

# **Bringing together what belongs together: Effects of matching ads to situations rather than to individuals.**

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## **Abstract**

Situational targeting is a promising and privacy friendly way to increase the effectiveness of advertisements purely based on contextual information. We present the results of a study designed to measure the impact of semantic congruence between a beer advertisement and a video clip on different advertisement measures, such as willingness to pay (WTP), attitude towards the brand (ATTB) or recall of the brand. The results indicate that semantic congruence implies a trade-off between improved ATTB and higher WTP for the product at the cost of lowered brand recall. We find that the effects on ATTB and WTP are only significant, when advertisement and video are being played at the same time, while recall is impaired in all conditions. The results further show that advertisements targeted towards beer drinkers only yield a positive impact on WTP and recall in case there is semantic congruence between ad and clip. Our results contribute to research on the economic impact of advertising and evaluate an alternative form of adaptive advertising, targeted to situations rather than to individuals.

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**Introduction**

Although advertisement spending has increased, advertising effectiveness has suffered dramatically in recent years. Usually it has been assumed “that high attention equates to high recall which equates to high advertising effectiveness” (Heath, Brandt and Nairn 2006, p. 411). However, as consumers are overwhelmed by the quantity of advertising messages, attention is becoming an increasingly scarce resource (Simon 1971) and more difficult to attract (Pieters, Warlop and Wedel 2002). As a result, advertisers and marketing agencies seek new ways to increase the effectiveness of advertisements.

Interruptive marketing practices are one approach to capture more attention. Interrupting a consumer’s primary task has been shown to increase brand recall and awareness (Barry and Howard 1990; Yoo, Kim and Stout 2004). However, due to a negative attitude formation, the effects of interruptive practices are not always positive; for instance, consumers’ willingness to pay (WTP) for the advertised brand can decrease (Acquisti and Spiekermann 2011).

A more promising way to break through the information clutter are targeting mechanisms, which aim to deliver advertisements “that match consumers’ interests, preferences, or needs” (Lekakos 2009, p. 404). Targeting is based on the concept of market segmentation, which aims to select advertisements that target a specific audience or ideally an individual (Lekakos 2009). On the Web, targeted advertising is widely used and praised for its effectiveness compared to traditional advertising (Adams 2004; Kazienko and Adamski 2007). It has been shown to increase the level of attention towards the targeted information (Malheiros et al. 2012), as well as to increase the perceived usefulness of this information (Tam and Ho 2006). Targeting mechanisms make use of customers’ personal attributes (e.g. demographics, past behavior, current search terms) or captured interests and preferences in order to select the right messages.

But, such targeting practices also face some severe challenges. For instance, consumers frequently report that targeted advertising intrudes their privacy (Chellappa and Sin 2005). As a consequence, they develop discomfort towards the advertised product (Malheiros et al. 2012). Purchase intent can be reduced by up to 65% (Tucker 2012). This “ad skepticism”, caused by privacy concerns and ad irritations, superimpose the positive effects of targeted advertising (Baek and Morimoto 2012).

Consumers' instincts about privacy are not too far fetched: The massive accumulation of person related data is increasingly becoming a legal issue for targeting networks. Some countries, especially in Europe, now force ad providers to obtain the explicit consent of individuals to collect and process their data. Against this background, some researchers even postulate a trade-off between privacy and targeting opportunities (Lee and Ahn 2011). Taken together, legal and social uncertainties, as well as low attention towards ads require media companies to evaluate alternatives to targeting individual consumers.

This paper presents such an alternative: a practice we call "situational targeting" (Lasinger and Bauer 2013). We define situational targeting as delivering ad information that is relevant to an individual or a group of individuals based on a shared situation between the potential consumer(s) and an intelligent environment in real-time. Information, which is retrieved, transformed or deduced from the environment (rather than from people), is used to select relevant advertisements. Examples are advertising for ear protection in loud environments, for ice cream on hot days, or advertising of beer when consumers are watching a video clip about beer production. In these scenarios the relevance of the ad message is enhanced through the semantic congruence with the situation in which it is shown. Semantic congruence describes a relationship between two entities that is perceived as 'fitting'.

"Situational targeting" seems similar to "contextual advertising", but really extends this well-known praxis. The interactive marketing community understand contextual advertisement today as a keyword-based matching between ads and website content (i.e. on Google), often complemented by user-profile based targeting. Situational targeting, goes further and stresses that ads should match entire situations that may be characterized by a multitude of real-world attributes while forgoing the use of people's personal data.

