Understanding Emotions and Related Appraisal Pattern

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Abstract Understanding of emotions and the appraisal patterns associated with emotions is vital in the fields such as user experience design, product design, advertising and fashion. People respond with different emotions to the same situation depending on how they interpret, or appraise the situation. It is important for a designer to understand the differentiation in emotions in order to design emotion-laden products. But assessment and mapping of emotions is always a tough task, because the topic itself is subjective and abstract. It is in this context that this paper presents an approach to differentiate emotions and to map emotions on the basis of the related appraisal patterns.

Keywords Emotion · Experience design · Abstract · Human cognition · Appraisal

1 Introduction

The world of design has been solely dominated by either usability i.e. ease of use and esthetics or combination of both. But the definition of meaningful design is slowly shifting from usability and efficiency to holistic aspects of emotional

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experiences and affect. Only in recent years, psychologists, designers, marketing gurus (Norman 2004; Demet 2002; Bagozzi et al. 1999; Jordan 2000) are trying to articulate cognitive decision making pattern of customers through emotional experience. To understand emotional aspects, design authors have been back to cognitive aspects of eliciting emotion i.e. appraisals.

1.1 Definition

According to appraisal theorists (Lazarus 1991; Oatley and Johnson-Laird 1989), emotion is a mental state of alacrity which is elicited from a diagnostic cognitive framework. This framework helps intelligent organisms to make the decision of subsequent activity. It depends on various parameters like relevance with goals and coping power of the organism according to the nature of stimuli. The coping power dictates the bipolar dimension of an emotion: positive or negative valence. Positive emotions are joy, happiness. Fun etc. and negative emotions are anger; disgust etc. emotions are varied from simple, primary which is triggered by behavior with high survival value to complex emotion which is triggered by complex multi-layered cognitive processing. Plutchik (1997), in his famous circumplex model, showed how these emotions are inter related with different intensity and combinations, and how mixing of these primary emotion can generate complex emotions with different valence like color wheel [1] (Fig. 1).

The study of positive emotions is important and interesting because designers are often prescribed to create a product experience with intension to evoke certain kind of positive emotion while interacting with users. Engagement, enticement is result of human appraisal to positive emotions. With clear goals, high level of equilibrium between individual skills and task challenges and clear immediate results user will fully engrossed in any task having high level of satisfaction-mostly leads to positive emotion [2]. If skill level or individual level of coping power is retarded with respect to challenge, it leads to anxiety.

2 Different Framework of Emotions and Their Relation Among Them

Jordan (2000), Norman (2004) and Desmet (2002) are trying to define the framework of eliciting emotion. These frameworks are outcomes of various research results done by various psychologists (Lazarus 1991; Frija 1994; Scherer 2001; Ortony 2005). Though the interpretation of these frameworks are different, but their philosophical aspects are interrelated.
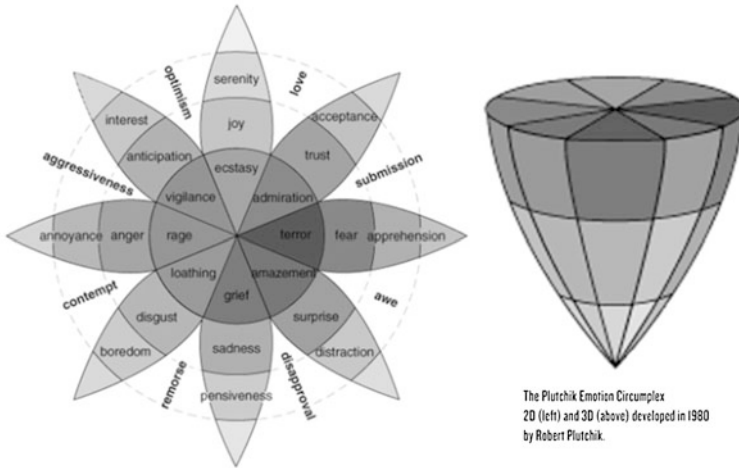
Fig. 1 Circumplex model of Plutchik. *Source* emotions and life: perspectives from psychology, biology, and evolution: Robert Plutchik

2.1 Jordan's Pleasure Theory

Foundation of famous four pleasure theory proposed by Canadian anthropologist Lionel Tiger, later popularized by Pat Jordan, lies on 'human pleasurability'. This theory is very straight forward and only implies for simple emotions, but it doesn't explain complex multi-layered emotions like thrill [3]. The 4 parameters are:

- Physio—related to the body and the senses.
- Psycho—related to the mind and the emotions.
- Socio—related to social acceptance, relationships and status.
- Ideo—related to values and beliefs.

