The Lived Experience of Mirror-Touch Synaesthesia:

A Qualitative Investigation of Empathy and Social Life

Daria Martin[1], Elinor Cleghorn[2], and Jamie Ward[3]

1. Ruskin School of Art, University of Oxford, UK
2. Ruskin School of Art, University of Oxford, UK (2012-2015)
3. School of Psychology & Sackler Centre for Consciousness Science, University of Sussex, UK

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Abstract

This report discusses the findings of the first ever study dedicated to the qualitative exploration of mirror-touch synaesthesia from a first-person perspective. As part of a project investigating the cross-disciplinary resonances of mirror-touch in the context of the broader social trait of empathy, this study aimed to document the lived experiences of people with this form of synaesthesia in order to offer insights into existing and new theoretical models for mirror-touch. Through examination of quotes drawn from first-hand accounts given by participating mirror-touch synaesthetes concerning their unique perceptual, interpersonal, and social experiences, this report demonstrates the value of experimental research, in particular first-person reporting, to enhancing the understanding of the way mirror-touch relates to empathy and social functioning beyond its quantitiavely measurable characteristics. The descriptions point to mirror-touch synaesthetes' automatic feeling into the emotional lives of others and their deliberate attempts to regulate this.

About the authors:

Daria Martin, artist, has researched mirror-touch synaesthesia for several years and made it the centre of three films: *Sensorium Tests* (2012), *At the Threshold* (2014-2015), and *Theatre of the Tender* (2016). Martin's 16mm films aim to create a continuity between disparate artistic media (such as painting and performance), between people and objects, and between internal and social worlds. Martin is currently Associate Professor and Graduate Research Leader at the Ruskin School of Art, University of Oxford. Her films have been exhibited in solo shows at Museum of Contemporary Art, Chicago; the New Museum, New York; the Hammer Museum, Los Angeles; Kunstalle Zürich; MK Gallery, Milton Keynes; and Tate Britain, among others.

Elinor Cleghorn is a researcher and writer specialising in mirror-touch synaesthesia, and also theories of embodiment explored through art spectatorship. She was editorial assistant to *Mirror-Touch Synaesthesia: Thresholds of Empathy With Art* (OUP, forthcoming 2016), and research assistant to 'Mirror-Touch: Empathy, Spectatorship, and Synaesthesia', a project based at the Ruskin School of Fine Art, University of Oxford, between 2013-2015. Cleghorn received her PhD from Birkbeck College in 2012, and her writing has been published in *The Moving Image Review and Art Journal*, LUX Online, and *Screen*; she is also an editor of the Arts Council England supported poetry and science journal *Litmus*.

Jamie Ward is Professor of Cognitive Neuroscience at the University of Sussex. His research in the area of mirror-touch synaesthesia includes its neural basis and development, the effects it has on cognition, and its relationship to typical modes of perceiving. Ward has

contributed to the public understanding of synaesthesia through numerous talks and extensive media coverage, including a documentary produced for the BBC's *Horizon* series. He is the Founding Editor of *Cognitive Neuroscience*, and the author of several books including *The Frog Who Croaked Blue: Synaesthesia and the Mixing of the Senses* (Oxford: Routledge, 2008).

Introduction

Mirror-Touch Synaesthesia (MTS) is the experience of feeling a tactile sensation on one's own body as a result of seeing another person being touched (Ward & Banissy, 2015). These feelings are reliable over time and noted to have existed from childhood. They occur automatically insofar as the person with MTS cannot choose to experience these sensations or not (involuntariness). In this regard, at least, the experiences can be considered to be more akin to perception than imagination. These broad features (developmental onset, automaticity, percept-like) resemble other forms of synaesthesia such as auditory-visual synaesthesia (visual experiences from sounds) although the extent to which these different forms of synaesthesia can be attributable to a single common mechanism is not known (Rothen & Meier, 2013). MTS has its own characteristic neural correlates: it is linked to increased activity in somatosensory regions of the brain when observing humans being touched, and it is linked to structural differences in underlying grey matter (Blakemore, Bristow, Bird, Frith, & Ward, 2005; Holle, Banissy, & Ward, 2013). Despite a fair amount being known about MTS from an experimental (third-person) perspective, there is comparatively little known about it from a first-person perspective in terms of the lived experience of MTS. This report fills this important gap[1].

