# Understanding Effects of Interactive Experience in Advertising

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**Abstract.** The purpose of this research is to understand the different effects of advertising interactive experience, explore effective advertising interactive methods, and provide effective parenting advertising training for abusive parents. This study is part of a larger contribution given by case study research methodology. Results of the study would include various interactive method combinations for advertising and user experience interaction, and a variety of experience effects for target people. The results are expected to guide in the development of a theoretical framework for combining advertising and user experience interaction. After the introduction of the background problem, this paper will present literature on advertising, user experience interaction, effective interaction methods and describe the literature review methodology before presenting the expected results. The research helps to identify interactive sensory experience characteristics in advertisements, guide the effective dissemination of parenting public service advertisements, and create a happier family atmosphere for children.

**Keywords:** user experience interaction, advertising, effective interaction methods, experience effects

## 1 Introduction

Many parents have become increasingly busy under the increasing work pressure, resulting in a certain lack of parenting knowledge and forcing many children to live in unhappy or even violent family environments. Therefore, it is necessary to use some public time and facilities that do not occupy the work of the parents, such as public service advertisements, to train these abusive parents. In recent years, as times change, advertisements have appeared in various interactive forms that attract users' attention. According to human attention channels for information processing, it can be divided into visual user experience, auditory user experience, multi-channel sensory user experience and so on [1]. Different sensory experience methods can bring different experience effects to users, and also produce different experience emotions. These emotions have a great influence on users' consumption decisions. According to Norman [2] “the emotional system changes how the cognitive system operates. [... ] emotions aid in decision making.”. The author also says that human beings, as the most complex of all animals, have three levels of the brain: “the automatic, prewired layer, called the visceral level; the part that [...] control everyday behavior, known as the behavioral level; and the contemplative part of the brain, or the reflective level.”. All of these levels build human’s intellect and influence human’s actions, from the simplest, like escaping from a hot surface, to complex ones like choosing one product or brand instead of the other. Let him produce the most initial surface feeling, and then affect one’s behavioral decision-making, and finally affect the introspective

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reflection layer of his contemplation. At the same time, research shows that attracting attention to interactive content through pleasurable experiences [3]. Therefore, this paper recommends taking the user's pleasurable experience as the premise and starting from three interactive sensory methods to try to draw a conclusion of the interactive experience model that helps in strengthening the user's attention to the advertisement and provides some ideas for the effective interactive experience of advertising design.

## 2 Methodology

The literature review presented in this paper follows the unique brought by the "Literature Review Synthesis Process" (Ibrahim and Mustafa Kamal, 2018[4]) in Masiran, et al. (2020) [5]. This process is a stand-alone literature review typology (Rousseau, Manning and Denyer, 2008[6]; Yu and Watson, 2019[7]; Templier and Paré, 2015[8]) that known to make sense of a selected body of existing literature leading to decisions regarding the background theoretical context in an early research ideation phase. Topics were identified using Ibrahim's (2011 & 2020) research question (RQ) on construct categorization technique for identifying three different RQ Constructs of "Who", What" and "How" in formulating a main research question. "Who" is defined as the element being impacted by the study; "What" is the information or body of knowledge required to solve the problem, and "How" is the targeted impact by the study. While in one PhD study, there are four required RQ constructs [9].

This study selected the RQ construct User Experience Interaction for reporting. The literature articles were identified using Scopus and Google Scholar, using the keywords related to the selected RQ construct such as visual interaction, auditory interaction and multi-sensory interaction. After title search and filtering out full research papers from year 1996 to recent, a total of 30 journal articles were identified. The abstracts were reviewed and assigned to smaller topics, namely the impact of visual interaction on user experience in advertising, the impact of auditory interaction on user experience in advertising, and the impact of multi-sensory interaction on user experience in advertising. The abstracts were reviewed in terms of their major findings by prior scholars, how their works could support future studies, and what aspects need to be enhanced. The top 30 potential journal reviews with strong potential to solve the main study's problem were selected for the synthesis review process. The distribution into the smaller topics was based on their existential importance as any new emerging topic may not have sufficient literature articles.

