Choosing What You Want Versus Getting What You Want: An Experiment with Choice in Video Ad Placement

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ABSTRACT

User agency and control serve as cornerstones of design in HCI, with numerous studies finding that choice improves user experiences. However, few studies examine how users benefit from the act of choosing, independent from the fulfillment of their chosen option; making this distinction is crucial for refining guidelines on when to provide user control. In our experiment on YouTube, participants randomly experienced either a pre-roll ad, a mid-roll ad, or a choice between the two. Participants then rated their subjective experiences. Mid-roll ads negatively affected experience ratings, but ratings between those choosing a pre-roll ad and those assigned a pre-roll ad were similar. That is, the right ad timing had a much larger impact than choosing an ad timing. The findings suggest that user interfaces should not offer choices solely for the sake of offering choices, and suggest scenarios where automation would be preferable to fine-grained user control.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in HCI*; **HCI theory, concepts and models**.

KEYWORDS

control, agency, autonomy, choice, user experience, advertising, marketing

1 INTRODUCTION

User agency and control features as a key design principle in HCI, with various experts [3, 15, 37] touting the benefits of giving users control. This way of thinking has found widespread application both in HCI research and deployed software. For instance, historically and today, Facebook publicizes new ways of controlling its News Feed, from allowing users to prioritize certain people [14] to

adjusting how much fact-checking demotes content [17]. Research highlights that providing controls improved feelings of satisfaction, transparency, and control in a variety of applications, including recommender systems [18, 22, 40], AI co-creation [29], and LLMs [42].

Unfortunately, few works disentangle the act of control from the changes/configuration that result from the control [7, 25]. For instance, are users more satisfied with news feeds that have controls [40] because the controls filtered unwanted content, or because they were offered the control, or both? The answer has critical interface design implications. If the mere offer of choice impacts satisfaction significantly, this signals that designers should surface more controls in the user interface. Conversely, users might prioritize satisfying content over controlling that content. This would signal a need for better content curation, which platforms may achieve with more usable/useful controls, but also through other means like smarter automation. Addressing the trade-offs between the customizability that controls offer versus a simpler user interface [15] further increases the value of knowing how much users value the offer of control.

Two prior studies with news personalization [39] and ad content choice [2] suggest that users value satisfying content more than the provision of controls around that content. To help further our understanding of how choice affects users, this study does not alter the content that users see. Rather, it offers users control over content *placement*. We select the context of advertising in an online video streaming service, and present people a choice of either an ad before the video (a pre-roll ad), or an ad in the middle of the video (a mid-roll ad). This choice context holds appeal in multiple ways from study design to study domain. First, in contrast to prior work in news customization [39] where each participant could customize a large variety of news stories to their liking, our design had only two ad placement alternatives, ensuring consistent and directly comparable system behavior among participants. Second, video advertising carries great influence; the video platform YouTube is the second most popular website in the world [38], and about half of adults in the US use the site daily [5]. And finally, to our knowledge, no public literature exists on giving people a choice of ad placement.

In a between-subjects experiment, subjects watched a video on YouTube. Participants were randomly assigned to see a pre-roll ad, a mid-roll ad, or a choice between the two. They then rated their subjective experiences around the ad/video, and they explained their ratings during an interview. Assignment to the mid-roll ad placement caused more negative subjective experiences than assignment to the pre-roll placement. Meanwhile, 13 out of 15 participants that got a choice chose a pre-roll ad; yet, they had

similar subjective ratings to participants assigned a pre-roll ad. Moreover, we observed negative effects of recieving a choice, like feelings of helplessness. This suggests that the act of choosing an ad placement had little effect on user experience when separated from the ad placement that participants actually experienced.

Our work contributes a case study where choosers likely would have been similarly satisfied had they been automatically assigned their preferred option. Based on this result and the characteristics of the choice that participants experienced, we suggest scenarios where providing automation would satisfy users more than providing controls. We then conclude with discussion on a research agenda to further investigate these scenarios.

2 RELATED WORK

The present investigation helps address the need for a more detailed picture of how user agency leads to more positive subjective experiences [7]. First, we situate our work by describing the role of agency in HCI. Then, we cover related work in the context that we selected for this study; that is, advertising.

2.1 Control and Agency in HCI

HCI has frequently discussed and broadly advocated for user agency [7], which we describe as the ability of users to control one or more aspects of how their software behaves. Ben Shneiderman's rules of interface design [37] recommend to "keep users in control" and to give experienced users "the sense that they are in charge of the interface." Control can allow users to exercise personal autonomy, which is linked with mental well-being [25, 35]. And user agency has gained importance in human-AI interaction, where experts recommend providing users the ability to customize the behavior of AI systems [3, 33].