Synaesthesia has been documented for over 200 years (Jewanski, Day, & Ward, 2009), but it has only been since the 1980s that an experimental approach has been applied to studying synaesthesia (Baron-Cohen, Wyke, & Binnie, 1987). This has involved finding

[1] It also relates to further research, to be published in the appendix of 'Mirror-Touch Synaesthesia: Thresholds of Empathy With Art', a volume edited by Daria Martin and including contributions by this article's authors, in press with Oxford University Press.

ways of discriminating it (quantitatively) from neurotypical cognition. However, the experimental approach has not done away with the need for first-person reports. If anything, it has drawn attention to the need be able to reliably document them in order to constrain and develop theory, and to motivate further empirical research. A good example is the case of grapheme-colour synaesthesia (experiencing colours to letters and digits). Whereas some people experience the colours superimposed on a page of text, others experience it on an 'inner screen', and still others experience it from both speech and text (Dixon, Smilek, & Merikle, 2004). These first-person differences in phenomenology map on to neural and behavioural differences (Rouw & Scholte, 2010). These qualitative differences have been tapped primarily through the development of questionnaires (e.g. Rothen, Tsakanikos, Meier, & Ward, 2013). Interviewing methods have rarely been used in this field (but see Gould, Froese, Barrett, Ward, & Seth, 2014). They have the potential to elicit more open-ended commentary, and also go beyond the characteristics of the synaesthesia itself to consider what it means for them at a personal and social level.

One unique aspect of MTS, relative to other forms of synaesthesia, is its inter-personal nature. That is, there is a conscious sharing of bodily sensations between other and self. The tendency to share in the bodily sensations of others is not unique to MTS as there is evidence that most people 'embody' visual and narrative depictions of pain, touch and visceral experience, insofar as the processing of these stimuli is not confined to visual or linguistic regions of the brain but also evokes body-based neural processes (Bruneau, Dufour, & Saxe, 2013; Keysers, Kaas, & Gazzola, 2010). What is unique, and defining, to MTS is the <u>conscious</u> feeling of having a tactile sensation that is localised and often elaborated (e.g. sharp, cold). Ward and Banissy (2015) discuss several models that would account for this. In one model (the Threshold Model), the conscious experiences of people

with MTS reflect an extreme end-point of a normal mechanism; that is a tendency to embody visual depictions of touch (a so-called tactile mirror system). When activity within this system crosses above a threshold the feelings are explicit (i.e. MTS) and when below the threshold they are implicit (i.e. everyone else). A second class of model (the Self-Other Model) also borrows the idea of a threshold for awareness, but argues that the driving difference is not normal variability but rather the impact of some other atypically functioning mechanism. This mechanism acts as a 'gate' or 'controller' for determining whether ongoing cognition is self-relevant or other-relevant. Thus, in MTS we can argue that there is a difficulty with suppressing other people's feelings, or a 'self-other blurring'. People with MTS may not be overtly confused: they can typically determine whether the touch they feel is caused by an observed or physical touch. Rather, the brain mechanism itself functions atypically. This 'confusion' may include touch but is by no means limited to it, incorporating emotional states too.

Evidence for the Self-Other Model comes from the fact that people with MTS have reduced grey matter in a region called the right temporo-parietal junction (rTPJ) (Holle et al., 2013). This region is implicated in bodily perspective taking (Arzy, Thut, Mohr, Michel, & Blanke, 2006) and controlling automatic imitation (Brass, Ruby, & Spengler, 2009). Temporary disruption of this region can result in non-corporeal objects influencing body ownership (in the Rubber Hand Illusion Tsakiris, Costantini, & Haggard, 2008) and, in neurological patients, it is linked to out-of-body experiences (Blanke & Arzy, 2005). It has also been linked specifically with normal mechanisms of empathy. The model of Decety and Jackson (2004) considers empathy in terms of a set of hierarchical mechanisms. At the lowest level are shared representations between self and other that would include mirror systems for pain, touch, affect and action. The operation of these mechanisms promote

