2-20-2017

Frustrations, Fights, and Friendships: The Physical, Emotional, and Behavioural Effects of High-Density Crowding on Mumbai's Suburban Rail Passengers

Lily Hirsch
CQUniversity, lily.hirsch@cqumail.com

Kirrilly Thompson
CQUniversity

Danielle Every
CQUniversity

Frustrations, Fights, and Friendships: The Physical, Emotional, and Behavioural Effects of High-Density Crowding on Mumbai's Suburban Rail Passengers

Abstract

Crammed together in tight folds of humanity, the suburban rail passengers of Mumbai, India, experience the most densely crowded trains in the world (Basu & Hunt, 2012). Whilst the immediate physical descriptors of crowdedness in Mumbai are well understood (Hirsch, 2016), there is little knowledge of the effect this has on the multitude of passengers. This is an important omission, as the effects of crowding on passengers impact their attitudes, travel behavior, and travel decisions. This paper therefore seeks to discern the physical, emotional, and behavioural effects of rail passenger crowding in Mumbai, India. To achieve this, a qualitative methodology, including 49 face-to-face interviews and 48 hours of ethnographic and autoethnographic observations in Mumbai were conducted. Mumbai is an ideal place to study these effects as it has high-density crowding, the likes of which are not experienced elsewhere. Additionally, there is a limited understanding of the effect of crowding on passengers in non-Western societies. With increasing rail ridership worldwide, the experiences of Mumbai's passengers within high densities may align with the future experiences of passengers in other Western and non-Western countries. For academics and service providers, understanding the specifics of the crowd, such as the density, passenger perceptions, and culture is important. With that knowledge, strategies to improve the experience of crowding would be more effective.

Frustrations, Fights, and Friendships:
The Physical, Emotional, and Behavioural Effects of High-Density Crowding on Mumbai's Suburban Rail Passengers

Lily Hirsch, Kirrilly Thompson, and Danielle Every
Central Queensland University, Rockhampton North, Queensland, Australia

Crammed together in tight folds of humanity, the suburban rail passengers of Mumbai, India, experience the most densely crowded trains in the world (Basu & Hunt, 2012). Whilst the immediate physical descriptors of crowdedness in Mumbai are well understood (Hirsch, 2016), there is little knowledge of the effect this has on the multitude of passengers. This is an important omission, as the effects of crowding on passengers impact their attitudes, travel behavior, and travel decisions. This paper therefore seeks to discern the physical, emotional, and behavioural effects of rail passenger crowding in Mumbai, India. To achieve this, a qualitative methodology, including 49 face-to-face interviews and 48 hours of ethnographic and autoethnographic observations in Mumbai were conducted. Mumbai is an ideal place to study these effects as it has high-density crowding, the likes of which are not experienced elsewhere. Additionally, there is a limited understanding of the effect of crowding on passengers in non-Western societies. With increasing rail ridership worldwide, the experiences of Mumbai's passengers within high densities may align with the future experiences of passengers in other Western and non-Western countries. For academics and service providers, understanding the specifics of the crowd, such as the density, passenger perceptions, and culture is important. With that knowledge, strategies to improve the experience of crowding would be more effective. Keywords: Rail Passengers, Crowding, Effects, Behaviour, Emotion, Transportation

The Effects of Crowding on Humans

Since the 1970s, a range of disciplines has studied human crowding. These studies encompass mundane crowding, such as being on a crowded train (Gomez-Jacinto & Hombrados-Mendieta, 2002) and extraordinary crowding, such as at festivals, or stadium stampedes (Davis Associates, 2003). Despite this variability, there is agreement on the definition of crowding. Crowding is a "group phenomenon" (Epstein, 1981, p. 370); for crowding to occur, a space must be shared with others. Reduced freedom of movement and an increased demand on physical coordination is an outcome of the shared space (Baum & Paulus, 1987; Saegert, 1973). This, coupled with people's feelings and experiences in that space result in crowdedness (Thompson, Hirsch, & Rainbird, 2011).

Much psychological research adheres to a negative view of crowding, claiming it to have antisocial (Lee & Graefe, 2003; Punpuing & Ross, 2001; Le Bon, 1985, in Reicher, 2002; Ryan & Cessford, 2003) and other negative emotional and behavioural impacts on people (Langrehr, 1991). The aloof and unfriendly manner attributed to many dwellers in large, busy cities (Milgram, 1974) reflects this. The phenomenon of increasing interpersonal detachment in association with increasing numbers of people has been observed for decades. The particular tactics employed by individuals to create and maintain social distance (or reduce and avoid unwanted social connection) have been the subject of much research. For example, Goffman's Theory of Civil Inattention (1963) and Hall's Theory of Proxemics (1966) describe how people

use tactics to actively avoid the attention of, and engagement with strangers in public. These can be seen in relation to train riding, when people avoid eye contact with passengers or change their posture to disengage from their surrounds (Evans & Wener, 2007; Hirsch & Thompson, 2011b):

> Erving Goffman's Theory of Civil Inattention (1963) described particular codes - subtle behavioural changes - that strangers in public follow to assign their own personal boundaries and remove the necessity of facing, or imposing on others. Through this behaviour, people in public spaces are able to maintain a comfortable social order. Goffman's observations were based in the US and UK during the 1950s and 1960s. He stated that considerations need to be taken into view in case of possible infractions to the theory, when looking at other countries, other cultures, and other times.

> Edward Hall's Theory of Proxemics (1966) suggested that people carry within themselves a prescribed set of social distances that apply to different social circumstances regarding the immediate space surrounding a person. For example, close social relationships allow close physical distances. However, further proxemic distances are applied for strangers. In cases where there is a disparity between the expected interpersonal distance and the actual interpersonal distance, social discomfort results (Altman, 1975; Goffman, 1963). Hall noted that personal space is maintained through posture and behaviour, much like Goffman's civil inattention. Importantly, Hall claimed that different cultures have different standards of personal space. For example, an appropriate distance for friends in Germany is further than the appropriate distance in South America (Thomas, 2009).

