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Highlights

- Crowd members' behaviour differs from the same people's everyday behaviour
- Crowd behaviour involves conformity to shared norms and closer social relations
- These norms and more intimate relations impact the risk of infection transmission
- Interventions to mitigate risk must work with these crowd psychology processes

Adding a Psychological Dimension to Mass Gatherings Medicine

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Abstract

Objectives: Mass gatherings pose distinctive challenges for medicine. One neglected aspect of this is that the behaviour of people participating in such events is different from the behaviour they exhibit in their everyday lives. This paper seeks to describe a Social Psychological perspective on the processes shaping people's behaviour at mass gatherings and to explore how these are relevant for an understanding of the processes impacting on infection transmission.

Conclusions: It is inadequate to conceptualise mass gatherings as simply an aggregate of a large number of individuals. Rather, those present may conceptualise themselves in terms of a collective with a shared group identity. Thinking of oneself and others as members of a collective, changes one's behaviour. First, one behaves in terms of one's understanding of the norms associated with the group. Second, the relationships between group members become more trusting and supportive. Understanding these two behavioural changes is key to understanding how and why mass gathering participants may behave in ways that make them more or less vulnerable to infection transmission. Implications for health education interventions are discussed.

Keywords: Mass Gatherings, Infection Transmission, Social Identity, Norms

Mass Gatherings Medicine (MGM) has two key claims to distinctiveness. The first is one of scale: When things go wrong at mass events, emergency and medical services may be overwhelmed. That is, mass gatherings present unique problems in terms of medical provision [1]. A second concerns diversity: Many mass gatherings are global in terms of where people come from. People come from almost every nation on earth to events such as the Olympics, the football world cup or the Hajj. They congregate together, often in close physical proximity and for an extended period. Then they disperse back to their homes. In this way, there is a unique opportunity for infections that start off in one location to spread far and wide [2].

These are reasons enough for a distinctive research programme concerning mass events. However, there is a third form of distinctiveness, a further warrant for a distinctive MGM research agenda. This relates to what people *do* when they come together. Our argument is that one cannot treat mass gatherings simply in terms of the agglomeration of very large numbers of different people. Rather, being gathered together changes individuals and leads them to act in ways that are different from their everyday lives. These changes and the behaviours that arise from them can impact upon people's health and well-being in a variety of ways. Moreover, the behaviours adopted by crowd members may have direct relevance for the processes of infection transmission. In what follows, we explain the need for MGM research to pay attention to both i., the ways in which people change when they are part of a crowd, and ii., the ways in which these changes impact upon health-related practices and well-being.

The Psychology of the Mass

There is nothing new in saying people and their behaviour change in crowds: Reiwald (1949) amassed a compendium of such commentaries going back to Herodotus [3]. Of all analyses,

Le Bon's (1895) has been the most influential [4]. He argued that when people are 'submerged' in the mass, they lose their sense of individual identity and rationality, and as a consequence, simply follow any idea or emotion that is suggested to them. That is, crowd members' behaviour becomes less controlled, more irrational, and riskier than normal. These assumptions are particularly prominent when crushing incidents are described (such as that in Mina during the 2015 Hajj, when many hundred pilgrims died approaching the Jamaraat Bridge). Here, talk of irrational 'panic' and 'stampedes' is routine.

Recently, this popular account has been challenged. Certainly, crowd psychology is distinctive, but we now have an alternative understanding of just how it is distinctive [5, 6] which draws on the social identity perspective to group processes [7, 8]. The social identity approach to group processes is well-evidenced and maintains that when in a crowd, people do not lose identity but rather shift from a sense of personal identity (what makes me, as an individual, distinctive compared to other individuals) to a sense of social identity (what makes us, as a group, distinctive compared to other groups). That is, at mass gatherings (e.g., the Hajj, the football world cup, a music festival) one may start to think of oneself as a member of a collective with a shared identity (e.g., as Hajjis, as football fans, as festival-goers). The shift from an individual *personal* identification to a group-based *social* identification is not automatic or guaranteed (and some events may be characterised by factionalism and an absence of shared identity). Moreover, individuals at the same event may vary in the degree to which they conceive of themselves and other event-goers in terms of a shared group membership. However, to the degree that an individual does indeed identify with others (including those that they do not know personally) there are multiple consequences, two of which are particularly relevant for present purposes.