uncontrolled empathic responses, or contagion, such as feeling distress when others are hurt, feeling happy when everyone else is smiling, or imitating the body language of other people. At an intermediate level they argue for a mechanism that distinguishes self from other and serves to regulate empathic contagion, and at the highest level are mechanisms that support deliberate attempts to shift perspectives. Although there is a tendency to activate our own central pain circuitry to the sight of pain this can be suppressed when seeing pain in a racial out-group (Avenanti, Sirigu, & Aglioti, 2010) or when seeing someone in pain who previously acted unfairly towards you (Singer et al., 2006). Decety and Jackson link this self-other gating mechanism to the rTPJ and Ward and Banissy (2015) link weaker functioning of this mechanism to MTS. One would predict that whereas most people show empathic responses, such as vicarious pain, conditionally (i.e. strongly modulated by context), people with MTS may do so in a more unconditional manner. This may ultimately be a double-edged sword: it may be related to a more humane outlook (everyone is equal) but the inability to regulate these responses could also be overwhelming or lead to seemingly unempathic behavior (e.g. avoiding helping others in distress to reduce exposure to that distress).

This report discusses the findings of the first ever project dedicated to the qualitative exploration of MTS from a first-person perspective, in order to document how people with this form of synaesthesia can offer insights into existing and potentially new theoretical models for MTS through accounts of their perceptual, interpersonal, and social experiences. The quotes included in this article offer some generative understandings of the way MTS relates to empathy and social functioning beyond its quantitatively measurable characteristics, and demonstrate the value of such experimental research in supporting and furthering theoretical models of MTS.

Method

At present, this research is supported by thirteen in-depth, first-hand interviews wherein participants who self-identify as having MTS describe the quality of their tactile sensations, and report the nature of their experienced responses to various driving stimuli (to other people, and also to environments, and to everyday and cultural objects). The sample size was dependent on the availability of willing participants. It is large enough to extract common themes and enables us to provide representative quotes from each person. While the findings of our qualitative study has contributed some reliable documentation, from the first-person perspective, of the recognized characteristics of MTS, the wider purpose of the research project was to map these characteristics within the context of each individual participant's unique lived experience. The quotes discussed in this report are drawn from interviews with MT synaesthetes conducted by Martin and Cleghorn between December 2012 and July 2015, and relate specifically to empathy and the social, demonstrating an observable connection between the variations of tactile sensation experienced by people with MTS as manifestations of their empathic style, and the implications of manifestations for social functioning. Participants were invited through calls circulated across popular online synaesthesia forums including Sean Day's Synaesthesia List, through promotion of Martin's project by the UK Synaesthesia Association, and through Ward's Synaesthesia research group at the University of Sussex. Participants were recruited from the United Kingdom, United States, Europe, Asia and South Africa and range in age (from 21 to 53), gender (4 males), vocation, and socio-economic background. Three participants had previously participated in experimental research into MTS.

The interviews were conducted one-on-one with either Martin or Cleghorn, employing a semi-structured format that encouraged open-ended commentary in response to a range of set questions. The questions were grouped around three themes. The first set of questions asked participants to describe their MTS, and other forms of synaesthesia, while reflecting on specific instances from their life (e.g. "What is your earliest memory of mirror-touch?"). The second theme related to experiences when viewing cultural objects such as film, sculpture, and painting (e.g. "Can you describe an unusual experience viewing an artwork?"). The third theme forms the foundation of the current analyses and relates to MTS and social life. Some of the questions were quite broad in nature to elicit unguided responses (e.g. "Do you find that having MTS makes you a more or less social person than you might be without it? In what ways?"). Other questions were chosen to evaluate previous claims in the empirical literature (e.g. "Do you ever confuse your own sensations with those of other people?").

Results

The following discussion of the results of our study evidence the variations of MTS experience brought to light through qualitative first person reporting.

The first section of quotes concern evidence that the empathic style of people with MTS is one of emotional contagion. The second section considers the difference between observable expressions and hidden mental states. The third section considers attempts to regulate MTS, and the final section considers the pros and cons of MTS for social functioning. The numbers in parentheses refer to individual synaesthetes, who wish to remain anonymous.