Information System researchers have suggested real-time situational targeting for a while (e.g., Linden, Smith and York 2003; Smith 2004; Adomavicius et al. 2005). Yet, real-world deployment is only now becoming technically feasible. Sensors are increasingly being embedded in the environment (i.e. in smart phones or retail outlets) and can provide information on temperature, precise location, noise levels, etc. (Baldauf, Dustdar and Rosenberg 2007). Machines are becoming increasingly better in interpreting unstructured contextual information (Kotsiantis 2007), as well as video content (Prasad et al. 2012).

However, the impact of such practices on advertisement effectiveness has not yet been evaluated.

What we know from contextual advertisement research is that ad perception and effects are heavily influenced by 'editorial context' (Moorman, Neijens and Smit 2002) or the environment (Mehrabian and Russell 1974). For instance De Pelsmacker et al. (2002) report that a perceived thematic closeness between advertising and the TV program enhances recall. Dahlén (2005) reports that the perception of relevance between an advertisement and its medium leads to higher ad credibility and positive attitudes. Research also implies that 'semantic congruence' between an ad and another entity impacts behavioral effects (e.g. Norris and Colman 1992; Meyers-Levy and Sternthal 1993; De Pelsmacker, Geuens and Anckaert 2002; Moore, Stammerjohan and Coulter 2005; Dahlén et al. 2008; Noseworthy, Cotte and Lee 2011). However, the type and direction of these effects of semantic congruence on consumer behaviour are not fully understood (Puccinelli et al. 2009). Studies show contradictory results. Dahlén et al. (2008) report, for example, that attitude towards the brand (ATTB) is improved when an advertisement does not fit the editorial context, while other authors report the opposite (De Pelsmacker, Geuens and Anckaert 2002; Russel 2002; Moore, Stammerjohan and Coulter 2005). Also, most studies have only reported ad effects for a single dependent measure (e.g. ATTB). They did not capture the fact that semantic congruence can have both positive and negative effects for advertisers at the same time, as we will show below.

In order to gain a holistic understanding of the effects of situational targeting in online-video environments we ran an experiment with 409 subjects. Situational targeting was operationalized as the perceived semantic congruence between online-videos and ads placed with them. We chose the online-video environment for our study as this market is growing rapidly, there is still no established advertising approach and little academic research on the effects of advertising. We compared the relative impact of situational targeting with the impact of targeting based on person-related variables. In fact, our experiment was conducted in co-operation with one of the world's leading advertisement conglomerates which allowed us to compare the effects of the company's most powerful user-related targeting variables with those achieved through semantic congruency.

To present our experimental work this article is structured as follows; the next section presents the theoretic foundations of our work and the hypotheses we investigated. We then introduce our research methodology and, design. The following section presents the results of the experiments, which are then discussed. We conclude with the limitations and conclusions of our presented research.

## **Theory and Hypothesis**

The Von Restorff Effect describes an enhanced attention to and learning of semantically incongruent items (Restorff 1933). Incongruent items tend to “stick-out” and are therefore better remembered (Wallace 1965). In contrast, when an advertisement is placed in a semantically congruent context, the advertisement seems to merge with its context (cognitive interference), which makes it harder to remember the advertisement (Norris and Colman 1993). As a result of these psychological mechanisms, the best recall and recognition of a brand have been achieved with semantic incongruencies that are unexpected but relevant (Heckler and Childers 1992; Russel 2002). Online ads placed in backgrounds of different color, for example, were recalled and recognized better (Moore, Stammerjohan and Coulter 2005). On the contrary, similarity of content between an ad and its surrounding TV program reduced recall (Furnham, Bergland and Gunter 2002). We thus hypothesize:

**H1.** An advertisement that is semantically congruent to a video-clip will be less memorized than the same advertisement placed in a semantically incongruent video-clip.

Memory effects are not the only goal advertisers have. Equally important are attitudes towards a brand (ATTB) and emotions that build up among customers over time. Such attitudes and emotions can equally be influenced through ad design. Gestalt Theory predicts irritations when there are perceived inconsistencies between an item in focus and its environment (von Ehrenfels 1890). Emotions are negatively impacted by these irritations (Metzger 2006). Hence, an advertisement shown in a semantically incongruent context may cause irritations, which again could reduce ATTB. In fact, several studies confirm this dynamic. For instance, ATTB is decreased in case an ad is not thematically congruent with

the TV program (De Pelsmacker, Geuens and Anckaert 2002). Products placed in an incongruent plot are leading to a decreased ATTB (Russel 2002). Semantic congruence between an ambient scent and product category increases attitude and brand evaluation (Bosmans 2006) and semantic congruence between an ad and a Webpage increases ATTB (Yoo 2009). Against this background we hypothesize that these directions also hold true in an online video context:

**H2.** An advertisement that is semantically congruent to a video-clip will produce a better ATTB than the same advertisement placed in a semantically incongruent video-clip.

