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Main Article:

Emotions in Risk Assessment and Decision Making Processes During Craft Practice

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Abstract

Traditionally subjective experiences and emotions have been overlooked in the practice of scientific research. In the field of design and craft research too, feelings and emotions have been considered as interfering with the rigour of research. However, as a result of findings in neuroscience, a new understanding has emerged, providing emotions a central role in risk assessment and decision making processes. This has implications also for how we understand craft practice. In this practice-led research, a craft practitioner analysed five video-recordings of herself while throwing clay blindfolded. The researcher-practitioner specifically studied critical incidents in the throwing process and made a detailed analysis of how sensory experiences and emotions guided her in risk assessment, decision making, and problem solving during the clay-throwing sessions. She found that her tactile experience gave her important clues on the condition of the material and its consequent possibilities at different stages. These experiences in turn affected her emotions in either positive or negative ways, affecting her risk assessment, decision making, and problem solving activities. This research has shown that sensory experiences and emotions influence the craft making process and are thus important elements in the expertise of the craftsperson. The role of such emotions remains to be studied further in the expertise of researchers in general.

Index Terms: sensory experience; practice-led research; embodied cognition; enactivism; somatic-marker hypothesis; emotion; risk assessment

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1. Introduction

Emotions and feelings have traditionally been overlooked in science (Damasio, 1994; 1999; Niedderer & Townsend, 2014) and thought of as interfering with logical thinking and an objective stance (Damasio, 1999, p. 39). In the field of design, too, it has been said that general accounts on experiential feelings are less interesting than the meaning of that experience, that is, the content (Biggs, 2004, pp. 3-4). However, research on the theory of somatic markers by neuroscientist Antonio Damasio (1994) in particular indicates that feelings which arise in the body of the subject are important in decision making processes (pp. 173-175). This aspect is also interesting from a design and craft research perspective, as there are now several examples of research where emotions and feelings are elaborated on as contributors to knowledge in the field (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015; Niedderer & Townsend, 2014; Seitamaa-Hakkarainen, Laamanen, Viitala, & Mäkelä, 2013; Mäkelä & Latva-Somppi, 2011).

It is natural to talk about emotion in an art context and emotion is generally considered relevant in craft practice too. However, the connection of emotion to the felt experience of working with a material is less discussed in design research. In user-experience tests and in co-design contexts, the feel of a product is considered important and well discussed. However, in research on design and craft practice, the subjective sensory experiences of the maker are not recognized as important. Connecting emotions to decision making and problem solving in design and craft practice is perhaps elaborated on in general speech, in a studio setting, but not examined in research. However, new opportunities for research are arising due to the relatively new possibility for craftspersons to examine their own practice in a systematic way.

This present research investigated the effects of emotion in risk assessment and decision making processes in clay throwing practice. Sensory experiences related to the feel of the material affect emotions that help the maker in his or her sense making of the throwing process. The research questions were: (a) what emotions arise from the tactile sensory experiences of throwing clay and (b) how these emotions affect risk assessment, decision making, and problem solving. The research involved analysing critical incidents (Flanagan, 1954) during five clay-throwing sessions recorded during an earlier case study (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015).

The original case study was conducted in order to explore ways in which a craftsperson thinks through her hands (i.e., aspects of embodied cognition in craft practice). The research design included blindfolding as a means to enhance the tactile aspects of the clay-throwing experience. The idea for enhancing the tactile aspects and the whole research context is grounded in the author's doctoral research on tactile and embodied knowledge in crafts and the related previous study on deaf-blind maker's ways of making sense through their enhanced tactile sensitivity (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2013).

This research is situated in a larger research project called Handling Mind, funded by the Academy of Finland, which aims to link together art, craft, and design research with neuroscience, focusing on the socio-emotional, embodied, and brain-functional aspects of making with hands. The research examines experiences that are difficult to catch as they

are always situated, multimodal, temporary, and ever-changing. A narrative and phenomenographic research method might have been useful too. However, in order to gain details of what is really going on in the clay-throwing practice, the researcher used activity sampling (Muukkonen, Hakkarainen, Inkinen, Lonka, & Salmela-Aro, 2008), thinking aloud accounts, protocol analysis (Ericsson & Simon, 1993), and critical incidents (Flanagan, 1954), coupled with less traditional and more experimental methods such as blindfolding.

The use of video analysis software assisted in studying the rapid progress of the clay-throwing sessions and the thinking aloud accounts given by the researcher-practitioner during the events. Critical incidents were detected in the video recording, subsequently related emotions and felt experience of the material were identified and studied in relation to risk assessment, decision making, and problem solving.

In order to draw out the relevance of this research for craft processes and similar other processes, it is necessary to first examine some theoretical starting points. This is followed by a detailed description of the specific research setting and how results were obtained. This leads to a discussion on how embodied knowledge and expertise may form in craft practice.