The outcomes of this exercise produce a synthesized summary for each topic which went further the cross-analysis, integration of possibilities, and prioritization of the synthesized summary towards high probable solutions for understanding effects of interactive experience in advertising. The resulting key summaries are presented in the "Point of Departure (POD) Tree Diagram" adapted from Ibrahim and Mustafa Kamal (2018) shown in Figure 1[4]. This study used the EAGLE Navigator online system to document the literature review synthesis process.

## 3 Effective Interactive Experience Process

Research shows eight criteria for judging the effectiveness of an interactive experience design: Understanding of users, Effective design process, Needed, Learnable and Usable, Appropriate, Aesthetic experience, Mutable, and Manageable (Lauralee Alben, 1996) [11]. Therefore, if we want to judge whether an interactive experience design meets the criteria of "effective experience", we need to check whether it has a deep understanding of the users it faces, whether it has designed a complete and effective design process, users and the market, whether there is a real demand for it, whether the interactive experience process is easy to learn and use, whether the data source, meaning and conclusion of this interactive experience are appropriate, or whether the whole interactive experience effect presented is in line with the aesthetic experience. It is also necessary to understand whether the structure of this interactive experience has variable applications for other industries or objects, and whether the entire process is manageable. When designing interactive experiences for the advertising industry, it is also necessary to refer to the above standards, in addition to specific effective interaction methods analysis.

## 4 The Impact of Various Sensory Interactions on User Experience in Advertising

With the development of society and its population, the current public environment has long been flooded with various advertisements since before. Whether in the offline public facility environment or online public websites, advertisements for various products or services can be seen everywhere. In this kind of information explosion environment, we need to consider how to increase the user's attention to the specified advertisement, and perceive the content information that the advertisement wants to convey. According to Li Shengweng et al., AIEDA tourism advertising effects model includes five hierarchical stages, namely attention, interest, evaluation (Perceived Usefulness→ Perceived Credibility), desire, and action [12]. Among them, attracting the audience's attention is the crucial first step. Based on attention, the audience may be interested in the content of the advertisement. Then, the usefulness and credibility can be evaluated through perceptual information, and the desire to purchase may be generated, then the order will be triggered. Therefore, combining the above, this study can start with visual sensory interaction, auditory sensory interaction and multi-channel sensory interaction to achieve the goal of increasing the audience's attention.

### 4.1 The impact of visual interaction on user experience in advertising

Visual sensory interaction is an interactive method that is more commonly used in the advertising industry. Users can mainly perceive the content they want to deliver in the advertisement through visual elements, such as graphics and text in the advertisement, and produce subsequent consumer purchase behaviors. However, considering the current complex public visual environment, this study needs to study how different visual elements can attract users' attention.

The first is graphic elements, which can be divided into static graphics and dynamic graphics. For static graphics, different shapes of graphics have different effects on attracting

users' attention. In the online environment, online users typically adopt advertising avoidance behaviors to avoid from being disturbed by advertising [13]. This is because in this era of Internet information explosion, most online users have become accustomed to full-screen pop-up advertisements. Habitual objects can hardly reproduce curiosity and attention. Therefore, they will default to these regular advertisements or specifically, they deliberately avoid the rectangular or square regions around the main content of webpages, which schemally recognizes as advertising messages [13]. However, it is only the regular square regions that make users automatically avoid psychology. According to schema congruence theory, incongruous information can produce arousal and subsequently increase attention [13]. Therefore, interactive advertising design can completely re-attract users' attention by changing the graphic shape of the advertising area. According to Chih-Wei Liu et al., researchers changed the advertising graphic from a square to a diamond in order to test its effect on the user's attention. The results proved that this shape change could attract users' attention to a certain extent. However, when the new shape is viewed in multiple times, it will no longer capable to attract user's attention [13]. Therefore, for effective information output, the shape of static graphics needs to be frequently updated.

