated a multivariate probit for ad click and brand recognition and a regression model for website experience using this subset of data.

Impact on ad click and brand recognition. The native ads with less prominent disclosures received significantly more clicks, with the low prominence condition receiving a 10.4% click-through rate, medium prominence drawing 3.6%, and high prominence receiving 2.7% ($\chi^2 = 25.90$, $p < .001$, Cramér's V = .149). Notably, whereas the click-through rate for the medium prominence disclosure was significantly lower than for the low prominence disclosure ($\chi^2 = 11.61$, $p < .001$), there was no significant difference in click-through rates between the medium and high prominence disclosures. These results were also confirmed by the parameter estimates for low (.699; prob = 1) and medium prominence (.188; prob = .890) disclosures, suggesting that changing from a medium to a high prominence disclosure does not hurt the click-through rate as much.

With respect to brand recognition, the ad with the most prominent disclosure had the highest recognition rate (57.1%), larger than the medium (49.8%) and low prominence (44.9%) conditions ($\chi^2 = 12.11$, $p < .01$, Cramér V = .102). Pairwise tests revealed that this difference was driven primarily by increased brand recognition from medium to high prominence conditions ($\chi^2 = 3.37$, $p = .067$). The parameter estimates also showed that high disclosure prominence leads to significantly

higher brand recognition than either medium ($-.268$, prob = .001) or low ($-.365$, prob = 0 for high) disclosure prominence. These results show that using a prominently branded disclosure significantly benefits brand recognition.

Experience with the newsletter. Unlike Studies 1 and 2, Study 3 does not show that disclosure prominence has an impact on website experience. The differences in ratings across conditions, including the control condition, are not significant. Nonetheless, these results are consistent with our pretest reported in Web Appendix D. In the pretest, we used the same trustworthiness scale as those used in Studies 1 and 2; therefore, it is unlikely that our use of a simpler scale in Study 3 affected the results.

Discussion of disclosure prominence. The results in Study 3 (and in Web Appendix D) show consistent evidence: Making a native ad's legal disclosure more prominent (e.g., including the brand logo) leads to the highest brand recognition rates. Although this may come at the expense of click-through rates, it may be worthwhile. The difference in ad click-through rates between the medium and high prominence disclosure conditions is smaller, and this suggests a clear managerial implication: Advertisers may benefit most from high-prominence disclosures to take advantage of increased brand recognition. The mid-level prominence option, on the other hand, seems like the worst choice. Finally, despite the negative impact of the native ad format on website trustworthiness, we do not find the same relationship between disclosure prominence and trustworthiness. Given our findings, Morning Brew chose to disclose sponsors' brands more prominently, displaying advertisers' brand names and logos at the top of the newsletter.

General Discussion

Brand advertisers and online publishers considering native ads have conflicting objectives. Their ideal would be to deliver ads that generate both ad clicks and brand recognition without sacrificing the trustworthiness of the publishing platform. But this joint optimization involves trade-offs. To understand these trade-offs, we conducted randomized experiments that compared consumers' responses to display ads versus in-feed native ads while controlling for ad positioning and measuring eye movements to capture attention. Visual attention is key to the FTC's concerns about the possible deception of native ads and their disclosures, so we manipulated the visual layout and prominence of ad disclosures.

Our results provide evidence of three key trade-offs:

1. Advertisers must make a trade-off in using the native versus display formats. Whereas native ads generate higher click-through rates, display ads can garner more attention and greater brand recognition. According to 2018 industry reports, native and display ads are similarly priced in the range of $0.30 to $3.00 per thousand impressions, which suggests that relative costs may not be critical in the choice between native and display formats (Dey 2018; Pratskevich 2018).

2. The same trade-off applies to advertisers' decisions about the prominence of a native ad's legal disclosure.

3. The publishers who earn revenue from clicks and impressions should also be concerned that (unintentional) clicks, which generate revenue, could also have negative effects on their readers' trust. Notably, the adverse effect on trust is driven by the ad format (native vs. display) and not by how prominently the native ads are disclosed.

Our results point to direct recommendations for marketers: If advertisers and publishers decide to follow the FTC's guidelines more closely, they may be better off going above and beyond to make brand names prominent in their disclosures. This demonstrates that FTC guidelines align well with the interests of advertisers and online publishers. The finding speaks to the importance of research at the intersection of marketing and public policy.

Our findings also complement the existing evidence of the impact of native ad disclosures provided by Sahni and Nair (2018), who find that promoted listing ad click-through rates are higher in a more prominent disclosure condition than in a less prominent one. However, we find an opposite result in Study 3. In their goal-congruent setting, consumers who are looking for restaurants on search platforms (e.g., Yelp) have a browsing goal of finding a restaurant, which is a goal that can also be satisfied by clicking on a restaurant advertised on the platform, particularly if it is shown prominently. In contrast, when consumers are browsing with the goal of reading online news, clicking on an ad is incongruent with their goal. Therefore, a native ad with a more prominent disclosure is less likely to be clicked in the online news context. We also predict higher overall ad click-through rates for both native and display ads in a goal-congruent setting than in a goal-incongruent setting, but testing this prediction would require further study. Our prediction is consistent with previous research showing that consumers tend not to click on links that are not goal-congruent when searching online (Huberman 1998). Examining individual goals or contextual differences as moderators could be a fruitful direction for future research.

We also acknowledge some inconsistencies in our results. First, whereas Study 1 showed that the native ad format had an impact on brand recognition, we did not find this effect with a repeated exposure design in Study 2. We decided to measure brand recognition after participants had seen all the news sites because we did not want to artificially encourage them to pay attention to advertisements. This decision, we believe, accounts for the weaker effect of native ads on brand recognition, as participants were less likely to remember brands after browsing four news sites. We reran the analysis with only the first or the last news site observed, but we still failed to detect the effect (which could have been due to the smaller sample sizes). Second, although we found the main effect of native ad format on website trustworthiness in Study 2, we found the significant negative effect of native ad format only when participants clicked on native ads in Study 1. The stronger negative effect of native ads on website trustworthiness might have been

strengthened by our design, as repeated exposure to display ads from the same advertisers has been found to reduce click-through rates (Chatterjee, Hoffman, and Novak 2003). Finally, unlike Studies 1 and 2, neither Study 3 nor the pretest in Web Appendix D detected the effects of native ad format (vs. control) or of disclosure prominence on website trustworthiness or experience. These results suggest that we may not be able to view a prominently disclosed native ad as if it were a display ad. In addition, in Study 3, users had more experiences with the platform and thus their evaluation of the publisher could have been less sensitive to changes in ad disclosures. Future research should continue to test this effect on website trustworthiness and explore prior experience as a moderator.

In addition to these discrepancies, we also want to address our research limitations. Our measure of brand recognition imperfectly measures memory, and indirect memory tasks could better assess the effect of attention on brand recognition and recall. We also do not directly test the mechanism by which attention drives higher brand recognition or by which confusion leads a consumer to click on native ads, mistaking them for articles. We also cannot speak directly to consumers' long-term responses to native ads. Despite using a repeated exposure design, we could not say whether, over a longer period, consumers may grow accustomed to native advertising and accept it as a norm. Finally, our research does not address how advertisers should design sponsored content that readers see *after* clicking on native ads, but this would be a promising direction for future research. For instance, sponsored content designed to be congruent with the target consumer's goal (e.g., entertainment) would be worth examining.

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