MULTISENSORY DESIGN AS A TOOL FOR EMOTIONAL REGULATION: ENABLING USERS TO COMMUNICATE EMOTIONS THROUGH SENSES

Nadiya KARIBAYEVA and James LOWLEY
Oslo Metropolitan University

ABSTRACT

The complex nature of emotions poses challenges for those struggling to manage them. Thus, a broader spectrum of regulatory strategies needs to be developed. The ways in which product design contributes to emotional regulation have been scarcely investigated. Yet it is argued here that multisensory design can provide new ways of emotional communication by enabling individuals to use senses to express inner states non-verbally. The paper tries to draw the connection between emotions, senses and product design. It then presents the results of four case studies evaluating expressive sensory features of various objects designed by contemporary product designers. In addition, the survey conducted among students at Oslo Metropolitan University and Manchester School of Architecture reveals basic user preferences in expressing emotions through senses. The findings suggest that in order to facilitate emotional expression through objects, opportunities for contextualisation and variety of choice should be provided. Furthermore, expression of a negative emotion is in many cases less effective than distraction and, therefore, should not be the only goal in the design process. Most of the respondents reported experiencing difficulties in emotional expression. Although few use objects in displaying emotions, many expressed interests in alternative ways to communicate feelings. The recommendations for using senses in designing for emotional regulation, which can be addressed in teaching practices in design and other relevant fields, are compiled based on the obtained results.

Keywords: Emotional expression, emotional regulation, senses, multisensory design, product design

1   INTRODUCTION

Historically, emotions were considered to be disruptive states [9]. They were thought to be unnecessary due to the effect they had on behaviour and productivity [10]. Although this way of thinking is still often encountered today, emotions are part of humans and even new-born children possess abilities to express them. In fact, inability to recognise and process emotions is seen as a mental disorder in medicine and causes difficulty in integrating into society [2].

Since the 1990's, there has been an increased attention towards emotions in different domains of research [10]. Design too is one of the fields that recognise the role of emotions. Norman [19] states that for designers' consideration of emotions may be of even greater importance than practical features and functionality. Objects have emotional value, as they set up a positive frame of mind, trigger memories or assist in self-expression [19]. With a growing acknowledgement of emotions and the effects they can have, there is now more freedom of expression and less criticism of them. However, emotional displays need to be managed to maintain good relationships, as well as mental and physical health. In order to regulate emotions, people tend to search for ways to redirect spontaneous flow of their emotions [16]. The ways to do this are manifold. In fact, almost any stimulus or activity that can cause changes in people's emotional states may be recruited in emotional regulation [16].

Despite the fact that emotions and emotional intelligence have been a topic of much academic interest for more than two decades [10], it is still a relatively new field of research. Since emotions are such a complex phenomenon, more time and effort are required to study them and change the established ways of thinking. What makes this task even more challenging is the fact that they are person, culture and context-specific and are largely influenced by external factors, such as rules of behaviour [7].

Some people claim that expression of emotion is inhibited in social settings, whilst others feel that social settings may in some cases even facilitate expression of emotion [7].

2 BACKGROUND

2.1 Non-verbal communication of emotions

Given the fact that emotional communication is an integral part of emotional regulation, it is worth exploring how people communicate in order to thoroughly understand this psycho-physiological process. Although language with all its richness can express a wide array of subtleties of what one thinks or feels, it is not always preferable. Studies of emotional display through non-verbal channels started to be conducted as early as in 1872 and it was repeatedly claimed that the importance of such communication precedes the evolution of verbal abilities [1]. Thus, the use of multiple non-verbal channels, such as the face, body and touch, should not be considered surprising [4].

Body language and voice tone have been used ever since first humans started to communicate. There are, however, many other ways in which we convey messages. Take arts as an example. Drake, Winner, Reiter-Palmon and Tinio [6] define art-making as "a universal activity, present in all human cultures from the earliest humans on, despite the case that there is no clear evolutionary, adaptive reason for creating works of art." Fine art, sculpture, music, dance are human activities, whose main goal is self-expression. The following definition of arts was proposed by Tolstoy [22]:

"To evoke in oneself a feeling one has once experienced, and having evoked it in oneself, then by means of movements, lines, colours, sounds, or forms expressed in words, so to transmit that feeling that others may experience the same feeling - this is the activity of art".