2.2 Norman's Theory of Emotion

Neuro-biological process theory discusses how information is processed in different levels: visceral, behavioral and reflective. The automatic, prewired primary level, the visceral level: this layer deals with sensory aspects of an experience. The second level: this subconscious thinking is the Behavioral level of processing in everyday life. And the third level is the most complex advanced level: reflective layer which deals with conscious consideration and reflection learned during past experiences [4].

2.3 Desmet's Appraisal Theory

As a designer it is very important to have an in-depth knowledge on appraisal patterns of emotion so that one can use this concept while designing a product. And designer can generate a product to evoke certain emotions. People respond with different emotions to the same situation depending on how they interpret, or appraise. Appraisal theories state experiencing an unpleasant emotion requires appraising a situation as harmful to personal well-being, whereas a pleasant emotion involves appraising a situation as beneficial. In this context appraisal theorist proposed several cognitive appraisal components. These are: motive consistency component, expectation confirmation component, agency component, standards conformance component, coping potential component, certainty component, valence, goal congruency, goal conduciveness, normative significance [5].

By observing these theories, a common pattern and inter-relation can be found. For example Jordan's Physio-pleasure theory and Norman's visceral level processing manifest same interpretation in different way. Jordan's Psycho, Socio and Ideo-pleasure, Norman's behavioral and reflective level of processing and Desmet's appraisal theory demonstrate same core philosophy.

3 Research

3.1 Prolog

We have taken five positive emotions: Happiness, joy, excitement, thrill and fun. The preliminary aim of the research is to make dimensions on how each of these emotions these pleasing emotions can be differentiate.

Question we are trying to address are:

- These emotions have very similar meaning and they are abstract too. So are there any dimensions on which we can differentiate them?
- Is there any pattern?
- Which emotions are too similar for people?

3.2 Sample and Data Collection

Forty two university students (age between 24 and 30) were recruited for a volunteer research study. 15 out of 42 students were females. Half of the students have design background. An interview was designed to identify the participant's appraisal pattern. They have been asked to recollect any situation or product that they have faced or experienced last time along with a set of questionnaire and interview. Video/audio recording has been taken.

3.3 Analysis

The video/audio recordings have been transcribed. These corpuses are used as the unit of analysis. The verbatim comments are printed and cut into several corpuses, and rearrange into group with the similar corpuses. These chunks have been coded into several categories. Table 1 provides exemplary statements for all emotions. Latent content is also included into the analysis to notice silence, sighs, stammering, and postures to infer whether participants are finding difficulties to distinguish among emotions or trying hard to recollect a certain emotion. The number of times that a category repeats has been recorded in the study and analyzed. And finally mapping has been done with the co-relation among these categories and the emotions.

4 Findings

4.1 Prolog

We already conceive literary meanings of these emotions. But can the dictionary definition of these emotions exactly be mapped with actual perception of these emotions! Based on the interviews and questionnaires, 4 major types of dimensions are being address. These are Amplitude, Time, frequency of occurrence and association with social interactions. On these parameters we can map these abstract emotions.

4.2 Happiness

The dictionary meaning of emotion 'Happy' says:

- Feeling, showing or causing pleasure or satisfaction......Cambridge [6]
- Delighted, pleased, or glad, as over a particular thing......dictionary.com [7]
- Experiencing pleasure or joy; Satisfied; enjoying well-being and contentment......Webster [8]

The associate keywords/emotions are related to higher level of wish fulfillment, contentment and satisfaction after achieving desired goals-an activity based emotion. Most of the users say when they achieve his desired goal. The value/ amplitude antecedent of this emotion is very high. But another important factor is responsible to determine the mapping of this emotion: expectancy or subjective control over achievements. For happy it is partial control over achievement i.e. the uncertainty factor is pretty high at the same time the user has high motive relevance and congruence. Users perceive that the action-control expectancy and action outcome-control and situation. For e.g. one has done a good amount preparation and he

