Chapter 6
Assessing the Attributes of Unconscious Interaction Between Human Cognition and Behavior in Everyday Product Using Image-Based Research Analysis

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Abstract This paper's objective is to critically assess the attributes of unconscious interaction between human cognition and behavior in the everyday product. During the study, a total of 30 images has been captured through natural observation. Using image-based research analysis as an approach, each image was critically assessed based on Burri's theoretical framework of visual dimensions analysis. Nevertheless, a set of evaluation scheme was distributed to 30 Malaysian designers to obtain the reliability of the image analysis. The findings of the study indicate a significant descriptive characteristics analysis contained within different dimensions, which led to the identification of the attributes of unconscious interaction between human cognition and behavior in the everyday product. The implication of this study will help designers to widen their gaze on the possibilities of identifying user's need during design thinking process by looking at the realms of unconsciousness and embodies human interaction.

6.1 Introduction

The unconscious interaction between human cognition and behavior (hereafter referred to as "UIHCB") in the everyday product can be defined as subtle and amusing ways that human reacts to the world and things (products) around them [1].

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In other words, it can be explained as an automatic, effortless process, unconscious, and involuntary in the use of everyday life product [2]. Despite the lack of fact of standardized definition, the hypothetical ideas mostly resemble Alexander's [3] theory of unselfconscious design; a form of cognitive interaction which is animated by incremental engagements leading to subjective and possibly unknown design improvements in relationships among everyday products, environment, and end-users. Through the theory, Alexander defines the descriptions of "goodness of fit", which states that people unconsciously make a "good fit" from a "misfit" as soon as the "misfit" is recognized. The term "unselfconscious" used by Alexander is to describe the process that produces this fit and claimed that the unselfconscious designing culture passes on by imitation and correction leading to the coherence of the design. For the past few years, the integration of varying and disparate literature regarding this theory has shown extraordinary potential in product design ideation (see [1, 4–9, 10]). However, the applicability and the usefulness of understanding the theory may come out to question since the approach, as well as the empirical evidence to clarify the theory's attributes, is not widely discussed, which clarified the gap of the study. In order to fill this gap, it is important to obtain the empirical evidence which helps to clarify the theory's attributes using an appropriate observation approach as the methodology. Hence, the objective of the study is to observe the subtle and creative ways in which people unconsciously interact with the product, assess the attributes of UIHCB, and obtained its reliability. The contribution from the study will provide a better understanding of how the attributes of UIHCB can comprehend using image-based research analysis. Moreover, the outcome from the analysis of image's scenario will help designers to expand their design thinking and reasoning parameters by reflecting the subtle interaction existed between the users and the products, which identified the user's need and be inspired to create an innovative product design concepts.

6.2 Literature Review

6.2.1 The Attributes of UIHCB in Everyday Product

Suri [1] introduced the idea of "thoughtless acts," which was adapted from Norman's [11] idea of behavioral level of interactivity and dynamic relationship of human experience. Thoughtless acts revolve around intuitive ways in which human adapts, exploits, and reacts to things in our environment. In other words, the acts involve things human do without "actually thinking." Through her study, Suri presented dozens of pictures and glimpses of human interaction through observations. Suri argues that by observing such interactions, it can inspire new design opportunities and guide better, valuable solutions. By examining human everyday interactions, Suri affirms that a researcher shall able to discover a lot about how human engage, adapt, and make sense of surroundings. It also helps scientist to determine how

design's thought process plays in human lives, and how it actively shapes the environment. Based on the observations, Suri outlined seven attributes of unconscious interaction in everyday human behavior: (1) reacting, (2) co-opting, (3) exploiting, (4) adapting, (5) conforming, (6) signaling, and (7) responding. However, through psychology literature concerning human behavior and unconsciousness, visual evidence, including the cautious and repeated process of analysis, Sohn et al. [5] simplified Suri's attributes into four. The objective of reducing the number of Suri's attributes is to simplify the design process. Moreover, the exact distinction among the seven attributes was not that meaningful for designers. For instance, the terms "reacting" and "responding" do not seem to be very different from each other. After the grouping up of similar categories, Sohn et al. [5] finally developed the four attributes that can be differentiated from each other. It is as follows:

Reacting: Human reacts automatically with the affordance of an object (e.g., physical properties) and spaces that they encounter, even without any purpose [2, 11]. Sohn et al. [5] justify this attribute as an individual reaction that happens unintentionally. For instance, some people shake their pen unconsciously while reading due to the element of stress. At the moment, the gesture happens with no specific intention or purpose but helps to reduce the stress.