Negative health effects of crowding include an increase in stress levels and stress-related disorders (Cox, Houdmont, & Griffiths, 2006; Fuller, Edwards, Vorakitphokatorn, & Sermsri, 1993), and the spread of infectious disease (Chow, 2002; Fuller et al., 1993; Toole & Waldman, 1997). Crowding has also been associated with specific symptoms such as fainting (Penter, 2005), backache, anxiety, and tiredness (Cartledge, 2003). In addition, Cartledge (2003) and Penter (2005) warn that the public's physical risk is increased when in a crowded environment.

However, crowding is not necessarily universally viewed negatively. Indeed, Freedman (1975) suggests that crowding is not necessarily good or bad, it simply increases the awareness of other people's behaviour and presence in a situation. In some situations, there is a "general liking and trust for the others present" (Saegert, 1973, p. 256), such as the mutual joy at music festivals, or the camaraderie seen at sporting events. In these cases, the affective atmosphere (Bissell, 2010; Brennan, 2004) – the positive "vibe" of the surrounding crowd – can enhance the enjoyment of the spectacle and influence the individual's emotions and behaviour (Durkheim, 1915; Lee & Graefe, 2003; Mowen, Vogelsong, & Graefe, 2003).

Whilst the social, psychological, physical, and public health effects of crowding are generally known, there is a need to understand the effect of crowding on passengers in mundane high-density settings. Additionally, there is a limited understanding of the effect of crowding on passengers in non-Western societies. Both Goffman and Hall warned about cultural factors that may repudiate their theories. The rail network in Mumbai, India encompasses both of these issues and is thus an ideal location to study if, and how the effects of crowding are dependent on culture and density.

Mumbai's Suburban Railway Network

India has the second largest population in the world, with millions of people residing in densely inhabited cities. Mumbai is India's most densely inhabited city (Joshi & Kale, 2013). It is located on a peninsula on the west coast of India, and its Central Business District (CBD) is located at the southern end. Mumbai's suburbs extend 120km to the north and east (Sehgal & Surayya, 2011), and follow the three railway lines: Western, Central, and Harbour (Tiwari & Kawakami, 2001). Due to the distances involved and the cost and time efficiency of other forms of transport, such as bus, rickshaw, or car (Nallathiga, 2006), residents of Mumbai's outer-suburbs can only realistically access the CBD by train (Agarwal, Mullick, & Ray, 2013; Kusters, 2009). However, the suburban railway system is also relied on by people residing close to the CBD, who may be able to afford other forms of transport, but prefer the efficiency of the trains. Therefore, the trains carry a cross section of Mumbai's residents.

Mumbai's local trains are the most densely crowded in the world (Mumbai Railway Vikas Corporation Ltd & Wilbur Smith Associates, 2013), with an estimated daily ridership of 7.4 to 8 million passengers (Mumbai Railway Vikas Corporation Ltd, 2013; Mumbai Railway Vikas Corporation Ltd & Wilbur Smith Associates, 2013). Between the 8-11am and 5-9pm peak hours (Kusters, 2009), super-dense-crush loads of 14-16 passengers per square metre are often experienced (Basu & Hunt, 2012; Sehgal & Surayya, 2011). Train surveys note that at these times, passenger loads are at least double the recommended passenger capacity (Mumbai Railway Vikas Corporation Ltd & Wilbur Smith Associates, 2013). Platforms and stations also experience high levels of crowding.

Train carriages are divided into various compartments, reserved for different types of passengers: second class (ladies' or general), first class (ladies' or general), "handicapped" (introduced in 2001; Kusters, 2009), and vendors. Like many other non-Western railway systems, women are allowed to enter the general compartments, but ladies' compartments are strictly reserved for women. The doors to the carriages are operated manually and passengers generally choose to leave them open, allowing for improved ventilation and efficient boarding and alighting. During the monsoon, passengers may close the doors to discourage the entrance of water (Agarwal et al., 2013). For the vast majority of the year, some passengers opt to travel on the "footboard," a runner located at the entrance to the carriage (Hirsch, Thompson, Blewett, & Every, 2016). Significant risks are associated with this locational choice, as the pressure of the crowd inside the carriage can cause people to fall from the moving train, or to hit an electrical pole along the track (Ambe, 2014; Dargalkar, 2012; Ganesh, 2011). These circumstances often result in severe injury or death. Indeed, during the first three months of 2012 (the data collection period for this research), 805 commuters died and 867 were injured in train-related accidents (Kumar, 2012), including pedestrians being hit whilst crossing the tracks (Kamath, 2014), and passengers falling from carriages (Hindustan Times Correspondent, 2012).

Mumbai's extensive local rail network—with all classes of the city's inhabitants represented as passengers—is an ideal miniature of the massive city it services. Thus, understanding the experience of passengers in Mumbai's local trains may assist in a better understanding of high-density crowding, interactions with strangers, and behaviour in public more generally.

Understanding Rail Passenger Crowding in Mumbai

Qualitative research on the experiences of crowded rail passengers during quotidian travel in Mumbai is limited. However, three recent studies have documented crowded passengers' experiences in Mumbai.

Kusters (2009) explored what it was like to be a Deaf passenger in Mumbai's local trains. Although not focused specifically on crowding, her research mentioned that the 'handicapped' compartment gives an advantage to passengers with disabilities because it offers a place with better access and more space. Ambe (2014) examined the impact of crowding on female passengers in the ladies' compartment, finding that the high-density crowding present in the compartments caused stress amongst the passengers. Finally, Hirsch (2016) documented detailed descriptions of the physicality of crowdedness from the passengers' viewpoint. They found that Mumbaikers described crowdedness in relation to the physical experience of their bodies. Additionally, several factors, such as the behaviour of others, and the weather were found to exacerbate the experience of crowdedness. Four constructions of crowdedness were determined:

1) Lack of physical control (mis-corporeality and dispersed corporeality);

2) Touching (matter connecting);

3) Situations that would not be tolerated in public;

4) Exchange or threat of exchange (corporeal transgression/exchange);

    a) Discomfort associated with corporeal transgression;

    b) Being in close physical contact with strangers or undesirables.

The physical descriptors of crowdedness in Mumbai are well understood (Hirsch, 2016). However, there is little knowledge of the effect this has on passengers. This paper seeks to qualitatively explore the effects of crowding on Mumbai's passengers. This is important because the factors that affect the experience of crowded rail transport from a passenger or customer viewpoint provides an opportunity for policy makers and service providers to better understand their passengers and react to their passengers' needs.