2. Embodied Cognition and Somatic Markers

In design and craft practice, a large portion of knowledge and expertise arises in the contact between body and material. In order to research this space, we need epistemological frames that include the body as a provider of information. Phenomenology and embodied cognition provide such frames, introducing the body as a contributor to knowledge formation. The idea of embodied cognition suggests that we are a psychophysical whole and all our knowing is reflected in and by our sensory experiences (Johnson, 1987; Lakoff & Johnson, 1980; Merleau-Ponty, 2013).

The philosophical strand of neuroscience that embraces this idea is called enactivism (Varela, Thompson, & Rosch, 1991). Enactivism applies the embodiment idea and explains that a person learns in action and accumulates knowledge through her embodied experiences with the surrounding environment (Noë, 2009; Varela et al., 1991). This also means that without our body we cannot have any experiences; the body is integral to all knowing (Johnson, 1987; Lakoff & Johnson, 1980; Noë, 2009; Varela et al., 1991).

Emotions are enacted through the body, for example, in facial gestures and body positions. Emotions are also felt in the body as cognitive neuroscientists Nummenmaa, Glerean, Hari, and Hietanen (2014) display in their seminal research on where in the body we feel different emotions. Emotions also arise in the body according to research by neuroscientist Damasio (1994, 1999). Feelings and emotions might be confused with each other, but they are rather distinct, although causally related: emotions lead to feelings:

> It is through feelings, which are inwardly directed and private, that emotions, which are outwardly directed and public, begin their impact on the mind; but the full and lasting impact of feelings require consciousness,

> because only along with the advent of a sense of self do feelings become known to the individual having them. (Damasio, 1999, p. 36)

Emotions are described as short lived, but feelings may occur although we are unaware of them; we may become aware of them at a later point (Damasio, 1999, p. 36). Keltner and Gross (1999) further elaborate on the function of emotions and define emotions as "episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action and communication that occur in response to specific physical and social challenges and opportunities" (p. 468). This indicates that emotions are connected to physical and psychological experiences, arise in response to something, are felt in the body, and affect our reactions and actions on our environment. Emotions give rise to feelings that work in the background (i.e., "background feeling," Damasio, 1994, p. 150).

In their article on Phineas Gage, Damasio et al. show that decision making is connected with emotion (Damasio, Grabowski, Frank, Galaburda, & Damasio, 1994). Phineas was hit by a metal rod that injured his frontal lobe and could not make decisions after his injury. Damasios' research team make a reconstruction of Phineas' injury and, through research on subjects with similar injuries today, find that the processing of emotion is affected or even absent in these subjects and subsequently their ability to make even simple choices is complicated (Damasio, 1994, pp. 44-45; Damasio, 1999, p. 41; Damasio et al., 1994). This gives us a reason to believe that emotions are crucial in decision making processes and also an understanding of the role of emotions within rational thought (Damasio, 1999, pp. 40-41). "[T]he purpose of reasoning is deciding" (Damasio, 1994, p. 165). One of Damasios' (1994) central claims is that bodily experiences, or gut feelings, generate emotions that guide us in intuitive decision making, especially when the problem is closely related to our personal or social space (Damasio, 1994, pp. 169 & 173). Damasio calls this the "somatic-marker hypothesis" and explains it as follows:

> In short, *somatic markers are a special instance of feelings generated from secondary emotions*. Those emotions and feelings *have been connected, by learning, to predict future outcomes of certain scenarios*. When a negative somatic marker is juxtaposed to a particular future outcome the combination functions as an alarm bell. When a positive somatic marker is juxtaposed instead, it becomes a beacon of incentive. (Damasio, 1994, p. 174, italics in the original)

Somatic markers (*soma* in Greek means body) are important in the study discussed in this article. In this study, experiences that are felt in the body of the maker are closely connected with the emotions that guide the maker in her risk assessment and decision making process. Thus, these bodily experiences and emotions help to solve problems in her practice.

Knowledge related to bodily or sensory experiences and emotions during craft practice has been out of the scope of research in the crafts. This is so perhaps due to the fact that craft research has been the domain of art historians, ethnographers, and sociologists. They did not possess the specific insider knowledge of the craft practice they were describing.

3. Methods

Recently, due to the inclusion of art schools in the academic realm, craft practitioners have had the opportunity to research the tacit and tactile aspects of their profession in a practice-led research setting. Some examples: Almevik et al. (Almevik, Jarefjäll, & Samuelsson, 2013) researched the tacit knowledge of craftsmen in the 1970s through enacting their actions in a documentary video. Erin O'Connor (2007) made an autoethnographic study on glass blowing, by starting her apprenticeship in a glass blowing studio and reflecting on her experiences of learning the craft. A practice-led self-study research setting provides insights into what matters in craft, including emotions and feelings, sensory experiences, and experiential knowledge.

