Dennis Relojo-Howell
Chief Editor
Psychreg, United Kingdom

Berny Wilkinson
Associate Editor
Webster University, United States

Mark Hoelterhoff
Associate Editor
University of Edinburgh, United Kingdom

Richard Marshall
Associate Editor
Webster University, United States

EDITORIAL BOARD MEMBERS

Andrew Lane
University of Wolverhampton, United Kingdom

Antoinette Schembri
University of Warwick, United Kingdom

Annita Ventouris
University of West London, United Kingdom

Clare Sarah Alley
University of Salford, United Kingdom

Dara Mojtahedi
University of Huddersfield, United Kingdom

Elizabeth C. Braithwaite
Manchester Metropolitan University
United Kingdom

Irina Roncaglia
National Autistic Society, United Kingdom

Jennifer Drabble
Sheffield Hallam University, United Kingdom

John A. Barry
University College London, United Kingdom

Laura Jenkins
Loughborough University, United Kingdom

Liliana Mata
Vasile Alecsandri University of Bacau, Romania

Nigel MacLennan
PsyPerform, United Kingdom

Petra Marcotti
University of Essex, United Kingdom

Rebecca Owens
University of Sunderland, United Kingdom

Stanislava Stoyanova
South-West University Neofit Rilski, Bulgaria

MANUSCRIPT ASSISTANTS

Graham Howell
Psychreg, United Kingdom

Rona dela Rosa
Polytechnic College of the City of Meycauayan, Philippines

pjppsyphys.org
ACKNOWLEDGEMENT

We would like to thank the excellent reviewers who have contributed their time and expertise to making this publication possible. Their voluntary efforts enable us to bring you quality articles in a timely manner.

Amir Singh
Management Development Institute of Singapore

Christie Chung
Mills College, United States

Deborah Powney
University of Central Lancashire, United Kingdom

Elsie Ramsey
Johns Hopkins University, United States

Evelyn Antony
University of Edinburgh, United Kingdom

Joel Petch
Kent and Medway Medical School
United Kingdom

Martin Graff
University of South Wales, United Kingdom

Maxwell Guttman
Mental Health Affairs, United States

Pranati Misurya
University of Sussex, United Kingdom

Robin Hadley
Independent Researcher
United Kingdom

Roopali Das
University of Delhi, India

ARTICLES

1 Is the link between stress and mental health now more pertinent than ever?
Elizabeth C. Braithwaite
Manchester Metropolitan University, United Kingdom

Social network use, social support, and mental health in adolescence: A systematic review
4 Sophia Fedorowicz¹, Elliott Phillips¹, & Elizabeth C. Braithwaite²
¹Staffordshire University, United Kingdom
²Manchester Metropolitan University, United Kingdom

Non-clinical autistic traits, perceived social support, and perceived stress: A preliminary study in the general population
23 Oliver Lack & Laura Jenkins
Loughborough University, United Kingdom

Social media-induced secondary traumatic stress: Can viewing news relating to knife crime via social media induce PTSD symptoms
38 Rosie M. M. Secker & Elizabeth C. Brathwaite
Manchester Metropolitan University

Mental health impacts of lockdown juxtaposed with lockdown effectiveness during the COVID-19 pandemic: A perspective piece
50 Jordan Howell
Independent Researcher
United States
Helping, sharing, and comforting behaviours in primary school children: The effects of year group and well-being on prosocial behaviour
64
Jenny Parker & Laura Jenkins
Loughborough University, United Kingdom

Is it all bad news? A transactional model of coping with stressors in elite performers
76
Irina Roncaglia
English National Ballet, United Kingdom

Another perspective on the relations of personality to suicides, suicide attempts, and suicide ideations
84
Stewart J.H. McCann
Cape Breton University, Canada

Film review of 'Swallow'
106
Betsy Edwards
University of Birmingham, United Kingdom
Is the link between stress and mental health now more pertinent than ever?

Elizabeth C. Braithwaite
Manchester Metropolitan University (United Kingdom)

Correspondence: e.braithwaite@mmu.ac.uk

The prevalence of poor mental health, including disorders such as depression and anxiety, has been steadily rising over the past two decades among all age groups, but most strikingly so among children (World Health Organization, 2017). Many factors contribute to the onset and maintenance of poor mental health, including genetics, physiology, neurological functioning, and environmental factors. In short, it is a very complicated picture. One key environmental factor which is consistently associated with poor mental health is perceived psychological stress (Burke et al., 2005; Thoits, 2010). That is, high levels of perceived stress are often associated with high levels of depression and anxiety. Although exactly how feelings of stress lead to the onset of poor mental health is, again, complicated, and includes biological, psychological, and social mechanisms and pathways. Investigation of the link between stress and mental health is a worthy pursuit, because targeting how an individual manages and copes with stress has clear implications for reducing the prevalence of mental health disorders, and their associated personal, social, and economic impacts. Following the onset of COVID-19 pandemic, there has been a surge in self-reported low mood, reduced well-being, and poor mental health (Salari et al., 2020); and once again this change is particularly striking among younger people (Salari et al., 2020). Thus, understanding the link between stress and mental health is perhaps more pertinent than ever.

I am delighted to have been invited to be the guest editor for this special issue of Psychreg Journal of Psychology (PJP) on stress and mental health. Much of my own research has focused on understanding the biopsychosocial mechanisms that occur following exposure to stress in early life, and how such pathways might manifest in mental health disorders over the life span. As an early career researcher, it has been very exciting to be involved in preparing the manuscripts for this issue, which bring together a range of methodologies and research from several different countries to examine the links between stress and mental health at different stages of the life course.

The first paper in the special issue is a systematic review of associations between social network use, social support, and mental health in adolescence. There have been multiple suggestions, and some supportive evidence (Keles et al., 2020), that the increase in use of social media in adolescents might contribute to the rise in mental health disorders seen in this age group. This systematic review takes a slightly different approach, and questions whether access to social support via social media might buffer against poor mental health. Eleven articles are reviewed, and the findings suggest that adolescents do actively use social media to access social support; and when this social support is perceived, there is a positive impact on mental health. Read more details on the findings in Social network use, social support, and mental health in adolescence: A systematic review.

Continuing on the theme of social support buffering against the effects of perceived stress on poor mental health, the second paper in this issue aimed to investigate whether sub-threshold autistic traits and perceived social support were associated with perceived stress in a general population sample of 322 participants from 32 different countries. In Non-clinical autistic traits, perceived social support, and perceived stress: A preliminary study in the general population, the authors report that the autistic traits of rigidity and pragmatic language were associated with perceived stress. Additionally, perceived social support from family was negatively associated with perceived stress, suggesting that support from family members may be particularly important in buffering against perceived stress and its effects.

The next paper, Social media-induced secondary traumatic stress: Can viewing news relating to knife crime
via social media induce PTSD symptoms, brings us back to the theme of social media and mental health. Building on evidence that engaging with news on the television regarding graphic topics such as terrorism and knife crime can induce secondary traumatic stress symptoms, this study investigated whether similar associations might exist when viewing knife crime on social media. A particularly important point here is that social media algorithms are designed to repeatedly show you similar content to what you have already viewed. Thus, just a single view of a news video regarding knife crime will likely result in exposure to many more videos of a similar nature. The authors report that a higher frequency of viewing knife crime via social media was associated with higher secondary traumatic stress symptoms. Additionally, this effect was moderated by residential location, with those participants living in towns and villages most at risk.

In a very interesting perspective piece, the next article considers whether the costs of national lockdowns aimed at halting the spread of the COVID-19 virus may outweigh the potential benefits, especially in cases where lockdowns have been implemented too late or too lightly (such as in the UK and US), and therefore case and death rates remained very high. This paper considers both the negative impacts of lockdowns on mental health, and also the potential positive outcomes, such as the improvement of stress management strategies which may help individuals to cope with life stressors following the COVID-19 pandemic. You can read more on this topic in Mental health impacts of lockdown juxtaposed with lockdown effectiveness during the COVID-19 pandemic: A perspective piece.

The next article examines the relationship between well-being and prosocial behaviour in young children aged 1–11. Prosocial behaviour is an important construct when considering mental health, especially in children, because those who demonstrate high levels of prosocial behaviour find it easier to make friends, and draw on social support from friendship groups to buffer against the effects of stress. In Helping, sharing, and comforting behaviours in primary school children: The effect of year group and well-being on prosocial behaviour, the authors report a developmental trajectory for prosocial behaviours, with those children with more positive well-being demonstrated more positive prosocial behaviours. Thus, the promotion of prosocial behaviours from a young age could be an effective method for combating the effects of stress on mental health.

Is it all bad news? A transactional model of coping with stress in elite performers is an interesting article which firstly reviews literature from sport and exercise psychology regarding what constitutes a stressor and how this can affect an individual. Second, a model of coping styles is presented to illustrate how different perceptions of stress and anxiety are managed individually and in groups. This focus on coping with stress in elite performers compliments an existing body of research into stress management and performance in other elite performers; including military, astronauts, and expeditioners. This is an important body of work from which we can draw inferences about stress and performance, and of course its link to mental health, in the general population.

The next article in the issue examines the relationship between personality and suicides, suicide attempts, and suicide ideations using state-level data from the US. Using data from 2008–09, relationships of suicide rates, attempts, plans, and thoughts to the Big Five personality variables and six sociodemographic variables (socioeconomic status, percent of White population, percent of urban population, unemployment rate, religiosity, and depression) were determined using sequential multiple regression analyses. Lower neuroticism and lower agreeableness were associated with higher suicide rates, but were unrelated to attempts, plans, or thoughts. You can read more details on the findings in Another perspective piece on the relations of personality to suicides, suicide attempts, and suicide ideations.

The final article in this issue is review of the film Swallow, a psychological thriller released in 2020. The film follows the story of a young woman who, under very stressful circumstances, develops a disorder known as pica; where she swallows increasingly dangerous and non-edible objects, including marbles, batteries, and drawing pins. Although a rare disorder, this has recently been at the forefront of UK media attention when a Lithuanian man was found to have more than one kilogram of mental nails, screws, nuts, and knives in his stomach (BBC, 2021). It is important to consider and review how mental health disorders, such as pica, are portrayed in the media; since such portrayals are often the source of misunderstandings and stigma within the general public.

In sum, this special issue brings together several perspectives on the link between stress and mental health across differing age groups, cultures, and contexts. I hope that you enjoy reading these nine very different articles. I have certainly enjoyed guest editing this issue.
REFERENCES

Social network sites (SNS) are a preferred method of communication for many young people. Therefore, it is of increasing importance to examine the possible benefits and detriments of SNS use to adolescent mental health. One possible benefit to adolescents who engage with SNS is increased access to social support from peers, which may promote positive mental health. We aimed to systematically review the existing research that has examined relationships between SNS use, social support and mental health in adolescents. The protocol for this review was registered with PROSPERO. A systematic literature search was conducted using PRISMA guidelines for studies published between 2003 and 2021 to identify research that examined the relationships between SNS use, social support, and mental health in adolescents. Study quality was appraised using the Mixed Methods Appraisal Tool. Eleven articles met the criteria for inclusion in the current review. Findings show that adolescents use SNS to access social support when experiencing stressful life events and perception of support is important for enabling a positive impact on mental health. SNS offer marginalised groups a way to access social support that may be lacking in their offline life. There is a clear difference between males and females in how adolescents use SNS and how active and passive SNS use impacts mental health. Included studies are mostly cross-sectional in design, and investigations into the differences between male and female adolescents experiences of using SNS were limited. Despite the widespread publication of the adverse impact of SNS on adolescent well-being, access to social support is a clear benefit with positive impacts on adolescent mental health. However, the benefits of perceived social support appear to be context-specific.

Keywords: adolescence; mental health; online behaviour; social network sites; social support
Adolescent mental health and emotional well-being is a major public health concern due to the associated societal and economic burden it represents (Department of Health, 2015). Additionally, adolescents who experience mental health difficulties are at higher risk of poor mental health throughout their lives (Kessler et al., 2007). Social networking sites (SNS), such as Facebook, Twitter, Instagram and Snapchat, have become the primary method for communication among adolescents, with 92% reporting daily engagement, and 24% reporting that they go online ‘almost constantly’, facilitated by three-quarters of adolescents owning smartphones (Lenhart, 2015). As SNS use continues to be a preferred method of communication for many young people, it is of increasing importance to examine the possible benefits and detriments of SNS use to mental health in this group. In this review, we define SNS as a site where users have a personal profile that is publicly visible and content which is continuously updated and generated primarily by those who have profiles (status updates, photographs, videos, etc.) or by third parties (e.g., advertisements; Verduyn et al., 2017).

Research focused on the impacts of social media use and adolescent mental health has produced mixed results, indicating that the relationship is not unidimensional. There are many reported positive impacts of SNS use, including social connectedness, access to information and diverse perspectives, increased self-esteem, safe identity experimentation, enabling relationship maintenance and providing distractions from difficult situations (Best et al., 2014; Nesi et al., 2019; Verduyn et al., 2017). Alternatively, reported negative impacts of SNS use on adolescents include upward social comparison which elicits feelings of envy and resentment, exposure to harm, social isolation, cyberbullying and increased risk of depression (Best et al., 2014; Nesi et al., 2019; Verduyn et al., 2017). There is evidence that SNS use directly increases depressive symptoms in adolescents (Kelly et al., 2018). However, the size of the association was reduced when potential confounding factors such as experiences of online harassment, poor sleep quantity and quality, low self-esteem and distorted body image were accounted for (Kelly et al., 2018). This demonstrates the importance of understanding the nuances of the relationship between SNS use and adolescent mental health, and highlights that a dichotomous approach may be inappropriate when considering guidelines for safe online behaviours.

Social support is frequently reported as a positive outcome associated with SNS use, often also referred to as ‘connectedness’ or ‘social capital’. Social support is defined as social interaction through which emotional concerns, instrumental aid and information are perceived, expressed or received (Tardy, 1985). It is a multidimensional construct that can have multiple sources (friends, family, partner) and multiple types (emotional, instrumental, informational, appraisal; Demaray & Malecki, 2002). Social support seeking has been identified as a coping strategy in dealing with various kinds of stressors for adolescents, reflecting a shift away from reliance on adults and towards self-reliance through seeking support from friends and peers (Zimmer-Gembeck & Skinner, 2011). This is important because perceived social support can play an important role in adjustment outcomes for adolescents, acting as a buffer against the detrimental effects of life stressors, and therefore promoting good mental health (Demaray & Malecki, 2002).

It is also possible, therefore, that perceptions of social support via SNS use may promote resilience to the potential harms of engagement with SNS for adolescents. This systematic review aims to review the existing literature that has examined the relationships between the use of SNS, social support and mental health in adolescents.

METHODS

Search strategy

PRISMA guidelines were followed to develop a protocol for the systematic review, which was pre-registered (Braithwaite et al., 2018). A systematic literature search was conducted for studies published between 2003 and 2021 to identify research that has examined the relationships between the use of social network sites, social support, and mental health in adolescents. Five databases were searched: PsycINFO, Cochrane Library, PubMed, Web of Science, and Scopus. The search terms used were ‘support’ AND ‘adolesc*’ OR ‘young adult’ OR ‘teen’ OR ‘youth’ OR ‘junior’ AND ‘social network’ OR ‘social media’ OR ‘Facebook’ OR ‘twitter’ OR ‘Instagram’ OR ‘snapchat’ OR ‘online’ AND ‘well-being’ OR ‘mental’ OR ‘dep*’ OR ‘anx*’ OR ‘distress’.

Inclusion

Following the initial database search, abstracts were screened for inclusion and potentially eligible articles were subjected to full-text screening. Articles were eligible for inclusion if they met the following criteria: peer-reviewed original studies (This included cohort studies, cross-sectional studies, prospective studies, longitudinal studies, and qualitative studies), have a measure of social network site use and a
measure for social support, and an outcome of symptoms of psychological distress; defined as a state of emotional suffering, such as anxiety and depression. The sample was required to be aged between 11–17 in any setting. We included studies of adolescents aged 11 or above in the review, as 11 is the earliest starting age that children would start high school, and their network of friends would expand. Reviews, non-peer reviewed studies, discussion papers, and editorials were not eligible for inclusion.

**Data extraction**

Study characteristics were extracted, including study design and location. Sample characteristics were extracted (sex, age, sample size, ethnicity), and the sampling strategy was used. Measures of psychological distress, SNS use, and social support were recorded, as well as any other measures used or concepts explored. How the data were analysed, the findings and the strengths and limitations of the studies were also recorded. Data were initially extracted by SF and EP separately. Any disagreements were discussed between SF and EP, using the protocol to reach a consensus on inclusion or exclusion.

**Quality assessment**

Study quality was appraised using the Mixed Methods Appraisal Tool (MMAT; Nha Hong et al., 2018). The MMAT consists of two screening questions and a further five questions suitable to the study design. An answer of 'Yes', 'No', or 'Can't tell' is noted for each question, and a percentage score is attributed to the study to denote the quality; the higher the percentage, the greater the quality. SF and EP appraised each study separately, and there was a 100% agreement between the authors. The MMAT score for each study can be found in Table 1.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Sample</th>
<th>Findings</th>
<th>MMAT Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frisson &amp; Eggermont</td>
<td>2015</td>
<td>910</td>
<td>Daily stress positively predicted adolescents seeking of social support through Facebook. When social support was sought through Facebook and subsequently perceived, social support seeking through Facebook decreased adolescents depressed mood. However, when social support was sought and not perceived, social support seeking through Facebook increased adolescent depressed mood.</td>
<td>80%</td>
</tr>
<tr>
<td>Frisson</td>
<td>2016</td>
<td>910</td>
<td>96.9% from Belgium, 1.8% from Europe, 2.1% from non-European country</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Sample</th>
<th>Findings</th>
<th>MMAT Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frisson &amp; Eggermont</td>
<td>2015</td>
<td>910</td>
<td>Daily stress positively predicted adolescents seeking of social support through Facebook. When social support was sought through Facebook and subsequently perceived, social support seeking through Facebook decreased adolescents depressed mood. However, when social support was sought and not perceived, social support seeking through Facebook increased adolescent depressed mood.</td>
<td>80%</td>
</tr>
<tr>
<td>Frisson</td>
<td>2016</td>
<td>910</td>
<td>96.9% from Belgium, 1.8% from Europe, 2.1% from non-European country</td>
<td>80%</td>
</tr>
</tbody>
</table>
There are no significant differences between boys and girls regarding their perceptions of social support and depressed mood. Active Facebook use was not a significant predictor of depressed mood. However, European girls reported significantly higher depressed mood.