At the same time, many of today's systems, especially AI, carry out tasks on behalf of users, arguably denying them direct control. Experts have recognized that an emphasis on user agency does not mean the rejection of such automation. Friedman's Value-Sensitive design [15] makes a distinction between user autonomy and user control. She conceptualizes user autonomy as their ability to "decide, plan, and act in ways that they believe will help them to achieve their goals and promote their values." She cautions that adding excessive controls increases interface complexity and hinders autonomy, and urges designers to give users "control over the right things at the right time." Similarly, Pattie Maes argues that "users must be able to turn over control of tasks to agents but users must never feel out of control" [36] The extent to which systems should perform tasks for users vs encourage users to directly perform tasks, however, has been a matter of debate [36]. Objective and subjective user evaluations – such as the current study – help designers navigate this balance.

2.2 Choosing An Option Versus Getting An Option

To build on suggestions to provide users the "right" kind of control, we consider *how* choice improves subjective user experiences. Generally speaking, for any given outcome (e.g. satisfaction), it is unclear whether the offer and exercise of choice causes the outcome, or the implementation of the chooser's wishes [25]. This question

has crucial importance for interface designers. Taking satisfaction as an example target outcome, if the offer of choice causes strong inherent satisfaction, then it justifies more research on surfacing choice to users and increasing their feelings of agency. On the other hand, if properly-behaving software matters more, then it would argue for judiciously ensuring that control mechanisms align with users' goals as well as greater amounts of automation.

A limited number of studies involving computer interfaces disentangle the effect of choice provision from the effect of the chosen options. One example is Sundar and Marathe, who conducted an experiment in which participants assessed the quality of news homepages that they customized themselves or that the researchers tailored to their browsing histories [39]. News pages personalized by the researchers received about the same ratings as pages customized by the participants, but only when participants received privacy reassurances regarding tracking. This suggests that direct control did not improve user attitudes of their news content, but it could help users understand the mechanism of personalization, helping relieve privacy concerns.

As another example, Ahn and Ham manipulated both whether participants had a choice of an ad to watch and their involvement with (i.e. relevancy of) the ads [2]. Choice only increased positive attitudes towards the ad when participants had low involvement with the advertised products; choice had no effect given involvement with at least one of the choices. In other words, there was little difference between choosing a relevant ad and being given a relevant ad.

Overall, these findings suggest that relevant content matters more than the provision of choice over that content. However, little information exists about how this principle generalizes. To help provide such information, instead of analyzing the effects of user control over content, we analyze control over content placement. That is, we examine whether the right timing of an ad fosters a positive user experience, or the choice in that timing, or both.

2.3 Consumer Control In Advertising

Like in HCI, the field of advertising and marketing has discussed user control and agency at length, often under the umbrella of *interactivity*. Liu and Shrum [27] conceptualize interactivity as "the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages," with one key dimension of interactivity being the degree of active control afforded to the user.

Generally, higher degrees of interactivity positively influence consumer attitudes towards advertising and the advertised products [19]. For in-stream video advertising, the context of our study, providing viewers a choice in the topic of ad to watch increases ad engagement [23] and attitudes towards the advertised brand [2]. Pashkevich et al found that the option to skip ads increases users' satisfaction of the video platform without sacrificing ad engagement [34], although more recent work suggests that users' attention on the Skip Ad button reduces brand recall [13].

2.4 Pre-Roll vs Mid-Roll Advertising

The current study provides users a choice between a pre-roll and a mid-roll ad. Pre-roll and mid-roll ads interrupt before and during

video content, respectively. As far as we know, no published work has explored giving users this kind of choice in ad placement. However, prior work has found that consumers perceive mid-roll ads as more intrusive and irritating than pre-roll ads [9, 10, 13, 28]. This could affect a website's business, as intrusive ads can reduce users' intentions to revisit a website [16, 31].

In addition, researchers have compared pre- and mid-roll ads' effects on various dimensions of advertising effectiveness, with mixed results. For instance, compared to pre-roll ads, Christy et al. [10] found that mid-roll ads decrease brand recall, Brechman et al. [9] found that they increase brand recall, and Frade et al. (2022) [13] found no effect of mid-roll ads on brand recall. One explanation is that each of these studies used video stimuli of different topics and lengths, ranging from under 5 minutes to a full hour. Thus, Frade et al. (2021) [12] call for investigation into various contextual factors such as ad skippability, ad length, the number of interruptions, relevance of the ad to the consumer, and more. In this landscape, our research contributes more empirical evidence of how ad placement affects advertising effectiveness in our study's specific context, as well as how choice in ad placement interacts with this outcome.

