IMAGERY, MINIMALISM AND PERCEPTUAL ORGANIZATION IN CONVEYING TRAFFIC AWARENESS

Dr. Gopakumar AV[1], Dr. Juby Thomas[2], Ms. Sreedevi VK[3]

Abstract

Human beings are almost involuntarily inclined to make mistakes and commit violations; such violations and mistakes are particularly high on roads. Several mechanisms like law enforcement, education, training, and even additional infrastructural developments have been put in place to prevent accidents, but road traffic relies more heavily on its users to keep accidents from occurring. This calls for the need for Road Safety Campaigns. Together with other 'behavioural' measures, psychological and rational elements are inculcated in the road safety campaigns, as a means of influencing the public to behave more responsibly during transportation. The researchers have tried to understand these promotional engagements through Semiological Analysis, which would study about the deeply embedded structures, meanings and its corresponding effects in these print media campaign. The study focuses on the importance of these Campaigns using principles of gestalt and design, along with other key factors affecting the perceptual organization of the visual content and its influence on the audience especially in awareness campaigns.

[1] Professor, Department of Media Studies, Kristu Jayanti College, Bengaluru, Karnataka, email: gopakumar.av@kristujayanti.com

[2]Assistant Professor, Department of Media Studies, Kristu Jayanti College, Bengaluru, Karnataka, email: juby@kristujayanti.com

[3]Teaching Assistant, Department of Media Studies, Kristu Jayanti College, Bengaluru, Karnataka, email: sreedevi@kristujayanti.com

Introduction

Rise in Traffic is an inevitable part of urbanisation. The number of new vehicles which enter on roads has grown beyond bounds which has led to increased traffic. Commuters find it difficult to manage this issue as they consider it as an inability of the government as well as irresponsible civic behaviour. In order to curb certain uncertainties there are traffic rules and regulations which the commuters are expected to follow. Understanding the significance of this aspect, Detran Sao Paulo Traffic Department, Brazil has launched a professional campaign titled 'Traffic quotes' which was published in March 2022 and these print media campaigns concentrate on Alcoholic drinks, Automotive, Education and Public Interest. Certain planned activities are undertaken to attain a specific goal in any field of action and is referred to as campaign. Advertising campaigns are an integral part in informing the audience in a creative way and are large scale advertisements are made to introduce new concepts using different media. The major reasons identified as the cause of accidents are speeding and driving after the consumption of alcohol or other psychoactive substances. Few of the avoidable circumstances which lead to common ground of accidents like non-use of helmets while riding, denial of seat-belts, and other distractions while driving and usage of mobile phones etc. are some of these crucial issues that are addressed through the campaign. Unsafe road infrastructure and inadequate law enforcement of traffic laws and unavailability of constant maintenance are other factors.

A study of this kind is highly significant at this juncture, as the World Health Organization (WHO) draws attention towards the fact that every year almost 1.3 million individuals die as a consequence of road accidents. As per their statistics most vulnerable road users like cyclists, pedestrians, and motorcyclists are almost three times as likely to be killed in a road traffic crash. This study also highlights that low and middle income countries constitute 93 per cent of the world's fatalities on the roads, even though these countries have approximately 60 percent of the world's vehicles. WHO also seeks attention towards another alarming situation, where the leading cause of death for children and young adults are identified as road accidents. About 73 per cent of all road traffic deaths occur among young men under the age of 25. (Road Traffic Injuries, 2022)

The situation in Brazil is alarming and the country has a negative image due to its high rate of accidents. As per GRSF reports, 68% of the road accidents in Brazil comprises four and two wheeler whereas 26% pedestrians and 4% cyclists comprises the fatalities in the region. It is also alarming to see that out of one lakh people, 1040 lives are affected due to disabilities in road accident injuries and also 82% of the road crash fatalities and injuries are affected to the economically productive age group. (Brazil's Road Safety Country Profile, 2021) Such data might be the major reason for the Detran Sao Paulo Traffic Department to launch campaigns like 'Traffic quotes.'

Objectives

- To analyze the iconic representation of well-known personalities and their sphere of influence used in traffic education.

- To study how the textual messages are associated with the psychological, behavioural, and rational dimensions of an individual in protecting life.

- To study how the Visual elements of the advertisement aid in the connotative meanings of the textual messages.

