

Getting in the Mood:

The role of mood in product design and interaction

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Abstract: Understanding emotion in product design and specifically measuring emotions is an area of focus that has gained substantial research attention. Mood research on the other hand, is limited largely due to the challenges presented by defining and measuring mood. While much of product research focuses on emotion, mood as a design criteria and technique is starting to gain interest in product development. Keeping users in a good mood is a valuable design goal. Products that offer detection, indication and inducement of moods are more likely to extend the emotional impact of a product. Understanding the broader experience surrounding product use can increase mood-sensitivity in design. This paper will illustrate how mood plays a vital role in product appraisal and will outline a taxonomy of mood with a specific emphasis on mood as an important interaction design objective.

Key words: *Moods, mood research, emotion, appraisal, interaction design*

1. Introduction

Mood is perhaps one of the most allusive design problems in our current understanding of product interaction and emotion in design. The dominant tendency in the literature is to overlook mood due to the controversy regarding the definition and measurement of mood [12] [32]. Despite this tendency, mood is starting to gain more attention in terms of its untapped potential in product design [1-2] [9] [31].

Mood is being explored in various contexts from how to improve understanding of ethnographic research [30], to how moods can be detected or mapped in physical-social spaces [9], and even how mood impacts the Facebook user experience [2]. Mood has even found its way into iPhone applications [8] and mobile devices [24] [26] [28].

The key issue is that moods and emotions are different. What defines their difference is duration (time): moods last longer than emotions [12] [13] [15]. Whereas emotions are triggered by events and pass quickly without warning, mood follows events over time [12]. Therefore, moods are less easily observed and measured because events can't be linked to moods, unlike emotions.

Context plays a major role in interaction design. Moods factor into user context (and cognition) by reflecting the state of their environment [40], and therefore must be considered as part of the overall design problem. Moods

provide the affective backdrop, or 'emotional color' to all we do [12]. For example, mood has been shown to play a role in service experiences [21] and to significantly impact loyalty and satisfaction in service environments [29].

2. The emergence of mood-sensitive products

A mood-sensitive product is a product that colors an existing mood and contributes to or sustains a mood. Mood can have a powerful impact over experience. The author recently noticed at a New Year's party that the most significantly discussed item in a newly designed living room was a "mood light" (a ball that pulses changing colors). A similar noticeable shift in experience was noticed by the author at the Weston Hotel (a hotel that tries to differentiate itself with a spa-type feeling) which used low-lit candlelight at the reception check-in desk, producing a marked change in the check-in experience. Both lighting [37] and background sound [38] are known in retail environments to impact customer mood. Yet mood lighting and sound are currently under-utilized in consumer experiences rarely appearing in stereos, airplane seating environments, computer peripherals and refrigerators for example.

2.1 Defining a Taxonomy for mood-sensitivity

a) Mood detection: Products can detect a user's mood through physiological data in order to enhance the emotional experience or put the user in optimal moods required for experiencing product emotions.

For example, Sony Ericsson created an MP3 player that patented "generating a playlist based on facial expression", while Anaïd Ortigoza at NYU developed a prototype MP3 player where increases in detected heart beat provide faster songs [11]. Mood detected by physiological signals (captured by a body sensor) can also be detected to tailor the experience of mobile services and applications [26].

Experiments with "bio-mapping" (data gathered through Galvanic Skin Response and Global Positioning System) have produced emotional maps of cities capturing moods and emotions [9].

b) Mood indication: Products that allow users to indicate their moods in order to provide social context to their thoughts or status.

For example, social networking site LinkedIn.com provides a Twitter style "What are you doing?" interface. Web conferencing systems like DimDim.com provide mood status (happy/sad). Customer service site GetSatisfaction.com lets users rate the mood of their service feedback, a useful indicator of priority and severity. Mood can even be communicated in synchronous text-based online chat for extended periods of time [1].

Self-reporting methods can also contribute to mood detection. The iPhone application called Glow allows users to indicate their mood, plotted on a map based on their GPS coordinates [8]. See Figure 1.

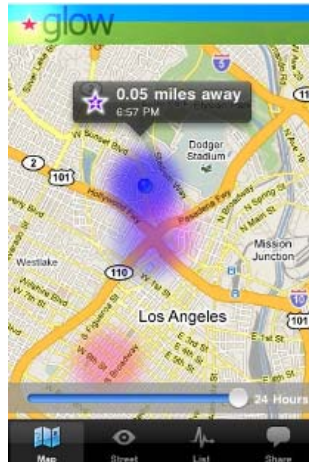


Figure 1: Glow creates a "feelings" map, that allows iPhone users to share how they feel while in a specific location [8].

c) Mood inducement: Products that induce moods based on interpreting user input or augmenting an existing mood.