Retail relies on very small margins. Therefore, even small differences in consumers' WTP are highly important. In general research assumes that WTP is linked to consumers' emotional states (Vakratsas and Ambler 1999; Puccinelli et al. 2009). However, the impact of situational targeting on WTP has only been examined by a few empirical studies and for classical media and in store settings. For instance, scents being semantically congruent to a product have been reported to increase evaluations of the store and sales (Spangenberg et al. 2006). Also intention to donate has been reported to increase in case there is semantic congruence (in regard to the positive or negative framing) between the call to donate and editorial context (case story) (Chang and Lee 2010). Based on this empirical evidence as well as the theoretic reasoning for hypothesis 2 we hypothesize:

**H3.** An advertisement that is semantically congruent to a video-clip will produce a higher willingness to pay for the advertised item than the same advertisement placed in a semantically incongruent video-clip.

### **Methodology**

The experiment was designed as a 2x2 between subject design to investigate the impact of semantic congruency between ads and online video clips on ad effectiveness. For this purpose, a pre-tested fictitious beer advertisement was either semantically congruent (conditions 1 & 3) or semantically incongruent (conditions 2 & 4) to the video material. The

advertisement was shown either as an overlay (conditions 1 & 2) or as a pre-roll (conditions 3 & 4). In each of the four groups there were around 100 participants. Figure 1 summarizes the set-up.



	<b>Overlay</b>	<b>Pre-roll</b>
		
<b>congruent ad – video clip</b>	Condition 1 (n=101)	Condition 3 (n=103)
<b>incongruent ad-video clip</b>	Condition 2 (n=106)	Condition 4 (n=99)

Fig. 1. Experimental Conditions Overview and Stimuli

*Procedure*

Participants were recruited through a market agency to participate in a 20 minute online survey for a compensation of € 4. They were sent to our website upon clicking on a link that was sent to them by the agency via e-mail. Subjects were randomly assigned to one of the four experimental conditions. Subjects were instructed to ostensibly judge on the quality of a video clip. While watching the video clip to which they were assigned, the advertisement of a beer brand appeared for 7 seconds either during (overlay conditions 1 & 2) or before the 120 seconds video clip (pre-roll conditions 3 & 4). As shown in Figure 1 the brand was displayed either in full size when displayed as pre-roll or in a one-third screen-size when displayed as an overlay. These are the typical formats used to today for video advertising. The ad could not be clicked off the screen to ensure that all participants had identical exposure time to the stimulus. After watching the video clip (and the advertisement) for a first time participants filled out a questionnaire on what they had just seen. Then they saw the clip and advertisement again and were asked for the perceived congruence between the ad and the clip.

### *Measures*

Our goal was to measure the differences between WTP, recall, recognition, and ATTB between subjects that had been exposed to a clip being semantically congruent to the ad, versus subjects being exposed to a clip being semantically incongruent to the ad.

The questionnaire contained (1) questions to rate and review the clip, (2) open questions to measure recall of the brand shown in the ad (De Pelsmacker, Geuens and Anckaert 2002) and recognition of the brand (Furnham, Bergland and Gunter 2002). (3) Affective ATTB was captured using three questions on an 11-point Likert scale (from strongly disagree to strongly agree) (Aylesworth and MacKenzie 1998). Also (4) willingness to pay (WTP) for the product was measured, by using an open-ended question. Thereby our intention was not to capture the “real” WTP, which would require other, incentive-compatible, mechanisms like the Becker-DeGroot-Marschak method (Becker, Degroot and Marschak 1964; for application refer to Acquisti and Spiekermann 2011), but being able to compare the mean WTP in the different manipulation groups..

In addition the questionnaire captured the subjects' (5) general attitude towards advertisement. After viewing the clip and advertisement for a second time, (6) the perceived congruence between the ad and the clip was measured in line with scales from (Heckler and Childers 1992; Lange, Selander and Åberg 2003; Lee and Ang 2003; Bosmans 2006). Finally, (7) demographic data, as well as data on product usage and product preferences was obtained. Participants were asked (8) in what situation and environment they had conducted the experiment and whether they had been thirsty or had been drinking something during that time. This information was collected in order to control for environmental factors that could potentially influenced the results (i.e. the WTP for a beer).

### *Material*

We extensively pre-tested the material used in the experiment. The advertisement for the beer brand was created by a professional advertisement agency just for the purpose of this experiment (mean appreciation: 2.76, s.d.: 2.42; mean positive emotion: 4.27, s.d.: 2.55). It contained the slogan “Maximus – The natural beer delight”.