2.5 Research Questions

To summarize, separating the effects of choice provision from the effects of implementing the chooser's wishes will inform UI design guidelines. We tackle this problem in the choice context where users choose between a pre- or mid-roll ad. This study examines the UX-related outcomes of (1) satisfaction and (2) feelings of control. Lastly, we include attitudes towards the advertised brand as one historically important aspect of advertising effectiveness, as more positive brand attitudes increase brand equity (e.g. purchase intentions and willingness-to-pay) [21].

- **RQ1: How does ad placement (pre- vs mid-roll) affect UX and ad effectiveness?**
- **RQ2: How does user *control* over ad placement affect UX and ad effectiveness?**

3 METHOD

To answer our research questions, we designed a between-subjects experiment in which participants watched a video with an ad. Participants were randomly assigned to either experience a pre-roll ad, a mid-roll ad, or a choice between the two. After that, we elicited participants' user experiences through questionnaires and interviews. The study was approved by our institution's IRB. Below, we describe the details of the experiment design.

3.1 Video Stimulus

All participants viewed the same video and ad to avoid effects from varying content. We sought a video that appealed to as many people as possible to represent the typical recreational YouTube experience – around 82% of YouTube users visit the site for the purpose of entertainment [4]. Hence, we searched for videos matching all of the following criteria:

- Engaging and having a narrative arc.
- Unrelated to activities with strong personal tastes including politics, food, entertainment, and music.

- Uncontroversial and devoid of violence, gore, and sexual themes.
- Under 5 minutes in duration.

Informational and storytelling videos intuitively matched these criteria especially well. We asked colleagues and searched on Google for YouTube channels that specialized in this genre. The first author then screened videos from these channels according to the above criteria until they found three satisfactory videos. We then further screened the videos by asking crowdworkers on Prolific to rate their interest in each of the videos. The most highly-rated video, a video about the definition of continents (https://www.youtube.com/watch?v=3uBcq1x7P34), became the study's video stimulus.

3.2 Ad Stimulus

We wanted participants to feel little interest towards the ad to increase sense of interruption, as well as to represent the common scenario of seeing an irrelevant ad. At the same time, we valued an authentic ad. We took the following low-cost approach to find such an ad. First, we asked nine colleagues at our institution to each browse YouTube in Incognito mode to get non-targeted ads, and to refer any 15-second ads to us. They gathered a total of 44 such ads, 36 of them unique. The ads covered a large variety of industries including fast food, insurance, banking, automotive, cellular services, etc.

We selected eleven ads at random from the list of 36 unique ads, ensuring each ad came from a different industry. We then screened the ads on Prolific. 121 crowdworkers each rated a random subset of three out of the 11 ads, for an average of 33 ratings per ad. Our study used the ad rated most consistently as uninteresting – a Hotels.com ad.

3.3 Recruitment and Participants

We recruited a convenience sample of 45 people from the local area of our institution to participate in in-person interviews. Participants had no special criteria to fulfill other than being over the age of 18. To increase diversity, we posted flyers in a variety of public locations, including libraries, grocery stores, cafes, and restaurants. In addition, we posted an announcement in our institution's newsletter. Table 1 summarizes the demographics of our participants. The study lasted a median of 16.5 minutes and each participant received 10 USD in compensation.

Attribute	Distribution
Age	Range of 20 to 71 years old. Median = 29 years.
Gender	31 (69%) female, 13 (29%) male, 1 nonbinary
Race	21 (48%) White, 16 (36%) Asian, 5 (11%) Black, 5 (11%) Hispanic, 1 Native American[1]
Is student	25 (56%) student, 17 (38%) not student, 3 (7%) no response[2]

Table 1: Demographics of our 45 participants.

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[1]Numbers add to more than 100% because three participants selected more than one category.
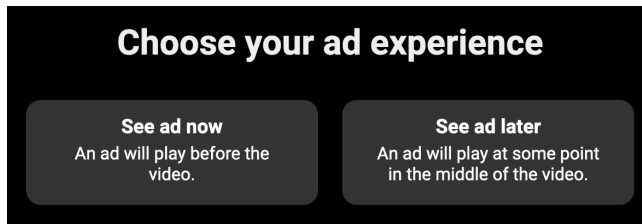[2]We queried student status starting with the 4th participant.

Figure 1: Screenshot of the choice interface.