Adapting: Human tend to alter the purpose or properties of things to meet certain objectives [1]. The process is called adaptation, which happens through the process of changing and evolving the surrounding artefact and system. In other words, human seek opportunities from other objects for the desired condition through adaptation. Sohn et al. [5] claim the adapting attribute triggers on an individual basis and transpires with interaction. This is in agreement with Wakkary and Maestri's [4] proposal that adaptation is not socially driven. However, under certain circumstances, the adaptive process can be instigated by stimuli (either unconsciously, or consciously but the stimuli were no longer present) [13]. For instance, people usually put their jacket on the back of their chair. At first, they may have an initial intention to exploit the chair physical properties (the back side of the chair) in order to meet their objective (of hanging the jacket). However, after continuous and repeated processes, they have adapted and are no longer conscious of their action. Moran [14] argues that the adapting attribute is a worthwhile focus element for design research.

Signaling: According to Suri [1], human convey messages through signals and prompts to other people. It was triggered by the desire to inform rules and to make others adhere to them. Sohn et al. [5] claim that the signaling attribute is usually triggered in a social context and happened with initial intention. Moreover, as proposed by Dijksterhuis et al. [15], human often make unconscious (or almost unconscious) choice. For instance, people leave the door ajar or open in signaling for a potential visit. In this case, the action of "leaving the door open" was performed after nothing more than a fleeting moment of awareness.

Conform to others: According to Suri [1], human learns patterns of behavior from others in both social and cultural contexts. This can be explained as conformity process where an individual's attributes, beliefs, and behaviors are influenced by others [5]. During the process, human unconsciously conforms to not only what

others are doing, but also others' behavior. This expands Cleereman's [16] idea regarding unconscious knowledge, which indicates that in such cases, it is often found that people have constrained conscious knowledge of what it is they have already learned. Cleereman concludes that people may be, to a certain extent, unaware that they have learned anything, or what it is that they have learned, or unaware that their behavior is influenced by something they have previously learned. Sohn et al. [5] claim the attribute as conforming to others. For instance, the evolution of fashion happened through the way people utilize their dress, learned from and followed others. Adapted from Skinner [17], conform to others falls under the category of social behavior; whereby the behavior of two or more people with respect to one another within a common environment. The behavior arises because one organism is important to another as part of its environment. In other words, Skinner concedes that an individual behavior is an important source of stimulation for another individual behavior.

6.2.2 Image-Based Research Analysis

Image-based research analysis is a research approach concerned with the meanings contained within images (e.g., the gender relations portrayed by mainstream images or historical family photographs) which has been prominently used to illustrate the textual narrative. The approach has been developed as a distinct (and minor) sub-discipline to sociology that specialized on analysis and interpretation of photographs. It has evolved around the mainstream discipline of cultural studies which draw ideas from literature and culture. As a result, the approach helps in developing critiques of visual representation and visual culture itself. In recent years, it became more evident to general social science research that image-based research should be seen as important forms of "the social." Burri [18] acknowledges the role of images as a representative of social realities and, at the same time, shape the ways people think and interact. According to Mason [19], despite a long history of using images in social research, image-based research analysis is also known as a reliable method which has been used throughout most of the research entities such as anthropology and visual ethnography. Within the mainstream research work, image-based research analysis has been viewed as an additional resource to those which are text-based. The visual is seen as a phenomenon worthy of analysis of itself.

6.3 Methodology

In this study, natural observations were conducted to observe the relationship between human experiences of things in everyday life with their environment. Through the observation, a total of 30 photographs has been captured, which illustrates the apparently unconscious exploitation of product attributes as people

put the product to new and varied uses in distinctive circumstances. The analysis of the images was analyzed based on Mason and Burri's proposition. According to Mason [19], the process of image-based research analysis started with a field notes as well as observations from the pictures generated during fieldwork, followed by a careful presentation of plates of pictures illustrating the theoretical points. Each picture is accompanied by a description of time and place as well as field and analytical observations. In order to constitute what is called the significance and logic behind the visual (images), Burri [18] proposed three different visual dimensions of images: (1) The visual value dimension: a dimension referred to the nondiscursive characteristics of images. It allows a simultaneous perception of visual information; (2) The visual performance dimension: a dimension that indicates the ways visual signs are composed in an image or to what it is visually represented; and (3) The image's visual dimension: a dimension where the visual become an element of persuasiveness. It underlines both the importance of visual information in communication and the rhetorical power of images. Thus, in this study, there are 10 sections of images analysis, which were extracted based on both proposals: (1) image number (visual value dimension); (2) date of image being captured (visual value dimension); (3) time of image being captured (visual value dimension); (4) the source of image (visual value dimension); (5) location of image being captured (visual value dimension); (6) image's subject (visual performance dimension); (7) image's focus frame (visual performance dimension); (8) image's significance scenario (image's visual dimension); (9) image's critical analysis (image's visual dimension); and (10) category of attributes. In order to clarify the reliability of the image analysis, a survey study has been conducted as well. Hence, there are 30 designers selected using Snowball approach from clearly defined groups as respondents.