Nonetheless, arts have traditionally been an activity that only a few could engage in. It often requires certain skills and years of practice in order for it to communicate intended emotions in all their richness. Therefore, although many people may want to be involved in it, they may either be discouraged to do so due to the fear of being criticised for the lack of talent or convinced that there is no practical use in doing arts. Yet arts are widely used by modern therapists, who recognise the effectiveness of expressive art therapy in helping patients in emotion regulation. Art creation is a way of meaning making, a form of communication, and a form of emotion regulation [24]. The ways in which arts can help to regulate emotions are divided into two groups: venting and distraction [6]. In fact, various kinds of artists confirmed that they experienced these in the process of creation of their works [6]. Venting, the process of eliciting and releasing negative emotions, has shown to be less effective in improving mood than distraction, involving art creation activities directed at opposing or disregarding the emotion [6]. Different studies, involving both clinical and nonclinical participants, have shown that art creation can serve as "a form of mood repair, at least in the short-term" [6].

Also, tools brought by technological advances, such as emoticons, provide opportunities to "express feelings, moods, and emotions and improves a written message with non-verbal elements" [23], attract the reader's attention and ensure the message is accurately understood [17].

2.2 Multisensory design

New ways of expressing emotions may be explored in order to widen the range of media that people can use to express themselves. As more is discovered about the nature of emotions, more might be done to assist in healthy emotional regulation. Basic human senses (vision, hearing, touch, smell and taste) aid humans in collecting information about the outer world [14], which is then processed by the brain [5]. Yet some of them (vision, hearing and touch) can act not only as perceptive tools, but as expressive ones as well. Consideration of different senses is necessary for the design of products which can meet customer expectations [11]. In recent years multisensory design, which aims to engage senses and influence people's perception, judgment and behaviour has been extensively studied [14]. Multisensory experience occurs in any interaction with a product and has an effect on the affective response the user produces [20]. However, senses are in most cases used to improve the perception of objects. Few objects allow for playful interaction [19], unless it was designed purely with such an intention, such as musical instruments or toys. Even if people are seeking to interact and use objects for other purposes, including emotional regulation, opportunities are limited. By designing objects that enable users to interact and express emotions through senses, a designer creates an experience that is not only rich in perception, but also in its expressive qualities.

3   METHODS

In order to explore the aforementioned ideas in greater detail, two methods were used: case studies and a survey. The case studies present four designed products (Fig. 1) which aimed to add interactivity and enable users to express themselves through different combinations of senses, while the survey attempted to determine preferences in expression of emotions through sensory channels.