The two video clips (one being congruent, the other incongruent with the beer ad) were two-minute fragments of videos sourced from Youtube. A pre-study allowed us to ensure that



the two clips would be commonly perceived as either being semantically congruent or incongruent to the beer ad. Moreover, the pre-study ensured that the clips were as similar as possible to each other in terms of type (professionally produced reportage), video quality, video size, appreciation and emotional involvement. For this purpose two judges initially selected 25 clips from Youtube based on their shared perception of semantic congruence or incongruence with the advertised product. 574 pre-study participants then rated their degree of interest (De Pelsmacker, Geuens and Anckaert 2002) and positive emotions towards (Russell 1980) the video clips as well as the beer ad. Semantic congruence was operationalized according to (Heckler and Childers 1992; Lange, Selander and Åberg 2003), asking testers to rate the perceived semantic congruence between the beer ad and the clips on an 11-point Likert scale. Two criteria were then used to identify a reliably semantically congruent and a reliably semantically incongruent clip-ad pair: First, the testers mean perceived semantic congruence for the ad-video pair should be either close to 0 (incongruent, totally disagree that the ad fits the clip) or close to 10 (congruent, fully agree that the ad fits the clip). Second, the standard deviation of the perceived semantic congruence should be as small as possible across participants, to ensure that the tester population shared a similar perception of semantic congruence. Furthermore, we wanted to ensure that emotions or a particular interest in the clip/ad material would not superimpose stimulus material. For this reason we also measured testers interest in the clip and emotions after viewing it.

The two clips chosen for the main experiment were “Beer- How it is created” for the congruent conditions (mean semantic congruence with the beer ad: 7.25, s.d.: 2.76; mean interest in the clip: 4.43, s.d.: 3.14; mean positive feeling towards the clip: 5.86, s.d.: 2.31) and “GEO documentary: Apnoe-Divers – Raptures of the Deep” for the incongruent condition (mean semantic congruence with the beer ad: 0.20, s.d.: 0.42; mean interest in the clip: 5.40, s.d.: 3.46; mean positive feeling towards the clip: 5.92, s.d.: 2.29). The differences between mean interest in the clip ( $t=-0.99$ ,  $p=0.33$ ) and mean positive feeling towards the clip ( $t=-0.09$ ,  $p=0.94$ ) were not significant.

## Results

409 subjects participated in the experiment. They were a representative sample from all age groups, education levels and locations in the country. Across all conditions females accounted for 50,4% of the sample. Participants were between 15 and 65 years old, with 29% younger than 30 years, 43% between 30 and 50 years and 28% older than 50 years.

### *The Effects of Semantic Congruence*

We captured free recall and recognition of the brand, affective attitude towards the brand and WTP for the beer brand after the experiment. Measure results for memory and ATTB were normalized to range from 0 to 1. Free recall was coded with 1 if the product category was recalled, 2 if the product name was recalled and three if both were recalled. The measure was divided by three to range from 0 to 1. The results are summarized in Table 1:

Table 1

Advertisement measures by conditions

	<b>Overlay</b>	<b>Pre-Roll</b>
<b>Semantic Congruent</b>	Condition 1	Condition 3
Free recall of brand and ad	0.12	0.11
Recognition of the brand	0.63	0.75
Attitude towards the brand	0.42	0.43
Willingness to pay	€1.58	€1.55
<b>Semantic Incongruent</b>	Condition 2	Condition 4
Free recall of brand and ad	0.20	0.24
Recognition of the brand	0.60	0.75
Attitude towards the brand	0.35	0.41
Willingness to pay	€1.17	€1.30

In the semantic congruent setting subjects remembered the ad much less. In the overlay condition the mean recall was 0.12 (s.d. 0.17, min 0, max 0.75) and in the pre-roll condition 0.11 (s.d. 0.17, min 0, max 1), compared to the semantic incongruent conditions, where the mean recall was 0.20 (s.d. 0.19, min 0, max 0.67) and 0.24 (s.d. 0.24, min 0, max 0.92).

As recall data was not normally distributed, the Mann-Whitney-U test was applied to compare these differences that are statistically significant and of medium effect size (overlay:  $U= 3980$ ,  $p= 0.001$ ,  $r= 0.33$ ; pre-roll:  $U= 3419$ ,  $p= 0.000$ ,  $r= 0.41$ ) Spearman correlation confirmed the negative correlation ( $-0.27$ ) between semantic congruence and free recall of the brand and ad, significant at the 1% level.