For dynamic graphics, its variability includes shape actions in addition to shape modelling. Therefore, the impact on the user's attention is also richer. Stone et al. designed four typographic animations and one still image showed them to one viewer and found an increase in emotional response to moving words. They proved that kinetic typography, when specifically designed with the intent of enhancing meaning, can evoke emotional responses from the viewer [14]. This clearly shows that, as compared with static graphics, dynamic graphics can better attract the user's attention and even cause emotional reactions with rich actions in a period. This effect of changing instead of the unchanged to attract attention is similar to the static graphics mentioned earlier. In addition, Malik et al. have also done experiments on the impact of dynamic graphics. They embedded specific emotions in typographic animations, tested them on 46 participants, and discovered that movements such as shaking, twisting, fading, bouncing, looping, jittery movements and flashing can convey emotions such as anger, sadness, happiness and fear [15]. Different dynamic actions in dynamic graphics are not only able to attract attention, but also convey different emotions.

In term of text element, it bears a very important explanatory meaning in the advertisement, and the presentation forms through its slogan, title, explanatory text, et cetera. Text and graphics often match and help each other in advertisements. When graphics cannot be explained quickly and effectively, the existence of text is necessary. Dong Hee Kim et al. have done research on the effectiveness of text attention in the food advertising industry, and the results prove that the text-dominant ads were significantly more effective than the picture-dominant ads for individuals who were unfamiliar with the culture of the cuisine's country of origin [16]. In another words, interactive advertising design needs to consider the user's familiarity with the cultural content of the advertisement when deciding-whether to use text as the main body of the advertisement or pictures as the main body of the advertisement. In addition, the results also suggest that marketers need to increase customers' attention by customizing advertising formats (e.g: text contents, presentation methods) based on target customers with varying levels of cultural familiarity [16]. For example, in rural areas of China, most of the sentences used in banner advertisements are easy-to-understand words by villagers. This method is more effective for local villagers than some words that are deep but obscure.

Based on the above discussion, Table 1 shows the visual impact of different visual elements in advertising. This study proposes that visual sensory interaction can be better attracting the attention of users in the complex information society by using novel static graphic shapes, appropriate dynamic graphic actions and text elements according to the user's cultural background.

**Table 1.** The visual impact of different visual elements in advertising

| Element | Influencing factors | Influential impact |
|---|---|---|
| Static graphics | Shape | ·Novel shapes can attract users' attention better than fixed shapes.<br>·However, the novel shape will be less attractive after long-term use. |
| Dynamic graphics | Synamic | Shaking, twisting, fading, bouncing, looping, jittery movements and flashing can convey emotions anger, sadness, happiness and fear. |
| Text | User's cultural background | ·When users are not familiar with the cultural background of advertising, text is more effective than pictures.<br>·For users with different educational backgrounds, different forms of text expression can arouse different degrees of attention. |

### 4.2 The impact of auditory interaction on user experience in advertising

With the continuous development of new media technology, the presentation mode of media content continues to increase, and auditory information has become the second new media presentation mode only to traditional visual information [1]. Sound can convey a lot of information. People can judge the material, size, temperature and other information of the object through the sound of the interaction with the object or the environment [1]. Therefore, in the current information society, many advertisements try to use auditory sensory interaction to convey information. For example, Pampers once used a lullaby that a mother sang for her children as an aural sensory advertisement, which sang the mother's love, care and expectations for her children. At the same time, it also expresses the characteristics of Pampers' products and brands well. The bubbling sound of Coca-Cola beverages has also been used in various advertising and marketing occasions for the brand many times, allowing users to feel the cool and refreshing sensory feeling of the product for the first time from the auditory sense, thus attracts the users' attention to watch the advertisement.

Auditory information affects the media user experience through both real and virtual sounds, and this impact is not static; auditory information affects the media user's attention, memory, user emotions, emotions, and user decision-making and feedback, forming auditory information. This internal mechanism is really important as it can affect the media user experience [1]. The elements that convey information to users in auditory sensory interactions include the speed of speech, pitch, accent, timbre, and gender of the voice. It is mentioned in the research of Yu Guoming and Fu Jia that these elements will affect users' attention degree and experience perception effect [1]. For users, the speed of speech can greatly affect the

recognition of information. When the speech rate is too fast, it will cause the user to be unable to accurately receive the content information, and when the speech rate is too slow, it will affect the user's concentration. The pitch also has a great influence on attracting users' attention. Hagtvedt and Brasel pointed out that there is a cross-correspondence between pitch and visual brightness. High-frequency sounds can draw users' visual attention to light-colored objects, and low-frequency sounds can draw users' visual attention to dark-colored objects [17]. Therefore, when the key information (picture or text) in the advertisement is light-colored, we can use the high-frequency sounds to attract users' attention and vice versa. In addition, Spence proposed that the characteristics of a sensory channel and the characteristics of another sensory channel tend to match each other. For example, people tend to match larger objects with bass, and smaller objects with treble [18].