Eur. Chem. Bull. 2023,12(Special Issue 1, Part-B), 1400-1410

1401

- To study how 'satire' is graphically represented in the advertisement campaign for conveying traffic awareness.
- To study Gestalt Principles – Pragnanz, Proximity, Symmetry, and other concepts in the perceptual organization of the visual content in the campaign.

Methodology

The research method followed is a qualitative study using gestalt principles and design principles with semiology. Content analysis is typically called qualitative as it involves counting and summing phenomena, to even support studies of more qualitative nature. Krippendorff (1980) calls it primarily a symbolic method as it is used to investigate symbolic material, conducting many interpretative works, relying on a good knowledge of the texts under examination. In this study, researchers are critically analyzing three advertisements that are part of the print media campaign 'Traffic Quotes' made by ad agency 'Artplan' for Detran Sao Paulo Traffic Department, Sao Paulo, Brazil with principles of Gestalt and design, along with other key factors affecting the perceptual organization of the visual content and grouping of the visual elements.

Findings and Analysis

The current study has adopted the three print media advertisements launched by the Detran Sao Paulo Traffic Department, Brazil who created a professional campaign titled "Traffic quotes" which was published in March 2022. The three advertisements have been chosen on the basis of psycho-social political attainment, as the advertisements have been endorsed by the three well known personalities in their respective fields like Sigmund Freud highlighting psychological perspective by quoting, 'With the Unconscious under control, Consciousness prevails: Don't Drink and Drive', Marie Curie highlighting the rational perspective by quoting, 'Nothing in Life is to be feared, it is only to be understood: Wear a Seatbelt' and M K Gandhi highlighting the humanitarian approach by quoting, 'Be the change you want to see in the world: Respect the speed limit'.

Identifying the usage of Gestalt Principles

In the current study, the researchers have identified certain gestalt principles like Law of Continuity, as when we see the flow of text in the quote and the traffic message visualized in the advertisement we can see the wave of continuity through the alphabets which shows the leading lines concept by not having any kind of distortion while reading. The implementation of Proximity portrays the closeness of the words used in the advertisement and through the adaptation of Symmetry, the advertisement has been placed in accordance to the center of the page and the quote has taken the center stage in order to divide equally in both sides to create an appealing factor. The last principle includes Emphasis, the researchers have identified that the emphasis is clearly given towards the last text which is the traffic message and ultimately, the last line is the need of the hour for the audience.
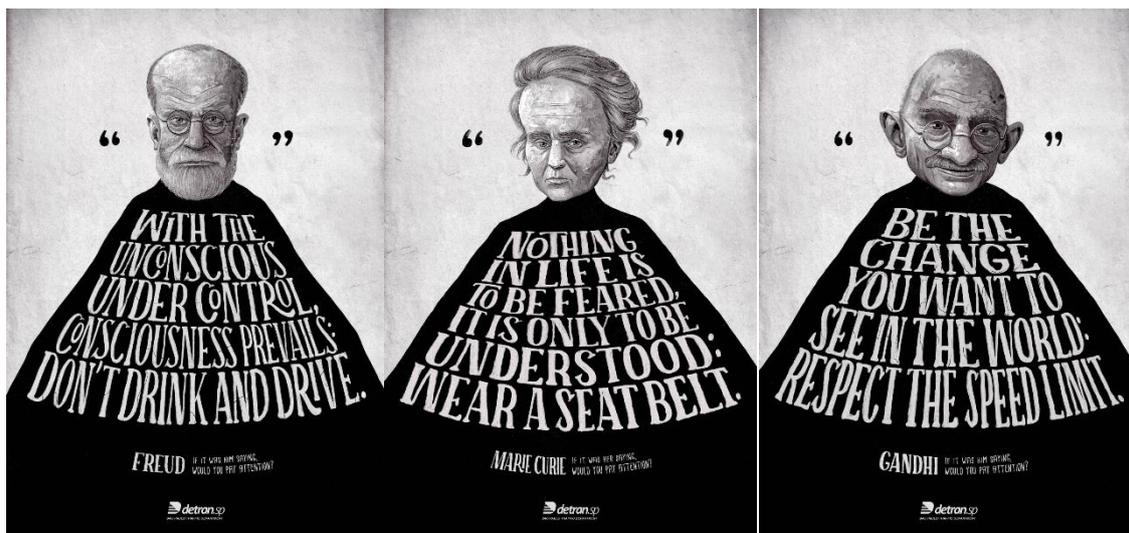
Figure 1.1   Figure 1.2   Figure 1.3