Recognition of the brand was equally evaluated. In the overlay and pre-roll conditions with congruency the mean recognition was 0.63 (s.d. 0.25 min 0, max 1) and 0,75 (s.d. 0.26 min 0, max 1). In the incongruent condition 2 the mean recall was surprisingly similar at 0.60 (s.d. 0.43 min 0, max 1) for overlays and 0.75 (s.d. 0.33 min 0, max 1) for pre-roll. So, in contrast to free recall, the means for recognition did not differ much between semantically congruent and incongruent conditions. Again, Mann-Whitney-U tests were applied on the not-normally distributed recognition data. For both overlay ( $U= 5287$ ,  $p= 0.89$ ,  $r=0.02$ ) and pre-roll ( $U= 4939$ ,  $p= 0.66$ ,  $r=0.04$ ) conditions there was no significant difference between semantically congruent and incongruent conditions. Also a Spearman correlation ( $-0.03$ ,  $p=0.59$ ) indicates that there is no significant correlation between semantic congruence and recognition of the brand. These results leave us with a mixed answer to hypothesis 1: The more rigid measure of memory effects, which is the recall measure, suggests that – regardless of the ad display-format - incongruent ad-video combinations drive memory, at least in the short term.

In addition to recall and recognition, the ATTB was captured. It was hypothesized (*hypothesis 2*) that the ATTB is higher in semantic congruent conditions than in semantic incongruent conditions. Indeed the mean ATTB was higher in the semantic congruent conditions. In a semantic congruent, overlay setting (condition 1), the mean ATTB was 0.42 (s.d. 0.22, min 0, max 0,9) compared to 0.35 (s.d. 0.23, min 0, max 1) in a semantic incongruent setting (condition 2). This difference is statistically significant ( $U= 4450$ ,  $p= 0.028$ ,  $r= 0.22$ ). In the pre-roll format however congruency does not seem to matter for ATTB. In the semantic congruent, pre-roll setting (condition 3), the mean ATTB was 0.43 (s.d. 0.22, min 0, max 1) compared to 0.41 (s.d. 0.21, min 0, max 0,9) in a semantic incongruent setting (condition 4) with the difference not being significant ( $U= 4628$ ,  $p= 0.245$ ,  $r=0.11$ ). Therefore hypothesis 2 can only be accepted for overlay advertisements. A crosscheck using non-

parametric Spearman correlations confirmed a positive correlation of 0.147, significant at a 1% level. Hence congruence improves ATTB in overlay settings, but not pre-roll settings.

The third research hypothesis investigates whether congruent ad-video pairs improve consumers' willingness to pay for a product. A majority of subjects expressed a willingness to pay greater than zero for the advertised product (324 out of 409, roughly 80%). WTP was not normally distributed and - as previously observed by related research (e.g. Acquisti and Spiekermann 2011) - clustered around zero. Considering that retail prices for a bottle of beer (0.5 liter) in the country at the time of the experiment ranged between €0.50 and €1.00 and country statistics indicating an average price level of €0.82, the mean prices stated by the participants ranking from € 1.17 to € 1.58 seem realistic.

In the overlay/congruent condition 1 the mean WTP was €1.58 (s.d. 1.58, min €0, max €9). In contrast, in the same-format semantically incongruent condition 2 participants expressed only a mean WTP of €1.17 (s.d. 1.17, min €0, max €10). Non-parametric Mann-Whitney-U test confirms the significance of this WTP difference ( $U=4222.5$ ,  $p=0.008$ ,  $r=0.26$ ). Pearson's  $r$  of 0.26 indicates a small to medium effect size. Hence, semantically congruent ad-clip combinations lead to a higher WTP in the overlay setting. Looking at the pre-roll conditions, a significant difference between WTP could not be observed for congruent vs. incongruent conditions ( $U=4451.5$ ,  $p=0.116$ ,  $r=0.153$ ). Based on these tests, *hypothesis 3* can only be accepted for overlay advertising formats. Thus only the simultaneous perception of semantic congruence leads to a higher WTP.

#### *Semantic congruence in comparison to user profiling*

To further investigate hypothesis 3 and also to understand the relative strength of situational targeting (here ad-video congruency) as opposed to profile based targeting we conducted an additional regression analysis. As outlined above, typically customer profile characteristics are chosen to target ads and it is assumed that such targeting has a positive effect on memory, ATTP and WTP. A globally leading advertising company provided us with typical customer profile characteristics used by them to select the right online ads for people. These include age, gender, product consumption patterns and product preferences. In a regression analysis we compared the relative importance of these user-related variables with the power of situational targeting.

In our analysis we particularly focused on the dependent variable of WTP, which is especially important in retail (small margins), provides a fine scale (Eurocent) and direct link to economic implications. We used a Tobit model to conduct the regression analysis (Tobin 1958), because WTP valuations lower than zero can be expected in our case. As stated above WTP flocked around zero, so many subjects may not have wanted to drink or buy a beer at the time of the experiment. It is therefore feasible to assume that some subjects would only accept to consume the beer for additional money (meaning a negative price).