When researching any practice, we are faced with the challenge of documenting experiences. Body based practices are best reflected on from an embodied perspective, as experiential knowledge is linked to sensory experiences. Experiences can be fleeting; knowledge connected to these experiences is embedded in actions, and therefore best reflected upon "in action" (Schön, 1991). However, a reflection in action may be difficult to produce if the action contains elements that require full attention of the practitioner. If documented carefully, these actions may be reflected on afterwards, to some extent, in a so-called reflection "on action" (Schön, 1991).

The strategy of reflection-in-action, and later reflection-on-action, was used wherein data were collected in the studio of the researcher-practitioner. Over the course of 5 days, the researcher-practitioner threw 12-24 kg of clay each day on her potters' wheel, blindfolded. This was done in order to test the augmentation of her tactile sensibility and ability to control the clay throwing process entirely without eyesight. To further enhance the challenge of the task, and thus highlight the expertise and amount of embodied knowledge needed to perform the task, the clay chosen was specifically difficult to handle and the amount of clay was unusually large. Multiple methods were used for collecting data during the event, including video-recordings with thinking aloud accounts, diary notes, and a contextual activity sampling system (CASS-Q self-report questionnaire), as described in a previous article (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015). The act of blindfolding was useful as it allowed the researcher-practitioner to become more aware of the tactile information often taken for granted in the clay throwing process. The sensory experiences became key in shedding light on the emotional feelings connected with the touch and feel of the clay material at different stages.

In the act of observing and reflecting on an activity, whether it is another person's or one's own, there are more and less important events mixed over time. It may be challenging to pay proper attention to the relevant issues, such as the events that change the situation or the course of the whole process. These events are called critical incidents. A technique for studying critical incidents in a human experience was developed by Flanagan (1954). The technique consists of ways to identify incidents that have either a positive or a negative effect on the experience or the outcome of an event.

In this research, the focus was on critical incidents producing negative effects, as the positive effects tend to go quite unnoticed in the clay throwing process. Although the

researcher-practitioner was blindfolded, the process of clay throwing progressed unhindered, following a typical pattern. The critical incidents found were commonly occurring incidents with the addition of a few related to the blindfolding, such as dropping tools on the floor and taking extra time to find them, or missing the water bucket during already stressful moments.

The *Interact* video analysis software was used. This software allowed for the critical incidents to be indicated and connected to the risk assessment and decision making activities. The video material included 10 hours of recording (2 hours of recording every day, for 5 days). The part of the recording where the clay was centred on the throwing board was omitted, because there were no critical incidents. This left only 5 hours of recording (1 hour of recording every day, for 5 days). From the video data, critical incidents were separated and categorized into three severity grades (1 to 3).

4. Data Analysis

Critical incidents were identified in the video data. It became clear that the critical incidents had different degrees of severity. Some were less severe and the problems were solved easily, while others were of a more serious kind. The incidents were also either expected or unexpected, some started abruptly and some developed over time. The critical incidents were coded as following:

Slow / Quick (i.e., whether slow or quick to start and develop)
Expected / Unexpected
Severity Level 1 / 2 / 3

The tactile experiences that were found in the analysis of the critical incidents were to do with the density of the clay material—how hard or soft it was, and the wetness of the surface—the stickiness of the clay at different times during the throwing process. Further, the position of the clay on the wheel, whether centred or not, was a clear factor in the critical incidents that would affect feelings in a negative or positive way. The key emotions involved confidence, stress levels, or spiritedness. The activities of risk assessment, decision making, and problem solving were known to play a part in the clay throwing process from previous study (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015).

The analysis was supported by the thinking aloud accounts frequently provided by the researcher-practitioner. Feelings were also re-lived through the tactile memory that the researcher had in connection with the events and knowledge of similar events in the past. Stress was physically experienced during the analysis process, and the researcher-practitioner went through the emotions of the events multiple times during the analysis process while tagging the codes to the video clip.

Video and spoken accounts were analysed simultaneously as they affected the coding during the video analysis. The thinking aloud accounts were useful in the analysis of decision making, risk assessment, and problem solving activities. These activities occurred at different intensities and partly overlapping, throughout the whole process. In the analysis however, they were separated according to their intensity. The thinking aloud accounts

helped to determine which activity is to be noted as the strongest of the three at any specific moment. These verbal accounts also spelt out what the immediate problems were and gave suggestions on dealing with them. The codes used in the analysis are shown in Table 1.