3.4 Study Procedure

Participants first sat down at the experimenter's computer and clicked a button that navigated them to our designated YouTube video. A custom web extension injected the 15-second video ad, which leveraged YouTube's existing CSS such that its style matched that of YouTube's native ads. We additionally obtained a YouTube Premium account to ensure that YouTube's ads would not interfere with our injected ad. The placement of the injected ad depended on the participant's randomly-assigned experimental condition:

- *No Choice, Beginning (B).* The ad played before the video. Then the video played with no further interruptions.
- *No Choice, Middle (M).* The ad interrupted the video at its exact halfway point. There were no other interruptions.
- *Choice (C).* Before the video started, a choice interface replaced the video player (Figure 1), with the options of either seeing an ad now or later. Choosing to see an ad later played the ad at the same point as the M condition.

Participants were not informed of the study's true purpose of investigating choice to help minimize response bias [32]. If a participant saw the choice interface and asked for instructions, the experimenter feigned ignorance and asked the participant to choose whatever they liked.

At the conclusion of the video, the experimenter directed participants to a questionnaire. The questionnaire measured our outcomes of interest and potential covariates such as interest in the video and ad. This questionnaire then guided a semi-structured interview. Topics of discussion included how the participant responded to the outcomes of interest and their thoughts on the choice interface in the study if they had seen it. Regardless of whether a participant got a choice, the interviewer solicited the participant's thoughts and feelings on a hypothetical world where popular video platforms provided the choice that we provided in the study. Lastly, participants completed a demographic survey and received a debrief about the true purpose of the study.

3.5 Outcome Measures

Through literature review and reflection among co-authors, we constructed three questionnaire items relevant to our UX outcomes of satisfaction and feelings of control. Participants rated the items on a five-point Likert scale from Strongly Disagree to Strongly Agree. Figure 2 displays the exact wording of each item.

The first item measured satisfaction. We deemed many existing measures of satisfaction such as usability [26], liking of the site [16], and intent to return to the site [31] inappropriate for our study.

These measures emphasized holistic platform attitudes, increasing the likelihood that they would capture preexisting attitudes towards YouTube instead of participants' experiences during the study. We instead asked participants to report their overall satisfaction with their YouTube experience during the study and asked them elaborate in the interview.

The next two items each interrogated a different aspect of subjective control. One item assessed the degree to which participants felt that YouTube was adequately considering their wishes, which was inspired by the Learning Climate Questionnaire [41], a measure of students' autonomy in the classroom. The other item measured general feelings of being in control, adapted from Vaccaro et al [40].

Besides the three UX-related items, a fourth single item measured brand attitudes. Following Bergkvist & Rossiteret [8], participants completed the statement "My overall feeling of Hotels.com is..." with options on a 7-point Likert scale ranging from Bad to Good.

3.6 Analysis

3.6.1 Quantitative. To address RQ1, the effect of a pre- vs mid-roll ad on our outcomes of interest, we focused on differences in outcomes between the No Choice, Beginning (B) and No Choice, Middle (M) conditions. To address RQ2, the effect of the choice in ad placement, we first examined the behavior of the 15 participants in the Choice (C) condition. 13 participants opted for a pre-roll ad, and the remaining 2 opted for a mid-roll ad. As such, for all but two participants, the C and B conditions had consistent ad placement and differed only in whether a choice was offered. This enabled the difference in outcomes between C and B to function as an estimate for the effect of choice provision separate from the effect of ad placement.

Statistical tests of whether potential covariates (age, gender, ad interest, video interest) differed among conditions found no significant differences. Thus our analysis uses Kruskal-Wallis ANOVA tests to facilitate comparison among the conditions without controlling for any covariates.

3.6.2 Qualitative. In addition to comparing questionnaire responses, we examined how participants' statements in the interview differed between experimental conditions. Interviews were transcribed, and then the first author took an iterative grounded-theory-like approach where the transcripts went through an open coding process. This process extracted themes from participants' (1) explanations of how they responded to our UX-related questions, (2) brand attitudes i.e. attitudes towards Hotels.com, (3) reactions to the choice if there was one, and (4) feedback to the hypothetical implementation of the choice.

4 RESULTS

Figure 2 displays participants' levels of agreement with our UX-related statements. Kruskal-Wallis ANOVA tests on the responses to each of the three statements yielded significance values of p=0.064, p=0.011, and p=0.032 respectively. None of the tests are considered statistically significant at a level of p=0.05 under Bonferroni multiple hypothesis testing correction. However, the themes from our interviews support the quantitative trends. Below, we first detail the effect of ad placement on UX (RQ1), then the effect of the

choice (RQ2). Finally, we describe the effects of ad placement and the choice on brand attitudes.