Table 1 Example of statements referring to different parameters

Category	Sub category	Example	Participant ID	Emotion
Social interaction	With closed ones	…When I proposed her and she accepted…	Participant 1	Happy
	With others	…with my old Panjab wale friends when I booze…	Participant 6	Fun
Frequency of occurrence	Seldom	…After the interview result of Supergas where I got selected through campus placement…	Participant 1	Thrill
	Often	…when play cricket with my cousins during my vacation…	Participant 3	Thrill
	Very often	…When 1 am with my roommates and friends doing mischiefs…	Participant 1	Fun
Duration of experience	Long (lasted for days)	…Last time I was with my family members, whole week I was happy…	Participant 2	Happy
	Moderate (lasted for an hours or several hours)	…When she accepted, the whole night I felt very happy, and recollecting…	Participant 1	Happy
	Very less (lasted for a min or little more)	…when result out…	Participant 4	Excitement
Intensity of arousal	Very intense	…After the interview result of Supergas…, it was very intense…	Participant 1	Thrill
	Moderate	…hanging with my friend, it was fun but moderately intense…	Participant 2	Fun
	Less intense	…When went for marketing with my best friend, it was less intense…	Participant 3	Joy

expects that he will get through the entrance exam, but at the same time he has a fear to failure as so many students are aspiring i.e. negative valence. This mixed valence creates internal predicament after the activity for the goal. Because of this uncertainty, the emotion steps up from joy level to happy level. Happy is more cherishable, flat and creates a long lasting impression (Fig. 2).

4.3 Joy

The dictionary meaning of emotion 'Joy' says:

- The emotion of great happiness; Make glad or happy……Webster [8]
- The emotion of great delight or happiness caused by something exceptionally good or satisfying; keen pleasure; elation……dictionary.com [7]
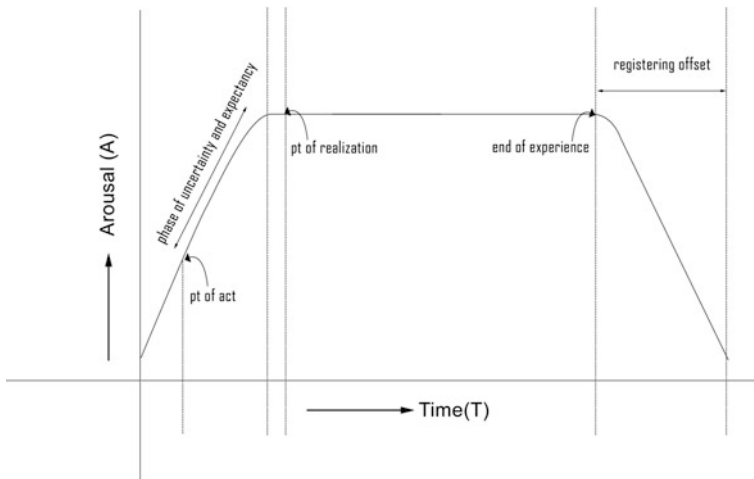- Great happiness……Cambridge [6]

Fig. 2 Proposed journey of experience model: Happy. *Source* self-study

Joy and happy are almost synonymous. People find difficulty to distinguish between them because of the thin layer. Because like happy, joy is also a flat emotion, but the time-extent of this emotion is little less and sometimes momentary. User has less motive relevance and congruence. Being with friends, meeting with my boyfriend, riding bikes, getting stipends has low motive relevance, it's a pleasant emotion, if one is getting stipend, one will be able to spend her assistantship that money on buying things whatever he/she wants. One does not have any repulsion to feed someone else with that money. He/she is not involved with her evaluation of his/her resources and options for coping. The process of going to the level of joy is as fast as the dropping the experience line (Fig. 3).