Iconic figures and their sphere of influence used in the advertising campaign

As you can see in figure 1.1 to 1.3, the iconic representation of the three legendary opinion makers of the society like Sigmund Freud, the founder of psychoanalysis, Marie Curie, a Polish-French Physicist and Mahatma Gandhi, a Humanitarian are portrayed in the advertisements based on their sphere of influence in the society. In the 21st century the legendary Sigmund Freud has greater significance as human existence is always experienced in terms of desire, feeling, and personal history. His ideologies help us to examine how our definition of reason shapes both daily existence and our social institutions practices. Freud revolutionized our thinking patterns and founded Psychoanalysis which has an enormous influence on modern psychology and psychiatry. He is regarded as one of the most influential and controversial minds of the 20th century. Marie Curie, was a Nobel Prize winner in the year 1903 with her husband Pierre for Physics, for their contribution towards Radioactivity. In 1911, she was the sole winner of the Nobel Prize for Chemistry, hence she was the only woman to win Nobel prizes in two different sciences. She, along with her daughter Irene, worked on X Radiography throughout World War I. She devoted herself to the study of Chemistry of radioactive substances and its related applications of these substances. Additionally, generations of women in Science and Medicine have followed in her footsteps inspired by Curie's remarkable accomplishments, passion for research and perseverance. Mahatma Gandhi, also called as the Father of Modern India played a significant role in carving out Independent India from British rule. Today, at a time of escalating conflicts, rising extremism, massive displacement and rapidly growing humanitarian need, Mahatma Gandhi's ideologies are thought provoking as he developed the Independent India with Truth and Non-Violence. The word 'Mahatma' means 'great soul' which was credited to Gandhi for his innumerable contributions towards the National Movement and for also being a source of inspiration for the people to achieve their fundamental rights.

Multiple Celebrity Endorsements and their influence on advertising

Celebrities always have a way to influence and exert their ideologies on the public through advertising due to their enhanced qualities to persuade the individuals (Hsu and McDonald 2022; Pringle 2004). As

they create an image in the society and its meanings are being derived through their culture, they are often considered to be the face value of the society. McCracken (1989) suggests that celebrity endorsers are individuals who enjoy public recognition and use this as a platform to appear with the advertisement. When compared with individuals who are not popular amongst the crowd, these celebrities deliver meanings and add depth and power to the products. Celebrities provide a holistic image and personality through associations. Friedman and Friedman (2000) figured that celebrities when compared with other advertisers and subject matter experts are more promising and desirable while generating the behavior amongst the audience to promote a product.

Hsu and McDonald (2002) suggest two possible outcomes of multiple celebrity endorsements pertaining to meaning transfer. Firstly, a multitude of separate meanings attributed to the celebrity endorsers who feature in an advertisement eventually get associated with the promoted product. Secondly, the specific meaning transferred to the product indicates that the celebrities involved in the process have certain common features. If the multiple celebrity endorsers are different, their characteristics and the transferred symbolic meanings will become complementary. In this case, the product or brand promoted is estimated to obtain a wider range of transferred meanings.

Usage of Direct Eye Gaze as an effective advertising Technique to draw viewers' attention to the rational dimensions of the advertising content

In Detran Sao Paulo Traffic Department's campaign titled "Traffic quotes", the ad agency 'Art Plan' adroitly uses ' Direct Eye Gaze" (looking straight at the viewer) to draw viewers' attention to the advertising content, and the popularity and visibility of

legends Marie Curie, MK Gandhi and Sigmund Freud are used to arrest viewers' attention.   According to Journal of Consumer Research (2020), a Direct Gaze stimulates the more rational side and is much preferred to Indirect Gaze (eyes looking away from the viewer) as it builds trust and conveys interest and credibility. Whereas, Indirect Gaze will make the communication more emotional and immersive and marketers use this to advertise products that appeal to the heart (e.g., FMCG products).On the other side, when advertising products have a rational appeal, direct gaze is preferred. In this campaign, the focus is on rational appeal and has used the direct gaze of prominent global personalities from different walks of life to build trust and credibility to the campaign.