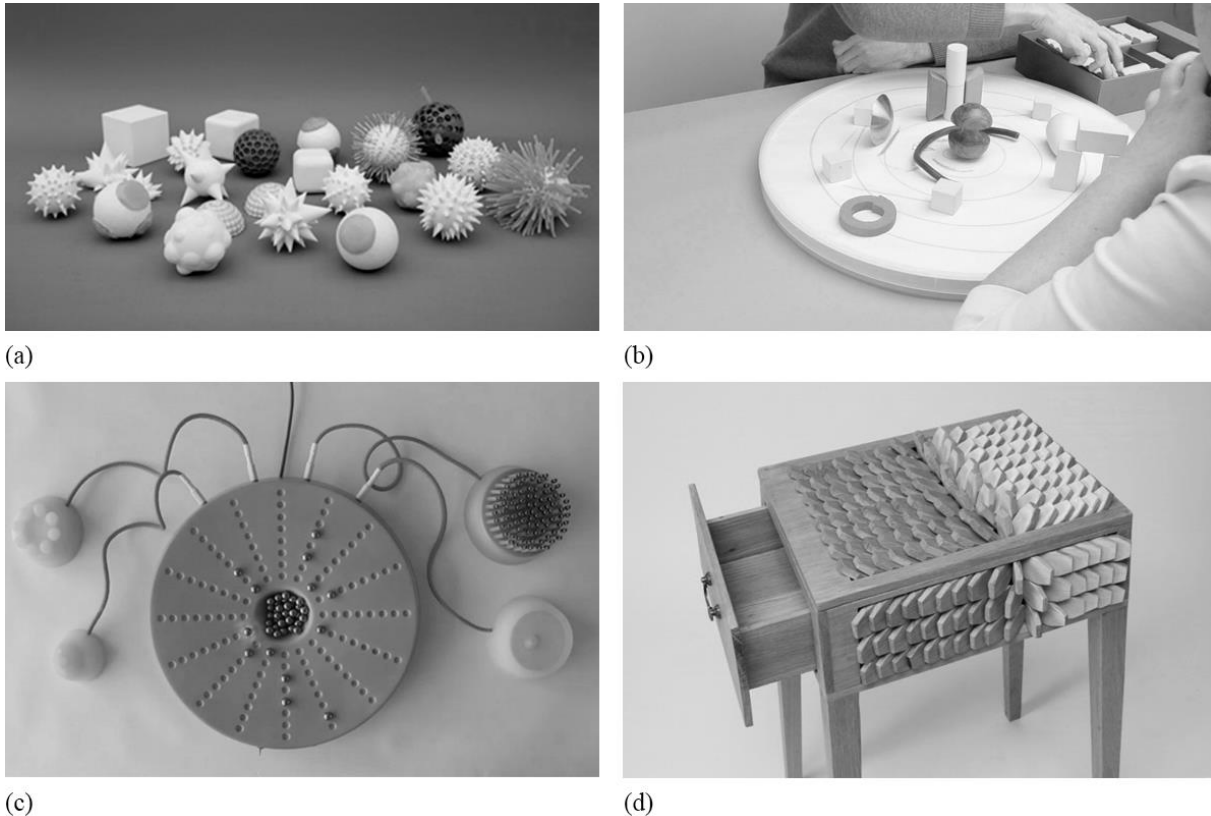# 4   FINDINGS

4.1 Case studies

(a)

(b)

(c)

(d)

Figure 1. TPAT (a), Tools for therapy (b), Neo (c), Pull me to life (d)

Tools for therapy designed by Nicolette Bodewes are a communication toolkit intended to help people express their thoughts in psychotherapy sessions [18]. It consists of two sets of objects: a series of basic building blocks and twelve irregular-shaped ones, inspired by archetypes developed by Swiss psychologist Carl Jung [18]. The basic blocks set represents situations, people, feelings or thoughts. In addition, the sets are accompanied by tracing paper for drawing and notebook for a therapist [18]. As stated by the designer, therapy sessions implementing this toolkit enable patients to communicate more effortlessly by using metaphor shapes and putting them in context to tell their stories. Using objects in psychotherapy sessions complements verbal communication. People are sometimes unable to understand their own feelings, let alone put it into words in a way that the therapist will understand, and in this way the toolkit supports them. The range of shapes could benefit from diversification so as to accommodate a wider spectrum of emotions. Nonetheless, combining the irregular-shaped tools with basic shapes to add context may help if not to express emotions themselves, then to tell a story behind it.

TPAT (tangible pain assessment tools) is a toolkit designed by Aishwarya Janwadkar. It is used in paediatrics to assist young patients whose linguistic skills are still in the development stage, in communicating their experience of pain with greater accuracy, which conventional self-report cards often fail to do [21]. The shapes were developed by analysing illustrations of pain produced by patients and producing prototypes, after which they were modified in cooperation with a practicing paediatrician [21]. The set is accompanied by three cubes to describe the intensity of pain [21]. Unlike

the previous set described, TPAT provides more variety and was based on findings obtained from patients and a specialist. Both the character and intensity of pain can be described using these tools. Although TPAT was not designed to express emotions, this toolkit could be used to express emotional states, since emotions, like pain, may be difficult to describe verbally.