It is important to note that using Facebook negatively impacts mood. When girls perceive Facebook as harmful, their social support decreases, which further contributes to their depressed mood. The decrease in social support due to Facebook use is more pronounced in European girls.
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Sample Size</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leung</td>
<td>2007</td>
<td>717</td>
<td>349.89</td>
<td>48.8</td>
<td>367.11</td>
<td>51.2</td>
<td>-</td>
<td>Range 8-18, M = 12.75, SD = 2.01, Not reported, Motives for internet use in relation to social compensation and mood management were significantly linked to stress experienced by participants. Regression results show that SNS was the most popular internet activity for participants to help reduce stress.</td>
</tr>
<tr>
<td>Wanget al.</td>
<td>2017</td>
<td>365</td>
<td>175.2</td>
<td>48</td>
<td>189.8</td>
<td>52</td>
<td>-</td>
<td>Range 14-18, M = 15.96, SD = 0.69, Not reported, Adolescents presenting authentically on SNS who perceive social support, will have a reduced tendency to ruminate, thereby reducing depression.</td>
</tr>
<tr>
<td>Valkenburg, Peter &amp; Schouten</td>
<td>2006</td>
<td>881</td>
<td>396.45</td>
<td>45</td>
<td>484.55</td>
<td>55</td>
<td>-</td>
<td>Range 10-19, M = 14.8, SD = 2.7, Not reported, Adolescent self-esteem was affected by the tone of the feedback they received on their SNS profiles. Positive feedback enhanced.</td>
</tr>
</tbody>
</table>

80%
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Sample Size</th>
<th>Mean Age</th>
<th>Median Age</th>
<th>Min Age</th>
<th>Max Age</th>
<th>Number of Participants</th>
<th>Participants' Ethnicity</th>
<th>Self-Esteem Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subrahmanyam &amp; Lin</td>
<td>2007</td>
<td>156</td>
<td>78</td>
<td>50</td>
<td>15</td>
<td>18.4</td>
<td>80%</td>
<td>40.4% White, 35.9% Asian, 15.4% Latino/Hispanic, 1.9% African American, 6.4% Other</td>
<td>Mean = 16.5, SD = Not reported</td>
<td>The total amount of time online or using emails did not affect self-esteem.</td>
</tr>
<tr>
<td>Donichi &amp; Moore</td>
<td>2004</td>
<td>336</td>
<td>151.64</td>
<td>34</td>
<td>15</td>
<td>21</td>
<td>100%</td>
<td>For 110 participants (adolescent group) M = 16.16, SD = 0.77</td>
<td>Not reported</td>
<td>Online friendships were associated with better well-being for girls, the opposite was true for boys. Higher numbers of regular online friendships amongst boys were related to lower self-esteem and greater loneliness. The number of offline friendships and their perceived importance positively predicted well-being for both boys and girls, while online friendship number and importance negatively</td>
</tr>
</tbody>
</table>
predicted well-being for boys only. Girls, around one-third of their time online engaged personal communication activities compared with boys who spend one quarter of their time doing this.

Most participants indicated that they used Instant Messaging (IM) to communicate with existing friends. Time spent using IM was positively related to the time spent with existing friends. The quality of friendships positively predicted well-being and acted as a first mediator between time spent with IM and well-being. Time spent with friends mediated the effect of time spent with IM on the quality of friendships.
<table>
<thead>
<tr>
<th>Best et al. 2015</th>
<th>Solke et al. 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey: 583</td>
<td>25</td>
</tr>
<tr>
<td>Focus group:</td>
<td></td>
</tr>
<tr>
<td>Range: 100</td>
<td>13</td>
</tr>
<tr>
<td>Range: Not</td>
<td>11</td>
</tr>
</tbody>
</table>
| Reported        | 44
| Not reported    | 1
| 100%            | 18              |

Participants described social media as a place where they could find emotional support. Participants described feeling validated by media content. Women who were particularly worried about public figures' endorses critical online content supporting transgender people affirmed gender identity affirming media as a helpful aspect of social media. All participants talked about relationships, including social media relationships or romantic relationships. Some said they felt supported by these relationships.
with others. There is a statistically significant positive relationship between the number of online friends and Warwick-Edinburgh mental wellbeing scale scores.

| Tseng et al | 2015 | 391 | 177.01 | 45.25 | 213.99 | 54.75 | - | - | - | - | - | - | Range 13–18 | Not Reported | Not reported | Communicating online is a risk factor for Self-injurious Thoughts and Behaviours (SITB) in boys but not in girls. Support from virtual social communities can have both positive and negative effects on adolescent SITB, with different effects by gender. Boys with less depressive symptoms may log on to social networking sites more frequently than those with more depressive symptoms. Findings indicate that the effect of online support may depend on what kinds of |
Identification of studies via databases

Publications identified through database searches (n = 4542)

Publications screened (n = 4542)

Publications assessed for eligibility full text (n = 28)

Publications included from database search (n = 5)

Identification of studies reference search of include papers

Publications identified during reference search of included papers from database search (n = 22)

Publications screened (n = 22)

Publications excluded (n = 23)
- Duplications (n = 9)
- Not suitable age or not reported (n = 9)
- Does not measure SNS or social support (n = 5)

Publications assessed for eligibility (n = 11)

Publications included from reference search (n = 6)

Publications included in paper (n = 11)

Publications excluded (n = 11)
- Abstract Screening (n = 11)

Publications excluded (n = 5)
- Not suitable age or not reported (n = 2)
- Does not measure SNS or social support (n = 3)
RESULTS

The initial database search identified 4542 articles for screening, and 4514 were excluded following title and abstract screening (summarised in Figure 1). Of the remaining 28 articles, 23 were excluded (9 = duplicates, 5 = not the correct age group, 9 = did not report a measure of SNS or social support), resulting in five articles to be included. The reference lists of the 28 articles that remained after the title and abstract screening were also screened, and 22 additional articles were identified. Of these 22, 11 were excluded following abstract screening, and five were excluded following full-text screening (2 = not the correct age group, 3 = did not report a measure of SNS or social support), leaving 6 for including the review. Thus, a total of 11 articles met the criteria for inclusion in the current review (Best et al., 2015; Donchi & Moore, 2004; Frison & Eggermont, 2015, 2016; Leung, 2007; Selkie et al., 2020; Subrahmanyan & Lin, 2006; Tseng & Yang, 2015; Valkenburg et al., 2006; Valkenburg & Peter, 2007; Wang et al., 2017). A summary of the sample characteristics and main findings are displayed in Table 1.

Characteristics of included studies

Studies were located in Belgium (Frison & Eggermont, 2015, 2016), Hong Kong (Leung, 2007), China (Wang et al., 2017), the Netherlands (Valkenburg et al., 2006; Valkenburg & Peter, 2007; Wang et al., 2017), US (Selkie et al., 2020; Subrahmanyan & Lin, 2006), Australia (Donchi & Moore, 2004), Northern Ireland (Best et al., 2015), and Taiwan (Tseng & Yang, 2015).

Ten of the included studies used surveys in a cross-sectional design (Best et al., 2015; Donchi & Moore! 2004; Frison & Eggermont, 2015, 2016; Leung, 2007; Subrahmanyan & Lin, 2006; Tseng & Yang, 2015; Valkenburg et al., 2006; Valkenburg & Peter, 2007; Wang et al., 2017) and one used semi-structured interviews in a qualitative design (Selkie et al., 2020).

Sample sizes varied between 1210 (Valkenburg & Peter, 2007) and 25 (Selkie et al., 2020). A variety of scales were used to measure psychological distress, social support, and other concepts such as stress and self-esteem. These include, but are not limited to, the Centre for Epidemiological Studies Depression Scale (Radloff, 1991), The Roberts revision of the UCLA Loneliness scale (Roberts et al., 1993), the UCLA Loneliness Scale Version 3 (Russell, 1996), the Warwick-Edinburgh mental well-being scale (Clark et al., 2011), the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988), the Social Support Scale for Children (Harter, 1985), subscales of Buhrmester’s Network of Relationship Inventory (Buhrmester, 1990), the 12-item Social Network Scale (Moody, 2001), the Adolescent Stress Questionnaire (Byrne et al., 2007) subscales taken from Manual for the self-perception profile for adolescents (Harter, 2012), as well as the Self-injurious Thoughts and Behaviours Interview (Nock et al., 2007).

Sample characteristics

There was a total of 5684 participants included in this review, which included: 51.33% (2917.6) male, 48.23% (2741.4) female, 0.22% (13) transfeminine, 0.19% (11) transfeminine, and 0.01% (1) non-binary. Ages ranged from 8 to 21 years old. Although the protocol stipulated a minimum age of 11 and maximum age of 17 for participants, Leung (2007) reported an age range of 8-18 and Donchi & Moore (2004) 15 to 21. It was not possible to separate the results by age, and as the majority of the sample falls within the range of the review, therefore we decided to include these studies in the review.

RESULTS SYNTHESIS

Stress

Two articles specifically discussed stress in relation to SNS use (Frison & Eggermont, 2015; Leung, 2007). Experiencing daily stress positively predicted adolescents seeking social support through Facebook, suggesting that adolescents turn to SNS for social support when experiencing stress (Frison & Eggermont, 2015). Additionally, Leung (2007) reported SNS as the most popular internet activity for participants to reduce stress. Thus, there is clear evidence that adolescents turn to SNS use when engaging with support seeking behaviours. However, because of the cross-sectional nature of the research, it is unclear whether seeking support from SNS positively impacts psychological distress. Given that adolescents are already utilising SNS as a source of social support, it would be prudent for future research to examine the potential impacts of these behaviours on mental health in a longitudinal design.
Perceived social support

Six articles discussed perceived social support from SNS use (Frison & Eggermont, 2015, 2016; Selkie et al., 2020; Subrahmanyam & Lin, 2006; Tseng & Yang, 2015; Wang et al., 2017). When participants sought social support through Facebook and subsequently perceived that support to be forthcoming, social support seeking through Facebook was associated with a decrease in depressed mood (Frison & Eggermont, 2015). Equally, when social support was sought by participants and not perceived, social support seeking through Facebook was associated with increased depressed mood (Frison & Eggermont, 2015). Similarly, Frison & Eggermont (2016) and Wang et al. (2017) also reported that perceived social support was associated with reduced depressed mood. Perceived social support was also associated with lower levels of rumination (Wang et al., 2017). The key characteristic of rumination is focusing on a negative emotional state, and consequently, rumination is positively associated with depression (Nolen-Hoeksema, 1991; Wang et al., 2017). Thus, the effects of perceived social support via SNS use on depressive symptoms may be mediated by rumination.

Wang et al. (2017) reported that authentic online self-presentation (presenting your true self online) was positively associated with perceived social support and negatively associated with depression and rumination. They hypothesised that adolescents presenting authentically on SNS could perceive social support, which reduces the tendency to ruminate and thereby reduces depression (Wang et al., 2017). Thus, how adolescents present themselves on SNS could impact how they perceive social support, with resultant impacts on their psychological state.

Some adolescents were having large numbers of online friends seemed to increase their perception of social support (Best et al., 2015). There is some evidence that how helpful or unhelpful social support is for an individual can depend on the kind of peers the support is coming from; for example, familial support had protective effects against non-suicidal self-injury, whereas support from significant others did not provide protective effects (Tseng & Yang, 2015). Adolescent self-esteem was affected only by the tone of the feedback they received on their profiles. Positive feedback enhanced adolescent self-esteem. However, the number of relationships did not impact social self-esteem (Valkenburg et al., 2006).

In a qualitative study exploring transgender adolescents’ use of social media for social support, Selkie et al. (2020) detailed facets of social support and how they related to SNS use for participants. This included emotional support, where participants described social media as a place where they could find other transgender people to interact with; appraisal support, where participants described feeling validated by transgender-related social media content; and informational support where participants commented on the ability to get information from other transgender people about gender as a helpful aspect of SNS (Selkie et al., 2020). Transgender adolescents are at increased risk of mental health difficulties due to family and peer rejection, stigma, internalised transphobia and many other factors (Connolly et al., 2016). In addition, transgender adolescents are less likely to seek mental health treatment due to discrimination and inadequate provider training (Guss et al., 2015). Thus, social support accessed via SNS may serve as a protective factor for transgender adolescents.

Type of SNS use

Two papers explored participant approaches to SNS use; active and passive use of Facebook (Frison & Eggermont, 2016) and the use of instant messaging, a function most SNS platforms have that allows people with accounts to communicate (Valkenburg & Peter, 2007) privately. Passive Facebook use, defined as viewing the content of other people’s profiles and monitoring their lives without engaging with them, was positively associated with depressed mood, especially in girls (Frison & Eggermont, 2016). Active Facebook use, defined as interacting with other Facebook users in a private (instant messaging) or public (status updating, commenting on others’ status) setting, was not associated with depressed mood in adolescents (Frison & Eggermont, 2016). Valkenburg & Peter (2007) examined the use of instant messaging and active private use of SNS and found that participants spent a greater amount of time using instant messaging than other forms of SNS use. Adolescents were mostly using instant messaging to communicate with existing friends (Valkenburg & Peter, 2007). Engaging in active Facebook users, either publicly or privately, positively predicted perceptions of online social support, subsequently decreasing adolescent depressed mood (Frison & Eggermont, 2016). Thus, it is possible that passive use of SNS by adolescents’ reduces perceptions of social support, with negative implications for depressed mood.
Sex differences

Three papers provided evidence of differences in how males and females experience SNS use (Donchi & Moore, 2004; Frison & Eggemont, 2016; Tseng & Yang, 2015). Adolescent females who engage in active Facebook use in public or private settings and perceive social support from other Facebook users benefit as perceived online social support negatively predicted depressed mood in females (Frison & Eggemont, 2016). There were no differences between adolescent males and females regarding passive Facebook use and perceived social support (Frison & Eggemont, 2016). Passive Facebook use predicted depressed mood in girls, and active public Facebook uses positively predicted boys’ depressed mood (Frison & Eggemont, 2016). In addition, Donchi & Moore (2004) found that online friendships were associated with better well-being for girls but not for boys. Higher numbers of regular online friendships amongst boys were related to lower self-esteem and greater loneliness (Donchi & Moore, 2004). Communicating using SNS was identified as a risk factor for self-injurious thoughts and behaviours in boys but not in girls (Tseng & Yang, 2015).

Online vs offline friends

Four papers discussed adolescent friendships dichotomised by online and offline friendships (Best et al., 2015; Donchi & Moore, 2004; Subrahmanyan & Lin, 2007; Valkenburg & Peter, 2007). Best et al. (2015) reported that the majority of participants used SNS to chat with offline friends (76.6%), whereas chatting with strangers (7.4%) was the least reported activity, and 64% stated they felt SNS strengthened their offline friendships. The amount of time spent online was not related to adolescents’ perceptions of support from significant others (Subrahmanyan & Lin, 2007). The number of friendships a person had offline, and the perceived importance of those friendships, positively predicted well-being for both boys and girls (Donchi & Moore, 2004). Alternatively, the number of online friendships and their importance negatively predicted well-being for boys (Donchi & Moore, 2004). The time spent using instant messaging was positively related to the time spent with existing friends offline, and the perceived quality of the friendships positively predicted well-being (Valkenburg & Peter, 2007). Although there is clearly a marked difference in how adolescents value offline vs online friendships, it is never suggested that online friends are unimportant, with some commenting that online friendships evoked feelings of belonging and togetherness (Best et al., 2015).

DISCUSSION

As SNS continue to be the preferred method of communication for adolescents, it is of increasing importance to examine the possible benefits and detriments of SNS use to adolescent mental health due to the associated risk for poor mental health in later life and the subsequent societal and economic burden it represents. Social support is frequently reported as a positive outcome associated with SNS use and the buffering effect it can have against stress and promoting positive mental health. This systematic review aimed to identify and synthesise literature that has examined SNS use, social support and mental health in adolescents. Several key findings are highlighted in the current review.

An important finding is that adolescents use SNS to access social support when experiencing stressful life events. In these circumstances, it appears that perceptions of social support via SNS are critical to enabling the positive impact of SNS use on mental health. SNS allow marginalised and isolated individuals to access support that might not otherwise be accessible through their offline family and friends. This is illustrated by Selkie et al. (2020), who examined transgender adolescent experiences of SNS use and additionally supported by Li & Peng (2019), who reported that international students experienced less acculturative stress when using SNS to communicate with host country nationals and perceived increased levels of social support (Li & Peng, 2019).

Different methods for engaging with SNS appear to have different impacts on adolescent mental health, particularly in terms of active or passive use. This supports existing research that details different types of internet activity associated with different outcomes for depressive symptoms in adolescents (Vidal et al., 2020). Using the internet for information searching was associated with lower depressive symptoms, however using the internet to communicate or play games for more than four hours a day was associated with greater-depression like symptoms (Vidal et al., 2020).

There are clear variations between genders in SNS use and the impact it has on adolescent mental health. This is consistent with research identifying gender differences in how adolescents engage with social media. However, the overall picture of these differences is not clear. Literature has highlighted that higher social media use at age ten was associated with declines in well-being for females but not males (Booker et al.,...
2018), whereas other results have shown that females on SNS give and receive greater social support than do males, which has an impact on well-being (Tifferet, 2020).

Adolescents use SNS to talk to and strengthen relationships with people they know offline rather than talking to strangers who are unknown to them. The included papers approach online and offline friends as two distinct groups. However, the findings do not support this dichotomy. In a study by O’Reilly et al. (2019), adolescent participants reported experiencing difficulty separating the two worlds of online and offline friendships: ‘You can’t just turn off your phone and leave it, ’cos like the two worlds are so like intertwined that if you’re not, you’re almost like a weird outcast’. Their research highlighted that SNS is not an addition to adolescent lives but a core part of peer relationships (O’Reilly et al., 2019).

All the studies included in the current review were carried out before the COVID-19 pandemic, and we do not know whether these findings would be the same during the pandemic. However, evidence suggests that social media can be a positive coping strategy for adolescents experiencing loneliness and anxiety during COVID-19 quarantine (Cauberghe et al., 2021).

**Evaluation of the reviewed studies**

Ten of the eleven included studies report using surveys to collect data; accordingly, there is a risk of self-report bias. In addition, the quality assessment indicated that most studies did not report their response rate, so we were unable to determine the risk of non-response bias. Causation cannot be inferred as the included studies all adopted a cross-sectional design.

There was considerable variation in how SNS use was measured in the included studies from two-items to measure support seeking through Facebook (Frison & Eggermont, 2015) to a combination of items from different established questionnaires addressing different aspects of the internet use and communication (Relojo-Howell, 2021; Tseng & Yang, 2015). This area of research would benefit from the development of objective and timely measures of SNS use specifically for adolescent samples that reflect the reality of how adolescents use SNS as social media platforms are continuously evolving.

There is a clear difference in the impact of public and private SNS use, including the use of instant messaging highlighted in the included papers. However, variation in the type of SNS use across different platforms is not explored. This is an important point to note as the average internet user holds between 8 and 9 social media accounts, and each platform serves a different purpose for the user (Statista, 2021; Verduyn et al., 2017). For example, platforms such as Facebook are primarily used for leisure (Verduyn et al., 2017). Similarly, the dominant mode of communication varies between platforms; for example, Twitter is mainly text-based, and Instagram is image-based, these differences are not explored in the literature with different types of SNS being generally combined, or the findings from research focussing on one platform being generalised across all SNS (Verduyn et al., 2017).

Mental health can be thought of as a continuum rather than being a strictly binary state of either poor or good mental health, particularly for individuals experiencing severe mental health problems undergoing prolonged treatment. For this reason, the lack of longitudinal work is a limitation of this review. How an individual engages with SNS can change over time; for example, Vidal et al. (2020) reported that adolescents’ use of SNS shifted from negative to positive while undergoing treatment for clinical depression. In addition, longitudinal research had found that using SNS over three years was not related to depressive symptoms in participants aged between 17 and 19 when the study began (Stockdale & Coyne, 2020).

There is some exploration of the difference between how adolescent males and females experience using SNS; however, there is no exploration of the non-binary, transmasculine or trans feminine in these studies. As Selkie et al. (2020) highlight, SNS are a means of developing a support system for non-cisgender individuals. As a group, these individuals are particularly vulnerable to mental distress due to factors such as increased experiences of stigma, isolation and abuse, and have a higher than average suicide prevalence (Connolly et al., 2016); therefore, this is an area in need of more research. Further to this, exploring why active public Facebook uses positively predicted boys’ depressed mood is of great importance. Qualitative research would be well placed to explore the differences in how adolescent boys and girls approach and experience SNS use, social support and the impact it has on mental health.