Table 1. *List of Codes Used in the Analysis of Video Data*

Class:	**Tactual feel of clay: Density**
Code	hard density
Code	medium density
Code	soft density
Class:	**Tactual feel of clay: Stickiness**
Code	dry surface
Code	Semi dry surface
Code	Wet surface
Class:	**Tactual feel of clay: Position**
Code	centred
Code	almost centred
Code	un-centred
Class:	**Emotions: Confident**
Code	confident
Code	un-confident
Class:	**Emotions: Spirits**
Code	low spirits
Code	high spirits
Class:	**Emotions: Stress**
Code	stressed
Code	relaxed
Class:	**Activity**
Code	risk-assessment - notes on what risks were present and why
Code	decision-making - notes on what decisions were made
Code	problem-solving - notes on how it was solved

All codes were provided with a code key that included a description for when the code would be applied. The coding of the video material was aided by the thinking aloud accounts that verbally described feelings and events as well as exclamations when things were either not working out as expected or when a problem was solved. Some examples of critical incidents are presented below, together with related quotes and reflective notes.

4.1. Examples of Critical Incidents

Day 1, 12 kg

Incident 2. Starting at 00:32:06, lasting for 1:12 minutes; Slow, Unexpected, Severity Level 2

Quote (at 00:33:54). "This is the point where I have to start working quickly, because the water, which I have to add quite a lot now, will make the clay so soft that I soon cannot work with it anymore. So, this is the critical moment I would say."

Reflective Note. The clay is too wet and soft to handle, it has gone soft while being centred and should have been harder to begin with. The pot is moving too quickly from side to side in an uncontrolled manner while being thrown and the clay is already losing its plasticity, giving me only a short time to work it. I stabilize the clay shape into a cylinder and solve the immediate risk of it collapsing but conditions are not good.

Incident 4. Starting at 00:33:56, lasting for 2:50 minutes; Slow, Expected, Severity Level 3

Quote (at 00:34:45). "The next actions will determine whether it is going to fail or succeed, because it's already quite an ugly pot."

Reflective Note. The clay is now so soft and un-plastic that it cannot adjust to my pushing at all.

Quote (at 00:35:12). "Where is the water? I'm getting nervous!"

Reflective Note. When stressed about the situation, I have difficulty in concentrating on anything other than resolving the problem, and the fact that I'm blindfolded gets in my way, I can no longer easily find the water bucket with my hands. One side of the clay pot stretches out (Figure 1) due to the centrifugal power from the spinning wheel, and I turn down the speed to be more in control, but it is too late. The clay starts tilting down on one side, the piece is lost and the process is interrupted.

Figure 1. Screenshot, Day 1, collapsing clay wall.

Day 2, 12 kg

Incident 5. Starting at 01:19:52, lasting for 5 minutes; Quick, Expected, Severity Level 3

Quote (at 01:21:49). "I don't see any point in continuing this . . . but one part of being a skilful thrower is to be able to fix mistakes, so I'm going to give this a try anyway."

Reflective Note. Learning from yesterday's mistake of using too soft clay, I had wedged today's clay on a plaster-board to make it dryer and harder. Now this clay is much stiffer to work with and considerable pressure has to be applied to the clay to be able to move it. This affected the throwing board, making it loosen its grip from the actual wheel head and the whole board and clay piece became un-centred (Figure 2). I managed to push the board back into place and to press down on the whole piece to try to fasten the board again. Although this incident happened quickly it was expected as the clay that keeps the board attached to the wheel head has been drying overnight and the weight of the clay is very heavy.

Figure 2. Screenshot, Day 2, feeling the condition of the clay.

Day 5, 24 kg

Incident 18. Starting at 00:16:36, lasting for 1:10 minutes; Quick, Unexpected, Severity Level 3

Quote (at 00:16:43). "That was so scary. The board almost tilted. The clay is now a little bit un-centred, but . . . That was a major critical point. I definitively should be more aware of pressing from above at the same time as moving the clay sideways, otherwise that will happen again."

Reflective Note. The board is not very well stuck on the throwing wheel, and the area of the thrown piece goes outside the area of the wheel head, so when throwing on the edge of the wheel the board tilted heavily, making the whole board and 24 kg of clay jump. Luckily, it did not move far out of place, and I solved the problem by pressing the clay down and avoiding pressing from the sides.

Incident 20. Starting at 00:37:06, lasting for 1:20 minutes; Slow, Expected, Severity Level 1

Reflective Note. The edge of the pot was becoming uneven due to the slightly un-centred position of the clay, but, more importantly, the edge was also becoming a bit too thin. I wanted to keep the edge thick so that the rim of the pot would not get a weak look. To solve this problem, I needed to cut off the edge, because just pushing it further down just made it more uneven, it being un-centred. Looking for the needle with which I could cut it took a while, but cutting the rim was easy (Figure 3) and did not create any further problems.

Figure 3. Screenshot, Day 5, cutting the rim of the clay pot.

Incident 23. Starting at 00:57:21, lasting for 1:16 minutes; Slow, Expected, Severity Level 3

Quote (at 00:58:33). "I think that's all I dare to do."