Neo is a musical instrument designed by Lola Gielen, which aims to allow people without musical talent and time to learn to get involved in music creation [8]. This digital instrument consists of a circular base, on top of which marbles are arranged by the players [8]. By placing the marble balls in different rows, users activate notes, creating a melody, which can be altered by removing or adding more balls. The melody can also be modified by using four sensory objects placed around the base. The designer states that unlike other digital instruments providing little tactile interaction which is inherent in conventional musical instruments, NEO combines both sound and tactile features [8]. Similarly, to two previous toolkits, NEO is not explicitly intended to express emotions. However, as with other arts, the characteristics of music allow players to embed their feelings. The tactile objects and lights add to multisensory experience and enrich expressiveness. Thus, it could be claimed that, to a degree, this instrument provides people with more opportunities to regulate their mood.

Pull me to life is a series of cabinets with added dynamic features. The designer Juno Jeon attempts to change the way we communicate with everyday objects and turn ordinary routines into special experiences [13]. His intention is to enliven objects in a natural way by applying ordinary behaviour as a trigger for movement [13]. When the drawers are pulled, the surface of the cabinets transforms. Unlike the previous sets of specifically designed objects, *Pull me to life* is an example of an everyday object with added features. As opposed to a conventional drawer, it provides sensory stimuli and encourages interaction. Although it was not the designer's intention to use objects in expression of emotions and was intended to improve the interaction between the user and the cabinet, emotional expression can be part of this interaction too. When feeling certain emotions, people can interact with the object in less practical and more experiential ways. The movements of wooden exterior, as well as the sound produced may help in regulating one's feelings.

4.2 Survey

An online survey [15] was conducted among Oslo Metropolitan students, as well as students at Manchester School of Architecture. The survey consisted of 14 multiple-choice questions. 25 people completed the survey, of which 10 were male.
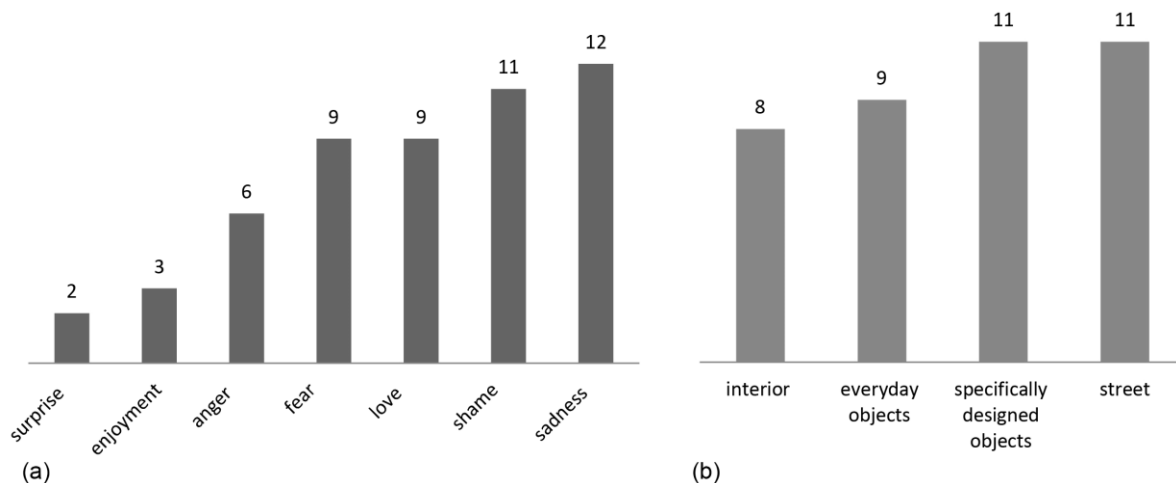
Figure 2. Emotions found hard to express (a), preferences for expressive opportunities (b)

Most of the respondents (20) experienced difficulties in sharing emotions. The most difficult emotions to express were sadness (12) and shame (11), closely followed by fear and love, with 9 people who chose each of them (Fig. 2(a)). Anger was found hard to express by just under a quarter of the respondents. A mere 3 people stated that they did not employ non-verbal ways in communicating emotions. The overwhelming majority of the respondents (21 out of 25) found it easier to share emotions with somebody they knew. The main reason for emotional suppression reported by nearly half of the respondents was that it was considered unhelpful. Rules of behaviour and lack of

opportunities were chosen by 4 and 6 respondents in turn. Other reasons reported by the respondents included embarrassment, difficulty in translating emotions into words and anxiety about the other person's reaction combined with fear of being rejected.