Method

The research question posed in this paper is to determine the physical, emotional, and behavioural effects of crowding on Mumbai's suburban railway passengers. To achieve this, qualitative fieldwork in the form of observations (ethnographic participation, and autoethnography) and semi- structured, in-depth interviews were undertaken by the primary author across the Mumbai metropolitan rail network from January 2012 to March 2012. In addition to interviews and observations, ephemera in the form of clippings from three of Mumbai's English-language newspapers were collected. These were used to glean the situational and political context in which the research was positioned and provided a further connection to the passengers.

Ethnography is a qualitative research method where the minutiae of daily interactions and practices of the studied group or community are observed and recorded (Taber, 2010; Thompson, 2013). To complement external observations, autoethnography was used as a tool for the researcher to self-reflect on their personal experience to better understand their cultural experience (Denzin, 2014; Ellis, Adams, & Bochner, 2011). Thus, patterns could be drawn to deduce how the observed phenomena happen (Adler & Adler, 2008; Spradley & McCurdy, 1972). These research methods were particularly useful for a study on the effects of crowded

rail travel on passengers, as it allowed the researcher to be open to the nuances that influence passengers' experiences.

In total, 48 hours of observations were conducted on platforms, in first and second-class ladies' compartments, and in some second-class general compartments on the three suburban lines. Observations took place between 7am and 8pm with a focus on the morning and afternoon peak periods.

At the time, observations were noted by the primary author in a small notepad, or as soon as possible after the event. Field notes were subsequently "written up" and organised according to emerging themes. The advantage of field observations is that they are undertaken in situ, giving insight into the "unselfconscious behaviour of passengers" (Branton, 1993, p. 116). Autoethnographic notes about the primary author's own experiences as a passenger on trains were also recorded. The incorporation of autoethnography acknowledged the experiential dimensions of crowdedness and gave an insight into what it is like being a rail passenger - significantly enhancing the primary author's ability to create rapport with interview participants, a pertinent point as a foreign researcher in India.

To explore why the observed behaviours occurred, and to better understand passengers' experiences, a series of semi-structured, in-depth interviews with 49 passengers (59% male, 41% female), aged between 20 and 73 years, was held. The combination of participant-observation and interviews was designed to understand what passengers say they do, as well as what they are seen to do (Hirsch & Thompson, 2011a; Thompson, 2013). The duration of interviews was between one and two hours. They were held in public locations, such as cafes or parks as suggested by the participant (Hirsch, Thompson, & Every, 2014).

Due to the extreme economic and educational diversity in Mumbai's population, coupled with the researcher's limited conversational abilities in Maharashtra's local languages, participant recruitment for interviews was divided into three methods. A private recruitment company was engaged to recruit participants from a lower socio-economic class (SEC)[1] (N= 8). These interviews were conducted in Hindi or Marathi by a moderator in the presence of the researcher, who was assisted by a simultaneous translator. Following these interviews, translated transcripts were provided to the researcher. Three low SEC participants were recruited through snowballing and their interviews were conducted, and translated by a local friend of the primary researcher. Higher SEC (N= 38) participants were recruited through snowballing (Sadler, Lee, Lim, & Fullerton, 2010) and by judicious use of a social networking site (Hirsch et al., 2014). They were interviewed in English by the researcher. Extracts from the interviews appear throughout this paper. They are de-identified and include the participant's gender, age, SEC, and train line (Western, Central, or Harbour).

Data were analysed following Green et al.'s (2007) four-stage Qualitative Data Analysis protocol of immersion in the data, coding, category creation and theme identification. Thematic analysis (Boyatzis, 1998; Braun & Clarke, 2006) was used to analyse incoming data and reanalyse existing data. The protocol had University of South Australia, CQUniversity, and The University of Calcutta ethics approval.

What Are the Effects of Crowding on Passengers in Mumbai?

Qualitative data analysis identified three ways that crowding affected interview participants: (1) physically, (2) emotionally, and (3) behaviourally.

---

[1] SEC is determined by the education level of the household's primary income earner and the number of durables owned (for example; colour television, LPG stove, air conditioner). These data are inserted into a socio-economic classification (SEC) matrix grid to determine a person's socio-economic level. For more information, see (The Market Research Society of India & Media Research Users Council, 2011).

1.   Physical Effects of Crowding

> *After a while, the crush lessened slightly when, to use a grocery term, "the contents settled."*
> (Portway, 1993) *Indian Odyssey: Around the Subcontinent by Public Transport*

The physicality of moving through the crowd was described by interview participants, was experienced by the primary author during observations, and is documented in detail in (Hirsch, 2016). Indeed, the first week of data collection was devoted to learning to become a regular commuter, to negotiating the "turbulent" [observations 17-1-2012 5:25pm, Western], "daunting" [observations 16-1-2012, Western] crowd so that travel could be undertaken safely.

Extract 1: Observations 7-2-2012, 5:10pm, Western

A woman's long ponytail is caught between two people. She yanks her hair back... A woman's large shoulder bag slips between two other people. She jostles, but they can't move enough to get it back to her. It takes a lot of tugging and pulling by all three parties to retrieve the bag... When there are so many people, so much hair, dupattas [scarves] and bags, everything becomes mixed together, like a big plate of spaghetti. It is amazing how quickly everybody seems to become knotted together and it is a really difficult task to separate all of the knots.

Particular "hot-spots" for severe crowding were in the vestibule of the carriage, and at the platform-carriage interface. This region-specific chaos involved fast moving people, pushing, and high densities that could result in injury and damage to, or loss of property.

1.1.   Physical: Damage to Passengers

Elsewhere, we described how bodily intimacy, the restriction of independent movement and loss of physical control strongly impact on passengers' perceptions of crowdedness in Mumbai (Hirsch, 2016). For everyday passengers, due to the density of crowding at floor-level, a seemingly simple task, such as managing one's foot placement and balance can be difficult. This has implications for passengers' physical safety within the carriage.

Extract 2: Observations 25-1-2012, 7pm, Western

The train sways, people lose balance and crush more heavily onto each other...
You can't have your feet too wide apart because there are too many feet.