At the same time, Biwas' research also found another feature of tone that attracts users' attention, that is, low volume versus high volume or no volume music/noise can relax users' moods, which then leading to the increased sales of healthy foods; high-volume music noise tends to increase user excitement, which then leading to the increased sales of unhealthy food [19]. Therefore, interactive advertising design can start from the actual needs of specific advertising content to apply the above characteristics of tones in increasing user attention. The difference in tone also has a certain impact on the persuasiveness of the user. Zoghaib found that speakers with bass (vs treble), dull (vs bright), and smooth (vs rough) are more convincing, while speakers with high-pitched, dull, and smooth voices are considered the most capable people, with the secondary persuasive effect [20]. Therefore, when there is a need to persuade users in our advertisements, we can use bass, dull, and smooth tones. In addition, the discovery of timbre elements is also related to the attention paid to colors and shapes in advertisements. Adeli et al. found that soft tones are closely related to blue, green or light gray rounded shapes, while sharp tones are related to sharp corners with red, yellow or dark gray [21]. Palmer et al. found that faster-paced music matches more yellow or warmer colors, while music in minor mode has a higher correlation with blue [22]. Few people may notice that voices of different genders also have different effects on advertising effects. Whipple et al. found that male and female voices in neutral product advertisements have the same advertising effect. For female product advertisements, the gender of the speaker or announcer will greatly affect the advertising effect; while for male product advertisements, the gender of the announcer affects the advertisement. The effect does not affect [23]. Moreover, the accent is also an element that cannot be ignored in advertising effects. Morales et al. found that media users prefer standard accents. However, when media content is played with non-standard but familiar accents, it can better attract media users' attention and enhance media users' memory to relate or remember the content [24]. Therefore, as shown in Table 2, this study recommends the following characteristics of different sound elements according to the actual needs of specific advertisements.

**Table 2.** The impacts of different auditory elements in advertising

| Element | Influencing factors | Influential impact |
|---|---|---|
| Speaking rate | On the fast and slow pace | Fast: think of yellow (warm color)<br>Slow: think of blue (cool color) |

| | | |
|---|---|---|
| Pitch | Frequency level | High: light-colored objects<br>Low: dark objects |
| | High and low pitch | High: Smaller objects. Strong sense of ability<br>Low: Larger objects. Strong explanation |
| | High and low volume | High: increase excitement<br>Low: relax |
| Timbre | Soft and sharp tone | Soft: blue, green, light color, rounded shape<br>Sharp: red, yellow, dark gray, sharp shape |
| Gender | different gender | Neutral products: different genders, the same effect<br>Male products: different genders, the same effect<br>Female products: different genders, different effects |
| accent | Accent standard or not | Standard: preferred<br>Non-standard but familiar accent: attract users' attention and improve memory content. |

### 4.3 The impact of multi-channel sensory interaction on user experience in advertising

The current information society has entered the era of digital multimedia. In addition to common visual and auditory presentations, advertising presentation is also a very important form of multi-sensory interaction in the digital environment. Multi-sensory interaction is simply to mobilize our "five senses", unite our senses, and interact in multiple forms, by giving people an immersive illusion in the exhibition. The "five senses" of the human body are divided into sight, hearing, smell, taste, and touch. This kind of interactive, experiential exhibition breaks the single exhibition form in the past, facing the same other "viewing" methods, multi-sensory interactive experiential exhibitions are easier to enter the hearts of visitors [25]. As this study mentioned earlier, a pleasant experience can attract people's attention to interactive content. [3] Therefore, the pleasant experience generated through multi-channel sensory interaction can also achieve this goal.