Just over two thirds of the respondents never use objects in expressing emotions. However, the majority of the students (21) expressed interest in alternative modes of expression, albeit the level of interest varied. As for places where people would like to use those alternatives, the results were comparable. Public places and specifically designed objects were equally favoured, with 11 people who wished to have opportunities for self-expression in each of these categories, whereas everyday objects and interior design were selected by 9 and 8 people respectively (Fig. 2(b)). The majority of those who were interested (18) preferred those objects to be non-digital.

5 DISCUSSION

The case studies of four multisensory objects revealed a number of considerations to be taken into account in designing for sensory emotional expression. Firstly, the case study of TPAT suggests that collaborating with target users and specialists in initial stages of design produces more tailored results and satisfactory variety. Due to complexity of emotions and a wide range of factors affecting the processing of feelings, finding a single solution to meet everyone's expressive needs is virtually impossible. Specific requirements of a particular user group should be thoroughly investigated in order to ensure the objects emotional functionality. A further important strategy is contextualisation. As emotions appear as a result of certain experiences, communicating what led to an emotion may eventually help to communicate the emotion itself. Allowing users to choose various levels of intensity, as in TPAT, also facilitates higher accuracy of expression. The case study of NEO suggests that objects should not require specific skills or restrict self-expression through rules and standards, while *Pull me to life* exemplifies enriched user-object interaction. Sensory properties of everyday objects and places can be intensified or modified in order to make the process of expression more explicit and effortless.

The survey brought about interesting findings, yet few conclusive statements can be made due to the small size of the sample. Most of the people surveyed were at least sometimes unwilling to share their emotions with others, which means they might opt for other ways to regulate emotions. The most common reason for unwillingness to share emotions with others was a feeling that it will not help. This suggests that communicating emotions to another person is not necessarily the most preferable way to deal with them. As in the case of art therapy, distraction from an unwanted feeling might be a more efficient strategy than expression.

6 CONCLUSIONS

Consumer society reflects the approaches favoured in different fields. Product design is no exception. Generally, the design process is guided by practical functions and aesthetical qualities. The designer is concerned with creation of the most convenient and pleasing product, which is in itself a genuine intention. Yet, objects solely fulfilling the function defined by the designer often fail to allow interaction and as such, products are complete and can be used and appreciated, but not transformed. The aim of designers is perhaps too often their own self-expression, but not as much the self-expression of those using their creations. Although users can express themselves by choosing a product that matches their personality or lifestyle, there are few opportunities for expressing more dynamic states, such as emotions. Enabling users to communicate feelings through objects can result in a transition from passive, utilitarian attitude towards the surrounding environment to more active, creative mindset. This, in turn, may lead to stronger product attachment and lower consumption levels. Multisensory design has an important role to play in developing such approach. The consideration of senses is as important in expressing and regulating emotions as it is in invoking them. Given the complexity of the task, there is a need for multi-disciplinary collaboration in linking existing knowledge, as well as conducting new studies. Higher educational institutes have necessary resources and are, thus, capable of facilitating the cooperation of relevant research fields. Design is infiltrating an increasing number of aspects of people's lives, and new arenas demand new considerations and approaches. The curriculum has a challenge of shaping and adjusting to the new role's designers play in society. One of those roles, proposed in this paper, is emotional regulation. Work-related stress, isolation of population and increased prevalence of mental illnesses are just few examples of how

design, together with other fields, may work towards addressing and achieving well-being and high quality of life.

REFERENCES

[1] App B., McIntosh D.N., Reed C.L., Hertenstein M.J. and Phelps E.A. Nonverbal channel use in communication of emotion: how may depend on why. *Emotion*, 2011, 11(3), 603-617.