Reflective Note. The clay is too soft to be thrown anymore (Figure 4). The wall of the pot is starting to sway from side to side, and the centrifugal force can easily bring the pot down if I continue to touch the clay. I make a last widening of the base to adjust the shape of the pot so that it becomes more cylinder-like.

Figure 4. Screenshot, Day 5, making decisions.

5. Results

The clay throwing process usually consists of the agenda of making a pot that includes centring the clay, making a hole at the top of the clay, widening the form and shaping the base, and then making the sides of the pot upwards. Critical incidents of varying severity occur during this process. Some critical incidents are severe enough to affect the conditions of the process over the long term, even though the immediate problem is solved.

Most critical incidents during the 5 days were due to the fact that the amount of clay was too large to be thrown on the wheel directly as the diameter was not wide enough. This meant that the throwing had to be made on a separate wooden board that was attached on top of the wheel head by a bit of soft clay. As the clay on the board was heavy, the clay under the board did not resist the pressure and kept moving. It was important to throw the piece so that most pressure was applied from the top and less from the sides, as the whole board would move otherwise. Also, pressing down on the very outer parts of the board made the whole board tip at one time. This, in combination with the blindfolding and the large amount of stiff clay made conditions even more challenging than a normal throwing session.

In this setting with extreme conditions, tension and stress built up quickly and accumulated in the critical incidents that needed immediate risk assessment, decision making, and problem solving. In contrast to normal conditions, this setting provided the opportunity to

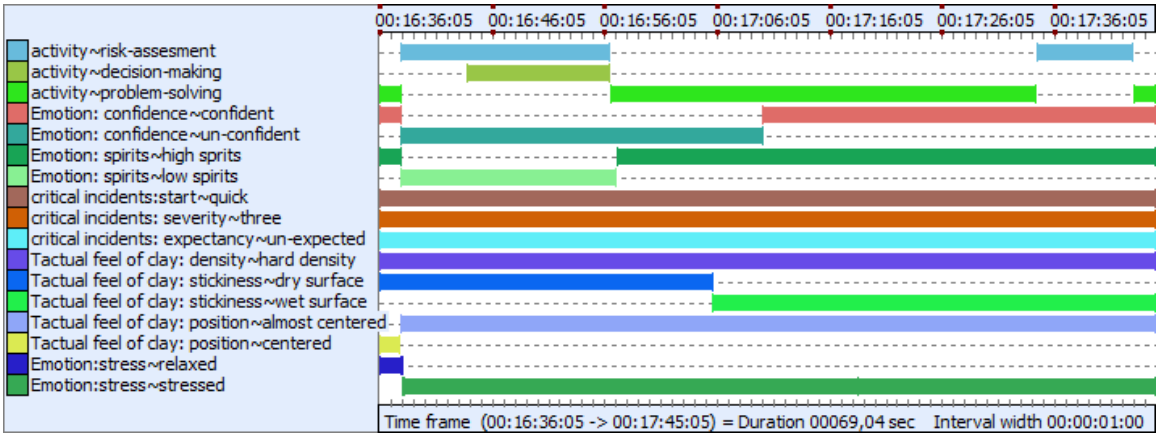
highlight the emotional feelings connected to the throwing process more clearly and to detect the tactile experiences that affected the emotions.

However, the average critical incidents during the 5 days were expected, developed slowly (rather than abruptly), and were of low severity. These were coupled with a relaxed and confident state of mind; problems, if any, were solved while maintaining good (high) spirits. The clay was mostly soft and wet, and was almost centred. It was only in the more severe critical incidents that stress emerged and confidence dwindled. The author's reflection is that critical incidents of Severity Level 1 or 2 can affect a novice's work, leading to termination at times. The more severe Level 3 incidents may threaten the success of the throwing process even for a more advanced thrower.

The general rule was that if the critical incident started quickly, it was also unexpected, and if it started slowly it was expected. Only one case was slow starting but unexpected. This was when the clay was too wet on the first day and it had gone soft while being centred as it should have been harder to begin with. Similarly, only in one case did the critical incident start quickly but remain expected. This was when the board came loose and the whole piece became un-centred. A quote from that incident: "I kind of expected this."