The full-bodied spatial issue of corporeal crowding (Hirsch, 2016) was apparent as vertical crowding - not just at foot-level, but also above passengers' heads. The placement of hands on handholds for stability was also affected by the crowd. People often transgressed social norms and cultural physical boundaries by sharing handholds or holding other

passengers' arms for support. Coupled with this social discomfort was the physical discomfort of holding one's hand above one's head for extended periods of time[2].

   Extract 3: Observations 23-1-2012, 7pm, Central

   The whole time (about 15 min) I have my hand on a D-ring. My arm is fully extended and it's quite sore by the time I disembark.

Restricted by the rigid timeline, each passenger within the train's tight physical confine has a unique locational and locomotional agenda and must push their way through the crowd to achieve it. Due to a combination of passenger density and brief dwell times, small injuries often occur.

   Extract 4: Female, 28, High SEC, Central

   There is a lot of pushing and shoving people. Getting into a ladies' compartment, we have all kinds of accessories and it is very easy to get bruised... I have bruised myself very often.

Injuries in crowded rail carriages are common in Mumbai (Hirsch et al., 2016), but they are not specific to Mumbai. Indeed, in an ethnographic study of rail travel in Delhi, Sadana related a similar situation involving a passenger being bruised by the bangles of another (2010).

More serious situations caused by the forced movement of the everyday crowd were not uncommon. They resulted in injuries, such as fainting (see more in section entitled "caring attitude"), severe bruising, broken bones, and even death. Instances of these occurrences were discussed in the interviews and were reiterated in some newspaper articles collected during the timeframe of observations (Dargalkar, 2012; Mishra, 2012; Ramkumar, 2012).

Due to the manually operated doors and the tendency for people to travel on the footboard (Hirsch et al., 2016), death or severe injury from falling from a crowded train or hitting an electrical pole was described by participants and detailed in newspapers.

   Extract 5: Male, 27, High SEC, Central and Harbour

   When the trains are crowded, people are hanging at the doorstep and there are poles [outside the trains] and people are hanging in such a way that they hit the poles and they fall down.

The sheer density of Mumbai's rail crowds and the urgency of boarding and alighting strongly exacerbates the potential for human factors issues (Cox, Griffiths, & Houdmont, 2003). This has parallels with other crowding situations, such as at religious events (Yamin, 2006), or in sports stadium stampedes (Ngai, Burkle, Hsu, & Hsu, 2009) where the urgent press and rush of people at speed can cause severe damage to themselves and their property. Indeed, Lee and Hughes (2005) state that in any crowd there is the potential for injury and death (Sharma, Rani, & Barwa, 2010).

---

[2] This physical discomfort, associated with static posture, was also described by interview participants and is discussed in more detail in Hirsch (2016).

1.2.   Physical: Damage to Property

As well as injury to people, the movement of the crowd also caused damage to property. Many interview participants complained of the regularity and predictability of property damage in the trains, particularly in the rush of boarding and alighting.

Extract 6: Male, 26, High SEC, Western

When you are wearing chappals [sandals], people step on them and you can't get free and you have to let your shoe go, it will fall out the door.

Extract 7: Female, 28, High SEC, Western

...like your specs getting torn off, your shoes getting ripped apart.

These events were a familiar experience of rail travel and due to their commonality, passengers sometimes jested about them:

Extract 8: Male, 23, High SEC, Western

Sometimes you go in and you have a nicely ironed shirt and then you stand in the crowd, and then it is not ironed.

Damage to person and property was a direct outcome of the density of the crowd. Likewise, crowding had effects on passengers' emotions.

2.   Emotional Effects of the Crowd: Frustrations

> *Over all crowds there seems to float a vague distress, an atmosphere of pervasive melancholy, as if any large gathering of people creates an aura of terror and pity.*
> Zola (1889) *The Girl Who Loved Me*

A number of participants described negative emotional reactions to the crowd. Their emotional responses ranged from "dismay" (Male, 23, High SEC, Western) and "frustration" (Male, 23, High SEC, Central and Western) at being in the crowd, to "fear" (Male, 38, Low SEC, Harbour) of missing their desired station due to an enforced, crowded sessility (Hirsch, 2016), to being "scared" (Male, 29, High SEC, Central) and "petrified" (Male, 33, High SEC, Central) of falling from the carriage and onto the tracks.

Many of the uncertain feelings of being ensconced in the crowd related to a perceived lack of self-efficacy and control, as well as the experience of Hirsch's. (2016) four constructions of crowdedness (as described earlier).

Extract 9: Male, 23, High SEC, Central

And people are frustrated, seriously...it is crazy, you do not want to be in that crowd, but you don't have any other option, you have to do that, so obviously you have to be frustrated.

This axiomatic emotional discomfort and frustration was a direct result of the physicality of crowding. This effect has been widely cited as a strong influence of the overall experience of a situation (Evans, 1979; Langrehr, 1991) and in rail journeys worldwide (O'Regan & Buckley, 2003; Thompson et al., 2012). However, this finding was also inconsistent with some of the literature, where it has been documented that emotional effects of crowding are more strongly related to the behaviour of others rather than the physical experience of crowdedness (Bissell, 2010; Hirsch & Thompson, 2011b; Lee & Graefe, 2003; Soenen, 2006).

Passengers' emotions are influenced by the crowd and so, too, are the social behaviours of the individual.

3.   Behavioural Effects of the Crowd: Fights and Friendships

> *The first problem of living is to minimize friction*
> *with the crowds that surround you on all sides.*
> Asimov (1954) *The Caves of Steel*

Participants discussed two behavioural outcomes that resulted from crowdedness. These were (1) fights on the train and (2) demonstrating a caring attitude towards fellow passengers.

3.1.   Fights

Many interview participants cited crowdedness as a factor that influenced the occurrence of verbal and physical fights. They suggested that many commuters enter the rail environment with the imminence of their job, or home life at the forefront of their consciousness. They saw the rush, heat, and jostle of the crowd as a conflagrant to the outbreak of arguments, which were not uncommon.

Extract 10: Female, 28, High SEC, Western

See, the women out here they have a lot of multitasking to do. So if a woman is troubled in the house, you see all the frustration coming out in the train [laughs]. Her husband must have beaten her, her kids must have failed an exam.