Minimalistic approaches in the form of low fidelity graphical images

The ideal expression of a message can be achieved through visual shorthand, and this can be done by reducing the realistic qualities embedded in a graphic. Designers think about realism in terms of fidelity, i.e. how much an image resembles something recognizable. Images with low-fidelity use fewer visual elements and qualities that make it recognizable in a design. Low-fidelity graphics are effective as they focus more on essential details and induce quick responses, create impactful messages, or provide a nominal knowledge of the content. In Detran Sao Paulo Traffic Department's campaign titled "Traffic quotes, researchers could find the usage of low fidelity graphics by deploying iconic images of famous personalities. These kinds of images with reduced realism are best suited for a general audience who can quickly comprehend the messages in the advertisements. Minimalism makes every stage of the human information processing system smarter and efficient and empower individuals to perceive graphics clearly. This perceptual clarity arises out of the

Eur. Chem. Bull. 2023,12(Special Issue 1, Part-B), 1400-1410

1404

usage of distilled graphics with just essential visual elements. According to Francis Dwyer, presence of unnecessary elements can distract the viewer from focusing on the vital message and can also result in miscommunication (Malamed, 2009).

In this campaign, the advertisers attempt to interpret reality through visual abstraction and simplification of the graphics. Designers have reduced the degree of detail and limit the expressions through sharp colors and hard shadows (Jonassen, 2004). Another approach used in reducing realism is the drastic limiting of one visual element in a graphic. Furthermore, icons used in the campaign appear as simple caricatures and they are an effective technique for minimizing realism. A caricature portrays a form through outlines of its shape without interior details, as it is filled with a uniform color within flat pictorial spaces. But it promotes quick responses and speedy comprehension as it maintains a close resemblance to the contours of a real world. For example, the images of MK Gandhi, Sigmund Freud and Marie Curie in the advertisements are represented as simplistic caricatures and are also labeled to avoid perceptual confusion, and the body part of the icons are visualized as silhouettes against visually concrete alphabets to avoid perceptual concerns. Silhouette shape is easy to detect and recognize and can minimize perceptual complexity (Gautier et.al, 2018). These images as silhouettes use a contrasting white colored background and it is differentiated as a well-defined figure with well-defined boundary and color contrast and presented as bigger shapes to be construed as ground rather than the figure.

When the researchers analyzed the minimalist approaches in the campaign, they found that the advertising agency uses silhouettes and caricature icons to reduce realism and activating the viewers to fill in missing details based on prior knowledge of familiar objects (Solomon, 1994).

Moreover, by reducing the visual noise through silhouettes and icons, designers are reducing the time taken for a viewer to perceive and comprehend a graphic.

Gestalt Principles – Pragnanz, Proximity, Symmetry and other concepts in the perceptual organization of the visual content in the campaign.

The Law of Pragnanz is also referred to as the law of simplicity, and states that all stimulus patterns are to be considered with structure that is as simple as possible. This principle confirms that the viewer interprets the elements in the simplest manner from a given set of elements. In this context, "simplest" means the arrangement having fewer visual elements and possessing symmetrical compositions conforming to Gestalt principles of perception (Lidwell et.al, 2010).

When the three advertisements of the campaign were visually analyzed, researchers found only two major visual elements in a single advertisement copy i.e. the alphabets and icons, and the supporting textual component ' Quotation Marks' of the campaign. This simplicity allowed viewers to perceive images in simpler forms with minimum cognitive resources. Moreover, research also supports the idea that the simple figures will enable one to quickly process and remember than complex figures. In connection with this, there is an associated concept called 'distractibility', which means the ability to focus on what is significant and removing distractions from the visuals to enable the viewers to concentrate on relevant information (Malamed, 2009). Here in the studied advertisements, graphic artists are minimizing distractions by using solid color backgrounds with minimal visual elements.

Proximity law states that the elements that exhibit proximity are closer in space or time. Besides this, one perceive elements with proximity as same group and also

perceive as one unit (Malamed, 2009). When the three advertisements were examined both icons and quotes with traffic safety instructions showed a strong association through overlapping and can be perceived as a grouped visual element, and their existence is dependent on the other component. In simple terms, one can easily read the textual messages *"Nothing in life is to be feared, it is only to be understood: Wear a seatbelt"*, *"Be the change you want to see in the world: Respect the speed limit",* and *"With the unconsciousness under control, consciousness prevails: Don't drink and drive"*, because of the contrasting black colored backgrounds.