**Limitations of the current review**

There was an under-representation of SNS platforms such as Twitter and Instagram, as most of the research has focused on Facebook, which probably reflects the popularity of the platform and its longevity (15
years). A search of the grey literature was not a part of this systematic review. However, this may have produced more research that met the criteria for inclusion.

Conclusion

This review draws on the available evidence and highlights gaps in the literature that require additional research to further the understanding of the relationships between the use of social network sites, social support, and mental health in adolescents. Key findings from this review show that adolescents use SNS to access social support when experiencing stressful life events and perception of support is crucial. Although there is good quality research in this area, it is mostly cross-sectional, correlational, and limited in terms of exploration of the relationships between SNS use, social support and adolescent mental health. This research area will benefit greatly from qualitative research exploring adolescent perspectives and longitudinal work examining how SNS use, perceived social support and the impact on adolescent mental health changes over time.

REFERENCES


Tseng, F.-Y., & Yang, H.-J. (2015). Internet use and web communication networks, sources of social support, and forms of suicidal and non-suicidal self-injury among adolescents: Different patterns between


Non-clinical autistic traits, perceived social support and perceived stress: A preliminary study in the general population

Oliver Lack & Laura Jenkins
Loughborough University | United Kingdom

Correspondence: l.jenkins2@lboro.ac.uk

Previous research suggests individuals with autism spectrum disorder (ASD) report higher levels of perceived stress compared to individuals without a diagnosis of ASD. However, there is little research on the relationship between autistic traits and perceived stress, particularly within the general population/non-clinical samples. Research also suggests perceived social support may act as a buffer against perceived stress. However, the relationship between non-clinical/subthreshold autistic traits, perceived social support, and perceived stress has never been investigated. The current study aimed to assess if sub-threshold autistic traits and perceived social support predict perceived stress in the general population additionally if social support is potentially protective against perceived stress in a model alongside non-clinical autistic traits. A total of 322 participants from 32 different countries completed an online survey of three questionnaires: Perceived Stress Scale; Broad Autism Phenotype Questionnaire; and the Multidimensional Scale of Perceived Social Support. Data were analysed using multiple regression. Results indicated non-clinical autistic traits did predict perceived stress in the general population. However, not all traits acted as predictors, with only rigidity and pragmatic language difficulties predicting perceived stress. Additionally, alongside non-clinical autistic traits, only perceived social support from family negatively predicted perceived stress, indicating this may be the most important source of perceived social support alongside increasing non-clinical autistic traits to protect against perceived stress.

Keywords: autism; autistic traits; social support; stress
Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterised by deficits in social communication and interaction (e.g., difficulties in social relationships, sharing thoughts and feelings with others, use of language, and understanding emotion) and restricted/repetitive interests (e.g., ridged routines, affinity with having things the same, and focusing on special areas of interest such as trains; American Psychiatric Association, 2013) ASD has an estimated median global prevalence of 0.62% (Elshabagh et al., 2012).

Research demonstrates a strong evidence base for the role of genetics in ASD's aetiology, with meta-analyses finding extremely high concordance rates between monozygotic twins (Tick et al., 2016). This genetic influence has also been demonstrated by studies finding siblings and parents of autistic probands exhibit traits of autism, however, often falling below the clinical threshold for ASD diagnosis (e.g., Bailey et al., 1998; Constantino et al., 2006; Piven et al., 1997; for a review see Rubenstein & Chawla, 2018). Subthreshold traits have also been observed in the general population (Constantino & Todd, 2005; Ruzich et al., 2015). Researchers suggest this is evidence of a broader autism phenotype (BAP; Bailey et al., 1998; Ingersoll & Wainer, 2014; Sucksmith et al., 2011) and that autistic traits exist on a continuum within the population ranging in severity (Constantino & Todd, 2003; Robinson, Koenen, et al., 2011; Robinson, Munir, et al., 2011; Sasson et al., 2012).

Subthreshold autistic traits (referred to as non-clinical autistic traits throughout this paper) are associated with a range of psychosocial outcomes, including obsessive-compulsive disorder (Liew et al., 2015), anxiety and depression (Pilaio et al., 2016; Rosbrook & Whittingham, 2010), and mental well-being (Stimpson et al., 2021). However, the literature provides little information on the impact of non-clinical autistic traits on perceived stress (Pisula et al., 2015). Perceived stress is an individual's perception or appraisal of the amount of stress they have in their life and how well they can cope with such stress (Cohen et al., 1983; Phillips, 2013). Higher levels have been associated with multiple negative physical and mental health outcomes, including increased risk of smoking (Gallo et al., 2014; Ng & Jeffery, 2003; Stubbs et al., 2017), fat intake (Jair Vidal et al., 2018), Body Mass Index (BMI), waist circumference and visceral obesity (Tenk et al., 2018) coronary heart disease (Cohen et al., 2007; Katsarou et al., 2013) upper respiratory tract infections (Marsland et al., 2007), decreased levels of happiness (Denovan & Macaskill, 2017; Schliffrin & Nelson, 2010) and depression and suicidal behaviour (Hirsch et al., 2019; see also Bergdahl & Bergdahl, 2002; Cohen et al., 2007). Hence the study of perceived stress and its potential causes is important.

Research comparing clinical ASD samples to neurotypical controls finds individuals with ASD have higher levels of perceived stress (Bishop-Fitzpatrick et al., 2015, 2017; Hirvikoski & Blomqvist, 2015; McGillivray & Evert, 2018), suggesting a link between autism and increased perceived stress. However, there is little research on the relationship between autistic traits and perceived stress, particularly within the general population/non-clinical samples. To the author’s knowledge, only one Swedish study has investigated this relationship (Hirvikoski & Blomqvist, 2015) The researchers found autistic traits positively correlated with perceived stress in individuals diagnosed with ASD and those without a diagnosis in the general population. However, the study’s small (entirely Swedish) sample of 53 individuals, 25 of whom had been diagnosed with ASD, makes it hard to generalise such findings, particularly to a non-clinical population.

Additionally, researchers investigating autistic traits have suggested that autistic traits, whether in clinical or non-clinical populations, should be studied individually rather than using global scores as this potentially results in researchers ‘missing important information’ (Happé & Ronald, 2008, p. 299; see also Happé et al., 2006). A recent study by Stimpson et al. (2021) investigating the relationship between non-clinical autistic traits and mental well-being supports this argument, finding that when measuring non-clinical autistic traits individually, only aloofness predicted mental well-being.Had only global scores been used, such intriguing results may not have been discovered (Stimpson et al., 2021). The existing literature looking at perceived stress and autistic traits (Hirvikoski & Blomqvist, 2015), in addition to its small sample (including clinically diagnosed individuals) and cultural confounds, used global scores of autistic traits, meaning potentially important information was missed in understanding the relationship between different traits and perceived stress.

Cohen and Wilk’s (1985) early work on perceived stress and health proposed a stress-buffering hypothesis, which posited that social support might help prevent perceived stress, assisting in the psychological reappraisal of the circumstances or event one may perceive stressful. This hypothesis has a growing body of psychological and neurobiological evidence to support it (Ditzen & Heinrichs, 2014; Hostinar & Gunnar, 2015; Raffaeelli et al., 2013; Steptoe, 2000). There is potential for social support to act as a buffer against perceived stress alongside non-clinical autistic traits. Though not looking directly at autistic traits and perceived stress, studies find social support to be protective against negative psychosocial outcomes in clinical ASD samples and studies looking at non-clinical autistic traits within the general population. For example, Hedley et al. (2018) found social support to be protective against depression and suicide in a clinical ASD sample. Leader et al. (2021) found that social support predicted higher quality of life in a clinical ASD sample.
Similarly, Stimpson et al. (2021) in their research on non-clinical autistic traits and mental well-being in the general population, found social support to play a protective role against poorer mental well-being. Social support has been protective against other psychosocial outcomes in clinical ASD and non-clinical samples; there could be a potential protective relationship between social support and perceived stress when investigated in a model with non-clinical autistic traits. However, these variables have never been studied together. Thus, further research is needed.

Social support is a multifaceted construct that researchers have divided into two main categories, perceived and received support (e.g., Ditzen & Heinrichs, 2014; Goodwin & Hernandez Plaza, 2000; Helgeson, 1993; Norris & Kaniasty, 1996; Zimet et al., 1988). Perceived support is defined as a ‘qualitative measure’ (Zimet et al., 1988, p. 32) of social support (an assessment of the extent to which someone believes people will help them or how adequate the support provided is). Received support, on the other hand, can be defined as a ‘quantitative measure’ (Zimet et al., 1988, p. 32) of social support (the number of people you can rely on in a difficult situation). Multiple studies demonstrate that measures of perceived support are superior to measures of received support in predicting psychological outcomes (Zimet et al., 1988; see also Hefner & Eisenberg, 2009; McDowell & Serovich, 2007; Prati & Pietrantoni, 2010; Szkody & McKinney, 2019). Hence to assess social support alongside non-clinical autistic traits in relation to perceived stress, it would seem most appropriate to measure perceived social support. Similar to Happé and Ronald’s (2008) work on different autistic traits, it has been proposed that studies measuring just one source of social support may ‘lose important information’ (Zimet et al., 1988, p. 38), on how different sources of support (e.g., support from friends or family) interact with the assessed outcome. Thus, to sufficiently investigate the relationship between non-clinical autistic traits, perceived social support, and perceived stress, different sources of support should be measured.

Across the literature, gender differences vary. Zhang et al. (2018) and Colarossi (2001) suggest no gender differences between males and females upon how much perceived support they received. Neff and Karney (2005) did suggest gender differences between males and females upon how much perceived support they received. However, this was not in terms of perceived support but in how support changed to a partner’s responsiveness. Stronge et al. (2019) demonstrated that a partner (or significant other) could influence how social support was perceived. Perceived social support mediated the effects of having a partner and higher well-being, more strongly in men, suggesting that gender could influence perceived social support. It would be interesting to investigate this further to see if these gender differences were present in the current sample.

**Current study**

As there is no literature looking at non-clinical autistic traits and perceived social support as predictors of perceived stress in the general population, the current study aims to investigate whether non-clinical autistic traits and perceived social support predict perceived stress in the general population. Additionally, this study aims to see if perceived social support in a model with non-clinical autistic traits could be protective against perceived stress.

It was therefore hypothesised that:

\[ H_1: \text{All non-clinical autistic traits (aloofness, pragmatic language, and rigidity) will positively predict perceived stress.} \]

\[ H_2: \text{All sources of perceived social support (friends, family, and significant other) will negatively predict perceived stress.} \]

Due to the lack of literature investigating this topic area, the hypotheses did not specify which traits or sources of social support will predict perceived stress. However, based on Cohen and Wills’s (1985) stress-buffering hypothesis (proposing perceived social support will buffer against stress/perceived stress), it was hypothesised that all sources of perceived social support would negatively predict perceived stress.

**METHODS**

**Participants**

Participants were recruited from the general public using opportunity sampling through an online study advertisement available from December 2020–February 2021. A total of 325 participants completed the online survey. The study’s inclusion criteria were adults over 18 years without a previous autism diagnosis. This was included in the study advertisement and the participant information sheet. Participants who did not meet the inclusion criteria were advised not to participate. Before data analysis, three participants were removed from the data set, one for not meeting the minimum age criteria, the other two for missing multiple response items,
meaning the scoring of questionnaires was impossible. A final sample of 322 participants was used for the analysis. Using the participant to variable ratio outlined by Tabachnick and Fidell (2013), \( N \geq 50 + 8M \) (with \( M \) being the number of predictors), the current sample considerably exceeded the minimum number of participants required (98 = 50 + 8*6) for six predictor variables to achieve adequate power to run a regression analysis.

The sample consisted of 218 females (\( M = 30.20, SD = 12.140, \text{ Range} = 51.00 \)); 84 males (\( M = 28.61, SD = 12.099, \text{ Range} = 62.00 \)); 14 non-binary participants (\( M = 28.38, SD = 3.001, \text{ Range} = 62 \)); 1 questioning participant (\( M = 24 \)); 1 gender participant (\( M = 21 \)); and 4 participants who did not wish to comment on their gender (\( M = 24.20, SD = 7.340, \text{ Range} = 11.00 \)). The overall sample’s age ranged from 18-80 years old (\( M = 29.29, SD = 11.871 \)). Most participants (70.8%) were from the UK, \( n = 117 \) and the US, \( n = 111 \). However, responses came from all over the world, including Canada, \( n = 19 \) (5.9%); Australia, \( n = 13 \) (4.0%); Germany, \( n = 13 \) (4.0%); New Zealand, \( n = 5 \) (1.6%); Brazil, \( n = 4 \) (1.2%); Sweden, \( n = 4 \) (1.2%); the Netherlands, \( n = 4 \) (1.2%); and a host of other countries, \( n = 29 \) (9.0%). A full list is provided in Appendix 1. Three participants did not provide a country of questionnaire completion.

**Materials**

Broad Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007). The BAPQ is designed to measure autistic traits within the Broader Autism phenotype, and in the current study it was used to measure non-clinical autistic traits. The 36-item measure uses a 6-point Likert scale ranging from 1='very rarely' to 6='very often'. The questionnaire produces an overall score of an individual's non-clinical autistic traits, as well as three subscales of the traits; aloofness (questions 1, 5, 9, 12, 16, 18, 23, 25, 27, 28, 31, 36) defined as a 'lack of interest in or enjoyment of social interaction' (Hurley et al., 2007, p. 1681), pragmatic language (questions 2, 4, 7, 10, 11, 14, 17, 20, 21, 29, 32, 34) defined as difficulties in social communication, and finally, rigidity (questions 3, 6, 8, 13, 15, 19, 22, 24, 26, 30, 33, 35) defined as 'little interest in change or difficulty adjusting to change' (2007, p. 1681). Scores are calculated after 15 of the items (1, 3, 7, 9, 12, 15, 16, 19, 21, 23, 25, 28, 30, 34, 36) have been correctly reversed scored. Subscale scores are calculated by averaging the 12 items for that subscale. A total score is calculated by averaging all 36 items. Scores for both subscales and the overall measure should range from 1-6. Higher scores indicate an individual has higher levels of non-clinical autistic traits and is likely to be part of the Broader Autism Phenotype, thus nearer the clinical ASD threshold. During development, the measure demonstrated good internal consistency with high Cronbach alphas for its subscales (.94 for the aloof subscale, .85 for the pragmatic Language subscale and .91 for the rigid subscale) and the overall measure \( \alpha = .95 \) (Hurley et al., 2007). Additionally, the BAPQ has been found a more effective measure of autistic traits within the general population than other similar measures such as Baron-Cohen and colleagues Autism Quotient (Baron-Cohen et al., 2001), with the BAPQ showing higher internal consistency and greater validity in its factor structure (Ingersoll et al., 2011). In this study, good internal consistency was demonstrated for all BAPQ’s subscales; aloof \( \alpha = .92 \), pragmatic Language \( \alpha = .83 \) and rigidity \( \alpha = .90 \) and the overall measure \( \alpha = .93 \).

Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS was used to measure individual’s levels of perceived stress. The 14-item scale asks participants to rate the frequency of several thoughts and feelings within the last month using a five-point Likert scale ranging from 0 = ‘never’ to 4 = ‘very often’. Scores are calculated after reversing the seven positive items (4, 5, 6, 7, 9, 10, 13) on the scale. A total score is achieved by summing up the 14 scale items. Scores can range from 0 to 56. Higher scores indicate higher levels of perceived stress. During validation, the measure demonstrated reasonable internal consistency \( \alpha = .84 - .86 \) (Cohen et al., 1983). Furthermore, adequate internal consistency has been demonstrated across multiple international studies \( \alpha = > .7 \) (Lee, 2012). In this study, the PSS also demonstrated good internal consistency \( \alpha = .89 \).

Multi-Dimensional Scale of Perceived Social Support (MSPPS; Zimet et al., 1988). The MSPPS measures perceived social support from three different sources and was used to measure perceived social support in this study. The 12-item measure uses a seven-point Likert scale ranging from 1 = ‘very strongly disagree’ to 7 = ‘very strongly agree’. The measure has three sub-scales, each a different source of social support: the significant other subscale (items 1, 2, 5, & 10), family subscale (items 3, 4, 8, & 11), and friends subscale (items 6, 7, 9, & 12). The measure produces a score for each subscale using the sum of the four questions for that subscale, divided by 4 to produce a mean score. The MSPPS also produces an overall score of perceived social support calculated using the sum of the 12 items divided by 12. Higher scores indicate greater levels of perceived social support for the subscales and the overall measure. In previous literature (Zimet et al., 1988) the MSPPS demonstrated good internal consistency for its subscales (significant other \( \alpha = .91 \), family \( \alpha = .87 \) and friends \( \alpha = .85 \)) and for the whole scale \( \alpha = .88 \). In the current study the MSPPS demonstrated excellent internal
consistency for the entire scale $\alpha = .92$ and its subscales (significant other subscale $\alpha = .95$, family subscale $\alpha = .97$ and friend’s subscale $\alpha = .93$).

**Procedure**

The current study was advertised on Facebook and online forums, including Reddit, The Student Room, and the BPS Student Forum. Participants were asked to fill out an online three questionnaire survey. The survey was designed using the online survey management software Qualtrics and took around 15-20 minutes to complete. Questionnaires were presented in the same order as in the materials section detailed above. Demographic questions were asked at the beginning of the study, the four questions asked for participants’ age (in years), gender, and the country of questionnaire completion. This study was granted full ethical approval from Loughborough University’s Human Participants Sub-Committee (study reference 2020-2276-2365) and aligned with British Psychological Society Ethics Guidelines (2018). Therefore, before starting the questionnaire, participants were presented with information on the background and purpose of the study.

Participants were also required to provide informed consent before progressing on to questionnaire completion. After questionnaire completion, participants were presented with a debriefing page reiterating the study’s purpose and support resources should they have been affected by any material covered. Support resources were also provided to participants at the beginning of the study.

**Data analysis**

Data were analysed using the statistical analysis software IBM Statistical Package for the Social Sciences (SPSS, Version 27). Initial correlations were conducted using Two Tail Pearson’s correlations. As collected data were continuous Likert scale data, the main analysis was run using a single multiple linear regression employing the enter method. A significance value of 0.05 was adopted for all analyses.

**RESULTS**

**Gender difference analysis**

Seven independent samples $t$-tests were conducted to look at the effect of gender (being male or female) upon all of the variables studied. There were no gender differences present with the BAPQ subscales, MSPSS Friends Subscale, or the Perceived Stress Scale (all $p > .05$).