In the study of Wanick Vanissa et al. introduced a conceptual framework that promotes a continuous loop of consumer experience and engagement from different and new touch points, which could be augmented by games, gamification and emerging technologies [26]. Moreover, there are already many brands that aim to create brand experience through gamification and advergames [26]. For example, the slimming mineral water under the French mineral water brand Contrex once did an outdoor game-type multi-channel sensory interactive advertising case. In this case, the advertiser connects the bicycle with the LED display screen. When there are enough people that can ride bicycles to give the screen energy simultaneously, the extremely attractive and interesting pictures and music in the LED will appear. In this case, various sensory methods were used, such as tactile, visual, and auditory. Through games, users can fully enjoy the sense of pleasure in the experience process, which is also very attractive while outputting advertising information. The goodwill of users is a very successful interactive advertising case. In fact, elements like having a sense of control, challenge or aspects of novelty and feedback could enhance engagement in digital environments [27]. For example, challenges in games are crucial in order to build engagement, whereas having a sense of control is strongly related to usability and user experience [27]. In games, engagement is just the first level of game immersion, which goes through a stage of emotional attachment and a level of total immersion (e.g., presence) [28]. Gaming multi-channel sensory interaction can play a certain role in

attracting users' attention and triggering users' pleasant emotions in pre-shopping advertisements. It can also play a certain role in maintaining user experience after placing an order. Gamification could still play a huge part through rewarding systems and loyalty programs. If combined with machine learning algorithms that could detect people's interactions and reward them accordingly, there is a huge potential to keep the consumer engaged over a long time [26]. Therefore, the unified multi-channel sensory interaction method is a fun interactive method that interactive advertising design can use to attract user attention and maintain user experience before and after purchase.

In addition to the form of interaction, the content and duration of the interaction will also have different effects on the user's emotional experience. According to research by Salminen, Joni et al., using personified user group (PUG) for online ad design evokes more empathy and improves click-through performance. More empathetic ads can have a positive impact on social media users, given their appearance to increase relevance [29]. That is to say, when the advertising content is expressed in a personalized way that meets the needs of users, it can generate better attraction towards users' attention and empathy. According to the emotional results, there was also a temporal relationship between user experience and interaction. The user experience impacted long emotions (e.g., Peaceful; contemplative; longing; tired) more than interaction, characterized by shorter emotions (e.g., Excited; aroused; amused; impressed...) [30].

In summary, when using multi-channel sensory interaction to attract users' attention, gamified interactive forms can be used to arouse users' pleasant experiences. At the same time, interactive advertising design needs to pay attention to the choice of interactive content and the different emotions triggered by the duration of the interaction features.

### 4.4 Point of Departure (POD) Tree with the impact of three sensory interactions

Based on the above literature review research, this research draws the following conclusions based on the sub-topics of these three keywords. In the current information age, visual user experience, auditory user experience, and multi-channel sensory user experience are the options that able to arouse the audience's attention and pleasant experience emotions, thereby promoting the generation of consumer behavior. In the visual interactive experience for the purpose of advertising, this research suggests paying attention to the different characteristics of graphics (static and dynamic) and text elements. In the auditory interactive experience, interactive advertising design needs to adjust the different presentation methods of speech speed, pitch, accent, timbre, gender and other elements according to actual needs. In the multi-channel sensory interactive experience, research proposes gamification as an element to attract the attention of the audience. Each advertisement will have different information presentation requirements, and different interactive experience methods can be selected according to the actual situation. This research helps to identify potential advertising characteristics, and submit implicit information to the audience. In addition, this study uses the Point of Departure (POD) Tree Diagram tool to integrate and summarize the conclusions of the three sub-headings, and draw the following final conclusions. Visual, auditory, and multi-sensory interactions all have different elements and characteristics, and can cause different levels of attention, memory, and emotions for users. Specific information is shown in Figure 1. [4]