Empathy in MTS resembles Emotional Contagion

The following quotes relate specifically to the notion of emotional contagion; i.e. the sense that the observer experiences the emotion of the people around him or her. Emotional contagion appeared largely inevitable (involuntariness) and regulation of these feelings may take place via extrinsic behaviours (e.g. leaving the room) rather than intrinsic cognitive coping mechanisms.

> Mirror-touch makes me more sensitive to people's emotions…I feel more emotionally connected to people, which brings me happiness. (13)

> If there is tension or sadness in a room, I can't help but feel it too, which is why I always have to go out of the room if I can't solve the problem. (9)

> I definitely think that a lot of my emotional reaction ends up being defined by the people around me, which can be very difficult. (11)

> I feel an overall physical manifestation of the emotion of another person because I feel those physical manifestations. I feel there is an automatic backflow of that information that goes to my brain from the physical sensation that pulls up those emotions in me; it's not so much a deliberate process as it is an automatic process….If I'm around someone whose emotional experience is very strong, and I'm around them for a sustained period of time, it gets to a point where I am unable to keep the volume down actively enough- especially if I'm actively interacting with

> them- to the point where I will take on a lot of those emotions and reflect a lot of those physical characteristics, and I can put myself in a very dark place because of it. (3)
>
> Sometimes, I am not even aware that emotions are coming from an external source, and I will be momentarily confused as to why I am feeling this strange emotion so suddenly... I can find it difficult to untangle my experience from that of others', and sometimes I feel desperate to do so. Sometimes, all I can do is leave the area. For example, when listening to music, if a heavy metal song comes on and they start to scream, I feel this cold tension wrapping around my body. I hate it, and cannot disassociate the incoming emotions from my emotions. I have to turn it off or leave the room. Sometimes when someone is having an aggressive outburst, I have to get away, because the emotion I experience is too intense. (1)

The quote below recapitulates the involuntariness that was mentioned in the previous quotes but illustrates what can happen when there are mixed emotions (anger and fear) amongst multiple observed protagonists. The observer describes an, apparently spontaneous, shift between the perspectives and emotions of the two people being observed.

> I get frightened when you come upon a conversation or a thing where two people are fighting and the man is being mean to his girlfriend, say, and you catch the mood, or see him point his finger or whatever, and that is frightening. I feel what she is feeling – I think, to my ability – and then I feel- sometimes simultaneously - like

> him, and I'm mad at her, and I feel MY finger on something when seeing his finger on her chest, for example. (12)

The same synaesthete expresses the ability to empathise with the antagonist in a piece of fiction:

> I think my mirror-touch helps me in way, now that I'm older- maybe it did back then to- to understand different sides of a story or where other people are coming from, or at least to be interested in where the supposed 'villain' is coming from. I'm interested in this, more than most people, I think. (12)

Observable versus Hidden Emotions

The quotes below are also related to emotional contagion, but speak to the separation between observable emotions (facial and bodily expressions) and hidden mental states. These quotes suggest the synaesthetes' sensitivity in picking up on ostensibly hidden mental states via subtle cues that the observed person is trying to disguise – an insincere smile perhaps.

> It is sometimes like I am watching two movies at once. The one movie is what I am seeing with my eyes, and the other movie is the same person behaving inline with the hidden emotions I am picking up. (1)

> One thing I find hard is that I want to respond to non-verbal cues that perhaps relate to a person's unconscious experience - rather than responding only to verbal communication that expresses their conscious thoughts. People don't generally want a response to these unconscious communications. (2)

Empathy as Partial Contagion: Maintenance of a Self-Perspective

The quotes in this section reveal how people with MTS are able to, at least partially, maintain a sense of detachment from the feeling of others.

The first three quotes point to a sense of ambiguity in terms of the ownership of emotions but this clearly falls short of an outright 'confusion' or misattribution of emotion.

> I am not sure that it would be appropriate to say that I confuse my sensations with those other people, but at times it most definitely seems as though I am feeling through another person. (7)

> The emotional state of others would definitely amplify my own feelings. Also, if I'm around people who are really happy and I'm feeling depressed, I feel happy but my mind is still depressed. There are conflicting emotions there. (11)

> While I don't at the very centre of myself 'become' another person, I feel like my proximity to other persons is greater. That sense of being right next to their

> experience, or seeing their experience from a greater proximity is how I would describe it. (5)

The next two quotes deal with deliberate attempts to distinguish self from other. Note how these synaesthetes refer to this process as checking (3) and reasoning (2) which implies that they need to engage in higher-order thought, rather than intuition, to accomplish self-other control.