Table 2 presents the results of the censored Tobit regression for both the overlay and pre-roll conditions. The model includes the dichotomous variable for the associated conditions (0 = semantically incongruent and 1 = semantically congruent). We further included user demographics, beer preferences, age (2 = 15 to 29, 3 = 30 to 39, 4 = 40 to 49, 5 = 50 to 65), gender (0=male and 1 = female), beer drinkers (0 = no beer drinker and 1 = beer drinker), beer as the favorite drink (0 = beer not favorite drink, 1 = beer is favorite drink), weekly consumption and the degree of being informed about the product (0 = not strongly informed about beer and 1 = strongly informed)

Table 2

Results from the censored Tobit regressions on WTP

	Overlay	Pre-Roll	Combined
Congruent	0.66* (0.32)	0.59* (0.27)	0.61* (0.29)
Overlay			-0.06 (0.29)
Congruent*Overlay			0.01 (0.41)
Age	0.09 (0.14)	-0.13 (0.12)	-0.02 (0.09)
Female	-0.25 (0.33)	-0.49 (0.28)	-0.34 (0.22)
Beer drinker	0.62 (0.38)	0.97** (0.31)	0.80** (0.25)
Favorite drink	0.51 (0.49)	-0.30 (0.49)	0.07 (0.34)
Strongly informed	0.86 (0.46)	-0.16 (0.46)	0.41 (0.33)
Beer l/week	-0.05 (0.03)	-.002 (0.02)	-0.03 (0.02)
Constant	0.33 (0.80)	1.55* (0.681)	0.93 (0.54)
N	201	199	400
Prob > chi2	0.02	0.00	0.00

Note: standard errors in parentheses; 9 cases had to be excluded due to no specified beer conception/week

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

In line with hypothesis 3, the regression shows that semantic congruency has a significant positive effect on WTP at the 5% level, both for the overlay and pre-roll conditions. Also, one strong single effect could be isolated for beer drinkers (vs. non beer drinkers) in the pre-roll condition ( $p < 0.01$ ). Other than that, a core take-away from the Tobit analysis is that none of the user characteristics usually used for targeting has an effect on WTP across formats.

*The boundaries of advertisements targeted to individuals*

The analysis so far showed that the only relevant user characteristic with predictive power for WTP is whether someone actually drinks beer or not. We therefore deepened the analysis for this particular segment, revisiting the effects of situational targeting for this group only. We looked into how ad-video congruency influences WTP and ATTB for this group of people. The results for WTP are depicted in table 3.

The mean WTP of beer drinkers is nearly € 0.30 higher than for all subjects in the congruent conditions 1 and 3. (condition 1:  $U= 938$ ,  $p= 0.042$ ,  $r= 0.20$ ; condition 3:  $U= 778$ ,  $p= 0.000$ ,  $r= 0.35$ ). In contrast, in the incongruent conditions (2 and 4) such an extra WTP cannot be observed.

Table 3

Mean willingness to pay by conditions for all and beer drinkers only

	<b>Overlay</b>	<b>Pre-Roll</b>
<b>Congruent</b>	Condition 1	Condition 3
Willingness to pay (all)	€1.58 (n=101)	€1.55 (n=103)
Beer drinker only	€1.85 (n=60)	€1.85 (n=59)
<b>Incongruent</b>	Condition 2	Condition 4
Willingness to pay (all)	€1.17 (n=106)	€1.30 (n=99)
Beer drinker only	€1.14 (n=62)	€1.30 (n=60)

We also looked at the differences in ATTB and free recall of the brand between beer drinkers and non-beer drinkers. Beer drinkers' mean ATTB (condition 1 mean ATTB=0.47;

condition 2 mean ATTB=0.38; condition 3 mean ATTB=0.47; condition 4 mean ATTB=0.43) was significantly higher only in overlay conditions, however for both semantically congruent and incongruent settings (condition 1:  $U= 877.5$ ,  $p= 0.010$ ,  $r= 0.26$ ; condition 2:  $U= 1055$ ,  $p= 0.040$ ,  $r= 0.20$ ; condition 3:  $U= 1028$ ,  $p= 0.065$ ,  $r= 0.18$ ; condition 4:  $U= 1025$ ,  $p= 0.287$ ,  $r= 0.11$ ). Still the difference was nearly twice as large in the semantically congruent condition.

Beer drinkers' free recall of the brand (condition 1 mean recall=0.13; condition 2 mean recall=0.22; condition 3 mean recall=0.10; condition 4 mean recall=0.27) was only significantly higher in a semantically congruent overlay setting (condition 1:  $U= 885$ ,  $p= 0.010$ ,  $r= 0.26$ ; condition 2:  $U= 1169$ ,  $p= 0.196$ ,  $r= 0.13$ ; condition 3:  $U= 1269$ ,  $p= 0.831$ ,  $r= 0.02$ ; condition 4:  $U= 957$ ,  $p= 0.117$ ,  $r= 0.16$ ).