4.1 Effect of Ad Placement on UX (RQ1)

Participants in the M condition tended to give lower ratings of UX (right column of Figure 2). 7 participants in B selected the highest satisfaction rating, in contrast to 1 in M. Furthermore, no participants indicated dissatisfaction in B, while 3 did in M. During the interview, participants often complained about the existence of ads, regardless of placement. For instance:

> I didn't [rate] it Strongly Agree because that would be an ideal case where I don't have to watch any ads. (P9, condition C, selected Somewhat Agree)

Complaints surrounding the ad were more prevalent in the M condition. 11 out of 15 participants in M explained the ad reduced satisfaction ratings, compared to 4 out of 15 in each of the B and C conditions. Four participants in M specifically called out the placement or mid-roll nature of the ad:

> The ad placement was really bizarre and disruptive ... it was not in a natural place. (P23, condition M, selected Somewhat Disagree)

In contrast, two participants in B indicated the pre-roll placement increased satisfaction ratings:

> The ad didn't interrupt the video; it was before, so that's nice. (P40, condition B, selected Strongly Agree)

Our second UX measure evaluated the degree to which participants felt YouTube was adequately considering their wishes. For this item, the median rating in the M condition was lower than the other conditions by 1 Likert point. Likely because the wording of the question did not prompt participants to consider what they had experienced during the study, 40 out of 45 participants made only general statements about YouTube. We observed no interview themes clearly correlated with experimental condition. 16 participants (7 in C, 4 in B, 5 in M) expressed that YouTube cared only about exploiting its users to generate engagement or profit, decreasing their ratings. For example:

> [YouTube] has to care enough to do things that make people keep wanting to come back. (P18, condition C, Selected Somewhat Agree)

> I think that they care in the sense that they know that they need users to make money. (P23, condition M, selected Neither Agree nor Disagree)

13 participants (3 in C, 6 in B, 4 in M) referenced ads or ad placement in general as a factor that decreased their ratings. As two examples:

> Sometimes ads will play in the middle of the video at very inconvenient points that make it hard to follow. (P10, condition B, selected Somewhat Agree)

> If they really did care, they wouldn't have so many ads. So that's why I didn't put Strongly Agree. (P19, condition B, selected Somewhat Agree)

4 participants mentioned past experiences with short, skippable, or relevant ads as a source of positive sentiment:

> [YouTube] shows us relevant ads, whatever we need. It's like the ads that you see are very relevant to what you want. (P4, condition B, selected Strongly Agree)

Finally, outside of ads, participants mentioned a variety of both positive and negative factors, including good video recommendations (N=5), unwelcome changes to the UI (N=4), and poor parental control features (N=1).

For the last item of feelings of control, the median rating in the M condition was lower than the other conditions by 2 Likert points. 10 participants in M described that the ad reduced their feelings of control, compared to 3 and 5 participants in B and C. Among such participants, they most commonly complained that they could not skip the ad. For instance:

> [Somewhat Agree], because of the ad in the middle. I couldn't choose to skip over [it]. And I couldn't choose to watch the video continuously. (P41, condition M)

Participants often mentioned factors besides advertising, as the item's wording did not specify control over any particular aspect of their experience. 16 participants said they felt less in control because we picked the video for them, for instance P7:

> I watched what you gave me, so I had no control. (P7, condition B, selected Strongly Disagree)

Other, less common factors, each positive, included the ability to control the video player (N=7), ability to discontinue participation in the study (N=6), and liking the video or ad (N=2).

4.2 Effect of Choice on UX (RQ2)

Participants assigned to the Choice (C) and No Choice, Beginning (B) conditions responded to the UX items with similar distributions. In fact, as the first row of Figure 2 indicates, participants in the B condition had *higher* average satisfaction than participants who received a choice.

The 15 participants in the C condition had a variety of reactions to the choice. On the positive side, they reported the choice increased satisfaction (N=2), their sense that YouTube cared (N=3), and feelings of control (N=10). P5 enthusiastically exclaimed, *finally an option!* Eight participants framed the choice in terms of its utility to prevent interruptions:

> I think [the choice] is a good idea because I don't like when ads interrupt in the middle of the video. (P12)

> I hate when I'm watching something on YouTube and then the ad pops up in the middle of it. I just hate that. So [the choice] was a big thing for me. I really enjoyed that. (P27)

On the other hand, eight participants reacted with expressions of helplessness surrounding the unavoidable ad:

> The only thing I could think of, all right, it's stuff I need to get done. It's like paperwork or something like that. Yeah, just get over and done with, whatever. (P3)

> I did appreciate the greater sense of control that I had, but at the same time, there was no way to avoid the ad. (P15)