> I've learnt to acknowledge and deliberately try to suppress when I know it's not my own genuine emotion. At times I feel there's a confabulation, and my brain tries to fill in the reason why I was feeling that. If I'm with someone who's irritated or grieving and I pick up on those emotions, I'll begin to feel those emotions and my brain will begin to fill in with all the reasons why I'm irritated and all the reasons why I feel the grief. As all that information comes in I can essentially check in with my own feelings and assess whether there are legitimate reasons for me to feel depressed or irritated. It can become quite clear that it's coming from the other person's emotions. (3)

> This is what happens with mirror-touch. You take on the other person's emotional feeling (you feel you are the other person feeling what they feel). You then process the emotion and try and reason it intellectually. From this logical reasoning process and through sensory distraction, you may return the sense of emotion back to your normal natural state. Sometimes this can take a lot of time and the emotions of others can be draining/cause emotional overload. (2)

MTS and the Double-Edged Sword

The first of the following quotes focuses on the pleasurable aspects of MTS and the second quote shows how it can be a source of pro-social motivation. Subsequent quotes discuss potential downsides to MTS sensitivity in terms of everyday social life.

> One of the things I think is really great about mirror-touch is that I get to experience all these things through people. I think if I were to pin it down more specifically it would be seeing other people enjoying life and hugging each other, and being able to take part in that- I don't want to make it seem voyeuristic, but I feel like I can be a part of their own joy as well as my own joy, and their joy amplifies my own joy. (3)

> I didn't even realise that my experience was synaesthetic until five or six years ago, but as I've become aware of it as a phenomenon and become more capable of understanding it I've also realised that it is an advantage in many ways, and that one of those advantages is that it helps me adhere to my beliefs, and that in many ways it helps me become a better person. There is a homeless man in my neighbourhood, and he was sleeping the other day, wrapped up in blankets, not far from the café where I go in the mornings, and when I was in my café I bought him a piece of breakfast bread and I tucked in next to him so that when he woke up he'd have something to eat. And its not so much based on a sense of charitableness, but on a

> sense of the feeling of being cold and the feeling on my skin of rough blankets, and what would comfort that, and it would be something to eat when he woke up. (5)

Not all of our participants regard themselves as being more socially adept than others; some asserted that their natural reactions can be perceived by others as odd. Either as a result of this, or perhaps as a direct consequence of their atypical experiences some report being socially withdrawn. The quotes often illustrate the idea of MTS as a double-edged sword: at one level these synaesthetes feel better able to tune in to others but this does not necessarily translate into a desire for sociality or an aptitude in managing interactions.

> I'm a very social person but I'm also not so easy for others! I can very easily change my behaviour to what is needed in different social contexts. By imitating the social behaviour; the bodies, how they move...(10)

> I think that mirror-touch makes me vastly more socially aware, but much less social. I avoid crowds, and always seek out more one-on-one interactions… Although I have these intuitive insights into psychologies of those around me, I feel socially "retarded". I love one-on-one interaction and do very well at it. But I seem totally incapable of dealing with group situations. I had a couple of people come round to my apartment the other day to have lunch and use the pool on the property, and I had a panic attack lasting most of the afternoon. It is not always so bad, but I feel like I cannot keep up with the complex inter-personal dynamics I perceive and interact in an appropriate way. (1)

My communication and socialisation is impacted by mirror-touch. I have always since childhood found socialising with others hard and I prefer to keep it to a minimum. My non- verbal communication is far higher than my verbal communication ability. (2)

On the one hand I can come off as more withdrawn- I don't necessarily need social interaction much- but at the same time it can make me more of a social person because when I am in a social situation I have the feeling I have a better concept of all these underlying social nuances that are going on. So I can kind of eventually rub in with all those aspects of it. (3)