However, gender differences were found in the MSPSS Significant Other Subscale, $t(300) = 4.552$, $p < .001$. Females had a higher significant other social support score ($M = 5.63$, $SD = 1.54$) than males ($M = 4.63$, $SD = 2.08$). Gender differences were also found in the MSPSS Family Subscale, $t(300) = 2.949$, $p = .003$. Females had a higher family support score ($M = 4.96$, $SD = 1.53$) than males ($M = 4.38$, $SD = 1.57$). See Table 1 for the descriptive statistics.

| Table 1 |
| Descriptive Statistics: Mean (and Standard Deviation) of Perceived Stress Scores, All Subscales of the Multi-Dimensional Scale of Perceived Social Support Scale, and all Three Non-Clinical Autistic Traits |

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Stress Scale</td>
<td>28.00 (11.72)</td>
<td>28.81 (8.51)</td>
</tr>
<tr>
<td>MSPSS Significant Other Subscale</td>
<td>4.63 (2.07)</td>
<td>5.63 (1.54)</td>
</tr>
<tr>
<td>MSPSS Family Subscale</td>
<td>4.38 (1.57)</td>
<td>4.96 (1.53)</td>
</tr>
<tr>
<td>MSPSS Friends Subscale</td>
<td>4.85 (1.58)</td>
<td>5.04 (1.47)</td>
</tr>
<tr>
<td>BAPQ Aloof Subscale</td>
<td>3.51 (1.06)</td>
<td>3.41 (0.96)</td>
</tr>
<tr>
<td>BAPQ Pragmatic Language Subscale</td>
<td>3.14 (0.82)</td>
<td>3.14 (0.76)</td>
</tr>
<tr>
<td>BAPQ Rigid Subscale</td>
<td>3.27 (0.83)</td>
<td>3.39 (0.91)</td>
</tr>
</tbody>
</table>

*Note*: MSPSS: Multidimensional Scale of Perceived Social Support; BAPQ: Broad Autism Phenotype Questionnaire

**Assumptions**

All Tolerance values were above .50, and all VIF values were lower than 10, suggesting no violations of multicollinearity assumptions. The Durbin-Watson test produced a value of 2.013 within the suggested range of 1–3 (Field, 2018), indicating there was no autocorrelation in the data; thus, the assumption of independent
errors was not violated. All Cooks Distance values were smaller than 1, suggesting no individual cases were inordinately influencing the model. No issues were found with normality, heteroscedasticity, or linearity in the data, with an adequate distribution of residuals in the scatter plot and residuals falling closely to the line of the P-P plot. As all assumptions had been met a regression analysis was carried out.

**Descriptive statistics**

Descriptive statistics for all predictors and outcome variables are displayed in Table 2.

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive Statistics: Mean (and Standard Deviation) of Perceived Stress Scores, All Subscales of the Multi-Dimensional Scale of Perceived Social Support Scale, and all Three Non-Clinical Autism Traits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Stress Scale</td>
<td>28.73</td>
<td>9.47</td>
</tr>
<tr>
<td>MSPSS Significant Other Subscale</td>
<td>5.36</td>
<td>1.75</td>
</tr>
<tr>
<td>MSPSS Family Subscale</td>
<td>4.78</td>
<td>1.57</td>
</tr>
<tr>
<td>MSPSS Friends Subscale</td>
<td>4.99</td>
<td>1.50</td>
</tr>
<tr>
<td>BAPQ Aloof Subscale</td>
<td>3.46</td>
<td>1.00</td>
</tr>
<tr>
<td>BAPQ Pragmatic Language Subscale</td>
<td>3.09</td>
<td>0.78</td>
</tr>
<tr>
<td>BAPQ Rigid Subscale</td>
<td>3.37</td>
<td>0.90</td>
</tr>
</tbody>
</table>

*Note: MSPSS: Multidimensional Scale of Perceived Social Support; BAPQ: Broad Autism Phenotype Questionnaire*

**Correlations**

Two-tailed Pearson’s correlations (Table 2) revealed all predictor variables were significantly correlated with the outcome variable perceived stress (p < .001). All non-clinical autism traits were significantly positively correlated with perceived stress (aloof r = .335, p < .001, pragmatic language r = .461, p < .001 and rigidity r = .369, p < .001). Pragmatic language showed the strongest correlation of the three traits demonstrating a moderate correlation (r = .461). All sources of social support were significantly negatively correlated with perceived stress (MSPSS Significant other subscale r = -.178, p = .001, MSPSS Family subscale r = -.335, p < .001 and MSPSS Friends subscale r = -.236, p < .001). The correlations between predictor variables were weak to moderate (the strongest correlation observed was between the non-clinical autism traits aloofness and pragmatic language, r = .579, p < .001), further demonstrating the independence of the predictors and that no violation of multicollinearity assumptions had occurred. The significant correlations between the predictor variables and the outcome variable further highlighted a regression analysis would be the appropriate next step in analysing the data. It should be noted that all non-clinical autism traits and all sources of perceived social support were significantly negatively correlated.

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Matrix of All Predictor Variables: Non-Clinical Autism Traits, Sources of Perceived Social Support, and the Outcome Variable of Perceived Stress</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. MSPSS Significant Other</td>
<td>-.178**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. MSPSS Family</td>
<td>-.335***</td>
<td>.423***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. MSPSS Friends</td>
<td>-.236***</td>
<td>.498***</td>
<td>.459***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. BAPQ Aloof</td>
<td>.335***</td>
<td>-.213***</td>
<td>-.396***</td>
<td>-.461***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. BAPQ Pragmatic Language</td>
<td>.461***</td>
<td>-.172**</td>
<td>-.365***</td>
<td>-.306***</td>
<td>.579***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. BAPQ Rigid</td>
<td>.369***</td>
<td>-.142*</td>
<td>-.244***</td>
<td>-.309***</td>
<td>.561***</td>
<td>.513***</td>
<td></td>
</tr>
</tbody>
</table>

*Note: PSS: Perceived Stress Scale; MSPSS: Multidimensional Scale of Perceived Social Support; BAPQ: Broad Autism Phenotype Questionnaire

*p < .05; **p < .01; ***p < .001*

**Regression analysis**
A multiple regression was carried out to assess if non-clinical autistic traits and social support predict perceived stress in the general population. See Table 4 for the full list of regression statistics. The overall regression model containing the three non-clinical autistic traits (aloofness, pragmatic language, and rigidity) and three sources of perceived social support (family, friends, and significant other) was a significant predictor of perceived stress, \( R^2 = 0.635 \), \( p < .001 \). The model explained 25.2% of the variance in perceived stress scores (adjusted \( R^2 = .252 \)). In the model, only two non-clinical autistic traits positively predicted perceived stress, pragmatic language (\( \beta = .317, p < .001 \)) and rigidity (\( \beta = .170, p = .006 \)). Indicating that as pragmatic language and rigidity increased, perceived stress scores also increased. Of the social support variables in the model, only perceived social support from family was a significant negative predictor of perceived stress (\( \beta = -.171, p = .004 \)), indicating that increasing perceived social support from family sources predicted lower perceived stress scores.

Table 4
Regression Table of the Relationship Between the Predictors Non-Clinical Autistic Traits, Perceived Social Support, and the Outcome Variable Perceived Stress

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>( \beta )</th>
<th>( t )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>17.295</td>
<td>.4604</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>MSPSS Significant Other</td>
<td>-.158</td>
<td>-.029</td>
<td>-.508</td>
<td>.612</td>
</tr>
<tr>
<td>MSPSS Family</td>
<td>-.1033</td>
<td>-.171</td>
<td>-2.912</td>
<td>.004</td>
</tr>
<tr>
<td>MSPSS Friends</td>
<td>-.015</td>
<td>-.002</td>
<td>-.038</td>
<td>.970</td>
</tr>
<tr>
<td>BAPQ Aloof</td>
<td>-.182</td>
<td>-.019</td>
<td>-.282</td>
<td>.788</td>
</tr>
<tr>
<td>BAPQ Pragmatic Language</td>
<td>3.844</td>
<td>.317</td>
<td>5.054</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>BAPQ Rigid</td>
<td>1.784</td>
<td>.170</td>
<td>2.794</td>
<td>.006</td>
</tr>
</tbody>
</table>

Note: MSPSS: Multidimensional Scale of Perceived Social Support; BAPQ: Broad Autism Phenotype Questionnaire

**DISCUSSION**

**Overview of aims and results**

The current study aimed to assess whether non-clinical autistic traits and perceived social support predict perceived stress in the general population and if perceived social support in a model with non-clinical autistic traits could potentially be protective against perceived stress. To reach these aims, two hypotheses were derived. \( H_1 \): All non-clinical autistic traits (aloofness, pragmatic language, and rigidity) will positively predict perceived stress. \( H_2 \): All sources of perceived social support (friends, family, and significant other) will negatively predict perceived stress. Due to the lack of literature directly investigating this topic area, the hypotheses did not specify which traits or sources of social support would significantly predict perceived stress. However, based on Cohen & Wills’s (1985) stress-buffering hypothesis that perceived social support would buffer against perceived stress, it was hypothesised that all forms of perceived social support would negatively predict perceived stress.

The first hypothesis that all three non-clinical autistic traits (aloofness, pragmatic language, and rigidity) will positively predict perceived stress was not supported. The current study found that only two of the three non-clinical autistic traits (pragmatic language and rigidity) predicted perceived stress. This would indicate that in the general population, higher levels of the non-clinical autistic traits, pragmatic language (difficulties in social communication), and rigidity (difficulty adjusting to change) were associated with higher levels of perceived stress, while aloofness (a disinterest in socialising) was not. This partially supports the findings of Hirvikoski and Blomqvist (2015), who observed that increasing global autistic traits in a small mixed sample of individuals (ASD and neurotypical participants) were associated with increased levels of perceived stress. However, the current study through measurement of individual traits rather than global scores produced the novel finding that not all non-clinical autistic traits predict perceived stress within the general population.

The findings that rigidity and pragmatic language difficulties were predictors of perceived stress were not unsurprising. For instance, Wainer et al. (2011) examined the structure of the broad autism phenotype and found higher rigidity to be associated with higher distress and anxiety. Furthermore, Morrison et al. (2018) found that individuals with high non-clinical autistic traits had similarly restricted (rigid) interests to individuals with ASD, and when unable to continue their interests, experienced heightened “resistance and distress” (Morrison et al., 2018, p. 31). It seems the inability to adjust to change/rigidity and its association with distress and anxiety is associated with perceived stress, as demonstrated by the current study. Additionally, studies
though not looking at autistic traits, have found difficulties in social communication ability, similar to pragmatist language difficulties, are associated with increased perceived stress (Segin, 2019), while increased social communication ability, with lower levels of perceived stress (Segin et al., 2007).

The finding that aloofness was not a significant predictor of perceived stress was unexpected. Especially as Stimpson et al. (2021) recently found aloofness to negatively predict mental well-being (a measure of positive mental health). However, Stice and Lavner (2019), when investigating non-clinical autistic traits and internalising symptoms (anxiety and depression), found only rigidity and pragmatic language difficulties were direct predictors, while aloofness was only an indirect predictor when mediated by social connectedness and loneliness. Therefore, it is possible that, like Stice and Lavner’s (2019) findings with internalising symptoms, other mediating variables may be needed to unpick any possible relationships between aloofness and perceived stress, especially as initial correlations revealed a significant positive correlation between aloofness and perceived stress.

The second hypothesis that all sources of perceived social support (friends, family, and significant other) will negatively predict perceived stress was also not supported. In the current sample, only perceived social support from family was a significant negative predictor of perceived stress, indicating that in a model alongside the three non-clinical autistic traits, only perceived social support from family members was associated with less perceived stress. On the flip side, this finding suggests lower perceived social support from family members alongside increasing non-clinical autistic traits is associated with higher perceived stress. Together, this indicates a potential protective role of perceived social support from family members alongside increasing non-clinical autistic traits against perceived stress, thus possibly acting as a buffer line in with Cohen and Wills (1985) stress-buffering hypothesis, while support from friends and significant others is possibly not as important in protecting against perceived stress. In clinical ASD samples, some studies show perceived support from family to be the most beneficial for other psychological outcomes such as quality of life (Leader et al., 2021), so there is potential this may be the same for perceived stress alongside non-clinical autistic traits in the general population. However, the current study was conducted during the height of the COVID-19 pandemic so this finding may be a result of specific temporal influences. Other studies investigating perceived stress and sources of perceived social support during this time found in regression models only perceived support from family members acted as a significant negative predictor of perceived stress (Özer et al., 2021). Additionally, for adults, during this period, support from family has been reported as the most important for general mental health (Li et al., 2021) indicating the results in this study regarding perceived social support may be better explained within the context of the pandemic.

Another important finding regarding perceived social support and non-clinical autistic traits was that initial correlations revealed all non-clinical autistic traits were negatively correlated with all sources of perceived social support (see Table 2). This would indicate increasing non-clinical autistic traits may be associated with lower levels of perceived social support. Previous literature found associations between increased autism symptom severity in ASD populations and lower levels of perceived social support (Alvarez-Fernandez et al., 2017). The current study suggests these findings may continue into non-clinical populations. Furthermore, increasing autistic traits in the general population have been associated with decreased social network size (Lei et al., 2019) and decreased social connectedness (Stice & Lavner, 2019), suggesting that the current findings align with existing literature. Future researchers may wish to assess perceived social support as a mediating variable between non-clinical autistic traits and perceived stress.

One other finding that merits comment is that like Stimpson et al. (2021), this study demonstrated (through only moderate correlations between aloofness, rigidity and pragmatic language), support for the proposal that autistic traits may exist as fractional/indirect entities as suggested by Happé et al. (2006) and Happé and Ronald (2008), and rather than viewing these traits as unidimensional constructs, traits should be measured individually.

Gender differences were presented in the current investigation but only in terms of how males and females view the social support from their significant other and family. Females indicated that they had more support than males from both family and their significant other. In general, females undertake more caregiving roles (Shumaker & Hill, 1991), therefore this can mean that females see where and how they have the support in comparison to males who may not have as many caring responsibilities. Results can also be considered in terms of the type of supported offered by family and the significant other. Matud et al. (2003) provided gender differences in terms of the type of support needed. Males often need more practical support (which can be given from anyone) whereas females need more emotional support provided from the key individuals in their lives such as family or partners. While gender differences were presented, these must be taken with caution as there was a large difference in the sample size (84 males vs 218 females). Current results are similar to the previous research in suggesting such differences (e.g., Neff & Karney, 2005, and Stronge et al., 2019), however
the previous literature did investigate social support from family, friends and a significant other in relation to other concepts such as well-being. This is one thing that the current investigation did not investigate or control for.

Limitations

The current findings should be viewed considering several limitations. Firstly, the cross-sectional correlational design means causality cannot be inferred. Additionally, the study used a questionnaire design, employing self-report measures. This type of design can be subject to social desirability bias (van de Mortel, 2008), however, the survey was anonymised, and the questionnaires employed reverse scoring, recommended procedural techniques to reduce response bias (Nederhof, 1985; Podskakoff et al., 2003; Ray, 1983). In addition, the current sample was predominantly female. Gender differences have been demonstrated in the reporting of non-clinical autistic traits, with males reporting higher levels of traits than females (Hurley et al., 2007; Ruzich et al., 2015). Moreover, males report higher levels of aloofness (Klusek et al., 2014). A greater gender balance in the current sample may have presented different results regarding aloofness as a predictor of perceived stress.

Additionally, having diagnosed Attention Deficit Hyperactivity Disorder (ADHD) was not used as an exclusion criterion in this study. Correlations have been found between autistic traits and ADHD symptoms (Panagiotidi et al., 2017; Riglin et al., 2021); therefore, potential overlap could have influenced participants’ responses to questionnaire items. However, ADHD traits also occur in non-clinical samples (Panagiotidi et al., 2017); therefore, unless actively screened case by case, this is a difficult confound to control for. Personality variables were also not controlled for, and studies demonstrate correlations between autistic traits and personality variables such as neuroticism (Stimpson et al., 2021). Attempts to control for these variables may give greater clarity to the explained variance in future research.

Arguably the greatest limitation of the current study is the possibility of significant temporal confounds arising from collecting data on psychosocial outcomes during a global pandemic. In addition to the aforementioned effects on sources of perceived social support, research suggests the impact of national lockdowns and the global pandemic has decreased mental well-being and increased levels of anxiety and perceived stress (Limcaoco et al., 2020; Savage et al., 2020). This may have tainted the results through participants recorded levels of perceived stress being influenced by the pandemic. Therefore, current results should be viewed through the lens of the pandemic and future studies should try and replicate these findings outside such adverse circumstances.

The current study also does not consider factors such as mental health issues and the influence of subsequent medication to treat such issues. Research has suggested that anxiety and depression can influence how people perceive the amount of social support they are receiving and can also be impacted by any medication taken to alleviate the symptoms of mental health conditions (Beehr & McGrath, 1992; Relojo-Howell & Stoyanova, 2019; Sinokki et al., 2009; Zhou et al., 2013). The current study did not control for any effects of mental health conditions or any effects of medication, therefore a consideration of this would be needed in future.

Despite these limitations, the current study had many strengths. For example, this was the first study to investigate the role of sub-threshold autistic traits and perceived social support on perceived stress in the general population. The study used reliable and previously validated measures, which demonstrated good to excellent reliability in the current study. Furthermore, using an online platform to collect data may have reduced social desirability as previously discussed and allowed the survey to reach participants from 32 different countries (see Appendix 1), suggesting specific cultural confounds may not limit this study. However, the study was only available to English speaking participants, future research should assess if the current study's findings are replicable in non-English speaking populations.

Future research and applications

Future research should also attempt to assess different variables that may mediate the relationship between non-clinical autistic traits and perceived stress in the general population and unpick the different associations found within the current study, possibly allowing for explanation of mechanism (Ogwuche et al., 2020). For example, personality has been shown to be linked with non-clinical autistic traits and social support in terms of how it is perceived and given (Stimpson et al., 2021).

As the current investigation did not control for any form of mental health condition, future research could investigate this in more detail. Individuals who have anxiety or depression (Zhou et al., 2013) may have
different perceptions of social support than clinically healthy individuals. This is very similar in consideration of mediation. In future, researchers could add medication and/or mental health conditions as part of exclusion criteria or they could compare individuals with and without such conditions to look at any influence of anxiety and depression.

Additionally, future studies may wish to control for potential confounds such as personality traits, to gain greater insights into the relationships between non-clinical autistic traits, perceived social support, and perceived stress. Research has suggested a strong link between lower levels of neuroticism and higher levels of agreeableness and conscientiousness (Barańczuk, 2019), therefore this would be of interest to investigate in future.

In summary, the current study suggests within the general population, non-clinical autistic traits do predict perceived stress. However, not all non-clinical autistic traits show an association, with only rigidity and pragmatic language difficulties acting as significant positive predictors. In addition, alongside increased rigidity and pragmatic language difficulties, only perceived social support from family members was a significant negative predictor of perceived stress, thus the only source of perceived social support that was potentially a buffer against perceived stress alongside non-clinical autistic traits. Additionally, higher non-clinical autistic traits were negatively associated with lower perceived social support. These findings should allow future researchers to use mediation analysis to further unpack relationships between subthreshold autistic traits, perceived social support, and perceived stress and assesses if the current results can be upheld outside the Covid-19 pandemic.

REFERENCES


Segrin, C. (2019). Indirect effects of social skills on health through stress and loneliness. *Health*


# APPENDIX

## Table A
Country of Questionnaire Completion

<table>
<thead>
<tr>
<th>Country</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Canada</td>
<td>19</td>
<td>5.19</td>
</tr>
<tr>
<td>Chile</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Czechia</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Denmark</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>Finland</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>France</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>Germany</td>
<td>13</td>
<td>4.0</td>
</tr>
<tr>
<td>Hungary</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>India</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Ireland</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>n/a</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td>Norway</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Romania</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Serbia</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>South Africa</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>117</td>
<td>36.3</td>
</tr>
<tr>
<td>United States</td>
<td>111</td>
<td>34.5</td>
</tr>
</tbody>
</table>
Social media-induced secondary traumatic stress: Can viewing news relating to knife crime via social media induce PTSD symptoms

Rosie M. M. Secker & Elizabeth C. Braithwaite
Manchester Metropolitan University, United Kingdom

Correspondence: e.braithwaite@mmu.ac.uk

There have been recent increase in reported knife crime throughout the United Kingdom, while social media usage has also increased. Existing research has reported associations between social media usage and secondary traumatic stress (STS), with symptoms similar to that of posttraumatic stress disorder (PTSD). The current study is the first to investigate the relationship between the frequency of viewing knife crime-related news via social media and STS. This study additionally investigated potential moderating effects of gender, age, and residential location. Participants (N = 155) completed an online survey which included the Secondary Traumatic Stress Scale (STSS), modified to refer to knife crime. Participants also self-reported the frequency of viewing knife crime on social media and relevant demographic information. Hypotheses and data analysis plan were pre-registered. 63% of participants reported STS symptoms, and 28% reported possible clinical levels of PTSD. A higher frequency of knife crime viewed via social media was significantly associated with higher STS symptoms, and this study found evidence that this effect is moderated by residential location, with those participants living in towns and villages most at risk. Younger, female participants scored highest on the STSS overall. It is important to understand the impact of viewing knife crime content via social media on mental health, and identification of those most at risk of experiencing STS will enable targeted intervention strategies.