Two participants commented that the choice did not matter to them because they felt indifferent to whether the ad was in the
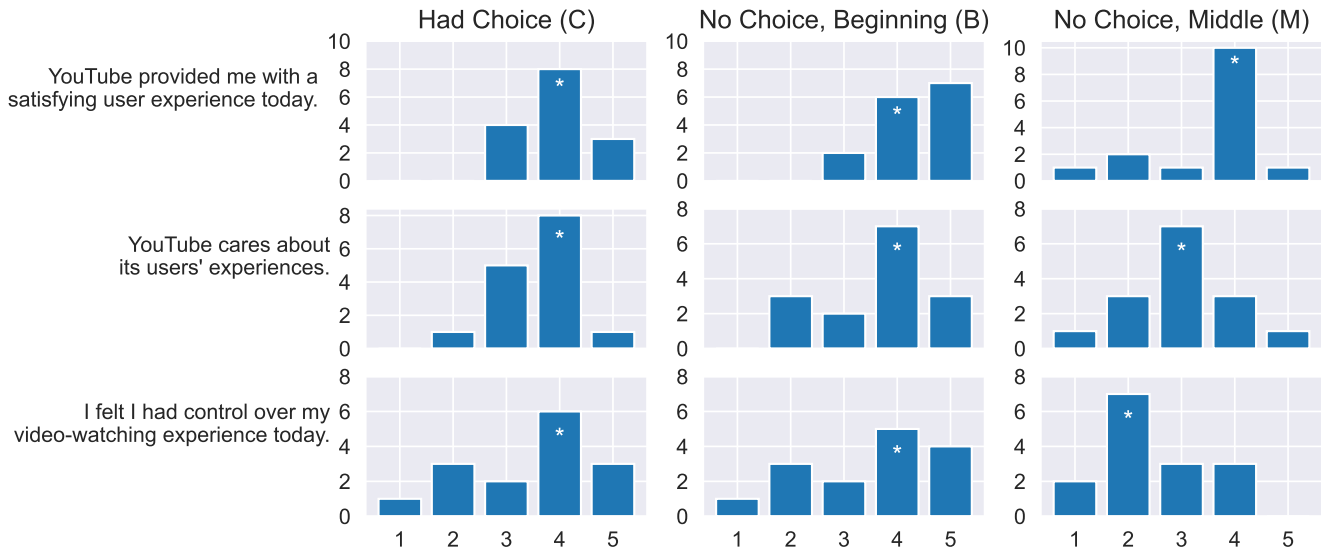
Figure 2: Distributions of participants' agreement ratings to our three UX-related statements. Ratings were on a 5-point Likert scale – 1: Strongly disagree, 2: Somewhat disagree, 3: Neither agree nor disagree, 4: Somewhat agree, 5: Strongly agree. A white asterisk within a bar indicates the median of that distribution.

beginning or the middle. And finally, two participants expressed the choice amounted to selecting the "default" ad placement (P18) or "something that I'm used to" (P15), limiting how much they felt that the choice benefited them.

Two out of 15 participants chose the mid-roll ad. P5 explained, *let me just watch [the ad] in the middle when I'm invested.* In other words, they wanted to first decide whether the video was worth watching before investing time in it and hence, the ad. They further explained that for other types of videos like music videos they would choose a pre-roll ad, as the need to watch the video to completion without interruption was greater. P42 decided on a mid-roll ad because *I just didn't want to see the ad right now. So I just delayed it.* But afterwards, they regretted their decision. They explained that they *didn't expect the ad to ... cut the sentence of the person that was talking.* Our ad indeed appeared mid-sentence, and this participant evidently expected a less disruptive experience when they chose the mid-roll ad. Their expectation has some merit, as YouTube automatically places mid-roll ads at natural breaks in videos [43].

4.2.1 Feedback on a Hypothetical Choice. Regardless of experimental condition, the interviewer asked all participants how they would feel if video platforms like YouTube were to implement a choice like the one in the experiment. 37 out of 45 participants gave at least one piece of positive feedback, with participants most commonly expressing that they liked the choice's ability to prevent ad interruptions (N=27). Other benefits that participants mentioned included the choice's ability to generate goodwill with users and providing flexibility. While almost all participants said they desired a pre-roll ad, two participants named scenarios in which they preferred mid-roll ads:

> *YouTube has movies free with ads. It could be like a longer [mid-roll] ad and that could give me time to check my phone or have a bathroom break. (P30)*

> *When I'm cooking and I need instant advice from the Youtube video, or just instantly want to watch what step I have to follow next, then I would prefer to watch [an ad] later than earlier. (P35)*

Some participants gave negative feedback. Six participants said the choice did not matter to them. Reasons included indifference to the ad's timing; or, as P45 elaborated, the fact that *an ad is still an ad.* Two participants pointed out there would be a cost to asking every time a video played, such as P18:

> *I don't want them asking every time because, you know, [it's] annoying and costing me time all the time. But if they want to just ask me once, fine. (P18)*

Echoing how P42 regretted their choice of a mid-roll ad, P15 expressed concerns about *where that control will send me, potentially down a bad route.* But despite some participants feeling that the choice had no use for them personally, they still expressed that it could have utility for other people.