I feel that my mirror-touch synaesthesia makes me less social that the average person, or perhaps more cautiously social... I think I'm also a little socially awkward in that it's taken me a long time to learn that my ideas about touching and being touched are not universal…Possibly mirror-touch makes me less social. I am more sensitive to stimuli so I am less apt to be in a party or a large crowd... So my social life is definitely influenced by my sensitivity to sensations and increased empathy. By empathy I mean it in the most literal way, as in being able to feel the world from another's perspective; I do not necessarily mean I am nicer to people as a result. (13)

Discussion

The relatively recent revival of interest in synaesthesia has been dominated by research from an experimental and quantitative perspective. This has been needed to

establish the authenticity and credibility of synaesthesia as a distinct phenomenon. However, this research has not removed the need to understand the first-person nature of synaesthesia. It has, instead, increased the importance of understanding the phenomenological aspects of synaesthesia in order to refine theory and drive experimental paradigms. The present study focusses on MTS, which is of particular interest because of its inter-personal nature. Although it has been defined (and diagnosed) in terms of experiencing the touch of other people, evidence from previous research (Banissy et al., 2011) as well as the current interviews demonstrate that MTS is linked to a broader tendency to experience the feelings of others (emotional contagion) and perhaps other forms of social contagion (e.g. spontaneous imitation). In brief, the interviews reveal a tendency for people with MTS to spontaneously take on the emotions of others; a need to consciously resolve who is the owner/agent of that emotion; and sometimes a contradictory impact on daily social functioning. That is, the interviewees often describe a greater sense of social awareness that does not necessarily manifest itself as a greater need for sociality or smoother social interactions.

Earlier accounts of MTS centered on the notion of hyper-activity within a so-called mirror system for touch; i.e. a set of somatosensory representations that are activated both by physical touch to oneself and the observation of touch on other people. There is also evidence that this same system is involved in recognising the emotions of others, for instance from their facial expressions (Keysers et al., 2010). That is, when we see someone angry we may simulate that feeling by activating the same somatosensory and affective representations that are involved in generating our own feelings of anger. There is good neuroscientific evidence for these systems, and many contemporary models of empathy

highlight the importance of shared representations between self and other (or mirror systems) (e.g. Preston and de Waal, 2002).

There are also limits as to how much influence this mechanism has in real-world empathy and social interactions. For instance, Bandura (2002) has pointed out that if we were to rely mainly on these mechanisms we'd have emotional overload. He also points out that human nature is as much characterised by indifference and hostility towards others (notably towards out-groups) as it is by acts of kindness. Some models of empathy (e.g. Decety and Jackson, 2004) account for this by suggesting that, in addition to mirror systems, there are additional systems needed for distinguishing between self and other (preventing emotional overload) and also systems for deliberately taking perspectives. It can be said that empathy is the collective action of these different systems. It has previously been argued, based on neuroscientific evidence, that MTS may be best characterised by a reduction in the mechanism that controls the separation between self and other and that this results in an over-reliance on mirror systems (Ward and Banissy, 2015). The quotes of people with MTS presented in this study are consistent with this framework. They report a spontaneous tendency to experience the emotions of others that, in some instances, can be overwhelming. Their accounts suggest that the origin of these emotions is deduced rather than intuited, or they report experiences such as "I am feeling through another person". The quotes often point to an automaticity in terms of both the feelings that are felt and in the perspective that is taken (e.g. the anecdote relating to the arguing couple).

One of the aims of the present research was to stimulate future research. In the broadest sense, we believe that the study paves the way for other qualitative studies on synaesthesia including those that use more in-depth analytical techniques to tackle first person report (e.g. Interpretive Phenomenological Analysis, IPA). IPA uses a freeform

interviewing method driven by the participant and guided by the principle question of the researcher, and the interviewing is usually multiple times over the course of the research. In the context of MTS, the findings could also be used to generate and validate questionnaires that could be explored further on this group and extended to other atypical groups (e.g. autism spectrum disorder) or normal individual differences. For instance, although autism is traditionally regarded as linked to impaired empathy this need not reflect unresponsiveness to the emotions of others but rather a difficulty in contextualising or interpreting such responses (Markram and Markram, 2010).

In summary, the present study documents for the first time the lived experiences of people with mirror-touch synaesthesia, places it within a theoretical context, and generates further insights that can be explored in the future.

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