[2] Bar-On R., Parker J.D.A. and Goleman D. *The Handbook of Emotional Intelligence: The Theory and Practice of Development, Evaluation, Education, and Application - at Home, School, and in the Workplace*, 2000 (Wiley)

[3] Bodewes N. *Tools for therapy*. Available: http://nicolettebodewes.com/ [Accessed on 2019, 10 March], (2016)

[4] Buck R. *The communication of emotion*, 1984 (Guilford press)

[5] Citrin A.V., Stem D.E., Spangenberg E.R. and Clark M.J. Consumer need for tactile input: an internet retailing challenge. *Journal of Business Research*, 2003, 56(11), 915-922.

[6] Drake J.E., Winner E., Reiter-Palmon R. and Tinio P. Confronting sadness through art-making: distraction is more beneficial than venting. *Psychology of Aesthetics, Creativity, and the Arts*, 2012, 6(3), 255-261.

[7] Friedman H.S., Miller-Herringer T. and Sarason I.G. Nonverbal display of emotion in public and in private: self-monitoring, personality, and expressive cues. *Journal of Personality and Social Psychology*, 1991, 61(5), 766-775.

[8] Gielen L. *NEO*. Available: http://www.lolagielen.nl/neo.html [Accessed on 2019, 10 March], (2015)

[9] Gross J.J., Salovey P., Rosenberg E.L. and Fredrickson B.L. The emerging field of emotion regulation: an integrative review. *Review of General Psychology*, 1998, 2(3), 271-299.

[10] Hartel C., Ashkanasy N.M. and Zerbe W. *Emotions in organisational behaviour*, 2005 (Taylor & Francis)

[11] Haverkamp M. *Synesthetic design: handbook for multisensory approach*, 2013. (Basel: Birkhauser)

[12] Janwadkar A. *Tangible pain assessment tools*. [digital image] Available: http://www.aishwaryaj.com/tpat/ [Accessed on 2019, 10 March], (2018)

[13] Jeon J. *Pull me to life*. Available: http://www.junojunos.com/2016/pull-me-to-life-series [Accessed on 2018, 9 October] (2016)

[14] Kampfer K., Ivens B. and Brem A. Multisensory innovation: haptic input and its role in product design. *Engineering Management Review*, 2017, IEEE, 45(4), 32-38.

[15] Karibayeva N. *Emotions and senses*. Available: https://surveyhero.com/results/93961/1525b6adee6f86413d8c341b269fa37f [Accessed on 2019, 27 May] (2018, 25 October).

[16] Koole S.L., Van Dillen L.F. and Sheppes G. The self-regulation of emotion. *Handbook of self-regulation: Research, theory, applications*, 2011, 2, 22-40.

[17] Kralj Novak P., Smailovic J., Sluban B. and Mozetic I. *Sentiment of emojis (Report)*, 2015, 10(12).

[18] Morby A. *Tools for therapy encourage people to open up about their emotions*. Available: https://www.dezeen.com/2016/11/04/tools-for-therapy-nicolette-bodewes-tactile-object-psychotherapy-dutch-design-week-2016/ [Accessed on 2019, 10 March], (2016) 4 November

[19] Norman D. *Emotional design: why we love (or hate) everyday things*, 2004 (Basic Books)

[20] Özcan E., Cupchik G.C. and Schifferstein H.N.J. Auditory and visual contributions to affective product quality. *International Journal of Design*, 2017, 11(1)

[21] The James Dyson Foundation. Available: https://www.jamesdysonaward.org/2018/project/tangible-pain-assessment-tools-tpat/ [Accessed on 2018, 15 October], (2018)

[22] Tolstoy L. *What is Art?* (A. Maude, Trans.), 1897/1996 (Hackett Publishing Company)

[23] Troiano G. and Nante N. Emoji: What does the scientific literature say about them? - A new way to communicate in the 21st century. *Journal of Human Behaviour in the Social Environment*, 2018, 28(4), 528-533.

[24] Winner E. *Invented worlds: the psychology of the arts*, 1982 (Harvard University Press)