Keywords: knife crime; posttraumatic stress disorder; secondary traumatic stress; sex differences; social media
Prior to the COVID-19 outbreak, knife crime in the UK was described as ‘a different sort of epidemic’ (Shaw, 2020). In 2019, there were 45,627 incidents of knife crime in England and Wales: the highest on record and 49% higher than 2011 (when comparable records began). Knife crime also accounted for almost half (44%) of ‘assault with injury and assault with intent to cause serious harm’ offences in 2019 (Office for National Statistics [ONS], 2020). The issue of increased knife crime created widespread alarm (Harding, 2020), resulting in a national campaign to recruit 20,000 more police officers to specifically address this issue (Gov.uk, 2019).

The rise in knife crime has also resulted in an increase in media coverage of this subject, especially on social media (Grimshaw & Ford, 2018). Nearly half (49%) of individuals in the UK use social media for news, with Facebook used the most, followed by Twitter and WhatsApp (Ofcom, 2019). There is evidence that media outlets are responding to the changes in consumer viewing with journalists changing the way that news is reported to fit in with viewing on social media platforms (Lasorsa et al., 2012). However, the shift to viewing news via social media has not only led to vast amounts of available information, but it has also increased the accessibility of unreliable sources (Flintham et al., 2018). This has led to the increase of exaggerated information and fake news on social media with journalists and the public, using shocking headlines, false information and graphic images/videos to gain popularity (Shu, 2017). Furthermore, social media algorithms are designed to show users content related to items they have already viewed (Eslami et al., 2015). This can result in disproportionate overrepresentation of certain issues, such as knife crime, leading to exaggerated fear/panic. Before the use of social media, most access to news reporting was via newspapers and live TV/radio. Exposure was therefore limited to certain times a day, with much of the day spent isolated from it. In contrast, social media now enables exposure to world news throughout the day, resulting in adverse effects on well-being and the creation of a ‘fear culture’ (Hardie, 2016). These effects may be exacerbated further as some sources can include graphic videos and images which social media platforms may struggle to remove (Wayne, 2016).

Following the 9/11 Twin Towers attack, research highlighted the psychological impact of viewing tragic events indirectly, such as on TV. Many people reported symptoms of posttraumatic stress disorder (PTSD) specifically related to viewing images of the terrorist attack via news channels (Neria et al., 2011). There was also a positive association between the time spent watching news about the 9/11 attack and the severity of the PTSD symptoms (Ahern et al., 2004; Schlenge, 2002). This phenomenon is defined as ‘secondary traumatic stress (STS)’, also referred to as ‘vicarious traumatisation’ and ‘compassion fatigue’ and was first described by Figley (1983) as stress resulting from helping others who are suffering or traumatised (Figley, 1999). He stated that individuals who are in contact with trauma survivors, such as individuals working with traumatised clients, may mirror symptoms of PTSD (Bride et al., 2004; Figley, 1995). Furthermore, Figley (1999) proposed STS as being equivalent to PTSD, with symptoms categorised with levels of intrusion, avoidance and arousal. The American Psychiatric Association [APA] (2013) defines ‘intrusion’ as repeated intrusive thoughts or flashbacks of the event, ‘avoidance’ as actively avoiding reminders of the event which may include not going to a particular place or seeing certain people and ‘arousal’ as bodily reactions such as problems with sleeping or experiencing angry outbursts.

Due to digitalisation and the shift towards social media becoming a popular source of news (Ofcom, 2020; Swart et al., 2016), recent research has focused on the association between social media and STS. An example of this is Ramsden (2015) who reported that nearly one-quarter of their participants scored high on clinical measures of PTSD as a result of viewing violent news such as 9/11 Twin Tower attack, school shootings and suicide bombings via social media. Additionally, participants who reported viewing the events more frequently were most affected (Ramsden, 2015). Similarly, Comstock and Platania (2017) investigated the effect of STS induced by the media (TV and social media) on perceptions of distress. Comstock and Platania (2017) found that nearly one-quarter of participants reported being significantly affected by adverse events viewed on social media, with the amount of stress reported relating to how often participants viewed the event. Ramsden (2015) and Comstock and Platania (2017) demonstrate that increased frequency of traumatic posts viewed on social media may exacerbate psychological and social anxieties, as well as symptoms of PTSD/STS. Therefore, there is a need to increase awareness of the damaging and dangerous risks of frequently viewing often unedited and graphic news via social media, and that appropriate support is made available for those who need it (Comstock & Platania, 2017; Intravia et al., 2017; Ramsden, 2015).

Building on previous research, the current study aims to examine the association between frequency of knife crime viewed on social media and STS, and test for moderating effects of age, gender and place of residence. It is important to test for possible moderating effects by demographic factors, as media consumption, and psychological impacts, can differ amongst individuals (Intravia et al., 2017). Previous research has consistently demonstrated that women are at greater risk of PTSD than men (Christiansen & Hansen 2015; Irish et al., 2011; Olff, 2017). However, there has been little research on sex differences in secondary traumatisation (Baum, 2014), and it is currently unknown whether viewing knife crime via social media may induce sex-specific STS.
symptoms. There is evidence that teenagers and young adults are becoming more anxious and have negative views towards society, which has been linked to greater social media use (Booth, 2019; Brooks, 2015; Ofcom, 2020; Vannucci et al., 2017). These findings could be explained by the fact that younger individuals use social media more frequently and are therefore more regularly exposed to negative content (Ofcom, 2020; Scott, 2017). Place of residence will also be examined as a moderating variable as violence tends to be concentrated in metropolitan areas and past research has reported that prevalence of probable PTSD after the 9/11 attack was significantly higher in metropolitan areas across the UK (ONS, 2020; Schlenger et al., 2002). Finally, the subscales of the Secondary Traumatic Stress Scale (STSS) will be considered individually, as the different subscales are associated with various symptoms, reflective of the PTSD diagnosis (APA, 2013). We made the following hypotheses:

Hypothesis 1 (H1): Individuals who view more information regarding knife crime via social media will score higher on the Secondary Traumatic Stress Scale than those who view it less frequently.

Hypothesis 2 (H2): Individuals who view more information regarding knife crime on social media will score significantly higher on the intrusion and avoidance subscales, but not the arousal subscale, compared with those who view it less frequently.

Hypothesis 3 (H3): Women who view more information regarding knife crime on social media will score higher on the Secondary Traumatic Stress Scale compared to men.

Hypothesis 4 (H4): Younger individuals who view more information regarding knife crime on social media will score higher on the Secondary Traumatic Stress Scale than older individuals.

Hypothesis 5 (H5): Individuals who live in heavily populated areas (e.g., cities) that view more information regarding knife crime on social media will score higher on the Secondary Traumatic Stress Scale than those who live in less populated, more rural areas.

**METHODS**

**Participants**

Participants were adults who completed a cross-sectional, online survey hosted by Qualtrics during July 2020. Potential participants were required to be social media users, fluent in English, UK-based, aged 18 years or over, and have the capacity to consent. Individuals with a previous clinical PTSD diagnosis were excluded. Participants were recruited via an opportunistic sampling method to an online survey advertised on the social media platforms LinkedIn and Twitter. Manchester Metropolitan University's Participant Pool Scheme and word of mouth was also used to recruit potential participants. A sample size calculation was conducted using G*Power Software V3.1.9.7 which indicated that a sample of 138 participants would be sufficient to detect a small effect size ($f^2 = 0.15$), at 95% power, accepting a p-value of .05 as significant. 238 participants initially completed the survey; however, 61 were removed due to incomplete data. Data from an additional 27 participants was removed because they met criteria for exclusion (previous clinical PTSD diagnosis, and/or selected 'none' on the frequency of knife crime posts viewed on social media). The final sample ($N = 155$) consisted of 125 females and 30 males aged 18–78 years ($M = 34.19$, $SD = 14.39$). All participants gave informed consent, and the study was reviewed and approved by Manchester Metropolitan University Research Ethics Committee.

**Design**

The online survey consisted of 27-items. The independent variables were age, gender, place of residence (categorised into city, town and village) and frequency of knife crime viewed on social media. The dependent variables (DV) were the overall STSS score, and the STSS subscale scores: intrusion, avoidance and arousal (Bride et al., 2004). The survey and supporting documents are available to view and download (https://osf.io/6n5a9).

**Measures**

**Social media usage**. Participants were required to respond to questions about how much time they spend on social media (How much time do you spend on social media per day? Less than 30 minutes = 1/30–60 minutes = 2/1–2 hours = 3/2–3 hours = 4/3+ hours = 5), and how often they see content relating to news/knife crime on social media (How often do you see posts relating to news on social media? Always/Very
often/Sometimes/Rarely/Never. Approximately over the past 12 months how many times have you seen posts (videos/photos/news) related to knife crime on social media? None/1–3/6–6/7–10/11+.

**Secondary Traumatic Stress Scale (STSS).** Participants completed a 17-item-self-report questionnaire with three subscales: intrusion, avoidance and arousal, which was originally designed to assess levels of STS in working professionals (Bride et al., 2004). Participants were asked to read a statement and rate how frequently the statement is true for them on a five-point scale from ‘never’ to ‘very often’. A high score indicates a high level of STS. The STSS was modified for this study with the wording of the instruction and questions altered to reflect knife crime viewed on social media rather than ‘client exposure’. The STSS is a standard tool used for measuring STS and is used internationally (Jacobs et al., 2019). It possesses good psychometrics showing good overall reliability (Cronbach’s α = .93) and for the subscales (Intrusion α = .80, Avoidance α = .87 and Arousal α = .83) (Bride et al., 2004; Roden-Foreman et al., 2017). Furthermore, Bride et al. (2004) provide evidence of the scale’s convergent, discriminant and factorial validity. Previous research has also found the scale to achieve good levels of factor intercorrelations, internal consistency reliability and validity (Badger et al., 2008; Benuto et al., 2018; Dominguez-Gomez & Rutledge, 2009; Mirsaleh et al., 2014;).

**Confounders.** Participants self-reported their highest educational qualification, and the social media platform most commonly used when news related to knife crime was viewed. These variables were included in the main analyses as confounders.

**Data analysis**

First, the distribution of the variables was examined, and descriptive statistics reported. The STSS subscales were created by summing the items which corresponded with each subscale, and the total STSS score was a sum of all the items. To address the hypotheses, four multiple linear regressions were conducted with the total STSS score, and each subscale, entered as the dependant variables. The following variables were entered in a step-wise fashion. Step 1: highest educational qualification and social media platform most frequently used were entered as confounders. Step 2: the main predictor variables (age, gender, place of residence, and frequency of knife crime viewed on social media) were entered. Lastly, at step 3, the interaction variables (frequency of knife viewed on social media X gender/age/location) were entered. The interaction variables were created using centred and standardised variables to avoid multicollinearity. Main effects and interactions are reported along with 95% confidence intervals (CI) and p-values. All data were analysed using the Statistical Package for the Social Sciences 26 (SPSS), and the data analysis plan and hypotheses were pre-registered (https://osf.io/6n5a9).

**RESULTS**

Summary descriptive statistics for the sample, and split by gender, are displayed in Table 1. 63.23% of participants indicated some level of STS and 9.68% showed severe STS levels.

Tests of assumption were conducted using histograms and skewness statistics, which showed normally distributed data with some slight skewness for gender and the STSS total score and subscales. Initial regressions were performed, and diagnostic data was saved. From examining the scatterplot of residuals, two data points were found to be more than 3 SDs from zero for each outcome. The data met the assumption of no multicollinearity evidence from the variance inflation factor and tolerance scores (Daoud, 2017). Although there is a violation assumption of no outliers, it was decided that the data would not be transformed as the skewness was only slight and the costs of transformation do not outweigh the benefits in this case (Siegel, 2016).

**Total STS score**

The first regression examined predictiveness of the variables on total STS scores (see Table 2). Step 1 showed the covariates to account for 1% of the variance in STS scores (Adjusted $R^2 = .01$). Including the main predictors at step 2 significantly improved the model fit ($F_{change} = 7.88$, $p < .001$), adding 15.9% to the prediction of STS scores which in total explained 16% of variance in STS scores (Adjusted $R^2 = .16$). According to Cohen’s (1988) conventions, this is considered a medium effect size. However, adding the interaction variables at step 3 did not significantly improve the model fit ($F_{change} = 1.31$, $p = .275$). Overall, the three-step model was significant, ($F(9, 145) = 4.32, p < .001$) but showed a larger f-value with the 2-step model ($F(6, 148) = 5.79, p < .001$). The results indicated that frequency of knife crime viewed on social media was positively associated with STS scores ($\beta = 0.21, p = .014$), indicating that those who spend more time viewing knife crime related news on
social media reported higher STS scores. Gender was also associated with STS scores ($\beta = 0.21, p = .007$), and further examination of the data revealed that women scored higher on the STSS ($M = 34.21, SD = 11.71$) than men ($M = 27.20, SD = 7.24$). There was a negative association between age and STSS score, indicating that younger participants reported higher STS symptoms ($\beta = -0.33, p < .001$). There was no association between place of residence and STSS scores. At stage 3, none of the interaction variables were associated with STSS scores.

<table>
<thead>
<tr>
<th>Table 1. Demographic Characteristics and Secondary Traumatic Stress Scale Scores of the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong> $M (SD)$</td>
</tr>
<tr>
<td><strong>N = 155</strong></td>
</tr>
<tr>
<td>34.19 ($\pm$14.19)</td>
</tr>
<tr>
<td><strong>Females N = 125</strong></td>
</tr>
<tr>
<td>34.45 ($\pm$14.37)</td>
</tr>
<tr>
<td><strong>Males N = 30</strong></td>
</tr>
<tr>
<td>37.27 ($\pm$14.31)</td>
</tr>
<tr>
<td><strong>Education level: n (%)</strong></td>
</tr>
<tr>
<td>No formal education</td>
</tr>
<tr>
<td>1 (0.60)</td>
</tr>
<tr>
<td>Entry-level functional skills</td>
</tr>
<tr>
<td>1 (0.60)</td>
</tr>
<tr>
<td>Secondary Education</td>
</tr>
<tr>
<td>20 (12.90)</td>
</tr>
<tr>
<td>Post-Secondary Education</td>
</tr>
<tr>
<td>52 (33.50)</td>
</tr>
<tr>
<td>Undergraduate Degree</td>
</tr>
<tr>
<td>61 (39.40)</td>
</tr>
<tr>
<td>Postgraduate Degree</td>
</tr>
<tr>
<td>19 (12.30)</td>
</tr>
<tr>
<td>Doctorate (PhD)</td>
</tr>
<tr>
<td>1 (0.60)</td>
</tr>
<tr>
<td><strong>Place of residence: n (%)</strong></td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>34 (21.90)</td>
</tr>
<tr>
<td>Town</td>
</tr>
<tr>
<td>92 (59.40)</td>
</tr>
<tr>
<td>Village</td>
</tr>
<tr>
<td>29 (18.70)</td>
</tr>
<tr>
<td><strong>Frequency of knife crime viewed on social media in the past 12 months: n (%)</strong></td>
</tr>
<tr>
<td>1-3</td>
</tr>
<tr>
<td>39 (25.2)</td>
</tr>
<tr>
<td>4-6</td>
</tr>
<tr>
<td>50 (32.3)</td>
</tr>
<tr>
<td>7-9</td>
</tr>
<tr>
<td>14 (9)</td>
</tr>
<tr>
<td>10+</td>
</tr>
<tr>
<td>52 (33.5)</td>
</tr>
<tr>
<td><strong>Total STSS: m (SD)</strong></td>
</tr>
<tr>
<td>32.85 ($\pm$11.32)</td>
</tr>
<tr>
<td>Intrusion Subscale Score, m (SD)</td>
</tr>
<tr>
<td>10.12 ($\pm$3.65)</td>
</tr>
<tr>
<td>Avoidance Subscale Score, m (SD)</td>
</tr>
<tr>
<td>13.40 ($\pm$3.37)</td>
</tr>
<tr>
<td>Arousal Subscale Score, m (SD)</td>
</tr>
<tr>
<td>9.33 ($\pm$4.12)</td>
</tr>
</tbody>
</table>

STC = knife crime, SM = social media

The second linear regression explored the association between the variables of interest and intrusion scores (see Table 3 for results). Step 1 accounted for 2% of the variance in intrusion scores (Adjusted $R^2 = 0.02$), adding the main predictors at step 2 significantly improved the model ($F_{change} = 8.84, p < .001$) explaining 19% of variance (Adjusted $R^2 = 0.19$) showing a medium effect size (Cohen, 1988). However, adding the interaction variables at step 3 did not significantly improve the model ($F_{change} = 1.41, p = .242$). The model as a whole was significant ($R(9,145) = 5.08, p < .001$) and, as for the total STSS score, frequency of knife crime viewed on social media ($\beta = 0.17, p = .044$), gender ($\beta = 0.24, p = .001$) and age ($\beta = -0.33, p < .001$) were associated with intrusion scores. There was no association between place of residence and STS scores.

At step 3 there was a significant interaction between frequency of knife crime viewed via social media and place of residence on intrusion scores ($\beta = -1.15, p = .047$). Further exploration of the data revealed a small significant correlation between frequency of viewing knife crime on social media and intrusion score for those participants living in a town ($r = .25, p = .018$) and a village ($r = .39, p = .037$). There was no association between frequency of viewing knife crime on social media and STSS score for those participants living in a city.
Table 2. Summary of Multiple Linear Regression Analysis for Total STSS Scores and Measured Variables

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>-0.07</td>
<td>-0.01</td>
<td>-0.07</td>
<td>.946</td>
</tr>
<tr>
<td>KC news platform</td>
<td>0.85</td>
<td>0.13</td>
<td>1.64</td>
<td>.104</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-3.69</td>
<td>-0.33</td>
<td>-4.11</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td>Gender</td>
<td>2.94</td>
<td>0.21</td>
<td>2.73</td>
<td>.007*</td>
</tr>
<tr>
<td>Place of residence</td>
<td>1.06</td>
<td>0.06</td>
<td>0.78</td>
<td>.436</td>
</tr>
<tr>
<td>KC SM Frequency</td>
<td>2.81</td>
<td>0.21</td>
<td>2.49</td>
<td>.014*</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KC SM Frequency X age</td>
<td>-0.52</td>
<td>-0.04</td>
<td>-0.51</td>
<td>.613</td>
</tr>
<tr>
<td>KC SM Frequency X gender</td>
<td>0.03</td>
<td>0.002</td>
<td>0.03</td>
<td>.98</td>
</tr>
<tr>
<td>KC SM Frequency X POR</td>
<td>3.04</td>
<td>0.15</td>
<td>1.96</td>
<td>.052</td>
</tr>
</tbody>
</table>

Note: N = 155, data from participants scores on the Secondary Traumatic Stress Scale. KC = knife crime, SM = social media. *p < .05, **p < .001.