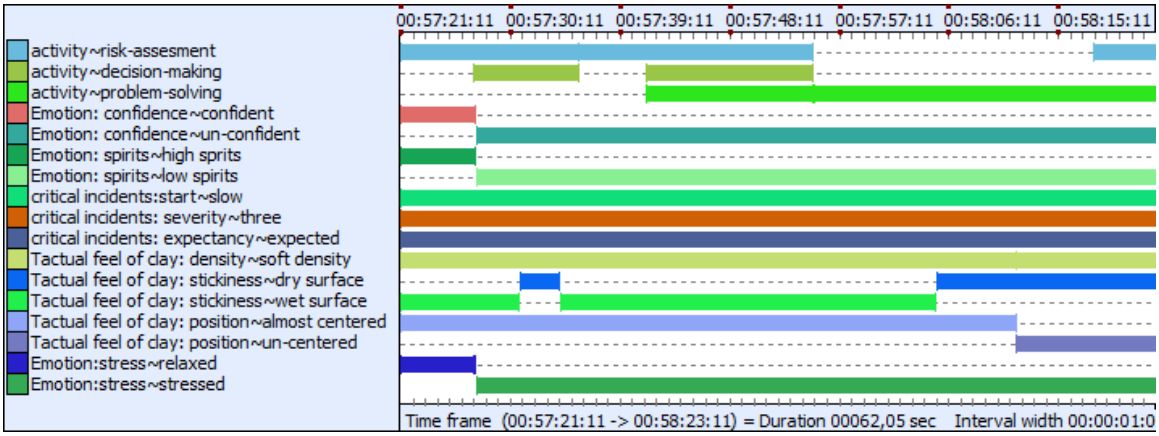
In Table 2, the progress and coding of a Severity Level 3 critical incident is shown from beginning (left) to the end (right), displaying both the tactile feel and emotion. Stress, un-confidence, and low spirits go hand in hand with risk assessment, followed by decision making and the attempt to solve the problem. In this incident, the problem is solved and the good (high) spirits is restored.

Table 2. *Emotion, Feeling, and Problem Solving During a Critical Incident (Problem Solved)*



In Table 3, another Level 3 critical incident is presented. However, this particular incident is disruptive enough that led the making process to be terminated.

Table 3. *Emotion, Feeling, and Problem Solving During a Critical Incident (Problem Unsolved)*



6. Discussion

In this study, the felt experiences, emotions, and activities followed a pattern. Stress was almost always connected with low spirits and un-confidence, and these were present during the start of the critical incidents, especially in the unexpected ones. Low spirits and un-confidence were present to a greater degree as the severity of the incident became higher. In some of the expected and less severe incidents, the problems were solved with confidence and high spirits, without experiencing stress.

At the beginning of an incident, risk assessment was coupled with decision making and/or problem solving. As the incident progressed, more problem solving and occasional risk assessment occurred. Risk assessment was generally combined with stress and un-confidence, but problem solving also appeared together with confidence and high spirits. During risk assessment, a slowing down of activities was observed. After a period of risk assessment, decision making and problem solving generally took over. Risk assessment continued occurring simultaneously with the problem solving process. This was reflected on as a way to ensure that the decisions and solutions were still appropriate for the situation.

When the clay was of a hard to semi-hard density, the surface was wet, and the clay was centred, conditions were considered optimal and small incidents were not experienced as severe. When conditions were different from this, stress was closer at hand. At these moments a high risk of recurring critical incidents was detected.

Critical incidents also enhanced the practitioner's vigilance and readiness to avoid new incidents, as conveyed in this quote: "The tilting of the board really made me much more focused, and much more careful, which reminded me to respect the conditions and the materials more."

Risk assessment and problem solving tasks seemed to be accompanied by low spirits. But this could be understood as reflecting the practitioner's serious intention to solve problems. It could reflect the worry and stress that was experienced until the problem was solved. Although these tasks are accompanied by negative feelings, these feelings helped the

practitioner to concentrate, make proper effort, and avoid further risks. A quote from Day 4 runs as follows: "I just have to be really careful and not make any mistakes." At all stages, previous embodied skills and material knowledge were utilized in order to foresee and control the next moment of the process. A sense of living in the next moment or in the immediate future was present during the whole process.

Problem solving occurred both verbally and in action simultaneously. On Day 2, the board had lost its grip from the throwing wheel head and the whole clay piece was un-centred for a moment. It was important to throw the sides up without pressing the clay too much from the outside, but there was a risk of the board getting loose again, so the problem was solved as captured in the following account: "I'm trying to move the clay upwards, but pressing more than pulling though, as when pressing, the clay cannot go downwards but has to escape upwards, and then there is no pressure from the sides, that would move the board."

The word *feeling* as in tactile sensations and *feeling* as in felt emotions are very closely linked. The way something feels (tactile) affects the way we feel (emotional). This is an important aspect in the field of design and craft, and sensitive practitioners use this aspect in their careful selection of materials (Groth & Mäkelä, in press). We have many shared notions of the feel of materials that are triggered as mental images even when only mentioned in speech, such as velvet, leather, or wet clay.