These additional analyses show that targeting beer drinkers only improved WTP and recall in semantically *congruent* conditions, but not so in incongruent conditions. As semantically incongruent conditions are the "general case" (when randomly matching ads with video clips), this would indicate that traditional targeting techniques are often not effective.

## Discussion

All participants in our study were exposed to a beer advertisement, while watching a video clip online. Some subjects were asked to review a clip that was semantically congruent to the ad, while others were asked to review a clip that was semantically incongruent. This manipulation was sufficient to generate very different reactions, valuations and memory effects for the advertised product. The resulting differences in WTP, ATTB and recall of the brand are both statistically significant and economically relevant, especially for overlay advertising formats that are now not only used on the Web, but especially on mobiles. The mean price that participants were willing to pay in the semantically congruent situation was 35% higher than in the incongruent one. Also ATTB was 20% higher in the congruent condition. On the flipside, recall was way lower (by 40%) in the semantically congruent condition.

In a pre-roll setting, the observed effects on ATTB and WTP were weaker and not significant. Only the impact on recall (dramatically improved in the semantically incongruent condition) remained high and significant. Consequently it seems that the perceived fit

(semantic congruence) between an advertisement and the *immediate* situation (video clip viewed) plays an important role how positive a brand is perceived and what consumers are willing to pay for the advertised product. As the share of overlay ads is increasing and new forms of advertising share the immediate relationship between ads and content (e.g. ads in mobile applications or ads on public screens), the observed effects of semantic congruence / incongruence are likely to be of high relevance.

Yet, improved recall (which is the classic measure of advertising effectiveness) requires perceived semantic incongruence between the ad and the clip, regardless of whether or not this incongruence is perceived simultaneously (overlay) or in sequence (pre-roll). When looking for improved recall, advertisers will do well when placing ads randomly, as in most cases this will lead to a semantically incongruent clip-ad constellation. The outlined trade-off between recall and WTP (and ATTB) implies that advertisers need to be aware though of their final advertisement goal (or right balance of goals) in order to choose the right level (and direction) of adaptation. It is indeed possible that some advertisers are looking for maximized recall - preferring adaptations that create perceived semantic incongruence - while others are looking for maximized WTP and ATTB - preferring adaptations that create perceived semantic congruence.

Our results cast a new light on traditional targeting approaches. As stated in the beginning, ad targeting today uses personal data and potentially infringes consumer's privacy. All major targeting variables were captured in our study. The data showed though that only past behavior (being a beer drinker) had a significant positive impact on recall and WTP and this only in semantically congruent conditions. All other means of classification (e.g. by product preference or product involvement) did not render any significant differences.

The analysis also revealed that the positive targeting effects on recall and WTP only materialized for beer-drinkers in semantically congruent conditions. In semantically incongruent conditions there were no significant differences in recall and WTP between beer-drinkers and not-beer-drinkers. This indicates that situational targeting (ensuring semantic congruence between ads and clips) is a pre-condition for effective targeting of individuals (e.g. beer-drinkers).



## Conclusions and Limitations

We present evidence that the perceived semantic congruence between an advertisement and a situation improves consumers' ATTB and WTP while impairing recall. In one of the most common ad formats used today, overlay display of ads on video material, subjects were exposed to a video clip semantically incongruent to an ad. This incongruency led to a significantly lower WTP for the advertised brand and a worsening of ATTB. At the same time recall improved. The same effects could not be observed in a pre-roll setting. Our analysis also revealed that the classical user characteristics used for ad targeting did not improve advertising effectiveness (especially WTP). Only the characteristic of already being a consumer of a product (in our case a beer drinker) would benefit WTP and free recall of the brand; yet only in a semantically congruent setting and not in a semantically incongruent one. This demonstrates that current user targeting mechanisms should either be enhanced by situational targeting or be completely replaced by the latter practice.

The implications of the presented results are relevant for both marketing practitioners and information system designers. Our results indicate that efficient advertisement (aiming to enhance ATTB and WTP) will need to strive for ensuring semantic congruence with the *immediate* situation (situational targeting). As situations can be highly dynamic, information technology is going to be key in order to continuously capture and determine the situation in order to automatically select, adapt and display suitable advertisements. However, if marketers were primarily focusing on recall metrics - which would benefit from semantically incongruent situations - they would be misled, unless recall is the main effect one wants to achieve (e.g. for notifications or security information).

To properly delimit the scope and external validity of our results, various aspects of the experimental design should be outlined. Firstly, we want to highlight that the sample of our study was large (409 subjects) as well as representative to the country's population and that we were able to observe significant effects across age, education or gender. We therefore argue that our results are applicable for the general population and are not specific to a certain group (e.g. students).