4.3 Effect on Brand Attitudes

To measure brand attitudes, we asked participants to rate their overall liking of Hotels.com. Responses showed little variation: with 15 participants in each condition, 13, 12, and 13 participants selected the neutral option in the C, B, and M conditions, respectively. A Kruskal-Wallis ANOVA test found no significant differences in brand attitudes among the groups (p=0.345). During the interview, 22 participants stated that they did not have enough information to form an opinion. For instance:

> *I don't know anything about the company, don't know their practices, don't know how they work. So I don't really have an opinion.* (P38)

10 participants referred to their prior experiences using Hotels.com, with 8 still selecting the neutral rating. As P22 described, *I've used them maybe once in the past and it was okay.* And finally, 13 participants based their opinions off the content of the Hotels.com ad, with 10 neutral impressions and 3 positive impressions. Nobody stated that the placement of the ad or that our provision of choice in placement affected their opinion. In fact, two participants, both in M, stated that the ad's interrupting nature did *not* affect their opinion of Hotels.com:

> *The fact that there's an ad- ... I'm not gonna hate them [Hotels.com] for it because everyone wants money.* (P17)

> *I don't think Hotels.com is the problem. I think having an ad is the problem.* (P20)

5 DISCUSSION

In this study, we set out to provide a deeper explanation of how user agency influences subjective user experiences by separating the effects of choice provision from changes made as a result of choosing. Below, we discuss the distinct effects of each of these two aspects, and the implications for future work.

5.1 Effect of Ad Placement on UX (RQ1)

Consistent with prior work showing that mid-roll ads cause more irritation than pre-roll ads, in our study the mid-roll ad placement worsened average user experiences compared to the pre-roll placement. However, this trend might not hold for all individuals or all situations. Prior work has explored factors that increase or decrease irritation levels from mid-roll ads on average, including whether the same ad plays multiple times [9], whether viewers can skip the ads [13], and whether the ads interrupt narrative (story-based) vs non-narrative content [10]. Our study adds nuance by documenting several reasons why individuals *actively prefer* a mid-roll ad, including desires to quickly decide if content is worth watching, to quickly gain information, or to take a break during longer content. Therefore, platforms interested in maximizing UX should consider further work in using these factors to predict ideal ad placement.

In addition, aligning with prior work [9, 10], we found no statistically significant effects of ad placement on brand attitudes, although we cannot rule out the existence of small effect sizes. Some participants pinned the blame of interruptions on YouTube, and not Hotels.com. This suggests that mental models of how platforms place ads and advertisers' level of involvement in ad placements might influence consumers' brand attitudes, which future work can explore.

5.2 Effect of Choice on UX (RQ2)

Participants in the choice condition perceived a contrast between the two options that they received. 13 out of 15 participants choose the pre-roll ad; yet, we found few differences in questionnaire responses between participants choosing a pre-roll ad and participants assigned a pre-roll ad. Moreover, participants framed the utility of the choice in terms of getting a pre-roll ad. This suggests

that participants primarily cared about the resulting experience – the ultimate placement of the ad, and less about the choice itself.

In fact, we observed negative effects of choice provision on UX. Choice *decreased* average satisfaction ratings and feelings of control (see Figure 2, comparison of first vs second column). Several interview themes align with this trend. First, some participants felt indifferent to ad placement, which would cause the choice to cost time and effort without benefit. Some participants also alluded to this cost of choosing when discussing the hypothetical wider implementation of the ad timing choice. Second, the surfacing of the choice resulted in some participants expressing helplessness around the inevitability of seeing an ad. This reaction bears some resemblance to feelings of helplessness surrounding online tracking that prior work has documented [6, 24]. It signals that despite the agency that the choice provided, the choice did not necessarily further participants' feelings of autonomy or further their goals to watch the video without ads.