Simple, and normally forgivable physical transgressions, such as pushing due to the movement of the crowd, looking at you "funny" (Male, 26, High SEC, Western) or having "hair in their face" (Female, 32, Low SEC, Central), were enough to trigger a fight.

Extract 11: Male, 23, High SEC, Central

Yeah, in crowded trains… sometimes, even the slightest reason, like people stomping your feet, they get angry. I've seen it many times. I've seen it a lot of times where somebody might just push another person, maybe by mistake so a verbal fight starts.

On a particularly difficult day of observations, the field researcher was able to sympathize with, and understand this behaviour:

Extract 12: Observations 7-2-2012 5:10pm, Western

I was feeling tense, reflecting on that morning's trivial argument with a friend. The continued loading of people on the train only frustrated and irritated me further. I didn't feel like being squashed and sweaty. I just wanted to calmly sit and get to my destination.... I can understand how people 'snap' so easily on the train... The press of the people just adds to your tiredness and irritation.

Interestingly, interview participants did not always depict fights in a negative light. Indeed, many participants agreed that observing a fight from a distance could act as a source of entertainment, and for those involved in fights with strangers, a degree of catharsis existed.

Extract 13: Female, 28, High SEC, Harbour

These people are not known to you, you fight and get off the train and it wouldn't matter to you. The next day you will not meet them again. It is a stress reliever. You are angry, you shout and get down at the next station, who cares? It's fun.

Loo and Ong (1984) suggest that some effects of crowding in residential environments lead to psychological stress and social conflict. Likewise, in another residential study, Chan (1999) claims that conflicts may increase the feeling of being crowded, which implies that a system of positive feedback may be in play.

For some, the effect of the crowd led to terse interactions. However, for others it led to a convivial and helpful atmosphere.

3.2. Caring Attitude

Interview participants also discussed positive behavioural effects stemming from crowding. They were practiced and regular reactions to common adverse situations where passengers could come to harm, for example when a fellow passenger fainted – not an uncommon event.

Extract 14: Female, 32, High SEC, Western

Many women, regular travelers... would always have some sweet in their bag. And water. So if someone faints, first thing is everybody will say "someone has fainted"... So then someone will definitely give a sweet or some water... People are very helpful that way.

While some passengers purposely prepared their bags with items to assist fellow passengers, others described helpful behaviours demonstrated toward those with reduced mobility, or passengers who had lost their balance.

Extract 15: Female, 45, High SEC, Western

People are very accommodating and helpful. If there's a pregnant lady, somebody, not even related to her would see to it that she gets a seat, or if there's an old lady.

Extract 16: Male, 28, High SEC, Harbour

People will help you... they are looking out for each other. They do it for anyone, which is nice... If they see that someone is falling they will help you. That's for sure.

Helping strangers in a difficult situation in the crowded carriages was not seen as unusual, unlike the bystander effect we often see in the West (Chekroun & Brauer, 2002). Whilst helping was common in the carriage, on the platform, away from the intimacy of the stagnant crowd, the bystander effect was more apparent.

Extract 17: Male, 23, High SEC, Harbour

See, there was this incident in which this guy gets knocked down because he was leaning too far- looking at the train, when it is coming... And, for at least half an hour, no one did a thing. He was just lying there, blood spattered on the platform.

As demonstrated, in some instances, crowding may have positive implications (Whiting & Nakos, 2008), creating a temporary "form of being together" (Soenen, 2006, p. 4), a Durkheimian aspect of crowdedness (Walter, 2001) in which a situation of adversity reinforces community. This is reflected in Kusters' work (2009) whose ethnography in the "handicapped" carriages on Mumbai's trains found that fellow passengers would frequently help each other to board. Indeed, the development of strong friendship bonds between passengers due to the regularity of travel and the crowd were discussed by interview participants. This phenomenon is described in more detail in Hirsch (2016). Interestingly, in Antwerp, Belgium, similar caring attitudes and actions have also been reported, with passengers helping each other to remain steady upon a sudden braking of the tram (Soenen, 2006).

From the physical to the emotional and the behavioural, there are many and varied effects of crowding on passengers in Mumbai, both positive and negative.

Discussion

In this paper, we have built on the knowledge that rail passengers in Mumbai construct crowdedness in a physical sense, including corporeal transgression, lack of physical control, touching, and physical situations not normally tolerated in public (Hirsch, 2016). By documenting the physical, emotional, and behavioural effects of crowding, this paper significantly extends the otherwise minimal understanding of passengers' reactions to crowdedness in Mumbai's trains. To further extend our understanding of passenger crowdedness and behaviour in Mumbai's suburban trains, future research could examine the strategies that passengers use to gain control back from the crowd and exhibit their own agency. This would be beneficial for service providers to better understand and act upon the choices and movements of their passengers.

From a physical sense, our findings reflected the literature concerned with extraordinary crowding, such as the Hajj pilgrimage (Yamin, 2006) and stadium stampedes (Ngai et al., 2009), where physical risk to individuals in the crowd was high. We found that minor injuries, such as bruising, and damage to, or loss of personal property were common, indeed were a familiar aspect of train travel, and that more serious injuries and death occurred daily. Therefore, physically, high-density train crowding in Mumbai was no different from other high-density crowding situations.

In this research, we found that the emotions expressed in the interviews corresponded with the physical feeling of being crowded, rather than with the behaviour of other passengers. This finding was inconsistent with some of the literature, where it has been documented that the behaviour of others is more critical to the experience of crowdedness (Bissell, 2010; Hirsch & Thompson, 2011b; Lee & Graefe, 2003). However, our findings are also substantiated by other studies which suggest that crowding leads to "increased anxiety, stress and feeling of exhaustion" (Tirachini, Hensher, & Rose, 2013, p.49) and passenger impatience (Mitomo & Jitsuzumi, 1999). Therefore, emotionally, high-density train crowdedness in Mumbai was associated with the corporeal experience, rather than the behaviour of fellow passengers.

