New study highlights difficulty in detecting threats in crowds

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Understanding and interpreting facially-expressed emotions such as happiness, sadness, fear or anger is something most of us take for granted. It is an evolutionary skill we've developed in order to survive - particularly in those situations where we perceive there is a potential threat.

But now a new study by Macquarie University cognitive neuroscience researcher, Dr Mark Williams, which has just been published in a special international conference edition of the European Journal of Neuroscience, reveals that in at least one important way, human evolution has failed to keep pace with changes in our lifestyles and the crowded urban environments in which we live.

Dr William's research suggests that while we can easily identify fearful facial expressions individually or in small groups of people, in large crowd situations, our brain's capacity to spot fear in faces is limited.

As with anger, we perceive fear as a threatening emotion, Dr Williams says.

"That's because you don't always know the source of the fear. You can't determine whether it's because of you, or whether it's some larger threat," he says.

Crucially, the findings have particular implications for security whenever large groups of people gather such as large sporting events,

concerts, or other mass gatherings, Dr Williams says.

"We've shown that there is a capacity limit in our ability to process multiple faces and therefore, detection of threatening faces may be limited. This has implications for the evolution of our threat detection systems and their ability to detect threats in crowds," he says.

"In large gatherings such as sporting events like the Olympics, other sports events, or even some kind of protest, things can escalate quickly, so it's important for police to be able to identify any kind of potential threat. This study shows, that as humans, there is a limit to what we can automatically perceive and process."

In order to conduct their study, Dr Williams and his team used functional magnetic resonance imaging or fMRI technology to measure activity in specific areas of the brain in real time to show which parts were active.

Study participants were shown multi-arrays of faces with happy, fearful and neutral expressions. They were instructed to identify the type of expression they saw. In the second part of the study, they then had to search for particular expressions.

The study revealed that participants had more difficulty and took longer to detect a fearful face than a happy face. The researchers also found more activity occurred in specific areas of the brain when they searched for a fearful face.

In contrast to previous studies, the research suggests that our brains have a limited automatic processing capacity when it comes to crowds of faces and detecting potentially threatening expressions.

The latest study builds on previous research conducted by Dr Williams

and his colleagues relating to angry expressions.

Source: Macquarie University