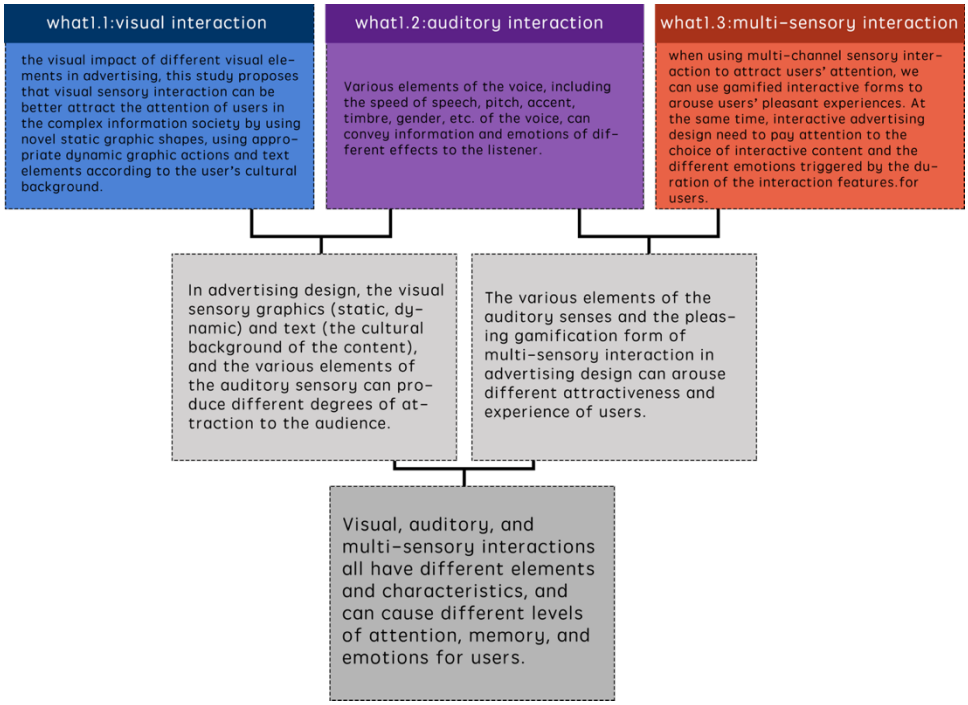


**Fig. 1.** Point of Departure (POD) Tree Diagram of User Experience Interaction (Adapted from Ibrahim & Mustafa Kamal, 2018)

## 5 Application and Suggestions of Sensory Interaction in Parenting Public Service Advertisements

According to the previous analysis, it can be concluded that the three sensory interaction methods can produce different experience effects for users in advertisements. This conclusion can guide designers to use sensory interaction to design parenting public service advertisements and effectively transmit parenting knowledge information, and provide parenting knowledge training for abusive parents. For parenting public service advertisements, the current target audience can be classified as busy grumpy parents. Their characteristics are conflicted, which is, although they love their children very much, they lack some basic parenting knowledge and do not have much training time. Therefore, when designing parenting public service advertisements for them, designers need to use powerful methods to quickly attract their attention in a short time. For example, they can use some novel graphics to attract the attention of parents, and use some shaking, fading or bouncing's dynamic advertisements arouse parents' feelings of anger, sadness or fear, allowing them to understand the dangers of lack of parenting knowledge in an emotional state, and they can also use powerful text advertising slogans to illustrate parenting knowledge. Finally, various elements of advertising content and sound can also be combined to guide parents to quickly associate specific parenting information. These

methods are all effective directions to try. In addition, we can also use some emotional interaction methods to deepen the parents' understanding of the parenting content in the advertisements, such as using the parents' waiting time for commuting to get off work, and setting up simple and clear multi-sensory interactive game advertisements in the station. Through simple interactions, various emotions of parents can be triggered, and the understanding of parenting content can be deepened. Regarding the specific application of sensory interaction in parenting public service advertisements, I will conduct in-depth discussions and tests in my doctoral research, aiming to explore more comprehensive and effective application rules.

## 6 Conclusion

In this study, three keywords and three sub-themes were studied by way of literature review synthesis process. They were concluded that visual, auditory, and multi-sensory interactions have different elements and characteristics, and can cause different levels of attention, memory, and emotions for users. This conclusion is expected to guide designers to pay attention to the impact of various sensory elements on users when designing advertisements, as well as to choose appropriate sensory forms and element expression methods according to the actual needs of the advertisement; thus, the advertising information can be more effective. In addition, this research helps to identify the experience characteristics of interactive sensory in advertisements, improve the effective dissemination of information, and guide public service advertisements to use effective sensory interactive methods. The results are expected to guide future development of visual modules on parenting training for abusive parents and strive for a happier family atmosphere for children.

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