In this paper, we challenged and extended the literature by demonstrating that the positive and negative behavioural effects of high-density crowding on passengers instigate social contact between commuters (i.e. shouting at each other, reviving each other). Bissell argues that in response to negative situations, people may respond with a *"care for life"* (Bissell, 2010, p.286 [original emphasis]). This may indeed be the case, although it must be noted that the deeply entrenched behavioural response of people toward strangers as described by Goffman's Theory of Civil Inattention (1963) do not consistently apply here. Those examples where breakdowns of these social theories occur may be explained in two ways: 1) culture, and 2) more extreme crowding than that on which those theories were built.

1)   Goffman's theories stemmed from observations in the USA and the UK, not in high-contact cultures (Drummond, 2000), such as India. As Hall noted, people from different cultures have different understandings of proxemic distances (1966). Additionally, culture is a factor which influences the perception of and tolerance to crowdedness (Kaya & Weber, 2003; Kim & Lee, 2010; Langrehr, 1991; Pons & Laroche, 2007; Whiting & Nakos, 2008). For a more detailed discussion, see Hirsch (2016);

2)   The observations made by Goffman were of everyday situations in the UK and USA in the 1950s-70s. Crowding densities, experienced by Goffman were not the same level as in Mumbai. Therefore, the behavioural reaction of passengers to strangers in the form of fighting or caring attitudes ('friendships') may be a possible extension to this theory. Perhaps, in these high densities, it is simply not possible to follow the usual social norms as there is no way to avoid the obvious fact that there are many people very close to you.

With regards to a caring attitude, and, in some instances, fights, the positive reaction within the crowd demonstrates that the effects of crowding on public transport are not inherently or unavoidably negative. Rather, they can be situations where adversity reinforces a sense of community, like Durkheim's work on funerals (1915). This is important to note because positive affect (Brennan, 2004) in high-density crowds is primarily associated with events, such as music festivals (Lee & Graefe, 2003; Mowen et al., 2003). Thus, the effect of crowding on passengers' behaviour is not necessarily negative and this leads to the question: Given this knowledge, can crowding in mundane settings, like daily rail travel, be fun, or at least tolerable?

Conclusion

This paper has developed an understanding of the effects of crowding from the personal and cultural perspective of Mumbai's rail passengers. We analysed passengers' physical, emotional, and behavioural reactions to everyday travel in their usual, extremely overcrowded

setting. We found that high-density crowding affected passengers in different ways and sometimes resulted in extreme outcomes. Some of these ways were in contrast to the most relevant theories (i.e., Goffman). Physically, the crowd posed significant risk to person and property, particularly in the high-flow areas of the vestibule and platform-carriage interface. Emotionally, passengers experienced negative reactions to the daily physical reality of the crowd. Behaviourally, people either came together as a community in adversity, providing assistance to each other, or they allowed their daily life tensions to get the better of them in the crush of the train, resulting in fights. The emic experiences of crowded passengers and the factors that affect the experience of crowded rail transport from a passenger or customer viewpoint provides an opportunity for service providers to better understand their passengers. This is particularly so with regards to our behavioural findings, which demonstrate how the effects of crowding are not inherently or unavoidably negative, rather, the crowd can be a source of entertainment, fun, and friendships. Thus, we stress the importance to service providers and academics, of understanding the specifics of the crowd, such as the density, passenger perceptions and culture. With a thorough understanding of the crowd, strategies to improve the experience of crowding would be more effective.

References

Adler, P., & Adler, P. (2008). Of rhetoric and representation: The four faces of ethnography. *The Sociological Quarterly, 49*(1), 1-30.

Agarwal, S., Mullick, A., & Ray, G. G. (2013). An observational study on usability issues in Mumbai local trains. Paper presented at the *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, San Diego, September 30 - October 4.

Altman, I. (1975). *The environment and social behaviour*. Monterey, CA: Brooks/Cole.

Ambe, S. (2014). Study of crowding and coping in ladies compartment in Mumbai Local: An environmental psychology perspective. *Tekton: A Journal of Architecture, Urban Design and Planning, 1*(1), 48-59.

Asimov, I. (1954). *The caves of steel.* Garden City, New York: Doubleday.

Basu, D., & Hunt, J. D. (2012). Valuing of attributes influencing the attractiveness of suburban train service in Mumbai city: A stated preference approach. *Transportation Research Part A, 46*(9), 1465-1476.

Baum, A., & Paulus, P. (1987). Crowding. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 533-570). New York, NY: John Wiley & Sons.

Bissell, D. (2010). Passenger mobilities: Affective atmospheres and the sociality of public transport. *Environment and Planning D: Society and Space, 28*, 270-289.

Boyatzis, R. (1998). *Transforming qualitative information: Thematic analysis and code development.* Thousand Oaks, CA: Sage.

Branton, R. (1993). Train drivers' attentional states and the design of driving cabins. In D. Oborne, R. Branton, F. Leal, P. Shipley, & T. Stewart (Eds.), *Person-centred ergonomics: A Brantonian view of human factors* (pp. 97-110). London, UK: Taylor and Francis.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

Brennan, T. (2004). *The transmission of affect.* New York, NY: Cornell University Press.

Cartledge, J. (2003). *Overcrowding on the railways, a health and safety issue?* Birmingham, AL: Railway Industry Advisory Committee.

Chan, Y. K. (1999). Density crowding, and factors intervening in their relationship: Evidence from a hyper-dense metropolis. *Social Indicators Research, 48*(1), 103-124.

Chekroun, P., & Brauer, M. (2002). The bystander effect and social control behavior: The

effect of the presence of others on people's reactions to norm violations. *European Journal of Social Psychology, 32*(6), 853-867.

Chow, W. K. (2002). Ventilation of enclosed train compartments in Hong Kong. *Applied Energy, 71*(3), 161-170.

Cox, T., Griffiths, A., & Houdmont, J. (2003). Rail safety in Britain: An occupational health psychology perspective. *Work & Stress, 17*(2), 103-108.

Cox, T., Houdmont, J., & Griffiths, A. (2006). Rail passenger crowding, stress, health and safety in Britain. *Transportation Research Part A, 40*(3), 244-258.