We may even feel the expected sensation in our bodies as we imagine what those materials feel like, because we have embodied this knowledge through previous experiences of these materials. Similarly, the feel of the material as it is actually touched gives us both the tactile feel and emotion, and thus also the anticipation of what this material has to offer us. For an experienced ceramist, the density of a bit of clay immediately gives an idea of its possible uses, together with an either positive or negative background feeling simultaneously. If the clay is too hard, it is not good because it cannot be easily handled and needs to be soaked. If the clay is too wet, it is also not good and it needs to be dried until workable. A perfectly smooth and dense bit of clay gives a good forecast for any project, and it is therefore experienced with positive emotions. This kind of internal connections were researched in this project and it was found that strong emotions and background feelings connected to the possibilities of the material were experienced throughout the whole throwing process.

6.1. Emotions in the Making

When working conditions turned bad in the critical incidents, negative emotions and stress emerged, prompting actions to put things right again. This illustrates the theory that emotions are important in risk assessment as they help in our survival (Damasio, 1999, p. 42; Keltner & Gross, 1999, p. 472). According to Damasio (1999), feelings guide risk assessment in order to make us choose wisely in life (p. 42). On a larger scale, this is a life-saving ability that we have as humans and something we also share with other organisms. In craft, it is not that serious, but in a similar way emotions are adjusted to the threat of losing a piece in which one has invested time and effort. Survival in this context

is to be able to continue the process and the success of the piece that is being produced. A quote from Day 5 exemplifies this:

> So, it seems like I'm a bit braver now than before. Maybe I have lost respect for what I am doing. I should maybe take it easy and concentrate more, otherwise I will start making mistakes. I don't want to lose this piece now after centring it for, I don't know how long. It would be such a waste.

Quite often claims of fear emerged in the spoken accounts. Even if the actual fear emotion was not coded in this analysis as it was considered to be included in the stress and low confidence, the words "I'm afraid" or "that was scary" appeared, especially when an incident was sudden and severe. Further, the balance of being brave and careful was elaborated frequently in the spoken accounts, as exemplified in an account from Day 5:"It's difficult to be somewhere in between brave and careful. But that just what it's about. Brave can all of a sudden be too brave, and careful needs to be not too scared." These accounts are directly linked to the somatic-marker hypothesis and illustrate the function of emotions in regulating behaviour in craft practice.

6.2. Critical Incidents and Verbal Accounts

The use of the critical incidents as a frame for the research was useful as there were generally more emotions present and exposed during the critical incidents, compared to non-critical periods of the throwing process. The more severe the critical incident was, the more stress and negative emotions emerged. Although risk assessment, problem solving, and decision making occur also in the neutral non-critical periods of the throwing process, they are more highlighted and intensive during the critical incidents. Therefore, this study focuses on the content of these critical incidents rather than on a comparison between critical and non-critical incidents in general.

In their book *Protocol Analysis: Verbal Reports as Data*, Ericsson and Simon (1993) thoroughly investigate how verbal accounts during an action may give access to cognitive processes. By thinking aloud, speaking out his or her thoughts, the subject reveals what is going on in his or her mind during an action, and the researcher is thus able to detect the cognitive process together with the actual actions of the subject. Ericsson and Simon also show how verbal accounts are viable reports on sensory stimuli and affirm that attention can be directed towards information in the sensory stores and that many kinds of verbal reports rely directly on our ability to process sensory information selectively (Ericsson & Simon, 1993, p. 31). In this research, the researcher-practitioner's attention was already directed towards the tactile stimuli due to the blindfold (Groth, Mäkelä, & Seitamaa-Hakkarainen, 2015).

Collecting only visual data, in the form of video-recordings, would have put a large demand on the ability to remember the events.We know that the memory of an event changes with time, and even a very short time lapse between an experience and a recall will affect the way we remember an event as we have had time to analyse it (Ericsson & Simon, 1993; Kujala & Miron-Shatz, 2013; Robinson & Clore, 2002). Therefore, the more immediate the reflection is, the less misleading post-analysis occurs or fewer interpretations are made. Thinking aloud accounts facilitate this type of data collection.

6.3. Limitations of the Research

It is important to mention that self-study, autoethnography, and practice-led study are all research settings in which part of the analysis is based on memory, as practice is first documented and then reflected on more carefully afterwards. As mentioned, this may be problematic due to the inaccuracies of memory. Pinnegar and Hamilton (2009) explain in their book *Self-Study of Practice as a Genre of Qualitative Research* that self-research into practice does not attempt to give one ultimate truth, but the understanding of the practice as the practitioner has experienced it and that the quality of such research is reflected in the resonance the reader finds in it.

However, there are a number of methods to help practitioner-researchers to note their experiences in real time, such as diaries, photographs, or videos, in order to be able to reflect on the data at a later point. Video is a viable tool for capturing experiences in its multimodal forms, as these may be re-lived through looking at the recording later.

