

Chapter 11

The Role of Emotion and Culture in the “Moment of Opening”—An Episode of Creative Collaboration



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11.1 Introduction

Creative collaboration in engineering design teams involves interpersonal interactions between the engineers in which the engineers exchange ideas and information. The quality of these interactions determines how ideas are generated, accepted, and evaluated in the team. But what determines the quality of interaction for creative idea generation? What patterns of behavior do we observe during an idea generation interaction? In this chapter, we will look at a particular pattern of interaction called a moment of opening that occurs during idea generation. We will describe the behaviors manifest during a moment of opening and discuss the effect of emotions and culture on a moment of opening interaction.

11.2 Defining Emotion and Culture

In the study of creative collaboration between engineering designers, we are concerned with their in situ behavior. Accordingly, our definition of emotion, and later of culture will entail an attempt to capture the multiple perspectives of the situations and environments engineers typically navigate during design. For the definition of emotion, we rely extensively on the work of Tomkins (1995) and Tsai et al. (2006). Regarding culture, we consider it an amalgamation of biology, biography, geography, and sociology/political-economy. This definition of culture reflects our view

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that culture pertains to both an internal environment of an organism and an external environment. Thus, culture involves human–human interaction at both the intrapersonal and the interpersonal levels. It also involves human–external environment interaction both at the level of product engineering and at the level of use, our interest being primarily in the former. What follows is a description of emotion from the two perspectives, which have been of benefit to our work.

11.2.1 Emotion: An Arousal-Valence Perspective

Most studies of emotion in a cultural context tend to refer to data and phenomena signified by emotional words, facial and vocal emotional expressions, and descriptions of emotional experiences. Following Tsai, we subscribe to the notion that these phenomena vary along a minimum of two dimensions: (a) valence and (b) arousal. Tsai gave the example that fear correlates with negative valence and high arousal, and calm correlates with positive valence and low arousal. For Tsai specific emotional states can be called affective states or affect when they are described in terms of valence and arousal (Tsai et al. 2006).

11.2.2 Emotion: An Awareness-Memory Perspective

According to this viewpoint, affect is the innate biological reaction experienced in the body. Feeling is the consciousness of affect. It is a sensation that has been checked against previous experiences and labeled. It is personal and biographical because every person has a distinct set of previous sensations from which to draw when interpreting and labeling his or her feelings. Emotion is the triggering of memories by feelings. It is the projection or display of a feeling. Unlike feelings, the display of emotion can be either genuine or feigned (paraphrased from Nathanson's description of Tomkin's work, 1992).

For Silvan Tomkins, the nine primary affect are:

Positive:

Interest/excitement
Enjoyment/joy

Neutral:

Surprise/startle

Negative:

Distress/anguish
Fear/terror

Anger/rage
Shame/humiliation
Dissmell (smell)
Disgust (taste)

As will be seen later, positive affect is the primary constituent of a moment of opening. Furthermore, in discussing the role of culture, we rely on the idea presented above that; memory or what others call cognitive appraisal will play a role in upregulating or downregulating of emotion (Gross 1998; Ochsner and Gross 2008).

11.3 Moment of Opening as an Episode of Creative Collaboration

The inspiration behind the moment of opening concept comes from creative collaboration in the field of theater. Improvisational theater is a drama form in which the actors do not rehearse predetermined scripts. Instead, they request suggestions from audiences for enacting scenes and collectively improvise a scene on the stage. Improvisational theater has its roots in a series of techniques and exercises created by Keith Johnstone to foster spontaneity and narrative skills among theater actors (Johnstone 1992). The actors use games and collaborative exercises to practice building awareness and listening skills, accepting others’ ideas, building on the ideas of others, and being spontaneous with expressing one’s own ideas. Since without the script, the actors do not know a priori what they would be doing next, they are open to all possibilities and ideas that are expressed. They accept each other’s ideas and add their own ideas to build on them and create a scene together. This interaction results in a group collaborating creatively together. A moment of opening in a design team is an interaction that manifests some of the same patterns visible in an improve group interaction.

A moment of opening can be described as an episode in the interaction between two or more persons characterized by in-the-moment awareness of ideas being exchanged and spontaneous expression of one’s ideas. The individuals open up to perceiving ideas from each other and to expressing their own ideas to each other. As observed through video analysis of design teams, this pattern of opening up to each other lasts only for a few minutes at a time. Hence we are calling this pattern of interaction, a moment of opening.

The interaction process in a moment of opening involves three steps.

1. Intake—This involves being aware of what is happening in the team space and listening to the ideas being expressed.
2. Processing—There is free association on the ideas that are listened to by the team member.
3. Expression—The ideas that arise from the free association—are spontaneously expressed by the team member.

The following sketch demonstrates the interpersonal interaction that occurs in a moment of opening.