4.4 Excitement

The dictionary meaning of emotion 'Excitement' says:

- The state of being emotionally aroused and worked up......dictionary.com [7]
- To make someone have strong feelings of happiness and enthusiasm......Cambridge [6]
- Feeling of lively and cheerful joy......Webster [8]

In excitement the amplitude of arousal is very high, but the same time the frequency of occurrence is quite low. There is low expectancy or no expectancy of outcome but which is highly consistent with the motive relevance. For e.g. first time movie watching, first time meeting with girlfriend, to see own name in the campus interview—a student who has mediocre preparation, have very low expectation of getting job, and then he suddenly sees his name in the list of successful candidate, he experiences excitement (Fig. 4).
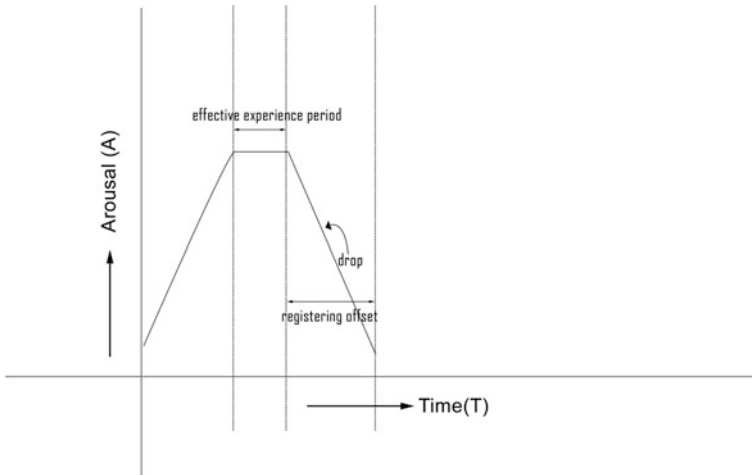
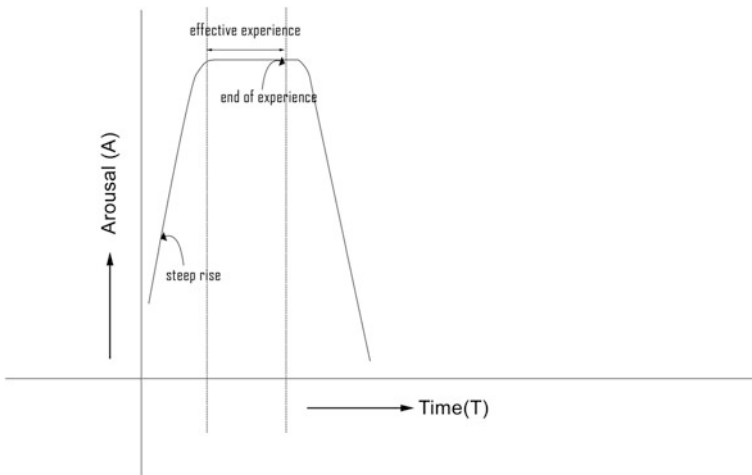Fig. 3 Proposed journey of experience model: Joy. *Source* self-study

Fig. 4 Proposed journey of experience model: Excitement. *Source* self-study

4.5 Thrill

The dictionary meaning of emotion 'Thrill' says:

- The swift release of a store of affective force……Webster [8]
- A feeling of extreme excitement, usually caused by something pleasant……Cambridge [6]

Amplitude of arousal is the highest among these emotions and frequency of the occurrence is zero, most of the time it is the first time and last time for a particular event. For e.g. first time riding on rollercoaster elicits the experience of thrill, but second time experience with rollercoaster evokes excitement rather than thrill and the association with social interaction is least with this emotion. The environment is apparently adverse and it gives a perception of negative valence, but the cognition force organism to readdress as a positive valence. The arousal level is very high with physiological signs like sweating. But the cognition suggests and the event/product lies in positive valence. This emotion is ambivalence in nature (Fig. 5).

4.6 Fun

The dictionary meaning of emotion 'Fun' says:

- Providing enjoyment; pleasantly entertaining……Webster [8]
- A source of enjoyment, amusement, or pleasure……dictionary.com [7]
- Pleasure, enjoyment, amusement……Cambridge [6]

The distinct feature of this emotion is high level of social interaction but positive valence amplitude of arousal is low. For e.g. roaming with friends and the day outing with family requires high level of social interaction, and the frequency of occurrence is also very high, but the amplitude of arousal is very low. But on the other hand, the experience time-span is very high.

In the Figs. 6, 7, 8, 9, these positive emotions have been mapped with respect to different parameters. In all the graphs, parameters i.e. Social interaction, frequency of occurrence and the time-span have been plotted with respect to arousal. A particular emotion which has shown highest value on these dimension, has been taken as highest unit, and other emotions have been mapped relatively based on the content analysis.