6.4 Results and Discussion

Having now outlined the way in which the experiment was conducted, this subtopic presents the results and discussion of the study. This involves describing the results and expand the discussion by correlating the significant findings with the literature gathered on the topics. Specifically, for this paper, only four-image analysis will be presented and discussed according to the four attributes of UIHCB adapted from Sohn et al. [5].

6.4.1 The Results of Image Analysis

Figure 6.1 illustrates the result of descriptive analysis of Image A. Image A was captured personally by the researcher somewhere in Kuala Lumpur (here in Malaysia) on September 23, 2013, at 11.30 a.m. Based on the analysis of visual

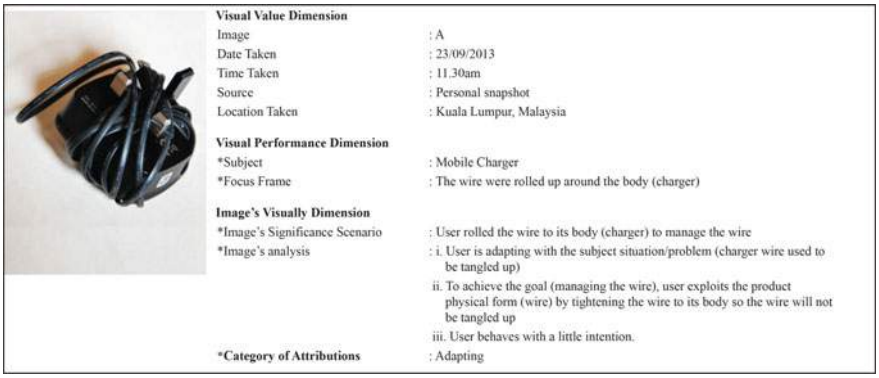

Fig. 6.1 The result of image-based research analysis of Image A

performance dimension of Image A, the subject of Image A is identified as a mobile charger where the primary focus of Image A is the cable, which has been rolled up around the charger's main body. The analysis of image's visually dimension shows that the wire was rolled up onto the charger's main body by the user in order to properly secure the cable. Based on the heuristic view of Image A, it seems that the user seeks opportunities by exploiting the physical properties of the charger and the cable. This interaction happened through user's adaptation toward the subject's problem (e.g., the tangled cable) and subject's physical properties (e.g., pliable cable and the box-shaped charger's body). This analysis expands the idea that humans tend to alter the properties of things to meet a certain objective, as proposed by Suri [1]. Moreover, it seems that the user was recently conscious with the initial intention to manage the cable. However, as argued by Bargh et al. [13], the user seems to become adaptive and no longer conscious by the interaction after an often continuous and repeated process. Therefore, it can be concluded that the attribute of interaction in Image A is "adapting".

Figure 6.2 illustrates the result of descriptive analysis of Image B. Image B was captured personally by the researcher somewhere in Perak (here in Malaysia) on October 19, 2013, at 11.45 a.m. Based on the analysis of visual performance dimension of the Image B, the subject of Image B is identified as a parking meter where the primary focus of Image B is the notes on the parking meter. The analysis of image's visual dimension indicates that the user has pasted the notes in order to signal others that the parking meter is malfunctioning. This finding strengthens the idea of signaling attribute as proposed by Suri [1], which indicates that human is conveying messages through signaling and prompt to others. In other words, Suri justifies that the signaling attribute was triggered by the desire to inform rules and encourage others to follow suit. Moreover, based on the heuristic view of Image B, the user seems to behave with the initial intention to convey a message through signaling, but the selection of interaction and the prompt action (e.g., sticking the notes) happened unconsciously. This analysis expands the idea that signaling attribute was triggered in the social context and can be executed by initial intention,