Let us look at the three steps involved in a moment of opening interaction in more detail.

1. Intake—The intake activity involves sensing the environment around the individual to perceive the ideas being expressed. This involves listening, seeing or touching depending on whether the ideas are expressed verbally, through sketching, gesturing, or through artifacts. The intake activity also includes giving validation or positive back-channeling to indicate that the idea has been understood and accepted.
2. Processing—The processing activity involves associating freely on the ideas received. The free association processing is different from other forms of processing like logical analysis, associating on feelings received with the idea or accommodating or assimilating new information, i.e., learning.
3. Expression—The key aspect of expression in a moment of opening interaction is that it is spontaneous. The individual does not filter ideas to be shared with the group based on what is appropriate or not appropriate. In the moment of opening, the response is to express the stream of consciousness that arises from free association in the mind of the individual.

Now, let us look at an example of interaction between three design engineering students that qualifies as a moment of opening. The three students were recruited for a laboratory experiment in which they were given a design task and were instructed to generate ideas for a toy suitable for children 3–7 years old. Their interactions were videotaped and then analyzed for content and emotional cues.

<p>A:</p>	<p>But could it be like at home like when you are a kid you always want to build a tree house or have a tent in the living room you can overnight in</p>	
<p>B:</p>	<p>What about a build your own tent, like a giant like that (gesturing with hand to indicate a big tent)</p>	
<p>A:</p>	<p>Yeah! Yeah! (with excitement)</p>	

(continued)

(continued)

C:	Build your own tent giant like!	
A:	(repeating A's gesture but exaggerating it to indicate a big tent) so it will like giant tent kit	
C:	Oh that'll be cool!	

In this example, person A starts suggesting an idea for a toy that could capture some of the desires of a child to build a tree house or a tent in the living room. Person B listens to the idea, accepts it, and builds on it to suggest a giant tent. Person B's processing could be considered a free association on the idea as the

response did not include judging or expressing feelings or beliefs. Person A listens to B and responds with excitement to the idea. Person C validates the idea being discussed and A repeats the gestures that B used to described the idea and express excitement. In this moment of opening interaction, there is an intake of ideas by A, B, and C, free association on the ideas by B and expression of ideas by A and B.

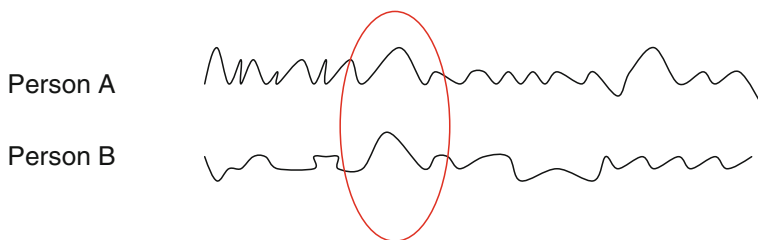
11.4 The Role of Emotion in a “Moment of Opening” Interaction

We coded the video for emotional cues expressed in the interaction. The following table describes the emotional cues that are visible in the video.

Speaker	Content	Gesture	Tone of voice	Facial expression	Body posture
A:	But could it be like at home like when you are a kid you always want to built a tree house or have a tent in the living room you can overnight in	Hands on the table fiddling with Lego pieces	Neutral ending with an intonation	Neutral	Leaning forward, facing B and turning to C and back to B
B:	What about a build your own tent, like a giant like that (gesturing with hand to indicate a big tent)	Fiddling with Lego pieces and then raising both arms	Neutral	Neutral	Looking from B to C and then to the table
A:	Yeah! Yeah!	Holding hands close to chest, nodding	High arousal	Smiling, open mouth	First leaning forward and then swinging back
C:	Build your own tent giant like!	Fiddling with Lego pieces	Neutral ending with intonation	Smiling	Looking at A
A:	So it will like giant tent kit	Raising arms wide and waving them	High arousal	Smiling, open mouth	Swinging back while gesturing with arms
C:	Oh that’ll be cool!	Holding Lego pieces	High arousal	Smiling, open mouth	Looking at A and then to the table

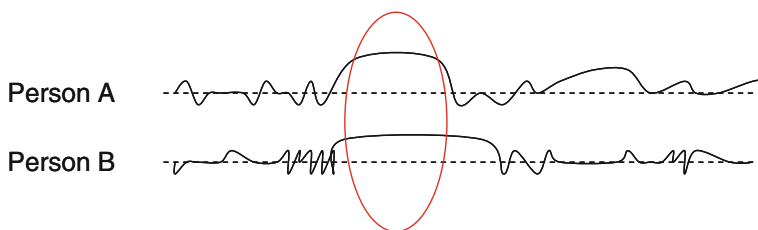
We observe in the video that along with the intake, processing, and expression of the ideas, there is also emotional validation (nodding, saying “yeah”, “Oh that’ll be cool”) and a general synchronicity of emotions among the team members during the interaction. When one team member is excited, the others pick up that emotion and mirror it in their tone, gestures, and facial expression. Thus, a moment of opening interaction can be characterized by certain emotional and ideational patterns. These patterns are described below.