5 Implication on Design Decision

Now the question is how these parameters can further extrapolate design decisions while designing an experience.

5.1 Synthesize Physio-Pleasure

If we analyze the experience journey of these positive emotions (refer Figs. 2, 3, 4, 5, 6), a common pattern of all these positive emotions is increase of amplitude of arousal within positive quadrant or from negative to positive valence with respect
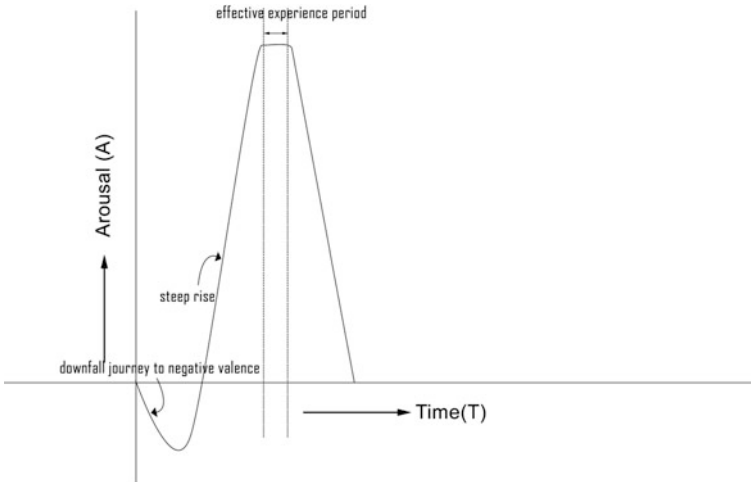
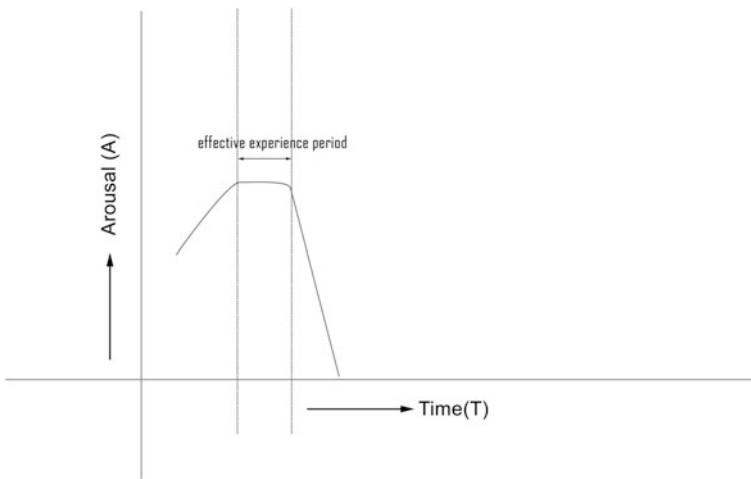**Fig. 5** Proposed journey of experience model: Thrill. *Source* self-study

Fig. 6 Proposed journey of experience model: Fun. *Source* self-study

to time. Now question is how a designer can increase an arousal. In the research, participants often refer an experience that is associated to synthesizing physio-pleasures i.e. any five senses or combination of multiple senses. They refer to an experience of visiting Taj Mahal in the moonlight i.e. visual pleasure, listening to Bach or Mozart i.e. auditory pleasure, having dinner in a restaurant with family i.e. pleasure of taste.

The classic example of visual stimulation is experience design in stalls in Delhi auto-expo 2010: If we compare the stalls of Hero-Honda and Yamaha [9, 10]. Hero-Honda as a brand emphasizes on the fact that it is a common man's commuter where