Dargalkar, N. (2012, February 5). Man who fell from train, still in coma, *Sunday Midday*. Retrieved from http://m.mid-day.com/articles/man-who-fell-from-train-still-in-coma/153256

Davis Associates. (2003). *Managing large events and perturbations at stations*. London, UK: RSSB: Rail Safety and Standards Board. Retrieved from https://www.rssb.co.uk/research-development-and-innovation/research-and-development/research-project-catalogue/t161

Denzin, N. K. (2014). *Interpretive autoethnography* (Vol. 17). Los Angeles, CA: Sage.

Drummond, L. B. W. (2000). Street scenes: Practices of public and private space in urban Vietnam. *Urban Studies, 37*(12), 2377-2391.

Durkheim, É. (1915). *The elementary forms of the religious life* [J. W. Swan, Trans.]. London, UK: George Allen & Unwin Ltd.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An overview. *Historical Social Research / Historische Sozialforschung, 12*(1), 273-290.

Epstein, Y. (1981). Crowding stress and human behavior. *Journal of Social Issues, 37*(1), 370-383.

Evans, G. (1979). Behavioural and physiological consequences of crowding in humans. *Journal of Applied Social Psychology, 9*(1), 27-46.

Evans, G., & Wener, R. (2007). Crowding and personal space invasion on the train: Please don't make me sit in the middle. *Journal of Environmental Psychology, 27*(1), 90-94.

Freedman, J. (1975). *Crowding & behavior: The psychology of high density living*. New York, NY: The Viking Press.

Fuller, T., Edwards, J. N., Vorakitphokatorn, S., & Sermsri, S. (1993). Household crowding and family relations in Bangkok. *Social Problems, 40*(3), 410-430.

Ganesh, H. (2011). Spectre of death derails Mumbai's lifeline, *The New Indian Express*.

Goffman, E. (1963). *Behavior in public places: Notes on the social organization of gatherings*. New York, NY: Free Press.

Gomez-Jacinto, L., & Hombrados-Mendieta, I. (2002). Multiple effects of community and household crowding. *Journal of Environmental Psychology, 22*(3), 233-246.

Green, J., Willis, K., Hughes, E., Small, R., Welch, N., Gibbs, L., & Daly, J. (2007). Generating best evidence from qualitative research: The role of data analysis. *Australian and New Zealand Journal of Public Health, 21*(6), 545-550.

Hall, E. (1966). *The hidden dimension*. Garden City, NY: Doubleday.

Hindustan Times Correspondent. (2012). Man falls off train rooftop, dies, *Hindustan Times*.

Hirsch, L. (2016). "It's a jungle in here: Conceptualising the crowdedness experience of Mumbai's railway commuters". Unpublished doctoral thesis CQUniversity, Rockhampton North, Australia.

Hirsch, L., & Thompson, K. (2011a). The carriage as an emotional landscape: How do passengers experience fear? Understanding fear in the Australian metropolitan railway industry. Paper presented at the *AusRAIL PLUS*, Brisbane, Queensland, November 22-24.

Hirsch, L., & Thompson, K. (2011b). I can sit but I'd rather stand: Commuters' experience of

crowdedness and fellow passenger behaviour in carriages on Australian metropolitan trains. Paper presented at the *Australasian Transport Research Forum*, Adelaide, Australia, September 28-30.

Hirsch, L., Thompson, K., Blewett, V., & Every, D. (2016). Death on the lifeline: The perceptions of Mumbai's commuters to high-density related risk. *Security Journal, 29* 72-86.

Hirsch, L., Thompson, K., & Every, D. (2014). From computer to commuter: Considerations for the use of social networking sites for participant recruitment. *The Qualitative Report*, *19*(5), 1-13. Retrieved from http://nsuworks.nova.edu/tqr/vol19/iss5/3

Joshi, V., & Kale, V. (2013). Environmental conflicts in coastal metropolitan cities in India: Case studies of Mumbai and Chennai metropolitan regions SECOA FP7, Research Project 4.1 (pp. 319-354).

Kamath, D. (2014). Lifeline or death line: [T]rack crossing accounts for 52% of train mishap deaths, DNA.

Kaya, N., & Weber, M. (2003). Cross-cultural differences in the perception of crowding and privacy regulation: American and Turkish students. *Journal of Environmental Psychology, 23*(3), 301-309.

Kim, D. Y., & Lee, K. H. (2010). Cultural differences in the customer perception of crowded restaurant: Emotions, intolerance and perceived price. *International Journal of Revenue Management, 4*(3-4), 420-431.

Kumar, K. (2012). Mumbai's killer trains: 805 dead in 3 months, insensitive railways blame commuters, *India Today*.

Kusters, A. (2009). Deaf on the lifeline of Mumbai. *Sign Language Studies, 10*(1), 36-68.

Langrehr, F. (1991). Retail shopping mall semiotics and hedonistic consumption. *Advances in Consumer Research, 18*(1), 428-433.

Lee, H., & Graefe, A. (2003). Crowding at an arts festival: Extending crowding models to the frontcountry. *Tourism Management, 24*(1), 1-11.

Lee, R., & Hughes, R. (2005). Exploring trampling and crushing in a crowd. *Journal of Transportation Engineering, 131*(8), 575-582.

Loo, C., & Ong, P. (1984). Crowding perceptions, attitudes, and consequences among the Chinese. *Environment and Behavior, 16*(1), 55-87.

Milgram, S. (1974). The experience of living in cities. *Crowding and Behavior, 167*, 1461-1468.

Mishra, L. (2012). State, rly wake up to need for better emergency care, *Mumbai Mirror*.

Mitomo, H., & Jitsuzumi, T. (1999). Impact of telecommuting on mass transit congestion: The Tokyo case. *Telecommunications Policy, 23*(10), 741-751.

Mowen, A. J., Vogelsong, H. G., & Graefe, A. R. (2003). Perceived crowding and its relationship to crowd management practices at park and recreation events. *Event Management, 8*(2), 63-72.

Mumbai Railway Vikas Corporation Ltd. (2013). *Annual report 2012/2013*. Mumbai, India: Mumbai Railway Vikas Corporation Ltd.

Mumbai Railway Vikas Corporation Ltd, & Wilbur Smith Associates. (2013). *Executive summary: Mumbai suburban rail passenger surveys and analysis*. Mumbai, India: Mumbai Railway Vikas Corporation Ltd.