When researchers analyzed the symmetry of graphics used in the three advertisements, they found that the icons (Sigmund Freud, Marie Curie, and M K Gandhi) in the advertisements have vertical orientations, whereas all the three textual messages used in the campaign have horizontal orientation. This kind of orientation conforms to 'physical regularities'. Viewers can perceive horizontals and verticals more easily than oblique (angled) orientations (Goldstein, 2011). Symmetry principle states that we configure elements into a whole when they form a symmetrical figure rather than an asymmetrical one. This kind of symmetrical composition eliminates numerous elements in a design and are visually drawn as simple figures and are more stable than asymmetrical compositions.

Furthermore, recent research in the area of preattentive perception has given new insights about the grouping phenomenon. These findings have proved that it intends to influence us to group the whole through parts. Such recent principles include the concept of boundary and uniform connectedness. The boundary principle states that if a set of elements is enclosed with a boundary, we group those elements together (McNamara, 1986).

Here in this campaign, textual messages are enclosed in the boundaries of icons and we perceive this as a unit as the included icons impart proper visibility to the alphabets. Another principle is connectedness, which enables one to perceive the elements as one unit when they are physically connected by a line or common edge. (Palmer & Rock, 1994). This principle is also deployed in the graphics as the icons used in the advertisements overlaps with alphabets and brings clarity to the contours and spaces among the icons used.

Considering the presence of the above mentioned principles of Gestalt, researchers have found that the advertisers have used a simple and effective design which makes visual search speedier because of the grouping of visual elements, enabling viewers to organize, interpret and comprehend the visual message in the advertisements. Moreover, grouping of the elements together is also enhancing the readability of the textual and visual elements in the advertisements.

Other factors influencing perceptual organization in the campaign

Primitive features are the unique properties that allow a visual element to stand out from an image during a visual search, as they are the most salient or prominent. Without this kind of perceptual organization, a picture may seem to be a chaotic set of disconnected visual components. Primitive features include color, motion, orientation, and size, and it also allows individuals to discriminate between textures, which one sees as regions of similar features on a surface. Discontinuation of a feature signposts a border or the edge of a surface, and it is called texture segregation. This process helps individuals to identify objects and forms. (Malamed, 2009).

In all the three advertisements of the campaign, icons and textual messages are grouped together, and this association provides information about the relationship

among individual elements present and their relationship to the whole design. It is because of icons, viewers are perceiving the textual messages with its structural components like contour and space. Moreover, advertisers using this visual language addresses to a viewer's pre-attentive visual processes i.e., discrimination of primitive features and grouping parts into wholes, enabling graphic designers to speedily communicate, grab attention, and provide meaning.

The term 'pop out' expresses how individuals perceive the most unique and conspicuous primitive features in a graphic during early vision. Through this process, the viewer gets a correct reading of whatever is important in our visual field. Primitive features that both pop out and are most likely to control later attention include color, motion, orientation, size, depth, tilt, shape, line terminators (where a line ends), closure (an enclosed space), topological properties (such as a dot inside a circle), and line curvature (Malamed, 2009). In the advertisements selected for study, the alphabets pop out from a black background and grouped black colored dressing of the icons highlighting the contours and spaces among the legs, bar and stems of the alphabets used. Besides this usage of contrasting colors, bigger size of the textual elements over the icons in the advertisements, enable viewers to discriminate alphabets from other visual components. According to Stephen Kosslyn, two properties in a visual must differ by a large enough proportion or they will not be distinguished, and exactly that kind of proportional difference is found in all the three advertisements when analyzed. Kosslyn also explains that differences between two visual properties are not noticed if the difference is not registered as a change in our brain cell activity. If the change in neuronal activity isn't powerful, it will be just a noise in the system that is a natural occurrence in the brain (Malamed, 2009). Therefore, to effectively promote visual discrimination, there should be

greater differences between two visual properties that can enhance neuronal activity. Above all, this proportional difference is relevant during preattentive processing, when discrimination occurs without our conscious awareness.