Secondly, while our definition of semantic congruence captures a major part of perceived fit between two entities, our pretest result showed that there might also be other forms of

congruence. Consequently our results may not be transferrable to other forms of what one could interpret as “congruence”, for example congruence in emotions or colors. The manipulated semantic congruence we studied was limited to the relationship between an advertisement and a video clip. Although we ensured that subjects were absorbed in the primary task of reviewing the clip (hence accepting the clip as their major point of reference) and controlled for other situational aspects (e.g. thirst, situation the experiment was conducted in) our results are primarily applicable for advertisement in online videos and should only be transferred to other advertising settings of this type. Future research could replicate our experiment and test the effects of semantic congruence on mobile phones or large, digital screens. Further research may look into testing combinations of semantic incongruence and semantic congruence. For example, can immediate semantic congruence combined with deferred semantic incongruence lead to high ATTB, high WTP and high recall at the same time? Additional research can also look at the impact of different levels of semantic congruence, not only looking at the extremes (congruence, incongruence).

Thirdly, the experimental set-up measured immediate reactions to semantic congruence. This set-up is similar to many forms of immediate sales situation, especially encountered in the Web, but also relevant for digital signage systems either being a point of sale or being encountered close to the point of sale. However, many other purchase decisions are disjointed in time. This means that between the time of exposure to the advertisement and the final purchase decision some time will pass by. Thus, further research will need to investigate whether the effects of semantic congruence and incongruence endure over time.

Fourthly, our experiment focused on a new brand from an unknown company. This approach offers an advantage as it relies on a design, well tested in behavioral economics and separating the effects from a (known) brand and the product itself. However, a drawback is that the advertisement may seem artificial and subjects may question the relevance, as they have never seen the brand or being able to purchase the product. While the findings of this study are especially relevant for new and unknown brands, the impact of semantic congruence on well-established brands has yet to be examined. Also the product category that was chosen here (beer) limits somewhat the generalizability of the results. Though the

effects of semantic congruence may be significant for low-value consumer goods, there may be different effects for other product categories (e.g. luxury goods like cars or watches).

Finally, the advertisement modes deployed did not allow for any control. Thus subjects were not able to stop the advertisements or to click them away. We would assume that in accordance to previous research on level of control, that the negative impact of semantic incongruence on attitude and WTP would be reduced in case subjects have more control over the advertisements. Further research might address this interesting combination.

When applied to promotional campaigns, the metrics we measured in our study (ATTB, recall, WTP) should only be considered in combination. Outside of an experimental setup, advertisers revenue depends on the combined effect of a consumer's ability to recall the brand (in order to include it in their choice set) and their appreciation of it. In light of the described trade-off between WTP and recall, it is feasible to carefully balance the benefits of semantic congruence on ATTB and WTP with the benefits of semantic incongruence on recall.

Summing up, our results provide noteworthy insights. When marketers design and deploy ads, they need to consider the situations the ads will be viewed in, in order to optimize for recall, ATTB or WTP. Also marketers will be more interested in advertisement offerings, where there is choice (or control) on the situations an advertisement will be displayed in. We already see some early offerings in the market place (e.g. to only advertise to a specific place and at a specific time). However, thinking along our results we imagine that other situational variables (like weather, noise levels, odor or crowding) will start to play an important role. This development offers great opportunities for computer science researchers and practitioners, who can further develop sensing systems, which are aware of the current situation and based on this information can dynamically place ads.

Also our research raises questions regarding the preconditions and boundaries of traditional targeting mechanisms. Our results indicate that targeting individuals might only work well in situations semantically congruent to the advertisement. At least, if traditional targeting is not an option (e.g. due to privacy concerns, missing data or anticipated negative effects), our results propose that situational targeting offers a way to increase the effectiveness of ads without requiring any person-related data.

Our paper contributes to the marketing literature in several ways. First we contribute to the growing literature on new media marketing (Winer 2009), as well as to targeting and privacy research (Chellappa and Sin 2005; Baek and Morimoto 2012; Lee and Ahn 2011; Malheiros et al. 2012; Tucker 2012) by proposing and evaluating a new form of adaptive, privacy friendly advertising –*situational targeting* – that works without the use of any personal-related data. Second, we evaluated the two major formats (overlay and pre-roll) used to advertise in online videos on a broad set of advertisement measures. Our results suggest that they are evenly effective, however overlay ads are more impacted by semantic congruence. Third, our study indicates that the success of traditional targeting (of individual consumers) seems to depend on the perceived semantic congruence between advertisements and the situation. Therefore further research will need to look into the kind of preconditions that are required to benefit from targeting advertisements to individual consumers.

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