According to visual anthropologist Sarah Pink (2009), sensory experiences are ultimately embodied in each other—they work together and trigger each other. Therefore, the audio-visual material may trigger not only visual memories but also olfactory and tactile experiences from the time of the lived experience, giving the researcher the full array of sensory experiences from the time of the event (see also Pink, 2011).

In this case, the researcher had no visual memories of the actual events due to the blindfolding, but an enhanced tactile or haptic memory in her body. The video recording of the event served as a recall of the lived experiences of the researcher, bringing back the embodied experiences to mind. Pink and Leder Mackley (2012) claim that "the potential of video to acknowledge and explore sensory experience beyond the audio-visual is increasingly recognised in visual anthropology practices of research" (p. 8). This is grounded in the connectivity of the senses and in the ability of the researcher to both re-live previously experienced sensory experiences and also the ability to empathize with research participant's sensory experiences (Pink & Leder Mackley, 2012).

It is acknowledged that previous experiences of similar situations are also expected to play a part in the analysis of the video. The outcome discloses something about the practice of throwing clay, from an insider perspective. An objective view from a non-practitioner would not have been able to access this information, as the objective researcher would not possess the tacit and embodied knowledge of the situation.

Another limitation of the study is the evaluation of expertise by the practitioner herself. It is difficult to estimate what expertise is, or when expertise has been reached, other than as outlined in the five stages of skill acquisition proposed by Dreyfus and Dreyfus (1980, 1986). In craft practice, skill accumulates throughout one's professional life. In a case where the practitioner is also a researcher, research skills also need to be accumulated. The time for studying to become an expert researcher is removed from the time available to spend on becoming an even more skilful practitioner. However, it requires quite some skill to throw 24 kg of clay blindfolded, and quite a few of the processes described above

include aspects of tacit knowledge, situational, and intuitive workflow as mentioned in Dreyfus brothers' work (Dreyfus & Dreyfus, 1980, 1986).

6.4. Hindrances in Research Practice

Craft practices are a relatively young research area. By including the crafts in academia, it has become possible for practitioners to research their own practice. When studying craft practice in an academic setting, it becomes clear that many research practices work within paradigms that exclude important factors in craft practices. The study of craft practices by crafts practitioners themselves includes subjective experiences, such as sensory experiences and emotions coupled with an attempt to describe and explicate the experiential knowledge that they possess.

This means the inclusion of three areas that are considered difficult to include within research: (a) subjective setting, (b) emotions, and (c) tacit knowledge. As mentioned above, in a self-study or a practice-led setting, subjectivity foregrounds aspects which objectivity will not reveal. This article's main argument is to demonstrate the importance of the body and related emotions as contributors to knowledge.

Tacit knowledge is difficult to research, but it is unavoidable when researching design and craft practices. The concept of tacit knowledge was coined in another knowledge economy (Mareis, 2012), at a time when audio-visual technology was not as advanced as today. Our new tools now, such as audio-visual media, allow for a slow motion analysis of actions and behaviour, thus they provide the craft practitioner with the time to speak out his or her experiential knowledge. Practice may now be researched in a new way, quite different from the time when Michael Polanyi (1958, 1966) introduced the concept of tacit knowledge.

7. Conclusion

The researcher-practitioner explored emotions as connected to tactile experiences and how they affect decision making and problem solving during craft practice. Due to the practice-led self-study research approach, she was able to study her knowledge and expertise as a practitioner. This research provided insights into the clay-throwing process, which, despite its long history, has been researched relatively little in depth.

The results indicate the role of sensory experiences and emotions in craft practice. Sensory experiences and emotions seem to guide the practitioner in risk assessment, especially during critical incidents. This influences the practitioner's decision making and problem solving during the craft making process. Thus sensory experiences and emotions appear to be integral to a craftsperson's knowledge and expertise in craft making.

The researcher-practitioner found that the condition of the material and the tactile feedback she received in the clay-throwing process directly affected her feelings. The feelings triggered either negative or positive emotions, depending on her forecast of how the process would develop. When conditions became difficult due to a critical incidents in the process, her emotions turned negative and she became careful in order to prevent

further damage. The decisions made during these critical moments affected the progression of the event and, as the critical stage was overcome, she became optimistic again. During such periods of optimism, she took more risk, as she felt greater confidence in her ability to handle the situation. During periods of negative emotions and negative forecast for the immediate future, risk-taking was out of question and all her concentration was aimed at either maintaining the status quo or solving the problem, while attempting not to panic or give up the battle with the material.

This research has shown that sensory experiences and emotions condition the craft making process and are thus important elements in the expertise of the craftsperson. The emotions involved in craft practice are not always as pleasant as often assumed. The challenge of mastering a complicated process can include fear of failure, stress, and disappointment as much as pleasure and satisfaction. Based on this insight, researchers in other fields may also consider the role of emotions so that connections between creative practice and research practice may be established.

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