Furthermore, advertisers are bringing in an effective discrimination through two contrasting shapes – icons in off white color on a similar colored background and white colored texts in a contrasting black background with different orientations. This also highlights the concept of 'emphasis' in designing. Emphasis can be achieved through contrast, and it makes elements prominent and more visible than other elements in the surroundings (Wood, 2015). Here in this campaign, designers use an effective design that uses contrast to ensure both alphabets and icons have a place in the hierarchy, avoiding a competition for dominance. Another feature deployed by the advertiser is 'incongruence', which means the placement of an unexpected object in a familiar context (Malamed, 2009). In the studied advertisements, viewers can see three popular icons along with three traffic messages, and these icons are not directly related to the traffic messages used. Incongruence attracts viewers as they challenge one's schemas because it fails to match their prior knowledge, and interest is also heightened when it gives them an opportunity to mentally accommodate an unconventional juxtaposition or an unusual attribute. This phenomenon can also be explained with the psychological concept 'Zeigarnik effect, which points out that if a task is cognitively interrupted it can be more readily recalled and also this approach enhances the memory retention of interrupted tasks better than completed tasks (Dahlen, Lange & Smith, 2010).

Another aspect the researchers found in the visual design is 'movement', and it can be explained as an energetic force embodied in

and between the lines, textures, shapes, and forms of a graphic. Rudolf Arnheim suggests that the pathway of visual forces in a visual is determined by three factors: the attraction created from the weight of visual elements, the shape of objects alongside their axes, and the visual pathway and movement of the subject (Arnheim, 1974). Researchers could find that the icons in all the three advertisements are shown vertically alignment with horizontally aligned alphabets, and displayed visual direction like upward and sideways movement, and these motion cues in graphics create the perception that the textual messages are popping out from its static surroundings (Malamed, 2009). This kind of physical regularities will enable viewers to perceive horizontals and verticals more easily than oblique (angled) orientations (Goldstein, 2011).

Humor as a by-product of cognitive dissonance and its effectiveness in conveying traffic awareness

In the campaign titled "Traffic quotes", the ad agency, Art Plan uses a cognitive dissonance strategy to create 'humor' and researchers could not find any direct relations between the quotes of famous personalities used in the campaign and traffic awareness messages used in the advertisements. This contradiction of thoughts create a kind of discomfort in viewers and also create ironical situations resulting in humorous effects like MK Gandhi and Respect the speed limit, Marie Curie and Wear a seat belt, and Sigmund Freud and Don't drink and drive

Iconic Personality used in the advertisement	Quote used	Traffic Awareness Message in the Advertisement
MK Gandhi	*Be the change you want to see in the world*	Respect the Speed Limit
Marie Curie	*Nothing in life is to be feared, it is only to be understood*	Wear a seatbelt
Sigmund Freud	*With the unconsciousness under control, consciousness prevails*	Don't drink and drive

Humor is good for both mind and soul. There are great benefits with using humor in advertising as it captures the viewer's attention. When humor succeeds in capturing attention, people will remember it for a long period of time. Another primary benefit with humor is that you remember the advertisement longer than compared to non-humorous advertisements. Weinberger & Gulas (1992) is of the opinion that humor attracts attention and it aids in comprehension.According to Fatt (2002) humor is one of the criteria in awarding awards for the most effective advertisements, and researches has shown that humor in a low-intensity, soft sell

advertising can positively increase the advertisement's persuasiveness.

Conclusion

Through this study, the researchers made an attempt to analyse the visual organization and visualization of the print media campaign 'Traffic Quotes' made by ad agency 'Artplan' for Detran Sao Paulo Traffic Department, Sao Paulo, Brazil. Researchers found that the adoption of the personalities from three walks of life are apt to the current psycho - socio- political scenario.

Considering the increasing road traffic violations and road accidents, this campaign is trying to influence consumers by bringing behavioural changes in their minds. Rationalization plays an important role in modern life, and the technological era re-enforces the intuitive standard for rational decision-making by carefully considering all available options. In this print media campaign, researchers found the usage of 'Direct Gaze' of well-known personalities to draw viewers' attention to rational dimensions depicted in the campaign.

In this study, researchers also could find extensive usage of gestalt principles like, proximity, symmetry, pragananz, and newer principles like boundary and connectedness to bring in perceptual organization and grouping of the visual elements in the advertisements. Along with this, features like color, visual orientation, pop-out, emphasis, movement and incongruence are deployed to guide the eyes of the viewers to comprehend the intended message in an organized manner. Also the humorous effect of the quotes by the well-known personalities in the campaign through incongruity improves the communication efficacy of the campaign.