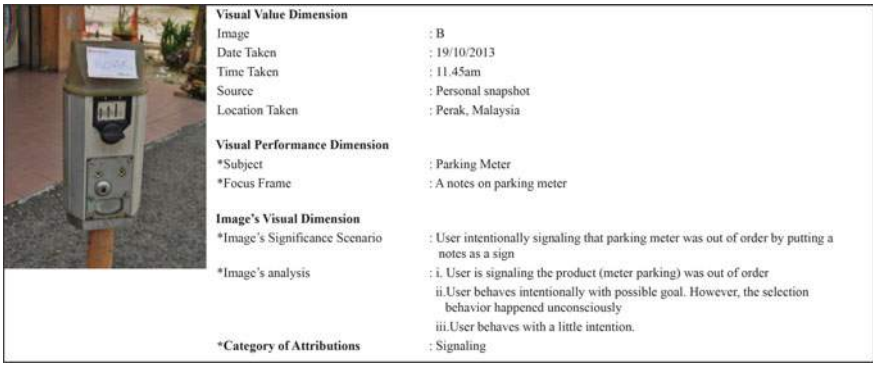

Fig. 6.2 The result of image-based research analysis of Image B

as proposed by Sohn et al. [5]. Consequently, it can be concluded that the attribute of interaction in Image B is "signaling".

Figure 6.3 illustrates the result of descriptive analysis of Image C. Image C was captured personally by the researcher somewhere in Kuala Lumpur (here in Malaysia) on October 23, 2013, at 10.38 p.m. Based on the analysis of visual performance dimension of the Image C, the girl with the pen is identified as the subject of Image C. Meanwhile, the focus of Image C is the pen, which was bitten by the girl while reading. The analysis of image's visually dimension shows that the girl was in an immersive reading mode, which might have stimulated her to react unconsciously with pen's physical form (e.g., biting her pen). This finding expands the idea as proposed by Norman [11] and Suri [1] that human reacts automatically with the affordance of an object that they encounter, even without any purpose. Therefore, it can be concluded that the attribute of interaction in Image C is "reacting".

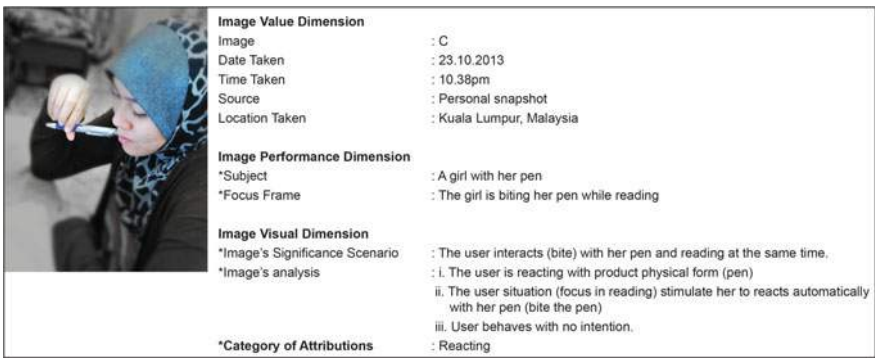

Fig. 6.3 The result of image-based research analysis of Image C

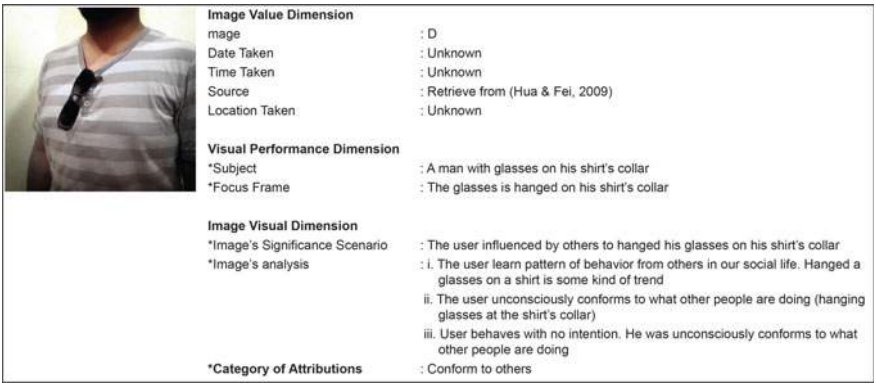

Fig. 6.4 The result of image-based research analysis of Image D

Figure 6.4 illustrates the result of descriptive analysis of Image D. Image D was captured personally by the researcher somewhere in Kuala Lumpur (here in Malaysia) on October 25th of 2013, at 11.56 a.m. The analysis also shows a man with his glasses is identified as the subject of Image D where the focus of Image D is the glasses which is latched on the man's collar. Nevertheless, the analysis indicates that the hanging glasses on the collar is a common behavior's pattern for those who own glasses. At this point, the man unconsciously learned and influenced by the behavior pattern of others. This analysis strengthens the conformity process as explained by Suri [1] and Sohn et al. [5] which indicates that an individual's attributes, beliefs, and behaviors are socially influenced by others. Hence, it can be concluded that the attribute of interaction in Image D is "conforms to others".