Fig. 7 Time versus
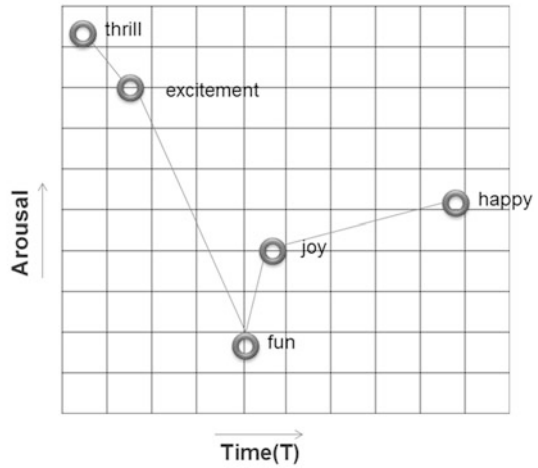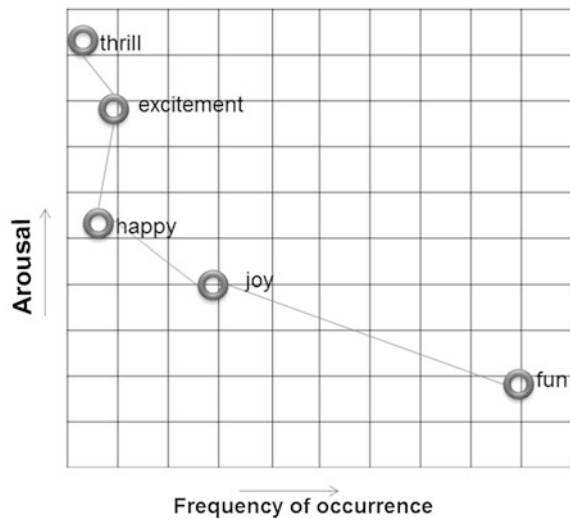amplitude of arousal. *Source*
self-study

Fig. 8 Amplitude of arousal
versus frequency of
occurrence. *Source* self-study

joy of riding is their central philosophy, so the use of bright ambience, sounds of
refreshing water-curtain creates a visual and aural pleasure which accentuates the
brand identity. On the other hand, Yamaha's ambience was little dark, posing
models in sensual way on top of the bikes creates a visual message of masculinity,
adventurous and raunchy nature of the brand (Figs. 10, 11).

Another classic example is goosebumpspickles.com's enticing photography of
pickles [11] or Tata-Nano's home page justifying their tagline "khusiyon ka
chaabi-key to happiness" [12] (Figs. 12, 13).

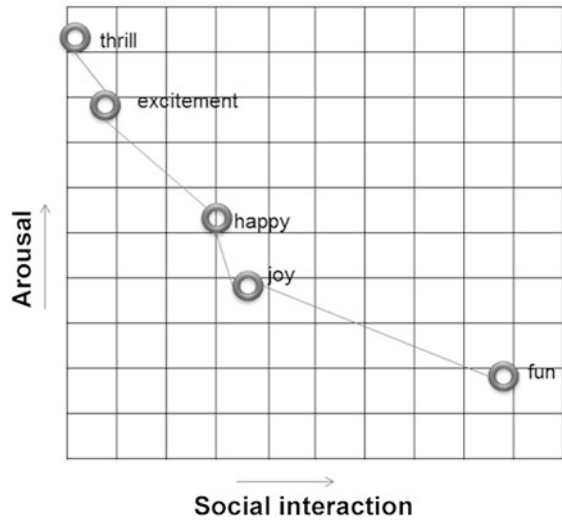Fig. 9 Amplitude of arousal versus social interaction. *Source* self-study

Fig. 10 Hero-Honda stall auto-expo-2010. *Source* http:// www.superbikesindelhi.com

5.2 Changing Persuasion with Positive Way

One of the important patterns from research is expectancy (refer to Sect. 4.2) and frequency of occurrence of events (refer to Fig. 8). Revealing unexpected positive elements in a subtle and intelligent way creates a surprise in positive way, changes the user anticipation and image towards the product experience. For example, Flipkart always promises to their customer that purchased product will be reached within 3–4 working days, but generally product comes within 1–2 days. Here users' expectation and persuasion changes because of promptness of the logistic

Fig. 11 Yamaha stall auto-expo-2010. *Source* http://www.2wheelsindia.com

Fig. 12 Homepage of Goosebumpspickle. *Source* http://www.goosebump spickles.com/

