

## Investigating Storm Fears and Safety Behaviours Using Virtual Reality

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Storm phobia is described as an intense and persistent fear of severe weather (e.g., thunderstorms), and is classified under the natural environment type of specific phobias in the DSM-5 (American Psychiatric Association, 2013). The lifetime prevalence for storm phobia is estimated to be 2-3% (Curtis et al., 1998; Stinson et al. 2007). With the goal of extending the limited understanding of storm phobia, Nelson and Antony (2013) developed the Storm Fear Questionnaire (SFQ), a 15-item self-report questionnaire designed to assess the behavioural, cognitive, and affective elements associated with storm phobia. Scores on the SFQ were related to subjective anxiety during a virtual thunderstorm, and individuals with high storm fear scored significantly higher on the SFQ than those with low storm fear (Nelson et al., 2014). Limitations of the virtual reality (VR) validation component of this study include a small sample size and an outdated VR protocol that has since been updated to look more realistic. Additionally, limited research has examined the use of safety behaviours in storm phobia (Westefeld, 1996). A new measure of safety behaviours in storm phobia (Storm Phobia Safety Behaviour Scale, SPSBS, MacDonald et al., 2015) was recently developed, though the extent to which individuals with storm phobia actually use these behaviours remains unknown. The purpose of the present study was to replicate the VR findings of Nelson et al. (2013) with a larger sample and an updated VR thunderstorm protocol, and to extend the findings by exploring safety behaviors in people with high storm fear. It was hypothesized that individuals with high storm fear would report more subjective anxiety on the VR behavioral approach task (BAT), and score higher on the SFQ and the SPSBS than individuals with low storm fear. Forty individuals with either high ( $n = 20$ ) or low storm fear ( $n = 20$ ) experienced a thunderstorm in an 8-step BAT (“Virtually Better VR environments” software), which progressed from a sunny blue sky to a very dark sky with heavy rain, frequent lighting/thunder, and strong winds. Each step lasted 30 seconds, after which participants were asked to indicate their level of subjective anxiety on a scale from 0 to 100. Thirty-seven of 40 participants (92.5%) completed all 8 steps of the BAT. Three participants discontinued the BAT after step 4 (dark sky and heavy rain, light wind, and approaching thunder). After the BAT, participants completed the SFQ and the SBSBS. Hypotheses were supported. Mann-Whitney  $U$  tests revealed that participants in the high fear group reported significantly greater subjective anxiety on the BAT ( $Mdn = 82.5$ ) than participants in the low fear group ( $Mdn = 10$ ,  $U = 366.5$ ,  $p < .001$ ,  $r = .72$ ), and scored significantly higher on the SFQ and the SBSBS ( $Mdn = 36$ ,  $Mdn = 65.5$  respectively) than participants in the low fear group ( $Mdn = 4$ ,  $U = 380$ ,  $p < .001$ ,  $r = .77$ ;  $Mdn = 10$ ,  $U = 366.5$ ,  $p < .001$ ,  $r = .71$  respectively). These results replicate Nelson et al.’s (2013) findings, which suggest that the SFQ successfully differentiates between individuals high and low in storm fear. Results also provide preliminary evidence for the use of safety behaviors in storm phobia.