First, there is a 'normative shift': People change from acting in terms of their individual idiosyncratic beliefs and values to group-based beliefs and values. To continue with the examples listed above, they begin to act on the basis of what they believe it means to be a Hajji, a fan, or a festival-goer. The priorities they set and the goals they pursue depend upon what is valued by these various groups. Thus, what people do in any given crowd depends on the group and its norms.

Second, there is a 'relational shift': When people define themselves in terms of a social identity and see each-other as sharing the same social identity, the social relations between them become markedly more intimate. Thus, there is a growing body of evidence to show that group members are more cooperative, respectful, trusting, supportive and helpful towards each other [9, 10]. Moreover, people who share a group identity seek greater physical proximity [11] and feel more comfortable with crowding [12]. This sense of intimacy and support contributes to the intensively positive emotions that characterise many crowd events [13].

Crowds and health

These normative and relational processes can impact upon behaviour in a variety of ways.

Normative impacts; There are at least three ways in which group norms may impact health practices and hence health and well-being. The first is that the groups involved in mass gatherings may have norms which affect the overall value placed upon good health. For instance, in contexts where youth is a defining feature (e.g., music events), then values associated with being 'adventurous' and 'carefree' may encourage practices that expose one to risk e.g., unprotected sex [14]. At other events the norms may be rather different, but also result in lessened concern about protecting oneself. Thus, at the Hindu Magh Mela [15] and Kumbh Mela [16, 17] (Allahabad, north India) pilgrims strive to transcend the material in

order to devote themselves to a spiritual existence. The body counts for nothing. Indeed, the body is an impediment to achieving a state of grace. At the extreme, it can be viewed as auspicious to die while at the Mela. Moreover, it is normative to trust to faith as a protector against ill-health which can lead pilgrims to stop taking medicines and abstain from seeking medical help in cases of illness.

A second way in which group norms may affect health and well-being concerns the practices that are judged appropriate. For example, at the Magh Mela, pilgrims bathe in and sip water from the sacred (yet polluted) Ganges and take back plastic bottles of it for their families at home. This can have serious consequences for their health and has been shown to result in an increase in the number of cases of non-bloody diarrhoea [18]. At other events, the behaviours adopted by crowd members may increase the chances of spreading infection. For example, blowing vuvuzelas (plastic blowing horns often used at African and Asian sporting events) can facilitate the generation and dissemination of respiratory aerosols [19].

Third, there are norms which don't directly impact health and well-being but which may usurp everyday norms that do. In many cases these have to do with perseverance and endurance. These derive from the fact that, in many cases, group membership is enhanced or even dependent upon completing the collective event. A true football fan is one who goes to games come rain or shine [20]. Completion of the Magh Mela for twelve consecutive years provides special status and accords grace to Hindus. Finishing the Hajj at least once is a core goal for each and every faithful Muslim. As a consequence, people are reluctant to give up even if they are unwell, infectious, and continuing constitutes a threat both to themselves and to others. Indeed at some events (such as pilgrimages) suffering ill-health can be part of the pleasure of the event because completing one's pilgrimage in the face of ill-health may be understood as implying that the deities are potent and protective.

Together, these brief illustrations hint at the multiple ways in which collective norms can impact on individuals' behaviour in ways that may be consequential for their own and indeed others' health. These group norms and their consequences are complex. Just as some norms may encourage behaviours that increase individuals' vulnerability to infection transmission, so some norms may work to protect health. For example, at some events there may be normative prohibitions on some behaviours (e.g., concerning drug use) which then have knock-on effects of decreasing the likelihood of engaging in other behaviours (e.g., unprotected sex) that could facilitate infection transmission. Moreover, several health-relevant norms may simultaneously be of relevance in any given gathering. Inevitably, the nature of the norms that are relevant to crowd members' health-related behaviours will be specific to the event in question which means that the way in which norms operate in relation to health will be different for every mass gathering. In turn this means that an understanding of infection transmission opportunities etc. will depend upon a situated analysis for the event of interest.

Relational impacts: The multi-directional nature of the impacts of crowd processes on health is even more apparent when we consider the social relational changes in crowds. As noted earlier, a shared identity in a group leads to the provision of social support. Indeed, the expectation of such support [21] can make people feel better able to deal with stressful situations and thereby improve their well-being. Thus, group membership can improve both mental and physical well-being in stressful situations [22, 23], can improve the functioning of the elderly [24], protect against depression [25], and help protect self-esteem amongst young people negotiating barriers to individual development [26].