Table 3. Summary of Multiple Linear Regression Analysis for Intrusion Subscale Scores and Measured Variables

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>0.05</td>
<td>0.01</td>
<td>0.17</td>
<td>.868</td>
</tr>
<tr>
<td>KC news platform</td>
<td>0.37</td>
<td>0.18</td>
<td>2.19</td>
<td>.03*</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-1.22</td>
<td>-0.33</td>
<td>-4.28</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td>Gender</td>
<td>1.11</td>
<td>0.24</td>
<td>3.25</td>
<td>.001*</td>
</tr>
<tr>
<td>Place of residence</td>
<td>0.41</td>
<td>0.07</td>
<td>0.95</td>
<td>.344</td>
</tr>
<tr>
<td>KC SM Frequency</td>
<td>0.73</td>
<td>0.17</td>
<td>2.03</td>
<td>.044*</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KC SM Frequency X age</td>
<td>-0.15</td>
<td>-0.04</td>
<td>-0.47</td>
<td>.643</td>
</tr>
<tr>
<td>KC SM Frequency X gender</td>
<td>0.14</td>
<td>0.03</td>
<td>0.36</td>
<td>.719</td>
</tr>
<tr>
<td>KC SM Frequency X POR</td>
<td>0.99</td>
<td>0.15</td>
<td>2.01</td>
<td>.047*</td>
</tr>
</tbody>
</table>

Note: N = 155, data from participants scores on the Secondary Traumatic Stress Scale. KC = knife crime, SM = social media. *p < .05, **p < .001.

Table 4. Summary of Multiple Linear Regression Analysis for Avoidance Subscale Scores and Measured Variables

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>-0.08</td>
<td>-0.02</td>
<td>-0.22</td>
<td>.829</td>
</tr>
<tr>
<td>KC news platform</td>
<td>0.19</td>
<td>0.08</td>
<td>0.92</td>
<td>.361</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-1.04</td>
<td>-0.24</td>
<td>-2.86</td>
<td>.005*</td>
</tr>
<tr>
<td>Gender</td>
<td>0.88</td>
<td>0.16</td>
<td>2.02</td>
<td>.045*</td>
</tr>
<tr>
<td>Place of residence</td>
<td>0.37</td>
<td>0.05</td>
<td>0.67</td>
<td>.507</td>
</tr>
<tr>
<td>KC SM Frequency</td>
<td>0.97</td>
<td>0.18</td>
<td>2.11</td>
<td>.036*</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KC SM Frequency X age</td>
<td>-0.16</td>
<td>-0.03</td>
<td>-0.38</td>
<td>.702</td>
</tr>
<tr>
<td>KC SM Frequency X gender</td>
<td>-0.19</td>
<td>-0.04</td>
<td>-0.37</td>
<td>.711</td>
</tr>
<tr>
<td>KC SM Frequency X POR</td>
<td>1.26</td>
<td>0.16</td>
<td>2.01</td>
<td>.047*</td>
</tr>
</tbody>
</table>

Note: N = 155, data from participants scores on the Secondary Traumatic Stress Scale. KC = knife crime, SM = social media. *p < .05, **p < .001.
Table 5. Summary of Multiple Linear Regression Analysis for Arousal Subscale Scores and Measured Variables

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>-0.04</td>
<td>-0.01</td>
<td>-0.10</td>
<td>.920</td>
</tr>
<tr>
<td>KC news platform</td>
<td>0.30</td>
<td>0.13</td>
<td>1.59</td>
<td>.114</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-1.43</td>
<td>-0.35</td>
<td>-4.38</td>
<td>&lt; .001**</td>
</tr>
<tr>
<td>Gender</td>
<td>0.95</td>
<td>0.18</td>
<td>2.44</td>
<td>.016*</td>
</tr>
<tr>
<td>Place of residence</td>
<td>0.29</td>
<td>0.04</td>
<td>0.58</td>
<td>.564</td>
</tr>
<tr>
<td>KC SM Frequency</td>
<td>1.12</td>
<td>0.23</td>
<td>2.72</td>
<td>.007*</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KC SM Frequency x age</td>
<td>-0.21</td>
<td>-0.44</td>
<td>-0.56</td>
<td>.576</td>
</tr>
<tr>
<td>KC SM Frequency x gender</td>
<td>0.08</td>
<td>0.02</td>
<td>0.17</td>
<td>.868</td>
</tr>
<tr>
<td>KC SM Frequency x POR</td>
<td>0.79</td>
<td>0.11</td>
<td>1.40</td>
<td>.164</td>
</tr>
</tbody>
</table>

Note: N = 155, data from participants scores on the Secondary Traumatic Stress Scale. KC = knife crime, SM = social media. *p < .05, ** p < .001.

STS avoidance subscale score

The third linear regression explored the association between the variables with avoidance scores (see Table 4 for results). The covariates at step 1 accounted for 4% of the variance in avoidance scores (Adjusted $R^2 = 0.01$), adding the main predictors at step 2 improved the model ($F_{change} = 4.26$, $p = .003$ accounting for 7% (Adjusted $R^2 = 0.07$) showing a small effect size (Cohen, 1988). However, adding the interaction variables at step 3 did not significantly improve the model ($F_{change} = 1.39$, $p = .249$) but the whole model was statistically significant ($F(9,145) = 2.49$, $p = .011$). Frequency of knife crime viewed on social media ($\beta = 0.18$, $p = .036$) and gender ($\beta = 0.16$, $p = .045$) were associated with avoidance. There was no association between age or place of residence and avoidance scores.

There was a significant interaction between frequency of knife crime viewed through social media and place of residence on avoidance scores ($\beta = 0.16$, $p = .047$). Further analysis revealed that for those participants who lived in a village, there was a positive correlation between frequency of knife crime viewed on social media and avoidance scores ($r = .45$, $p = .015$).

STS arousal subscale score

The final linear regression tested the association between the variables and arousal scores (see Table 5 for results). Step 1 accounted for 4% of the variance in intrusion scores (Adjusted $R^2 = 0.04$), step 2 significantly improved the model ($F_{change} = 8.23$, $p < .001$) explaining 16% of variance (Adjusted $R^2 = 0.16$), showing a medium effect size (Cohen, 1988). Step 3 however, did not significantly improve the model (Adjusted $R^2 = 0.16$, $F_{change} = 0.72$, $p = .54$). The overall model was statistically significant ($F(9,145) = 4.22$, $p < .001$) with frequency of knife crime viewed on social media ($\beta = .23$, $p = .007$) and gender ($\beta = 0.18$, $p = .016$) and age ($\beta = -0.35$, $p < .001$) associated with arousal scores. There was no association between place of residence and arousal scores. Additionally, none of the interaction variables at Step 3 were associated with the arousal subscale.

**DISCUSSION**

This study examined the association between the frequency of viewing posts relating to knife crime on social media and levels of STS, and investigated the potential moderating effects of gender, age and place of residence. As hypothesised, participants who viewed more information relating to knife crime through social media scored higher on the STSS (H1). This finding supports previous literature, which reported that frequency of viewing tragic events through social media significantly increases the prevalence of STS/PTSD symptoms (Ahern et al., 2004; Comstock & Platania, 2017; Ramsden, 2015; Schlinger et al., 2002.). The results of the current study extend existing findings by showing that this trend can specifically apply to knife crime viewed on social media and levels of STS. We further investigated the impact of viewing knife crime related news on the STSS subscales: arousal, intrusion and avoidance. Contrary to our hypotheses, frequency of knife crime viewed on social media was most strongly associated with arousal scores, followed by intrusion and then avoidance scores (H2). This suggests that participants most commonly experienced symptoms within the arousal subscale, which includes bodily reactions such as troubled sleeping or emotional outbursts (APA, 2013; Figley, 1999).
We hypothesised that gender would moderate the association between viewing knife crime on social media and STSS scores (H3). Although women reported higher STSS scores overall, we found no evidence for the moderating role of gender in this association. Our findings are consistent with existing literature which shows that women report more PTSD symptoms than men (Christiansen & Hansen, 2015; Irish et al., 2011; Off, 2017). Contrary to hypothesis H4, age did not moderate the association between viewing knife crime on social media and STSS symptoms. However, we did find that younger participants reported higher STS symptoms than older participants did; the age category 18-25 scored highest on total STSS. As younger participants also reported much higher levels of social media use than older participants, a possible explanation is that increased social media usage in general, leads younger participants to potentially experience greater anxiety (Brooks, 2015; Vannucci et al., 2017).

We additionally hypothesised that residential location would moderate the association between knife crime viewed on social media and STSS scores, and we specifically predicted that those participants who lived in cities would be most at risk (H5). We found that residential location did moderate the association between viewing knife crime on social media and symptoms of intrusion and avoidance. However, it was those participants who lived in towns and villages who showed the greatest association between viewing knife crime and symptoms of intrusion and arousal. Fear of crime could potentially explain this result. Although knife crime is more prevalent in cities (ONS, 2020) research shows that the fear of crime is generalised within the population, with even individuals who are considered a low risk of experiencing crime showing fear (Prieto Curiel & Bishop, 2017). Fear of crime is increasing in rural areas (Gilling, 2016), possibly due to crime being increasingly broadcast, especially on social media which contributes towards a fear culture (Hardie, 2016). Meško (2020) stated that the fear of crime is more serious than the actual crime itself in some rural communities. This could possibly explain why participants who live in villages scored significantly higher on the avoidance subscales compared to those living in towns/cities, as one of the main aspects of this subscale is actively avoiding areas where the traumatic events (knife crime) may take place (e.g., cities) (Figley, 1999; APA, 2013). Furthermore, previous research has found that those living in rural settings show less trust and lower satisfaction in the police with some communities feeling ignored and isolated (Meško, 2020; National Rural Crime Network, 2018). This is the first study to demonstrate that viewing knife-crime related news on social media is associated with STS symptoms. Implications of these findings could be to help target prevention and intervention strategies towards those most at risk and also to raise awareness within social media users and platform owners of the nature of the risk and the profile of those most at risk. As Brooks (2015) stated, social media will continue to grow with more people experiencing adverse effects. Therefore, understanding the risks, who is most at risk and most importantly, how to remedy them will be increasingly important to ensure safe use. A large proportion of the sample (63%) rated some level of STS with 28% reporting clinical levels of PTSD (scoring 38 or more), indicating they could need professional help (Bride, 2007). This is perhaps the most concerning finding of this study, and a similar rate to that reported by Ramsden (2015) and Comstock and Platania (2017) of nearly a quarter of participants reporting clinical levels of STS.

It is important to acknowledge the limitations of the research presented here. First, as this research is cross-sectional, it is difficult to obtain causal relationships due to its one-time measurement of exposure and outcome (Setia, 2016). Therefore, future research into this subject could utilise different research methods, including longitudinal data and incorporating qualitative research methods to develop a more holistic picture and improve the conclusions that can be made (Solem, 2015). There are also sample limitations of the study as there were more female participants (81%) than male participants (19%) which is unrepresentative of the general population and could have explained the gender difference in total STSS scores. Gender bias is a common issue with online survey research as previous research highlights that women are more likely to partake in online surveys compared to men (Smith, 2008). Similarly, the sample included more young participants, which may explain the result found for age. Thus, future research should try to obtain a more representative demographic sample. Additionally, future research should consider ethnicity as a potential moderator of the association between viewing knife crime on social media and STS, which the present study did not address. Due to the sensitive nature of this topic, response/non-response bias may have occurred. Individuals with strong feelings towards knife crime may be more likely to partake in the online survey due to personal importance, or less likely due to avoidance of this topic (Ting et al., 2005). It is also important to note that data collection for the current study took place throughout July 2020 during the COVID-19 pandemic when the first UK national lockdown had just ended, but many local restrictions remained (World Health Organisation, 2020; Gov UK, 2020). This may have impacted participants’ attitudes towards knife crime as COVID-19 was the main media focus at the time, and individuals were more likely to stay at home, making knife crime less of a threat. However, research shows that COVID-19 has had a negative psychological impact on many individuals inducing psychiatric symptoms such as depression and anxiety (Ho et al., 2020). This may have deterred
individuals from partaking in the current study to avoid further stress from the unpleasant topic (knife crime) or may have caused participants to respond with heightened stress, biasing the results. Supporting evidence of this comes from James and Xiaowei (2020), who found that young individuals and women experienced the largest declines in mental health due to COVID-19, which is interestingly compliant with the findings of the current study in that young women experienced the highest levels of STS.

This is the first study to demonstrate an association between viewing knife crime on social media and STS. However, it is unknown what social media platforms participants viewed the knife crime on. A suggestion for future research would be to examine whether the impact of viewing knife crime related news has different salience and effects when viewed on different social media platforms. Previous research suggests that social anxiety is a predictor of problematic internet use (Lee & Stapinski, 2012). This type of problematic internet use can be compounded by the algorithms within social media, which may further bias the users use of the platform towards similar content (Eslami et al., 2015). This can cause an overrepresentation of certain phenomena (such as knife crime), exaggerating the issue and exacerbating an individual’s anxiety towards the issue. Therefore, future research could also examine the moderating effects of social anxiety on the relationship between the frequency of knife crime viewed on social media and STSS scores.

CONCLUSION

In conclusion, the current study was the first to demonstrate that viewing more knife crime content on social media is associated with higher STS levels. We also found that individuals who live in villages/towns and who view more knife crime content on social media are at an increased risk of experiencing higher levels of STS. The arousal subscale, with symptoms including bodily reactions (such as problems with sleeping and angry outbursts), was the most commonly experienced category of symptoms for participants who viewed more knife crime on social media. Additionally, younger women reported higher STS scores in general, but this was not in interaction with levels of knife crime viewed on social media. This study is a valuable contribution to literature in this field, as it expands previous research on STS induced by media and is the first to focus specifically on knife crime and social media. As the use of social media increases, it is vital to understand and raise awareness of the adverse consequences. The results of this study can improve our knowledge and inspire further research to improve our understanding and promote safer usage of social media.

REFERENCES


Shaw, D. (2020). Knife crime in England and Wales rise to record high, ONS figure shows: Analysis by Danny Shaw home affairs correspondent. BBC.


Mental health impacts of lockdown juxtaposed with lockdown effectiveness during the COVID-19 pandemic: A perspective piece

Jordan Howell
Independent Researcher
United States

Correspondence: jordanhowell583@gmail.com

Lockdowns have been a common measure used worldwide to help mitigate the spread of COVID-19. Studies have shown that the effects of lockdowns during this pandemic, such as the lack of agency and social isolation, have negatively impacted people’s mental health worldwide. Cognitions, as well as the prevalence of mental illnesses, are being affected. However, it is also important to mention that there is some evidence that people have experienced positive mental health effects during lockdowns, such as increases in empathy and altruism and acquiring coping strategies that can help relieve stressors even after lockdowns pandemic are over. Studies have also shown that lockdowns themselves may not have been as effective in mitigating the spread of COVID-19 and, thus, have not significantly limited cases and deaths related to the disease. Consequently, the costs of lockdowns may outweigh potential benefits, especially as they may not have succeeded in thoroughly achieving their original purpose.

Keywords: cognition; COVID-19; lockdown; mental health; mental illness
It has been more than a year since COVID-19 began spreading globally, causing the current pandemic. As of 12th May 2021, around 580,073 COVID-19 deaths in the United States and 3,311,780 COVID-19 deaths worldwide (Centers for Disease Control and Prevention [CDC], 2021; World Health Organization [WHO], 2021). In response to this unprecedented situation, nations worldwide began employing lockdowns with varying levels of strictness to prevent the spread of the SARS-CoV-2 virus that causes the COVID-19 disease. In general, lockdowns involve measures that restrict the movement of people and can also be referred to with terms such as shelter-in-place orders and stay-at-home orders (Jacobsen & Jacobsen, 2020). The nature of these measures also results in business closures and delaying hospital procedures and appointments (Bendavid et al., 2021; Saba et al., 2021; Sud et al., 2020).

By design, lockdowns involve isolation from other people; this includes separation from family and friends who do not live in a person’s household. Besides isolation, lockdowns could have caused people to experience decreases in freedom of movement and agency and increases in loneliness and feelings of lack of control. Previous research has delved into the fact that these types of feelings and experiences can potentially lead to poor mental health outcomes such as increased likelihoods of depression, anxiety, and stress (Cote & Levine, 2014; Dalgaard et al., 2006; Perlman & Peplau, 1981; Taylor et al., 2018). It is important to look at how lockdowns affect mental and cognitive health with this information in mind.

The present perspective piece will review five aspects regarding the COVID-19 lockdowns. These aspects will be the effects of lockdowns on cognition, the impact of lockdowns on mental illnesses, the effect of lockdowns on psychological health by way of effects on physiological health, and the generally positive effect on mental health effects of lockdowns. With a review of this information, the main goal will be to begin delving into whether the benefits of lockdowns over the course of the pandemic have outweighed the costs.

**General effects on cognition**

Cognitions cover a broad array of areas that involve how people think about, interpret, and understand the world around them. Types of cognitions may include memory, language, decision-making, and attention, among others. Some studies have already started to research how COVID-19 lockdowns have impacted people’s cognitions. One study, in particular, looked at adults in Scotland who experienced social isolation with a focus on how lockdowns affected cognitions such as decision making, selective attention, learning ability, working memory, and time estimation (Ingram et al., 2021). A negative mood was also considered here. Results showed that participants improved on tasks relating to decision-making, selective attention, working memory, and negative mood as lockdowns were eased (Ingram et al., 2021). This study shows that easing restrictions and increased access to social activities, social contact, and general mobility helped increase scores on cognitive function tasks.

Other studies have also shown the detrimental effects of lockdowns on cognitions in people with and without previously diagnosed mental illnesses (Bland et al., 2021; Tondo et al., 2021). In particular, the Bland et al. (2021) study found that those with less social contact during lockdowns performed more negatively on cognition tasks. However, it is important to mention a major limitation. The Ingram et al. (2021) and the Bland et al. (2021) studies could not collect baseline scores from before the lockdowns, so it cannot necessarily be assumed that lockdowns decreased cognitive functioning. The better conclusion would be that the isolation and limitations on social interactions from lockdowns are correlated with deleterious effects on cognition, which dissipate as lockdowns are lifted.

**Mental illnesses**

Lockdowns have led to changes in the prevalence of various mental illnesses for children, adolescents, and adults. These groups have been through isolation and limits on social interactions. Children and adolescents in some parts of the world have experienced decreases in social school activities (recreational and academic). On the other hand, adults have experienced transitions from in-person work to working at home and closures of businesses that they own or work at. It is important to understand changes in prevalence rates as it speaks to the impacts of lockdowns and the potential need to focus on the future treatment of mental illnesses.

A white paper looking at paediatric mental health insurance claims in the US helps to show that children and adolescents were significantly affected during the pandemic. Throughout 2020, mental health claim lines increased for those aged 6–12 and 13–18 compared to 2019 for particular diagnoses (FAIR Health, 2021). For the 13–18 age group, an increase in claim lines was seen for generalised anxiety disorder, major depressive disorder, substance use disorders, and intentional self-harm (including suicide attempts) (FAIR Health, 2021). Even with this information, it was not stated what caused these increases in mental health claim lines. Lockdowns could be at play here, but one must also consider that these increases could have been affected by
anxiety/fear of COVID-19 (both in terms of catching it and being inundated with information about the disease) or by fear of being in an unprecedented situation that is a global threat (Lee, 2020; Nikšević et al., 2021; Nikšević & Spada, 2020).

Studies have done some work to parse through what may be causing these increases. For example, a separate study found that Australia’s children’s hospital saw a 104% increase in anorexia nervosa hospital admissions from January 2020 to May 2020 compared to that time frame in 2017, 2018, and 2019 (Haripersad et al., 2021). It was proposed that this was caused by the fact that lockdowns decreased protective factors for eating disorders seen from socialisation and schools (Haripersad et al., 2021). This possibility was raised using both recent and older studies in the literature that have shown how eating disorders that include anorexia nervosa, emotional eating, bingeing and purging, orthorexia Nervosa, and others may be exacerbated by consequences of lockdowns, including increased social media use, lack of normal routines, increased stress, and limits on areas for physical activity outside of the home (Haripersad et al., 2021; Heriseanu et al., 2017; Klatzkin et al., 2018; Levine & Murnen, 2009; Lombardo et al., 2020).