5.3 Implications for UX Research and Design of Controls

The pre-roll ad placement had a much larger positive impact on UX than the offer of choice over ad placement. This notably aligns with other studies that have found that relevant content matters more than control over that content [2, 39]. Control can help users shape the behavior of a system so it satisfies them. But if correct system behavior ultimately matters most for satisfaction, then it motivates designers to seek alternative ways to achieve this behavior. Choice costs users time and mental effort, as both our findings and prior work suggest [15, 20, 27]. Moreover, users can make choices that worsen their experience, such as the participant in our study that regretted picking the mid-roll ad.

Designers can consider automation as one alternative way to achieve satisfying system configurations. For instance, in the specific setting of our study, automatically assigning a pre-roll ad satisfied users about as much as letting them choose the pre-roll ad. However, this does not mean that designers should *always* automate decisions for users.

The characteristics of the choice architecture in this study can provide clues for when automation would see the most success. First, we propose automation must make low-stakes decisions. In the current study, being assigned a mid-roll ad when a pre-roll ad was preferred or vice-versa resulted in irritation at worst. But as a exaggerated high-stakes example, we reason that people would be less able to accept a career choice automatically imposed on them, even if it was the one they would have chosen by themselves.

Second, we propose that the automation must not deprive users of some benefit inherent in manual control. For instance, controls may function as a useful transparency mechanism for users. Sundar and Marathe found evidence that user control over news page content reassured some participants of their privacy; having direct control would give them knowledge of how the page was customized [39]. And Eslami et al. found that users came to appreciate the usefulness and accuracy of the Facebook feed algorithm more after they manually filtered their feeds [11]. But in our study,

we found no evidence that participants gleaned useful information about system operation by making decisions of ad placement, further explaining why the choice had no strong effects on UX.

To validate these proposals, we recommend that researchers disentangle the effects of control provision from the effects of software behavior when practical. This requires a method that assigns participants a software behavior similar to what they would have chosen on their own. Such methods include making good predictions of what participants would choose (as in this study), random assignment, or manipulating participants' desires (as in Ahn et al [2]). As work moves forward in this space, it may uncover even more characteristics of choice architectures that cause users to prefer control over automation or vice-versa.

Another direction of future work that we recommend is exploration of other outcomes besides the ones we choose for this study. One such metric is perceived usefulness, which predicts technology adoption [30]. Future work can investigate whether a high degree of control provision and customizability, such as the abundance of features that Adobe Photoshop provides, will increase users' perceived versatility of a program, fueling perceptions of its usefulness. But in general, outcomes of interest will depend on context. For instance, in advertising, researchers have measured purchase intentions, willingness to pay, liking of the ad, and more [1, 9, 10]. We urge researchers to tease apart the effect of choice provision on all outcomes of interest.

5.4 Implications for Advertisers and Video Platforms

While we primarily aimed to advance UI design research, our choice context also yielded some information for video platforms and advertisers. Much of the benefit of this study's choice architecture happened through preventing interruptions (and less so in the offer of choice itself), and some participants indicated that repeated forced choices would annoy them. After all, users come to platforms like YouTube to watch videos, not to decide the best ad placement. This suggests that less obtrusive designs of user control over ad placement would lead to a better overall experience for users, especially across multiple videos. For example, future work can test the design of a "Play Ad Now" button that appears on the edge of the screen near the time when a platform wants to show a mid-roll ad.

5.5 Limitations

Due to our sample size of 45 people, we cannot precisely estimate the effect of choice on UX. Small effects of having a choice, positive or negative, are still plausible. However, given the alignment of qualitative and quantitative data, a preponderance of evidence points to the effect of ad placement being larger than the effect of choice in our context.

The current study focused on the specific context of a short, interesting video paired with an uninteresting ad. While this represents many situations, it does not cover them all. As mentioned before in 5.1, many contextual factors influence viewers' response to mid-roll ads (RQ1). We invite future work to study contextual factors that influence users' evaluations of an ad placement choice (RQ2). For instance, they might more positively evaluate an ad

placement choice at the beginning of longer-form immersive content (e.g. a movie) because it has the potential to avoid multiple interruptions. Another factor could be the frequency of the choice. As mentioned before, we hypothesize that many users would not appreciate determining ad placement at the beginning of every video.

Finally, while the questionnaire items in this study served our purposes as measures of general participant sentiment and starting points for discussion during the interview, our participants interpreted the items in a variety of ways. We thus recommend scales with better psychometric properties in future, larger-scale studies.

6 CONCLUSION

This study delved into how providing control improved various measures of UX. In our context, giving users what they wanted affected UX much more than giving users a choice over what they wanted. Designers should carefully consider the ability of control settings to give users what they want, and ensure that choice provision outweighs the time and effort it costs users. With further work to understand when and how agency affects UX, we can ensure that user agency in computer systems truly improves their well-being.

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