For example, stereomood.com the "emotional Internet radio" is a music jukebox based on mood that analyzes songs for "musical feeling". It is also possible to detect mood and induce deeper or different moods through algorithms that analyze mood from music [16] [7].

A further example can be found with Facebook.com. Facebook has been able to add an element of play (not normally found in social networking experiences) with the addition of Facebook gaming applications. This experience for many Facebook users is crucial to "setting the mood" and extending the sociability of the site user experience [2].

3. Mood and Product Appraisal

Moods and emotions are close cousins. Emotions can lead to moods and moods can alter the probability that certain emotions will be triggered [14]. Products that offer mood detection, provide mood indication and help mood inducement are more likely to extend the impact of emotional responses to design. Since negative moods bias judgments [14] and can erode satisfaction [29], it is prudent for mood sensitivity to be factored into design.

Mood runs as a background process across user interaction. Mood seems to be always present and can persist, both before and after product interaction. Mood may also be changed by product interactions. People may also neutralize their moods in anticipation of interaction with a product, though this has not been yet been studied with products, mood neutralization behavior has been found to occur when people anticipate social interactions [22].

Product appraisal is a well documented methodology for understanding emotion and product interaction [17], [23]. However to date, our current understanding of the product appraisal process does not capture mood influences. Product appraisal theory distinguishes between emotions and emotional episodes but does not fully

track moods. Each offer different dynamics to be understood: emotions, emotional episodes and moods according to Frijda, are distinct processes [14].

For example a person who is grieving a death may be in an ongoing sense of shell-shock and may still appraise a product and emotion and revert to the mood leading up to the product interaction. If the person is going through a major life event (e.g. getting married, buying a home, narrowly escaping death), this may over-ride the emotional experiences from pre-appraisal to post-appraisal (the areas surrounding Desmet's appraisal model). See Figure 2.

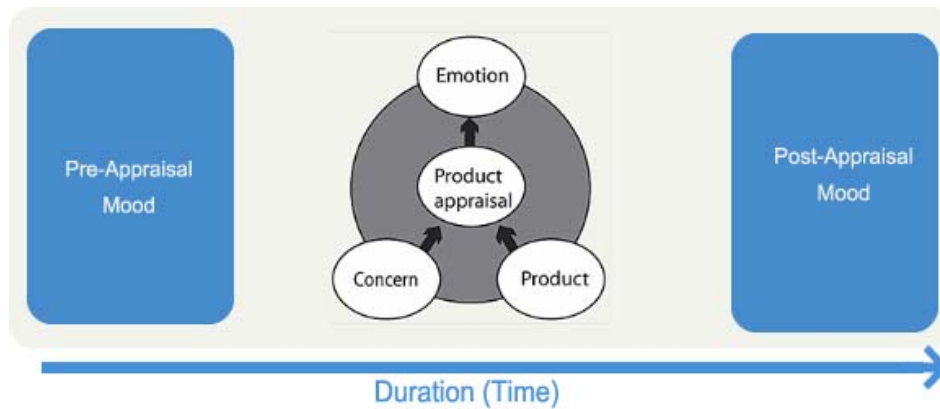


Figure 2: Desmet's product appraisal model with mood factored into the overall experience [17].

3.1 Significant Emotional Events

Moods may also be shaped by and include values and values formation processes in such critical life changing periods in what Massey [39] called Significant Emotional Events (SEE). SEE's govern the direction of change throughout an experience, understood for our purposes as a "meta-mood". These meta-moods can contain other less intense moods and emotions. For example: anticipating marriage (meta-mood lasting months); wedding dress delivered with tailoring mistakes (temporary mood lasting days); perplexed by sewing machine (appraisal lasting seconds); manifests anger (emotion lasting minutes); many failed attempts on the machine (emotional episode lasting an hour); and hiring an emergency tailor to fix the dress. SEE's may act as meta-moods either influencing a product interaction or being influenced by product interaction in return.

Designers ought to consider the broader temporal implications of product ownership, loyalty and user adoption with regard to moods. What is the broader experience surrounding product interaction and appraisal? Which emotions are needed to off-set a mood a person might be inhabiting, in order to enjoy product use?

3.2 Beyond interaction

Design necessarily focuses on the immediate interaction with product and user cognition, including the emotional experience. However, designers can provide more enriching experiences with products by looking beyond specific interactions and into the wider mood appraisal space. This implies deeper contextual analysis of user values for example, since mood is rooted in subjective experience [12].