6.4.2 Respondents' Evaluation of the Analysis of Images

Figure 6.5 shows the result of respondents' evaluation analysis of Images A through D. Based on the result, the evaluation of analysis of Image A, Image B, Image C, and Image D gained a positive response from respondents where all six items are mostly rated as "very good or excellent." The image significance scenario of Image A has the highest evaluation score of 90%, while the category of the attribute of Image A is highly rated at 83.3%. Moreover, the subject, the focus frame, image analysis, and satisfaction on the overall analysis of Image A were highly rated (score of 80%). Meanwhile, the results indicate that the subject, image significance scenario, and the category of the attribute of Image B are highly rated with equal evaluation scores of 70%. Nevertheless, the focus frame, image analysis, and satisfaction on the overall analysis of Image B are highly rated with evaluation scores of 60, 66.7, and 63.4%. In addition, the subject of Image C has the highest evaluation score of 83.3%, while the focus frame and category of the attribute of

Sample	Value Lable	Subject	Focus Frame	Image Significance Scenario	Image Analysis	Category of Attributes	Overall Satisfaction Analysis
Image A	Strongly Disagree/ Disagree (%)	3.3	6.7	6.7	0.0	0.0	6.7
	Good (%)	16.7	13.3	3.3	20.0	16.7	13.3
	Very Good/ Excellent (%)	80.0	80.0	90.0	80.0	83.3	80.0
Image B	Strongly Disagree/ Disagree (%)	10.0	20.0	6.7	20.0	10.0	16.6
	Good (%)	20.0	20.0	23.3	13.3	20.0	20.0
	Very Good/ Excellent (%)	70.0	60.0	70.0	66.7	70.0	63.4
Image C	Strongly Disagree/ Disagree (%)	0.0	6.7	3.3	6.7	16.7	6.7
	Good (%)	16.7	13.3	26.7	16.7	3.3	33.3
	Very Good/ Excellent (%)	83.3	80.0	70.0	76.6	80.0	60.0
Image D	Strongly Disagree/ Disagree (%)	3.3	0.0	30.0	13.3	23.3	13.3
	Good (%)	26.7	16.7	16.7	30.0	26.7	43.3
	Very Good/ Excellent (%)	70.0	83.3	53.3	56.7	50.0	43.4

Fig. 6.5 The result of respondents' evaluation of the analysis of images

Image C are highly rated with equal evaluation scores of 80%. Other than that, the evaluation scores of image significance scenario, image analysis, and satisfaction on the overall analysis of Image C are highly rated with evaluation scores of 70, 76.6, and 60%. Meanwhile, the focus frame of Image D has the highest evaluation scores of 83.3%, while the evaluation scores of the subject of Image D highly rated at 70%. Besides, the evaluation scores of image significance scenario, image analysis, the category of the attribute, and satisfaction on the overall analysis of Image D are rated with evaluation scores of 53.3, 56.7, 50, and 43.4%. Through the outcome of evaluation result on each analysis of images, it can be concluded that the assessment of the attributes of UIHCB using image-based research analysis is reliable.

6.5 Summary

Based on the results, we can conclude that our aim of this study has been met, to observe the subtle and creative ways in which people unconsciously interact with the product, assess the attributes of the interaction, and obtain its reliability. Through natural observations, we have managed to observe the relationship between human experiences of things in everyday life with their environment, which illustrates the apparently unconscious exploitation of products' attributes as people put the product to the novel and various uses in distinctive circumstances. Moreover, using image-based research analysis using Mason's [19] image analysis framework, and Burri's [18] proposal of three different visual dimensions, the attributes of unconscious interaction in everyday human behavior existed within those images could be identified and comprehended. Besides, supported by

evaluation using survey study, the results also help to justify the reliability of those images and its attributes. In relation to the theory of UIHCB in the everyday product, we argue for the imperative by design educators and students to critically understand and look for tiniest possible details in human interaction and behavior, including the realms of the unconsciousness. However, this does not involve the mere replacement of a term; rather, the role of unconscious interaction of human cognition and behavior in everyday products must be comprehensively considered. The implication of this study would help the designers to widen their gaze on the possibilities of looking at the realms of unconsciousness and embodies human interaction, identified the user's need, and be inspired to create an innovative product design concepts. By doing that, designers' ability to find the fit between human values and innovative design solution shall be greatly increased.

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