1. Synchronicity of emotions



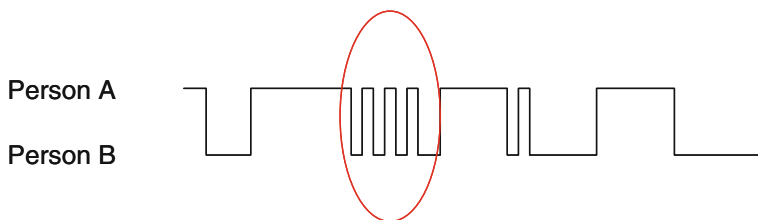
In the example given earlier, we observed that the team members were mirroring each other’s emotional expressions and gestures. This mirroring of emotions is called as synchronicity of emotions. If we could obtain the emotional intensity signals of persons A and B, then the emotional synchronicity in the moment of opening would be visible as matching signal patterns. The above figure shows a conceptual visualization of the emotional intensity signals of two persons A and B. The highlighted segment with matching signal patterns indicates a moment of opening.

2. Expressed validation



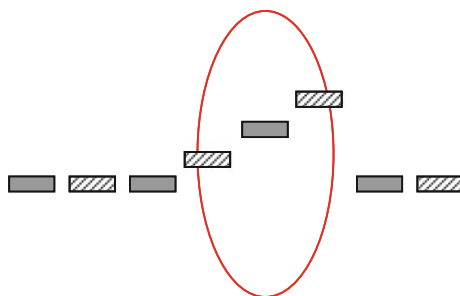
Expressing validation involves giving feedback to the speaker that his idea has been accepted. Validation is expressed through actions like head nodding, paraphrasing the idea or complimenting the idea. In the example discussed earlier, C expresses validation by paraphrasing and complimenting ideas. The above visualization, the highlighted segment shows positive validation from both participants that might indicate a moment of opening.

3. Rapid turn-taking



Another characteristic of a moment of opening observed through video analysis is rapid turn-taking. The individuals speak in shorter turns and the speaker turn rotates among the team frequently. The above diagram visualizes the rapid speaker turns occurring between persons A and B as highlighted in a moment of opening.

4. Building on previous ideas

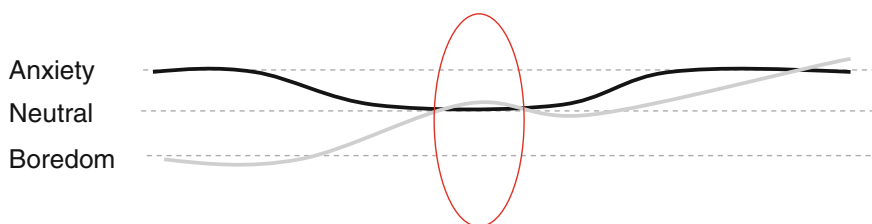


The content of the shorter speaker turns during a moment of opening is not independent. Rather, the individuals build on each other’s ideas during the moment of opening. In the conceptual visualization above, the black segments indicate ideas expressed by person A and hatched segments indicate ideas expressed by person B. In the moment of opening highlighted above, the stepped visualization indicates that the ideas are built on each other.

The four patterns of interaction described above are the necessary conditions for a moment of opening to occur during an idea generation session from a team perspective. However, what are the necessary conditions for a moment of opening to occur from an individual perspective?

To answer this question, we utilize the principles of flow behavior as described by Csikszentmihalyi (2001). Csikszentmihalyi described flow as a state of ordered consciousness in which the attention is focused on a task which is challenging enough to match the individual’s skills and during which the individual cycles

between perceiving external stimulus and acting on the stimulus to achieve preset goals. Csikszentmihalyi further describes flow as a rewarding experience of engaging with the task for the individual. The metaphor of flow could be applied to a moment of opening interaction. The individuals participate in a cycle of perceiving ideas and acting on this stimulus to free associate and express ideas to each other. Csikszentmihalyi described the state of flow occurring when the individual is neither bored by the task because his skills exceed the challenge presented to him, nor anxious because the challenge presented in the task exceeds his skills. Borrowing this concept of bored and anxious states, we can conceptualize that the occurrence of a moment of opening is simultaneous with the individual being neither bored nor anxious during an interaction, but is in a neutral state. This can be visualized as follows.