Fig. 13 Homepage of Tata-Nano. *Source* http://tatanano. inservices.tatamotors.com/ tatamotors/home.htm

and supply chain management system of the Flipkart. This transforms Flipkart to India's largest online retailer with 2.6 million users and daily revenues of Rs 2.5 crore [11] (Fig. 14).
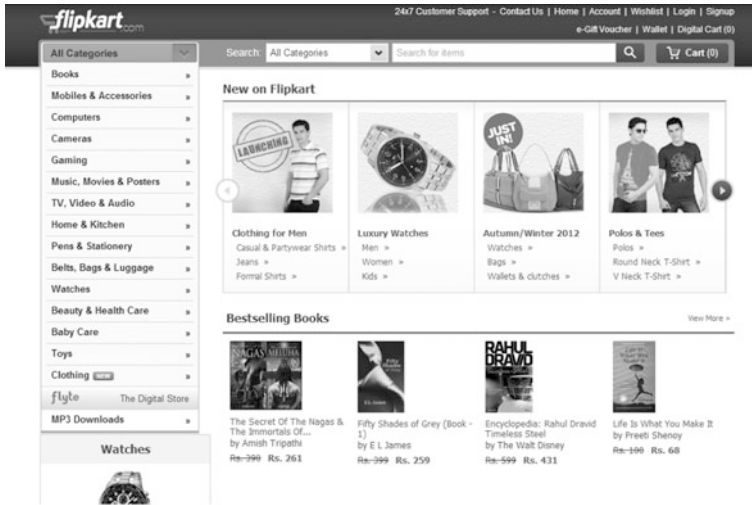
Fig. 14 Homepage of Flipkart. *Source* http://www.flipkart.com/

5.3 Stimulate Socio-Psychological Interaction

Most of the positive emotions has one common factor is high social interaction (Happy, Joy and Fun). Human beings are born with a natural instinct to find their natural place in society. For example, Facebook, top social networking website, is not a primary channel of communication or necessity like phone, but still according to Bureau of Labor Statistics report, the average Facebook user spends more than 11 h per month on Facebook [14].

5.4 Experience the Dynamics in most Usable Way

Usability is an integral part of emotional design. Though Norman says that even a product is esthetically appealing but little difficult to use, user will try to get the right path. But with excellent usability, the whole experience of easy completion of task elicits emotions and attachment with the product. Comments like "When I saw my 60 years old mother was easily able to use my gift-an iPhone, I felt so happy about it. It just took 2 days", make researcher to think about the beauty of usability.

Classic example is cleartrip.com. At the very first instance visually it's just clean website, nothing more than that, but experience during ticket booking elicits positive emotions, attachment with the website, because of efficiency and the performance of the website. The main reason behind this kind behavioral pattern is because appraisal theory says that relevance of the goal and attainment of goal in easiest possible way, elicit positive emotion (Fig. 15).
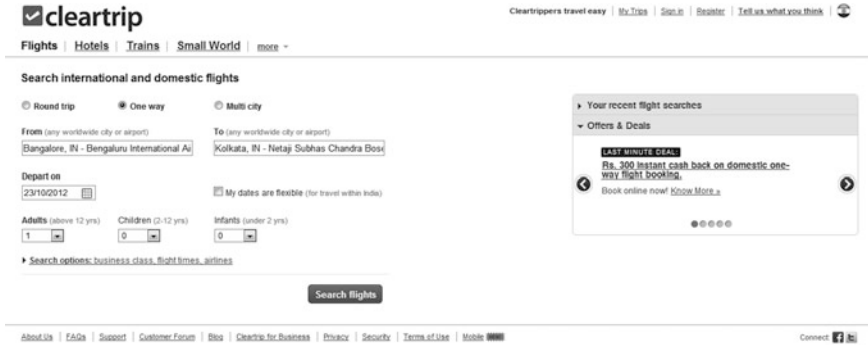
Fig. 15 Homepage of Cleartrip. *Source* http://www.cleartrip.com/

6 Conclusion

In general what we perceive or are taught about literary meanings of some of the important positive emotions are not same, as people appraise this emotion differently. There is a huge deflection in terms of articulating and understanding the dictionary meaning of these emotions. We have seen that though these emotions like happy-joy-fun or thrill-excitement are quite synonymous by nature but they have a very thin boundaries and their journey of experience are completely different with each other. But at the same time, these emotions can be mapped with certain set of parameters: Amplitude of arousal, time and social interaction and frequency of occurrence. These parameters further address the hidden cognitive meaning of these emotions and its implication on design decision. Though the appraisal of emotion is very abstract and subjective with individuals because of complex, multi-layer construct of human cognition, this paper is trying to address a framework on which these emotions can be re-articulated.

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