Besides these, researchers also found minimalistic approaches in the campaign, when they analyzed the advertisements of campaigns, they found the usage of low fidelity images like silhouettes and iconic representation to reduce realism. This reductionism in graphical designing is making viewers easy to detect and recognize visual elements in the advertisements, and it also minimize perceptual complexity. In this campaign, the advertisers attempts to interpret reality through visual abstraction and simplification of the graphics. Moreover, this is achieved through lowering of performance load on brain, conservation of space and above all, making signs more comprehendible across cultures.

Reference

Arnheim R. (1974). Art and Visual Perception. Berkeley: University of California Press

Catanescu, C. & Tom, G. (2001). Types of Humor in Television and Magazine Advertising. Review of Business, Vol. 22 Issue 1/2, p92, 4p

Chandler, D. (1994). Semiotics for Beginners [www document]. URL http://www. aber. ac. uk/media/Documents/S4B/semiotic. Html.

Chitoran, D. I. (1967). Syntagmatic and paradigmatic relations in lexis. Michigan State

University. Department of Linguistics and Oriental and African Languages.

Dahlen, M, Lange, F & Smith, T (2010). Marketing Communication – A Brand Narrative Approach, New Jersey : Wiley Publishers

Farooq, U., Shabir, G., & Hussain, S. (2020). Advertisement Campaigns and Human Behavior. Paradigms, 14(1), 58-66.

Fatt, J. & Poon T. (2002). When business can be funny, Management Research News,

Volume 25, No.1

Friedman, H.H. and Friedman, L. (2001) Endorser effectiveness by product type. Journal of Advertising Research, 19(5), pp. 63–71.

Gautier, D., & Gautier, C. (2018). Design, typography, etc.: A handbook. Salenstein, Switzerland: Niggli.

Global Road Safety Facility. (2021) *Brazil's Road Safety Country Profile*

https://www.roadsafetyfacility.org/country /brazil

Goldstein E.B., (2011) Cognitive Psychology –Connecting Mind, Research and Everyday Experience. Belmont CA: Wadsworth Cengage Learning

Guo, C., Jensen, C. S., & Yang, B. (2014). Towards total traffic awareness. ACM SIGMOD Record, 43(3), 18-23.

Hsu, Chung-Kue and McDonald D., (2002), "An Examination on Multiple Celebrity Endorsers in Advertising," Journal of Product & Brand Management, 11 (1), 19-29.

Jonassen D. H.(ed) (2004) Handbook of Research for Educational Communications and Technology NJ: Lawrence Erlbaum.

Krippendorff, K. (1981). Content Analysis: An Introduction to its Methodology, Beverly Hills, CA: Sage Publication

Lidwell W., Holden K., & Butler J. (2010). Universal Principles of Design- 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design. Beverly: Rockport Publishers

Malamed, Connie (2009) Visual Language for Designers: Principle for creating

Graphics that people understand, Beverly: Rockport Publishers.

McCracken G., (1989), "Who is the Celebrity Endorser? Cultural Foundations of the Endorsement Process,"Journal of Consumer Research, 16 (3), 310-321.

McNamara, T. P. (1986), "Mental Representations of Spatial Relations," Cognitive Psychology 18 (1986): 87–121.

Palmer S., & Rock I. (1994) "Rethinking Perceptual Organization: The Role of Uniform Connectedness," Psychonomic Bulletin & Review 1 (1994): 29–55.

Rita Ngoc, and Vanessa M. Patrick. "How the Eyes Connect to the Heart: The Influence of Eye Gaze Direction on Advertising Effectiveness." Journal of Consumer Research (2020)

Silva, T. C., Laiz, M. T., & Tabak, B. M. (2020). Traffic campaigns and overconfidence: An experimental approach. Accident Analysis & Prevention, 146, 105694.

Solomon G. (1994) Interaction of Media, Cognition and Learning Mahwah, NJ: Lawrence Erlbaum.

Wood, A. B. (2015). The graphic designer's digital toolkit. Australia: Cengage Learning.

World Health Organization. (2022) *Road Traffic Injuries*

https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries

Weinberger, M.G. & Gulas, C.S. (1992). The impact of humor in advertising: A review,

Journal of Advertising, Vol. 21 Issue 4, p35

Eur. Chem. Bull. 2023,12(Special Issue 1, Part-B), 1400-1410

1410