The dark curve indicates the mood of person A during interaction with person B over a period of time. The lighter curve indicates the mood of person B. The individual moods of persons A and B vary between anxiety, neutral, and boredom. It is not yet clear whether being in a neutral state is the precondition for a moment of opening to occur or whether it is a cause of being in a moment of opening. Further research needs to be conducted to investigate this question.

The characteristics of a moment of opening like emotional synchronicity and expressed validation, and the preconditions for individual participation in a moment of opening indicate the importance of the role of emotional expression in a moment of opening interaction. However, what is it that modulates the role of emotional expression in a group interaction? One of the important factors that affect emotional expression is the culture of the individual.

11.5 The Role of Culture in a “Moment of Opening” Interaction

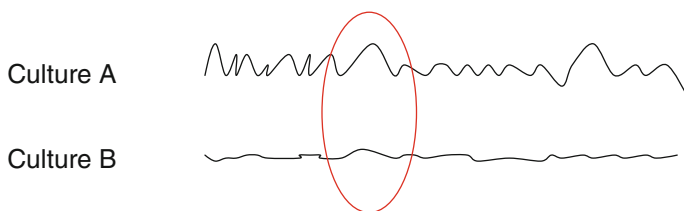
Culture could affect emotional expression in the following ways.

1. Culture influences the display of emotions.

The emotional cues that an individual displays or perceives from others influence her desire to retreat or advance during an interaction. Positive cues

encourage the individual to continue and negative cues encourage the individual to stop interacting or to change the direction. Culture could determine what emotional cues are displayed, whether positive or negative, because of its influence on the individual’s value system. For example, Ekman (1972) found that when Americans and Japanese viewed stressful stimuli first alone and then with a higher status experimenter, the Japanese were more likely to display smiles in the second condition, while there were no differences between Japanese and Americans in emotions displayed in the first condition.

2. Culture determines the range of emotional expression.



The above diagram shows the emotional intensity signals from persons belonging to two different cultures A and B. Culture A has a wider range of emotional intensity during expression than culture B. So if person A is excited, she would express his excitement by raising her tone of voice, laughing or gesturing wildly. Person B has a smaller range of intensity during emotional expression. If B is equally excited, she might express it by smiling or nodding her head. Thus during a moment of opening, both persons could have emotional synchronicity, but their amplitude could be different. Prior studies about emotional responses in individuals from different cultures support this hypothesis especially for the display for positive affect. For example, Tsai and Levenson (1997) conducted a study about the differences in emotional responses of Chinese Americans and European Americans. The study indicated that Chinese Americans demonstrated less variable and less positive reported affect than European Americans, but did not differ in most measures of physiological responding and in reported negative affect.

3. Culture determines how an emotion is interpreted.

The difference in cultures between two persons interacting during a moment of opening can also affect how they interpret each other’s emotions. Prior research conducted by Tsai et al. (2006) at Stanford University on affect valuation in different cultures indicates that cultural factors influence the ideal affect or what people consider as appropriate feeling in different contexts. In the above situation, if person B has a narrower range of emotional intensity in expression, person A might interpret this expression as B being bored or not appropriately excited by the idea, even though B is equally excited about the idea. This could have implication for A’s response to B’s ideas during the interaction.

11.6 Conclusion

In this chapter, we have described an interaction phenomenon called a moment of opening that occurs during creative collaboration in design teams. We investigated the role of emotion in the moment of opening both at a team level and individual level, and touched briefly on the role of culture in the moment of opening interaction. The concept of moment of opening as an observable interpersonal interaction gave us a practical opening into exploring the influence of emotion and culture in engineering design teams. Further studies into the moment of opening interaction, emotion and culture need to be conducted to broaden our understanding of creative collaboration in design teams.

References

- Csikszentmihalyi, M. (2001). *Flow: The psychology of optimal experience*. New York: HarperCollins.
- Ekman, P. (1972). Universal and cultural differences in facial expression of emotion. In J. R. Cole (Ed.), *Nebraska symposium on motivation, 1971* (pp. 207–283). Lincoln: Nebraska University Press.
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2, 271–299.
- Johnstone, K. (1992). *Impro: Improvisation and the theatre*. New York: Routledge.
- Nathanson, D. L. (1992). *Shame and pride: Affect, sex, and the birth of the self*. New York: Norton.
- Ochsner, K. N., & Gross, J. J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Current Directions in Psychological Science*, 17(2), 153–158.
- Tompkins, S. (1995). *Exploring affect: The selected writings of Silvan S. Tompkins*. (V. E. Demos, Ed.). New York: Press Syndicate of the University of Cambridge.
- Tsai, J. L., & Levenson, R. W. (1997). Cultural influences on emotional responding: Chinese American and European American dating couples during interpersonal conflict. *Journal of Cross-Cultural Psychology*, 28(5), 600–625.
- Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology*, 90(2), 288–307.

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