Moods may be a hidden factor in user assessment beyond focused product interactions. Norman's "Reflective" stage [33] seems to be a type of meta-appraisal largely because it can be characterized as a reflective assessment

conducted by the consumer over time and includes a wider mood appraisal space. Thus, mood seems to factor strongly into post-use assessment and reflection.

3.3 Mood regulation

Mood regulation is key to sustaining user experience. Mood regulation includes being able to interrupt negative moods, adjust or maintain positive moods and nurture emotional experiences that can be seamlessly patterned into an ongoing mood. The goal of mood-sensitivity in emotion based approaches to design is to 'keep the user in a good mood'.

Products impacting mood must first provide strong emotional experiences [23]. According to Ekman, moods can be elicited by changes in neurohormonal, biochemical states and can be generated by high intensity emotional experiences repeated over and over with no time between each episode [13]. Once an (emotional) threshold is crossed, and a biochemical change occurs, a mood is created. This means that if products fail to influence or offset a user's negative mood with remarkable emotions (capable of eliciting change), the mood will linger and could color subsequent emotions.

A "Wow" experience can be seen as one such desired outcome of product use and design. In trying to understand how users get to wow-experiences, Desmet found *fascination*, *desire* and *pleasant surprise* as key factors in creating wow-experiences [4]. Such 'wow-appraisals' were characterized by unexpectedness, unfamiliarity and possession worthiness. It seems that the wow-experience offers a clue to designing strong emotions capable of suspending or altering consumer moods. Tight coupling between action and appearance in interaction design has also been found to play a significant role [5].

Emotions such as surprise sustained over time, can help with mood regulation with beneficial impacts across the product ownership lifecycle. Designing surprise into products is known to evoke feelings of enjoyment [35]. For example, if surprise reactions resonate with users it is more likely that they will be repeated over time [36], and can therefore be said to have positively impacted mood. Kim et al. found that consumers differentiate between distinct positive emotions and use them as information in assessing a product's emotional claims. Processing a product's claims depends on the consistency between the message and the consumer's mood [20].

Compelling experiences resulting in memories can also aid in patterning mood: Designs that facilitate the formation of personal memories attached to the product offer greater attachment behavior [34] or bonding [19]. In addition, products that have a high degree of "synch" [19] with users are more likely to regulate user moods.

4. Measuring Mood

Since mood is largely a background process occurring over a greater duration than emotion, measuring mood requires a systems-thinking approach. Eliciting moods necessitates examining the combination of internal and external causes, rather than a particular stimulus [23]. Lazarus suggests that the difference between acute emotion and moods depends on the motivational and cognitive conditions that shape the appraisals that bring each about [15].

Proper measurement of mood in a product interaction and ownership context may also require updating definitions of our current models of emotion. For example, Boehner et.al. posit an alternate model of emotion with emotion characterized as interaction: "dynamic, culturally mediated, and socially constructed and experienced" [27]. This may require an examination of personal values, culture and even personality traits. For example, Frijda points to emotional personality traits as recognizable in sentiments [14].

To date, in different studies, mood has been measured with several different instruments: Wensveen et. al. used a Mood Induction Procedure (MIP) to induce positive and negative states [5] before testing their interaction design. Um et.al. used a self-referencing mood induction procedure (positive or neutral emotions). To audit the mood induction, to determine if the induction had affected participant's emotions, they employed a Positive Affect Schedule (PAS) from the Positive and Negative Affect Schedule (PANAS). (PANAS is well-validated and widely used self-report index of positive affect and negative affect mood dimensions) [10].

While mood is unpredictable and difficult to measure currently, it cannot be overlooked due to its quiet impact on product appraisal, reflection and long term user adoption of products. Good moods have been found, for example, to influence positive appraisals in learning situations [10]. Understanding the cause and context of negative moods is also important. For example, Lazar et. al found that frustrating moods in blind users were caused by lost work, not lost time due to frustrating situations [3]. Further studies are required to determine how mood influences long term user adoption, positive appraisal and how we reflect on products.

5. Conclusions

Designers may not be able to completely control or easily measure mood given our current understanding, but by better understanding how mood works and its significance, we can begin to design products that alter, influence, adapt to and sense moods. Designers need to understand mood in order to design products that offer emotionally significant experiences that can outlive usage scenarios. Being able to sustain positive experiences across time, and across product ownership are key goals of interaction design. Strong emotions are the key to influence moods. In turn, the broader goal of emotionally compelling products is to keep users in a good mood. By leveraging a sensitivity to mood, designers can elevate, alter and sustain mood as a design variable.

6. References

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