Similar studies have also been done for adults regarding the prevalence of mental illness or mental illness related symptoms during the lockdown. Many have been linked to incidences of anxiety disorders and depression. One study took a look at participants older than 18 in Nepal and the prevalence of depression and anxiety during the complete lockdown that occurred early on in the pandemic (Sigdel et al., 2020). It was found that 34.1% of the participants had depression, 31.2% of participants had anxiety, and 23.2% of participants were co-morbid for these two illnesses; further, participants were more likely to be in these three groups if they lived alone compared to if they lived with family (Sigdel et al., 2020). Related to the Bland et al. (2021) study, it seems that the isolation that can result from lockdowns have adverse effects on well-being.

The previous study’s findings can be combined with the results of a study that looked at mental illness prevalence rates of those older than 18 in Australia during part of their lockdown. Clinically significant depression symptoms were seen in 27.6% of participants, while mild symptoms were seen in 26.5% of participants (Fisher et al., 2020). Clinically significant generalised anxiety symptoms were seen in 21% of participants, while mild symptoms were seen in 24.5% of participants (Fisher et al., 2020). Also, 8.9% of participants had thoughts of self-harm or the idea that they would be better off dead on several days, while 5.7% of participants had these types of reviews more frequently (Fisher et al., 2020). A final important point from this study is that it was found that experiencing a negative impact from restrictions was related to living alone, just like in the Sigdel et al. (2020) study and Bland et al. (2021) study.

Other studies have also shown the impact of lockdowns on mental illnesses (Fancourt et al., 2021; Groarke et al., 2020). Limitations with a lot of these studies include the fact that many are correlational. Thus, cause and effect relationships cannot be determined. Further, due to the unexpected nature of the pandemic, some researchers were not able to gather baseline data before the pandemic or before lockdowns began. Altogether, this means that it is difficult to ascribe causality to mental illnesses from lockdowns. However, the studies have shown that symptoms related to mental illnesses decrease as lockdowns are lifted or that protective factors such as having more socialisation during the lockdown helped prevent symptoms of mental illness.

**Implications of changes to physiological health care on mental health**

Lockdowns have affected how hospitals and medical facilities are run through changes such as delays in general appointments, testing, and elective surgeries. Long-term impacts could potentially be seen regarding not only physical health but psychological health as well. It is important to delve into how restrictions have affected psychological health through effects on physiological health.

Cancer is one of the ways that physiological health has been affected by lockdowns and restrictions. There have been decreases in cancer diagnoses during the pandemic, as well as changes in treatment regimens and surgeries (Del Vecchio Blanco et al., 2020; Kaufman et al., 2020; Sharpless, 2020). From 1st March 2020 to 18th April 2020, there has been an estimated total 46.4% decrease in mean weekly diagnoses for breast cancer, colorectal cancer, lung cancer, pancreatic cancer, gastric cancer, and oesophageal cancer compared to 1st January 2019 to 29th February 2020 in the US (Kaufman et al., 2020). Looking towards effects on the future, one model estimates around 10,000 excess colorectal cancer and breast cancer deaths from 2020 to 2030 (Sharpless, 2020). Another model predicts that this effect on cancer can lead to a significant increase in lifeyears lost in the coming years (Sud et al., 2020).

In the past, there have been many studies on the relationship between cancer and mental health that can inform predictions about how patients may be affected by the COVID-19 lockdowns. In general, cancer can impact both patients and their families (Costa et al., 2016; Kotkamp-Mothes et al., 2005; Mitchell et al., 2013;
Papanastasiou et al., 2019). Factors such as low social support and adverse life events have been shown to correlate with psychological distress in cancer patients (Kornblith et al., 2001). Low social support is an important factor to consider as lockdowns lead to lower social interactions with peers and family members. Further, a cancer diagnosis can affect patients' and families' psychological health (Costa et al., 2016; Gibbins et al., 2012; Mcbride et al., 2000). This psychological impact may potentially be exacerbated by the mental distress caused by lockdowns and the general fact of being diagnosed during the COVID-19 pandemic. Late diagnosis due to lockdowns' effects on hospitals and medical facilities may also play a role if the patient and family later find out that cancer could have been spotted earlier if not for the delays; this may especially be true if the late diagnosis potentially led to a worse prognosis. Studies have also found correlations between loneliness and cancer. Not only may loneliness lead to higher likely mortality among cancer patients, but it may also lead to higher rates of anxiety and depression (D'Ippolito et al., 2017; Hill & Hamm, 2019). The loneliness from lockdowns, thus, could lead to worsening mental health among cancer patients and could even be tied to the excess deaths and loss of life years among cancer patients that has been predicted.

There are already some papers that have delved into the psychological effects that measures such as lockdowns can have on cancer patients during the COVID-19 pandemic. Not only are the loneliness and social isolation important effects that can impact one psychologically, but one may also need to consider patients potentially considering themselves to be burdens on others. Some patients may need others to buy essential items for them or need others to assist them with everyday activities, so they could feel guilty for having others help with tasks (Tsamakis et al., 2020). Guilt can potentially lead to poor psychological outcomes (Kubany et al., 1995; Pines et al., 2006; Tangney et al., 1992). Further, it has been found that parents of paediatric cancer patients have experienced high amounts of stress and anxiety concerning lockdowns and other pandemic factors (Guido et al., 2020; Relojo-Howell, 2020).

There are also issues related to the heart that has been affected by lockdowns. Studies have considered an acute coronary syndrome (ACS) to look at the impact of lockdowns on heart issues. One study investigated ACS admissions from 20th February 2020 to 31st March 2020 in Italy; lockdowns began around 8th March 2020 (Filippo et al., 2020). It was found that admissions during this period were lower than the period of 20th February 2019 to 31st March 2020 and 1st January 2020 to 19th February 2020 (Filippo et al., 2020). Similar findings of a decrease in ACS related hospital admissions were seen from 2nd March 2020 to 25th March 2020 in Austria; it was proposed that restrictions to self-isolate and to stay home helped to cause this reduction (Metzler et al., 2020).

Previous studies from before the pandemic can potentially give insightful information on any relations between lockdowns, the documented decreases in ACS admissions, and psychological effects. Generally, it has been found that patients with cardiovascular diseases, which includes ACS, experience psychological health issues, including depression (Steca et al., 2013). Further, depression has been shown to predict increased mortality rates among these cardiovascular disease patients (Barth et al., 2004; Frasure-Smith & Lespérance, 2005; Nicholson et al., 2006; Penninx et al., 2001). Not only is it possible that depression may be exacerbated or increased by lockdowns among ACS patients, considering the increased prevalence of depression seen in the general population, but this could also potentially lead to increased mortality among ACS patients down the line. Thereby, lockdowns could be a factor in poorer ACS outcomes. It has been shown that having a Type D personality is correlated with delayed seeking medical attention for ACS (Arrebola-Moreno et al., 2020). A Type D personality is characterised by negative affectivity, neuroticism, and distress (De Fruyt & Denollet, 2002; Denollet, 2000; Sher et al., 2000). It will not be surprising if this type of personality is exacerbated by the loneliness and isolation of lockdowns, resulting in taking more time to seek medical attention, affecting disease outcomes.

Some COVID-19 specific studies have been published already in relation to ACS. Interviews have shown that higher stress from lockdowns and other pandemic related factors makes it more likely for a patient to seek ACS care later, leading to potentially delayed diagnosis and treatment (Greco et al., 2020). The Type D personality may be playing a role in these findings as well. With this in mind, it is important to remember that not only are lockdowns potentially independently leading to mental health changes, but lockdowns are also playing upon pre-existing characteristics or attributes of people when impacting mental health.

Positive effects on mental health

Some of the current literature on people’s experiences during lockdowns have shown that there have been some positive outcomes in connection with mental health. Some examples include a decrease in burnout syndrome among medical students, potentially due to the transition to online learning, and some self-reports of increased happiness among students (Bolatov et al., 2021; Mansfield et al., 2020). A study examining adolescents’ prosocial behaviours in the Netherlands saw several positive outcomes of lockdowns. Data from
particular time points before the lockdowns (T1 from May 2018 to October 2018, T2 from August 2019 to January 2020, and T1.5 between these two time points) and during the lockdowns (from 30th March 2020 to 17th April 2020) were compared (van de Groep, Zanolie, Green, et al., 2020). Important results were that the adolescents showed a higher level of perspective-taking during the lockdowns compared to T1 and T2 as well as that they showed higher levels of vigour (representative of positive emotions) and lower levels of tension (representative of negative emotions) at all surveyed weeks during the lockdowns compared to T1.5 (van de Groep, Zanolie, Green, et al., 2020). The authors believed that the changes seen in perspective taking, vigour, and tension might have been due to decreases in stressors and pressures before lockdowns (van de Groep, Zanolie, Green, et al., 2020).

Going more in-depth, the perspective-taking results may show that living through rough times, particularly the general state of the world during the pandemic and the strict lockdowns, related to the participants being better able to understand the views of others. This may indicate greater empathy among these adolescents. Further, the adolescents in the study also played the dictator game during the lockdown period. Here, the participants gave the most coins to doctors working in hospitals, followed by an individual with COVID-19 and a poor immune system (van de Groep, Zanolie, Green, et al., 2020). Altruism may be shown here as the participants determined the need and deservedness for specific groups of people contingent upon the current pandemic's circumstances. These findings may connect to the empathy-altruism hypothesis that empathy motivates one to perform altruistic behaviours (Batson et al., 1981). The increased empathy and altruism could potentially lead to beneficial mental health effects through positive social interactions in the future.

Other positive outcomes that resulted from lockdowns involve the usage of coping strategies. These strategies reduce stress from certain situations (Folkman & Lazarus, 1980; Lazarus & Folkman, 1984). Over the course of the pandemic, people have been using a multitude of coping strategies to deal with stressors, such as the ones caused by feelings of loneliness and lack of agency that have arisen due to lockdowns: physical activity (Carriedo et al., 2020); spending time around nature (green and blue spaces) as well as doing activities in these spaces such as gardening (Corley et al., 2021; Pouso et al., 2021; Ribeiro et al., 2021); and various other strategies such as humour, reframing of the situation, planning, praying, and social media (Cauwberghe et al., 2021; Jarego et al., 2021; Ramos-Lira et al., 2020). As some of the participants in these studies began to use these strategies during lockdowns, the strategy may become a part of the participants' repertoire of ways to deal with other stressors in the future.

As lockdowns largely involve restriction of movement or confinement to a household, it would not be surprising if the coping strategy of social support through familial bonding would also have an important role in getting people through the adverse stressors of lockdowns. So far, research on familial bonding during the COVID-19 lockdowns has been positive. A qualitative study on families under lockdown in Finland found that relationship-level coping strategies were important ways to get through the stressors of lockdowns; this includes agreeing on familial routines or responsibilities, having flexibility in these routines or responsibilities, doing activities together, and having conversations (Salin et al., 2020). Beyond stress, the social support that arose from familial bonding has been related to positive outcomes regarding mental illnesses. Perceived familial support was a predictor of depressive symptomatology (Mariani et al., 2020). Relatedly, the research found that greater familial bonding, represented by questions regarding an increase in cooking healthy meals together, spending more time together, and exercising together, was related to lower anxiety and depression symptoms in university students in Saudi Arabia (Alfawaz et al., 2021). Another study evaluated relationship quality assessed through The Quality of Marriage Index (QMI). It was found that those with good relationship quality had lower depression, anxiety, and stress scores and higher well-being, sleep quality, and quality of life scores than those with poor relationship quality (Pieh et al., 2020). A limitation with many of these studies is that they could not capture much information about familial support and bonding before lockdowns began. This means that it is difficult to understand if the support was maintained from pre-lockdown into the lockdown period or if there was an increase directly due to being in close proximity for an extended period.

**Evaluation of lockdown effectiveness**

Lockdowns have been used as a common spread reduction measure taken by many nations around the world. This has occurred even as WHO doctors have stated that the WHO does not advocate lockdowns as the main way to approach the pandemic, citing economic and social costs (Boseley, 2020; The Spectator, 2020). Especially in the face of the adverse effects of lockdowns seen in the previously mentioned research, it is important to determine whether these measures effectively accomplished the goals for which they were enacted.

Even as we are still amid the COVID-19 pandemic, studies are steadily being published that attempt to determine lockdown effectiveness. One, in particular, sets the stage as it notes that the effectiveness of
lockdowns appears to be highly influenced by the model one uses. Essentially, the researchers compared how three particular models estimated the change in COVID-19 transmission over time (Chin et al., 2020; Costic et al., 2020). The first model considered general non-pharmaceutical interventions (NPIs), the second model considered changes in mobility, and the third model considered both NPIs and mobility (Chin et al., 2020; Flaxman et al., 2020; Unwin et al., 2020). The models were used to look at intervention effectiveness from 4th March 2020 to 5th May 2020 and from 4th March 2020 to 12th July 2020 in 14 countries. For both the investigations up to 5th May and 12th July, the first model showed a high reduction in COVID-19 transmission due to lockdowns (Chin et al., 2020). For both the investigations up to 5th May and 12th July, the second model showed that COVID-19 transmission was already decreasing before imposed lockdowns (Chin et al., 2020). The third model showed that up to 5th May, COVID-19 transmission was not significantly impacted by lockdowns, but that transmission was impacted considerably by lockdowns when considered up to 12th July (Chin et al., 2020). Essentially, researchers’ results on whether lockdowns should have been implemented in the first place may have been biased by model usage. Certain prediction models may have biased lockdown effectiveness as the operative approach to the pandemic and that is why nations continue to readily implement them.

Beyond models, studies have delved into using correlational data to determine lockdown effectiveness. One study decided to delve into potential factors that had relations to COVID-19 mortality rates. The research looked at countries worldwide (and states and regions when considering parts of the United States and China) with at least 10 COVID-19 deaths (De LarocheLambert et al., 2020). One of the factors considered was a government response to COVID-19, which was determined by the containment and health index, the stringency index, and the economic support index. Particularly, the containment and health index looks at lockdown measures and other measures such as testing and contact tracing; also, the stringency index looks at the strictness of the lockdown and mobility limiting measures (De LarocheLambert et al., 2020). It was found that there were no significant correlations between the containment and health index or the stringency index in regards to COVID-19’s death rate (De LarocheLambert et al., 2020). Even though this is an example of the ineffectiveness of lockdown measures, one can argue that the goal of lockdowns was to control spread and not necessarily to prevent deaths directly. From this lens, the study is relatively limiting as it only looks at effects on mortality rates.

To control virus spread in mind, studies have delved into how lockdowns have affected COVID-19 cases. In one study, countries that imposed more restrictive non-pharmaceutical interventions (mNPIs), which included mandatory stay-at-home orders and mandatory business closures, were compared to countries that imposed less restrictive non-pharmaceutical interventions (lNPIs) (Bendavid et al., 2021). The countries studied that imposed mNPIs were England, France, Germany, Iran, Italy, the Netherlands, Spain, and the United States; those that did not impose mNPIs were Sweden and South Korea. When compared individually to Sweden and South Korea, none of the countries that implemented mNPIs showed a significantly lower daily growth in case rates (Bendavid et al., 2021). Interestingly, it was found that when comparing Sweden to both Spain and England, the countries that imposed mNPIs had a significantly more significant daily growth in case rates (Bendavid et al., 2021). Lockdown ineffectiveness is seen as there appeared to be non-significant differences in daily case rate growth between the countries that used mNPIs and countries that used lNPIs. Thus, lockdowns did not achieve the goal of preventing spread more so than the usage of other intervention methods.

Another study narrowed the research by specifically looking at shelter-in-place orders in the United States and how the orders tied to both COVID-19 cases and deaths. It was found that these orders did not lead to significant decreases in COVID-19 cases or deaths both immediately and several days after order implementation (Berry et al., 2021). Further, shelter-in-place orders continued to have no significant effect on COVID-19 cases when the researchers accounted for policy spillovers from other states and testing changes seen in different forms (Berry et al., 2021). Here, the lack of correlation between the shelter-in-place orders to COVID-19 cases and deaths may prove that the charges did nothing to change the pandemic trajectory substantially.

There are crucial limitations in these studies. Many of them look at the effects of lockdowns early in the pandemic. It is possible that lockdowns were ineffective at this initial stage in various countries but increased effectiveness over time. This could potentially have resulted from changes in testing and the potential greater severity of successive COVID waves. Another limitation is brought up in Berry et al. (2021) as there was not much consideration for how well enforced the restrictions were. Less enforcement of restrictions could potentially lead to perceived lesser effectiveness. The stringency index used in De LarocheLambert et al. (2020) helps alleviate this issue, and it would be useful if more studies applied it. Finally, it is challenging to disentangle effectiveness when many nations employed multiple measures at once. Bendavid et al. (2021) were effective in this regard as they looked at countries that used mNPIs and lNPIs to separate the
effectiveness of lockdowns from other measures such as testing, social distancing, and contact tracing. More studies should aim to do something similar to ensure that the effectiveness of measures is analysed as separately as possible.

Other studies show the opposite results compared to the studies mentioned above as they conclude that lockdowns were effective. Studies such as these cite avoidance of possible consequences of unimpeded COVID-19 spread, such as decreased medical resources and reduction of deaths not related to COVID-19, as proof of effectiveness (Gros, 2020; Qi et al., 2020). These considerations are one reason why all information regarding lockdown effectiveness must be taken in tandem. Different studies have different ways of assessing lockdown effectiveness. Further, lockdown effectiveness may differ between countries due to pre-existing demographic, health, and economic factors. Also, studies may look at the costs and benefits of lockdowns and differentially conclude the severity of the costs or the intensity of the benefits. The most impartial assessment method may be seen in Bendavid et al. (2021), where significant differences between nations that employed lockdowns versus ones that did not were investigated.

**DISCUSSION**

This perspective presented information about the mental health impacts of COVID-19 lockdowns and the effectiveness of these lockdowns. There is evidence that the lockdowns relate to adverse effects on decision-making, selective attention, and working memory. In addition, lockdowns have been correlated with increased prevalence rates of mental illnesses, including anxiety, depression, and anorexia nervosa. These mental health issues are exacerbated in those who already have physiological health problems such as cancer or ACS; thus, greater mortality rates may be seen among these populations. These negative impacts are all associated with isolation, lack of agency, and various other consequences of having restrictions on movement or contact with others. However, there are positive impacts of lockdowns that have been noted as well. Increased empathy and altruism among adolescents have been documented and can potentially lead to productive social interactions in the future or better relations with others. The literature supports the use of coping strategies such as social support stemming from familial bonding, and people may continue to use these strategies to help manage stressors after lockdowns and the pandemic are over.

Several studies delved into the impacts of lockdowns on mental health that could not be discussed previously. Positive impacts include decreased anxiety and depression scores during lockdowns for those classified as at risk for the respective disorders before lockdowns began (Widnall et al., 2020). There are also several other negative impacts of lockdowns to consider, each of which can take a psychological toll on a person: increased use and buying of tobacco in the US due to factors such as boredom or irregular routines (Giovenco et al., 2021); an estimate of 30,231 excess deaths in the US due to unemployment between April 2020 and March 2021 (which was in part caused by lockdown policies) (Matthay et al., 2021); increased violence against women (Roesch et al., 2020); and delayed elective surgeries (Fu et al., 2020; Sharpless, 2020).