Nallathiga, R. (2006). Envisioning a comprehensive transport strategy for Mumbai. *Journal of Transport Management, 30*(2), 153-177.

Ngai, K. M., Burkle, F., Hsu, A., & Hsu, E. (2009). Human stampedes: A systematic review of historical and peer-reviewed sources. *Disaster Medicine and Public Health Preparedness, 3*(4), 191-195.

O'Regan, B., & Buckley, F. (2003). *The psychological effects of commuting in Dublin Centre*

for Research in Management Learning and Development. (Working Paper Series). Dublin Ireland: Dublin City University Business School.

Penter, A. (2005). *Health and safety effects of crowding (T307): Research brief.* London, UK: Rail Safety Standards Board and Rail Passengers Council.

Pons, F., & Laroche, M. (2007). Cross-cultural differences in crowd assessment. *Journal of Business Research, 60*(3), 269-276.

Portway, C. (1993). *Indian odyssey: Around the subcontinent by public transport.* London, UK: Impact Books.

Punpuing, S., & Ross, H. (2001). Commuting: The human side of Bangkok's transport problems. *Cities, 18*(1), 43-50.

Ramkumar, J. (2012). Youth travelling in train dies after hitting post, *The Hindu*.

Reicher, S. (2002). The psychology of crowd dynamics. In M. A. Hogg & R. S. Tindale (Eds.), *Blackwell handbook of social psychology: Group processes* (pp. 182-207). Oxford, UK: Wiley-Blackwell.

Ryan, C., & Cessford, G. (2003). Developing a visitor satisfaction monitoring methodology: Quality gaps, crowding and some results. *Current Issues in Tourism, 6*(6), 457-507.

Sadana, R. (2010). On the Delhi Metro: An ethnographic view. *Economic and Political Weekly, 45*(46), 77-83.

Sadler, G., Lee, H. C., Lim, R., & Fullerton, J. (2010). Recruitment of hard-to-reach population subgroups via adaptions of the snowball sampling strategy. *Nursing and Health Sciences, 12*(3), 369-374.

Saegert, S. (1973). Crowding: Cognitive overload and behavioral constraint. *Environmental Design Research, 2*, 254-260.

Sehgal, P. C., & Surayya, T. (2011). Innovative strategic management: The case of Mumbai suburban railway system. *Vikalpa, 36*(1), 61-72.

Sharma, A., Rani, A., & Barwa, J. (2010). Traumatic asphyxial deaths due to an uncontrolled crowd at railway station: Two case reports. *Journal of Indian Academy of Forensic Medicine, 32*(3), 254-256.

Soenen, R. (2006). An anthropological account of ephemeral relationships on public transport. A contribution to the reflection on diversity. Paper presented at the *Understanding Diversity: Mapping and Measuring,* Milan, Italy.

Spradley, J., & McCurdy, D. (1972). *The cultural experience: Ethnography in complex society.* Prospect Heights, IL: Waveland Press.

Taber, N. (2010). Institutional ethnography, autoethnography, and narrative: An argument for incorporating multiple methodologies. *Qualitative Research, 10*(1), 5-25.

Thomas, J. A. P. K. (2009). *The social environment of public transport.* Victoria, Australia: Victoria University of Wellington.

Thompson, K. (2013). Qualitative research rules—Using qualitative and ethnographic methods to access the human dimensions of technology. In C. Bearman, A. Naweed, J. Dorrian, J. Rose, & D. Dawson (Eds.), *Evaluation of rail technology*: *A practical human factors guide.* Aldershot, UK: Ashgate.

Thompson, K., Hirsch, L., Mueller, S., Sharma-Brymer, V., Rainbird, S., Titchener, K., . . . Dawson, D. (2012). Riding a mile in their shoes: Understanding Australian metropolitan rail passenger perceptions and experiences of crowdedness using mixed-methods research. *Road & Transport Research Journal, 21*(2), 46-59.

Thompson, K., Hirsch, L., & Rainbird, S. (2011). *A socio-economic study of carriage and platform crowding in the Australian railway industry: Qualitative research summary.* Brisbane, Australia: CRC for Rail Innovation & University of South Australia.

Tirachini, A., Hensher, D., & Rose, J. (2013). Crowding in public transport systems: Effects on users, operation and implications for the estimation of demand. *Transportation*

Research Part A, 53, 36-52.

Tiwari, P., & Kawakami, T. (2001). Modes of commuting in Mumbai: A discrete choice analysis. *Review of Urban and Regional Development Studies, 13*(1), 34-45.

Toole, M., & Waldman, R. (1997). The public health aspects of complex emergencies and refugee situations. *Annual Review of Public Health, 18*(1), 283-312.

Walter, T. (2001). From cathedral to supermarket: Mourning, silence and solidarity. *The Sociological Review, 49*(4), 494-511.

Whiting, A., & Nakos, G. (2008). Functional density and its impact on retail satisfaction in cross-cultural contexts: Can crowded stores be a good thing for retailers? *Research, Teaching and Practice, 2*(1), 1-11.

Yamin, M. (2006). A framework for improved Hajj management and research. Paper presented at the *International Conference on Wireless Communications and Sensor Networks.*

Zola, É. (1889). *The girl who loved me. The attack on the mill and other stories.* [D. Parmée, Trans., 1984]. Oxford, UK: Oxford University Press.

Author Note

Lily Hirsch, PhD, is a social researcher with a focus on transport behavior and safety. Correspondence regarding this article can be addressed directly to: l.hirsch@cqu.edu.au.

Kirrilly Thompson, PhD, is a trained anthropologist and uses ethnographic methods to research the cultural dimensions of risk-perception and safety. She has particular interests in human-animal interactions, high risk interspecies activities, and equestrianism.

Danielle Every, PhD, is a social psychologist specialising in research on social inclusion and ethnicity, emergency management, and transport.

Article Citation

Hirsch, L., Thompson, K., & Every, D. (2017). Frustrations, fights, and friendships: The physical, emotional, and behavioural effects of high-density crowding on Mumbai's suburban rail passengers. *The Qualitative Report, 22*(2), 550-566. Retrieved from http://nsuworks.nova.edu/tqr/vol22/iss2/12