In our own research we have extended this work in two ways. First, we investigated whether such effects extend from small groups to mass gatherings. Second, we investigated

whether any such effects extended beyond the gathering itself to one's sense of physical and mental well-being back in everyday life.

Research conducted at the Magh Mela shows that participation in this month-long annual Hindu festival at the confluence of the sacred Ganges and Yamuna rivers impacts (positively) on self-assessed health [27]. Although the event is crowded (with several million attending on the most auspicious bathing days and many hundreds of thousands living on the Ganges floodplain for the whole month) participants in a longitudinal survey study (with a control sample of non-participants) reported better health after the event than before. Given the difficulties posed by the cold weather [28], the basic living conditions and diet, and the noise throughout the day [29], this is striking. Moreover, there is evidence that a sense of shared identity at the event was key: The more that participants at the event reported feeling a shared identity with their fellow pilgrims, the more they reported relational intimacy with others, and the greater the increase in self-assessed health from before to after he event [30]. Based on our survey data and on our interviews with pilgrims [15] we believe that any understanding of how the psychology of crowd membership shapes health-related behaviour and practice must pay regard to crowd members' understandings of both the norms associated with their shared identity and the relational intimacy that is engendered between crowd members. Thus, even if it is true that some people get ill through the harsh, crowded, noisy and unsanitary conditions of pilgrimage, the great majority (who do not) may report improved self-assessed health.

Yet, this same sense of connection with others can bring risks. Take for example the issue of disgust which is often seen as an evolved tendency which keeps us distant from the pathogens of others [31], particularly those of strangers, to which we may have less immunity [32]. Unsurprisingly, we are less disgusted by the excreta of intimates than that of aliens. For

instance, our own children's diapers offend us less than those of other children [33]. A little more surprisingly, perhaps, we have found that we are less disgusted by a sweaty t-shirt belonging to a stranger, when that person happens to be a member of a group with which we identify ourselves (a fellow student, say). Such a loss of disgust may be functional in terms of allowing families to live together and groups to cohere. Yet, at the same time, the lessening of disgust may be dysfunctional, leading us to drop our guard against forms of proximity and physical conduct that could facilitate infection transmission. This is where the social psychological analysis of crowd behaviour is especially relevant to issues of infectious diseases. Where people are less disgusted by the physical presence of others, and are even willing to tolerate their physical excreta, this may make possible a series of practices which expose people to the spread of disease. They may be slower to distance themselves from someone who is coughing and spluttering. They may be more willing to share food and drink, to loan handkerchiefs and to accept such loans in turn. Moreover, all this sharing may be facilitated by the sense of positive emotion and enhanced well-being that many experience at mass gatherings.

Once again, the process of lowered disgust may be general where people share identity in a mass gathering, but the impact will be specific, depending on what behaviours are relevant in the particular gathering of interest. Sharing bottles of beer or kissing strangers may be relevant at music festivals such as Glastonbury (UK) but not at the Hajj. Conversely, handling discarded face masks may be relevant at the Hajj but not at Glastonbury. What is needed is a mapping of the different sharing practices at different mass gatherings, followed by an analysis of their incidence. Such data could be incorporated into the analysis of people's contacts in mass gatherings and so add a neglected dimension to current models of infection transmission which tend to focus on contact frequency [34]. At the same time, in the same way that it is now well recognised how central such simple practices as hand-washing

can be to the spread of disease in hospitals and elsewhere [35] and that observance of such practices can be shaped by focused interventions [36], so, we suggest that i. practices of sharing may be central to the spread of disease in mass-gatherings; ii. reducing the danger of disease being spread in such gatherings is critically dependent upon influencing practices of sharing, and iii. the ability to achieve influence is dependent on understanding the collective psychology which underpins practices of sharing.

Conclusion: Using mass psychology to make a difference

Thus far we have sought to demonstrate, first, that mass psychology is critical to understanding the health impact of mass gatherings and, second, that the distinctiveness of mass psychology contributes to the distinctiveness of mass gatherings medicine. People think and act differently in mass events to the ways they think and act in much of day to day life. As a consequence, their health practices differ from everyday practices. This in turn shapes the ways in which people's health is affected and the ways in which ill-health spreads. If the sheer number and diversity of people who attend mass gatherings is relevant to the potential creation of non-local (or even global) pandemics, so is the way that social relations between people are transformed in the mass. In short, we hope to have shown that the addition of a psychological dimension is crucial for appreciating the distinctiveness of the challenges posed by mass gatherings.

The importance of addressing the psychological dimension in mass gatherings research is sometimes noted. However, in the absence of a clear empirically-based theoretical framework, the approach taken to conceptualising mass gathering psychology has been limited. Typically it has involved a taxonomy of different crowd 'moods' and their associated risks [37]. Moreover, and as hinted at earlier, it is often assumed that crowd psychology undermines judgement and leads individuals to behave in ways that make mass gatherings

inherently risky. This is particularly clear when the concept of 'panic' is used to describe crowd behaviour in disasters and emergencies [38]. Certainly there are accidents at mass gatherings (indeed, in the 2015 Hajj, not only was there a major crushing incident but earlier a crane had come tumbling down onto the Masjid al-Haram resulting in more than a hundred deaths). However, it is misguided to characterise crowd members' behaviour in such scenarios in terms of irrational panic. Where crushing occurs it is typically due to overcrowding caused by poor management rather than crowd members' irrationality, and in disasters crowd members routinely support and help each other [39].

The social identity perspective offers an alternative conceptualistion of the bases for crowd members' behaviour which avoids such talk of irrationality. It explains how social identity processes lead to meaningful behaviour that differs from that found when individuals conceptualise themselves in terms of their diverse personal identities. Moreover, it contributes insights with regards to interventions designed to improve mass gathering safety. For example, research at music festivals highlights the importance of social identity processes for crowd members' resilience in the face of risk, and makes the point that mass gathering organisers and staff should seek to use these process (rather than act in ways that intentionally or unintentionally subvert them) [40]. Indeed, a social identity approach emphasises the importance of officials having a real appreciation of the particular social identities associated with the mass gathering they are charged with planning and controlling: Without this they will forever misunderstand participants' behaviour and act in ways that alienate those they must work with [38]. Needless to say such understandings must also be incorporated into the modelling of crowd movement and flow [41].

Similar messages apply to attempts to bring about the behaviour change relevant to decreasing infection transmission. Medicine is a domain in which the point is not just to

understand the world but to change it. We analyse the way in which ill-health comes about in order to intervene and restore good health. If mass psychology contributes to such an analysis, how then can its inclusion within mass gatherings medicine inform our interventions? Will the normal techniques of health communication work in crowds? Or, does a distinctive crowd psychology point to the need for distinctive techniques?

Our answer to the latter question is 'yes, it does'. To explain, we need to add one more element to our sketch of mass psychology, above. If it is true that, in groups and crowds, people shift from personal to social identity, and that they seek to act on the basis of group norms, group values and group goals, so social influence is a function of being able to couch particular messages – in the present context, health-related messages – so that they are seen as a reflection of these norms values and goals [42, 43]. This depends upon two factors. The one relates to the source of the message: the more this source is seen as part of the group he or she is seeking to influence, the greater the potential influence. The other factor relates to the content of the message: the more this message is couched in identity-related terms, the more influence it is likely to achieve. Can one, for instance, draw on group norms to persuade people not to persevere when ill or else not to share resources that might put others at risk? Again, the answer lies in a deep knowledge of group culture alongside a knowledge of medicine (to understand what practices put people most at risk) and a knowledge of group psychology (to understand the social identity processes that encourage such practices) [44]. A successful mass gatherings medicine needs to be truly multi-disciplinary. If we have spent most of our time arguing for the relevance of psychology, this psychology further suggests the importance of historians, social anthropologists, and other cultural experts.

In sum, the principles of group influence suggest that the way that health messages are communicated, even where the message is constant, will need to be culturally sensitive

and therefore adapted according to the specific audience that is being targeted. With this in mind, we are now in a position to finish with two simple summary points. Understanding the operation of social identity processes in the crowd is the key to understanding the psychological dimension of health and well-being in mass gatherings, including infection transmission. Understanding the social identity of those attending any given mass gathering is the key to understanding how to communicate with them in order to protect their health.

Conflicts of interest

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