It is important to consider these impacts on mental health in tandem with the findings mentioned above on lockdown effectiveness. It appears as though the COVID-19 lockdowns have had non-significant effects on COVID-19 cases and deaths in nations all over the world. Even though the positive impact of lockdowns is important to consider, the negative effects could potentially have lasting impacts. The increase in prevalence rates of mental illnesses is incredibly worrying and can lead to poor outcomes if people do not seek treatment. This is compounded by the fact that those with physiological health issues may face increased mortality due to the mental health issues that may have arisen or worsened during the lockdowns.

Further, some of the positive effects must be investigated to a greater extent before drawing concrete conclusions. For example, even though the Mansfield et al. (2020) report found increases in happiness during lockdowns for some students, large percentages of students also experienced worse or equal feelings of happiness during lockdowns in comparison to before; plus, the van de Groep, Zanolie, Green, et al. (2020) study, which found increased empathy through increased perspective-taking among adolescents during lockdowns, also found that adolescents experienced a decrease in empathic concern. Considering all of this, lockdowns may not have been the best strategy to deal with COVID-19 when evaluating the mental health costs accrued among the world population. To verify this, meta-analyses will have to be done to understand better the strength of the positive and negative impacts and lockdown effectiveness.

**General future research**

There are many potential directions for future research. First, there may need to be more qualitative studies on the impacts of lockdowns on mental health. There were several qualitative studies mentioned here that gave crucial insights into how people believed lockdowns affected them. New qualitative studies would
benefit from exploring generalised anxiety disorder and suicidal ideation, and mental health changes due to the stoppage of general medical care for children and adults. Connected to this, the Fancourt et al. (2021) study found that depression and anxiety scores eased as time passed.

Interestingly, some of this decrease was seen as lockdown measures persisted. This led the authors to consider the potentiality that people became acclimated to their new circumstances over time. A qualitative study would be helpful to see whether normalisation and acclimation were really at play during lockdown periods.

Second, it would be important for lockdown effectiveness to be assessed for times other than the early parts of the COVID-19 pandemic. Data to help with this assessment should be available, especially as time passes, and can help understand how lockdown effectiveness changed as the pandemic went along and if mental health was affected as a correlate of lockdown effectiveness over time. Third, more studies should investigate how likely it is for these effects on mental health to persist. Research shown here has already supplied information to show that at least the negative cognitive effects appear to decrease as lockdown measures are eased, but it will be important to find out if these decreases will return to pre-pandemic or pre-lockdown levels. Further, it will be interesting to see if the positive mental health effects such as social support from the family will be maintained as the lockdowns ease and members of households are not forced to remain in close proximity.

Lastly, more investigations into Bendavid et al. (2021) should be done to find out specific reasons to explain the few cases in which a country that employed mRNPIs saw larger daily growth rates than countries that employed lrNPIs. For each of these future research areas, researchers should do their due diligence to separate the effects of different COVID-19 mitigation measures since multiple measures were employed at once in many nations. Also, researchers should consider pre-existing demographic, health, and economic information regarding how COVID-19 affected different areas in particular ways (De Larochelambert et al., 2020).

The population of focus for future research on lockdown’s effects on mental health

A population of focus for researchers to explore regarding the effects of lockdowns on mental health may be adolescents. In general, adolescence involves social and neurocognitive changes relating to general cognitive abilities and general interactions with others (such as prosocial behaviours) (Blakemore, 2008; Crone & Dahl, 2012; van de Groep, Zanolie, & Crone, 2020; van de Groep, Zanolie, Green, et al., 2020). These changes can set the stage for how one experiences adulthood. Thus, adolescence is a very formative period in life. As lockdowns have kept adolescents away from peers, it would not be surprising to see potential effects on social behaviours and the neurophysiology of the brain that can have long-term effects. WHO views adolescents as 10–19 (WHO, 2020). Some studies have already started to delve into how this age group has been affected by lockdowns.

Some positive findings include the results from the previously mentioned van de Groep, Zanolie, Green, et al. (2020) study that saw increases in perspective-taking and noticed evidence of an understanding of situational needs and deservedness among adolescents during lockdowns. Also, it has been seen that adolescents from 11–16 years old experienced a reduction of emotional symptoms such as fear, worry, and sadness during lockdown (Waite et al., 2021). Comparing March and April of 2020 to the same months in 2019, England saw decreases in adolescent psychiatric inpatient admissions and psychiatric-related accident and emergency presentations (Ougrin, 2020). Another study found decreased referrals to child and adolescent mental health services in the UK than before the lockdown (Tromans et al., 2020). It would be important further to understand the reasoning behind these decreases in psychiatric issues as various factors could explain them: decreased academic and social pressures (Waite et al., 2021); increased social support from family members who were in the household (Mathias et al., 2020); feelings of needing to follow implemented lockdown measures leading to the decreased search for support (Tromans et al., 2020); and decreased available support from peers and teachers leading to decreased identification of issues (Patra & Patro, 2020)

Adolescents’ negative findings were prominently seen in the previously mentioned FAIR Health (2021) white paper that saw increased mental health insurance claims in the US. Further, a significant number of adolescents may have experienced mental health issues related to depression, anxiety, ADHD, ODD, and problematic internet use during the period of lockdowns (Giannopoulou et al., 2021; Mallik & Radwan, 2021; Mohler-Kuo et al., 2021; O’Sullivan et al., 2021). Interestingly, lockdowns may have significantly impacted adolescents with previous psychological issues such as ADHD, ASD, and eating disorders, potentially creating comorbidities (Guessoum et al., 2020; O’ Sullivan et al., 2021). For adolescents with these disorders, the disruption of relationships and routines due to lockdowns was significant in worsening symptoms and experiencing additional mental health issues. However, it is too early to determine if these effects are overwhelmingly positive or negative. Most importantly, it would be beneficial for researchers to do
longitudinal studies in the future to see if these effects lead to particular behaviours in adulthood. Imaging studies would also help assess neurophysiological changes that may be unexpected for adolescents.

CONCLUSION

Even with the positive effects that some people have experienced, the costs of lockdowns on mental health seem to outweigh any of the initially intended benefits. Instead of blanket lockdowns, it may have been better to use normal risk than COVID-19 risks to allow people to make their own decisions regarding how to approach the pandemic (Spiegelhalter, 2020). Further, implementation of only less restrictive measures such as testing, social distancing, and contact tracing may have potentially resulted in similar COVID-19 case and death numbers without the negative consequences on mental health from more restrictive lockdown measures (Bendavid et al., 2021; Habib, 2020; Normile, 2020). Hopefully, the negative mental health consequences of the lockdown measures can be mitigated in the future or are not long-lasting; hopefully, the people who did experience positive mental health effects can carry them long after the lockdowns and pandemics are over.

Funding acknowledgement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of conflicting interests

The author declares that there is no conflict of interest.

REFERENCES


American Journal of Geriatric Psychiatry, 28(11), 1146–1155. https://doi.org/10.1016/j.jagp.2020.08.007


[https://doi.org/10.3390/ijerph18031062](https://doi.org/10.3390/ijerph18031062)


[https://doi.org/10.1111/camb.12411](https://doi.org/10.1111/camb.12411)


[https://doi.org/10.3892/ol.2019.10361](https://doi.org/10.3892/ol.2019.10361)


[https://doi.org/10.1016/S2215-0366(20)30461-2](https://doi.org/10.1016/S2215-0366(20)30461-2)


[https://doi.org/10.1001/archpsyc.58.3.221](https://doi.org/10.1001/archpsyc.58.3.221)


[https://doi.org/10.1371/journal.pone.0238906](https://doi.org/10.1371/journal.pone.0238906)


[https://doi.org/10.1521/jscp.2006.25.6.688](https://doi.org/10.1521/jscp.2006.25.6.688)


[https://doi.org/10.1016/j.scitotenv.2020.134984](https://doi.org/10.1016/j.scitotenv.2020.134984)


[https://doi.org/10.1111/1467-858X.2020.12836](https://doi.org/10.1111/1467-858X.2020.12836)


[https://doi.org/10.1136/bmj.m1712](https://doi.org/10.1136/bmj.m1712)


[https://doi.org/10.1002/jemt.23702](https://doi.org/10.1002/jemt.23702)


[https://doi.org/10.3390/su12219133](https://doi.org/10.3390/su12219133)


[https://doi.org/10.1126/science.abb3377](https://doi.org/10.1126/science.abb3377)


[https://doi.org/10.1037/0022-006X.68.5.818](https://doi.org/10.1037/0022-006X.68.5.818)


[https://doi.org/10.1101/2020.04.30.20086926](https://doi.org/10.1101/2020.04.30.20086926)


[https://doi.org/10.1136/bmj.m3259](https://doi.org/10.1136/bmj.m3259)

Helping, sharing, and comforting behaviours in primary school children: The effects of year group and well-being on prosocial behaviour

Jenny Parker & Laura Jenkins
Loughborough University, United Kingdom

Correspondence: ljenkins2@lboro.ac.uk

Prosocial behaviours have been shown to be influenced by both age and well-being in the developmental literature, both in terms of home and school environments. The current study aimed to investigate the influences of age and well-being upon prosocial behaviours and whether they are displayed by primary school children in years 1–6, aged 5–11 years. The current research measured sharing, helping, and comforting behaviours as three separate prosocial constructs as previous research identified these as three key types of behaviours. A total of 185 parents were asked to complete two online questionnaires about their child. The Child Prosocial Behaviour Questionnaire was completed to measure the child’s prosocial behaviour, and the Personal Wellbeing Index – School Children was completed to evaluate the child’s level of well-being. Results showed that both year group and well-being affected the constructs of prosocial behaviour. Children with a higher (more positive) well-being displayed more prosocial behaviours. The older age groups, aged 9–11 years in year groups 5 and 7, displayed more helping, sharing, and comforting behaviours than that of the middle age group consisting of children aged 7–9 in year groups 3 and 4. This was consistent with previous research. Results are discussed in relation to the prosocial behaviour literature and the consideration of parental influences and individual differences relating to the different age groups.

Keywords: behaviours; primary school children; prosocial behaviour; school environment; well-being
Prosocial behaviour, as defined by Eisenberg et al. (2007, p. 646) is 'voluntary, intentional behaviour that results in benefits for another person'. Prosocial behaviour often involves comforting, helping, and caring for others, offering emotional support, and sharing resources (Williams & Berthelsen, 2017). A form of prosocial behaviour is altruism, which is behaviour motivated by a genuine desire to benefit another individual or improve their welfare. Altruistic behaviour is executed without expectation for external reward and often involves sacrificing one's welfare rather than another individual's (Batson & Powell, 2003). The development and presentation of prosocial behaviours also vary among genders, with research showing males are less likely to engage in prosocial behaviours, compared to females (Caprara et al., 2010; Hastings et al., 2007; Morrison-Gutman & Feinstein, 2008). Further research shows prosociality increases with age and also into adulthood (Catherine & Schonert-Reichl, 2011; Mayr & Freund, 2020; Takagishi et al., 2010), likely on account of older individuals having enhanced empathy and perspective-taking skills (Kokko et al., 2006). Outstanding prosocial behaviours are also associated with higher quality peer relationships (Clark & Ladd, 2000; Dekovic & Gerris, 1994; Fabes et al., 2012), increased social competence (Saarni, 1990) greater academic achievement (Caprara et al., 2000; Wentzel, 1993; 2015) and an increase in self-esteem (Lui et al., 2020).

Hoffman's (2000) Development of Empathy Theory suggests that prosocial behaviours are displayed during the first 12–24 months of life, as babies and toddlers begin to learn how to respond to another's distress around this age. Research by Geangu et al. (2010) found that when presenting aged 1, 3, 6, and 9-month-old infants with a crying sound; they displayed vocal and facial expressions of distress in response to the sound, an initial sign of early prosocial development. Further, Roth-Hanania et al. (2011) found prosocial behaviours during the first year of life were rare, but increase dramatically during the second year. Hoffman (2000) proposed this increase in prosociality is due to infant ability to express concern for another, as, at 24 months, the toddler can differentiate themselves and their feelings from that of others.

It is evident from the literature that parents can contribute to an integral part of prosocial behaviour development in children. Parents will often respond to their child's distress using empathy, which provides context for the child to observe their parents' behaviour and imitate their behaviour when responding to distress shown by others, by using empathy and prosocial behaviours of their own (Emde et al., 2001). Further, parents can encourage their child to take the perspective of others, which in turn promotes feelings of sympathy and compassion towards other individuals, ultimately motivating the onset and development of prosocial behaviours (Acharya & Relojio, 2017; Hoffman, 1984). Additionally, Farrant et al. (2011) discovered that parents who encourage their child to take the perspective of others are also facilitating the child's development of cognitive empathy skills. This is advantageous, as further research suggests that children with greater cognitive empathy skills are likely to engage in increased positive prosocial behaviours (Eisenberg et al., 2007). Different parenting styles can also have a fundamental impact on a child's prosocial behaviour development. Displaying a warm, sensitive, and responsive nature as a parent during infancy is beneficial for aiding the development of prosocial behaviours (Clark et al., 1996; Relojo et al., 2018). Likewise, positive parenting practices are associated with higher levels of child prosocial behaviour (McGrath et al., 2003).

Consequently, disciplinary parenting styles, such as maternal hostility, are associated with lower levels of prosocial behaviour in children (Romano et al., 2005). Therefore, parent-child relationships and interactions, paired with varying parenting styles, largely impact the development of prosocial behaviours amongst children (Hoffman, 2000; Knafo & Plomin, 2006; Yoo et al., 2013). When a child receives the appropriate parenting practices to develop prosocial behaviours, these behaviours can continue to develop into adulthood. Mayr and Freund (2020) suggest that older adults are more likely to engage in prosocial behaviours than younger adults due to considerations such as wealth, therefore the cost of acting on prosocial behaviours is less than younger adults (see Huggett, 1996). This does leave the question as to how this can be applied to even younger populations, such as primary school children, as children of this age will not have experienced any form of wealth or financial gain.

During childhood and adolescence, the presence of prosocial behaviours is crucial for engaging in positive social interactions and increasing social understanding and awareness (Eisenberg et al., 2018). Learning to share with siblings or peers at an early age can help children to develop the prosocial skills required to form positive relationships (White et al., 2014). Noble and McGrath (2008) found that positive relationships between peers and teachers, enable children to feel supported and accepted within the school, thus more likely to adhere to the prosocial culture within a school environment. Similarly, Gillies (2006) found when secondary school students worked in cooperative classrooms, they engaged in more positive helping behaviours with their classmates, highlighting the significance of different social contexts and how the environment can influence prosocial behaviours. Prosocial behaviours have also been positively related to academic achievement during primary school education (Caprara et al., 2000; Wentzel, 1993; 2015). Therefore, it is noticeable that educational environments play a huge role in the development of child behaviour and social
education. This in turn positively impacts academic achievement, peer relationships, and how children progress through school, all of which could ultimately influence the child’s well-being (Lozada et al., 2014). There is little research looking at the links between primary school-aged children, well-being, and prosocial behaviour, therefore the present study aims to build upon this, whilst using a much wider age span of primary school children (in years 1–6) compared to previous research (e.g., Gillies, 2006). The current study will consider the use of helping, sharing, and comforting behaviours as these are key behaviours indicated in the previous prosocial behaviour literature and are all distinct in nature (Gillies, 2006).

The well-being of a child refers to their health, safety, security, education, socialisation, development, and their sense of being loved, valued, and included within family and society (Adamson et al., 2007). A report by Morrison-Gutman and Feinstein (2008) found children at age 8 who experience low levels of well-being, will experience more positive well-being at age 10, demonstrating how this variable can vary and fluctuate across the life span. Further, the report detailed a correlation between children’s academic achievement and well-being. Thus, prosocial behaviours at one stage of development may strengthen other aspects of children’s positive development at a later stage. Research has also identified that aspects of higher levels of wellbeing, such as happiness and contentment, can reinforce and predict prosocial behaviours (Akinin et al., 2018; Light et al., 2015). Similarly, Akinin et al. (2015) suggested that engaging in prosocial behaviours can result in feelings of happiness, which could sequentially promote positive well-being, suggesting there is a link between the two variables of well-being and prosocial behaviours. They concluded that children aged between 2 and 5 years old displayed more happiness when giving sweets to another, compared to receiving them for themselves. Further, the emotional rewards of giving and sharing were greater when the child gave their sweets away, rather than sweets belonging to the experimenter. Additionally, Miller et al. (2015) found children who altruistically helped others by sacrificing personal gain, could be promoting their well-being, as well as the well-being of their peers. During this experiment, the children were allowed to donate tokens they had collected to exchange for a prize, too (fictitious) sick children. They found children from less affluent families were more likely to sacrifice their tokens to promote the well-being of another. This altruistic behaviour displayed by the children also predicted higher levels of well-being for themselves, as well as the children they donated their tokens to. Further, Alden and Trew (2013) identified a possible link between well-being and prosocial behaviour, by demonstrating how engaging in acts of kindness can increase positive emotions, particularly in individuals who have social anxiety. It is much of the existing research fails to directly measure well-being; therefore, the present study will aim to build upon this, adopting parental impressions regarding the well-being of their child, along with the prosocial behaviours they display. Parental involvement was found to give a more precise description of how their child behaves, as Fisher et al. (2014) found parents and carers can provide more accurate predictions of their child’s social behaviours. The present study will also contribute to existing findings by using the perspectives of parents, instead of teacher perspectives which are commonly adopted. For example, Johnson et al. (2002) asked class teachers questions related to different areas of their pupils’ behaviour, including prosocial interactions, to gain an understanding of how prosocial each child was, from a professional who works with them day. Other research combines parent ratings with teacher ratings, peer ratings, and self-report from the children (Caprara & Pastorelli, 1993; Eisenberg et al., 1996), failing to isolate parent perspectives alone. The preceding research also utilises samples of relatively young children (e.g., Akinin et al., 2015) or uses a more restricted age range, such as years 8–10 (e.g., Gillies, 2006). Therefore, the sample used in the present study covers a larger age span (years 1–6 at Primary school, ages 5–11) than what has been researched previously.

Prosocial behaviour is one aspect of development that is gaining increased attention in the literature (Brittain & Humphries, 2015; Su et al., 2020), possibly due to the movement towards positive psychology – an optimistic approach to promote well-being, resilience, and positive learning outcomes (Noble & McGrath, 2008). An existing body of research investigates prosocial behaviour by conducting observations of children in naturalistic environments (Davis, 2000; Eisenberg et al., 1999) resulting in subjective data which is difficult to code and interpret. Therefore, the present study aims to quantitatively measure prosocial behaviour through the use of questionnaires which are more objective measures of behaviour.

Recent research from Su et al., (2019), Lui et al. (2020), and Chenet et al., (2020) have investigated how prosocial behaviour may link to subjective well-being in school, providing suggestions that greater subjective well-being in school can increase children’s prosocial behaviours. Su et al., (2019) used the Primary School Upper-Grade Students Prosocial Behaviours Questionnaire, and this questionnaire was specifically designed to assess behaviours within a school environment. As this most recent research focuses upon a school environment, the current investigation will expand upon this further by focussing upon general well-being that could be applied to both home and school life, from the view of parents. To do this, the Personal Wellbeing Index – School Children (Cummins & Lau, 2005) will be used. While this is a measure designed for children, the questions are not specifically related to a child’s school environment and can be completed by parents. The Personal
Wellbeing Index will be used in comparison to previous measures (such as the Primary School Upper-Grade Students Prosocial Behaviours Questionnaire, Feng, 2009) as this index separates prosocial behaviours that are discussed in the research rather than classifying prosocial behaviour as simply positive or negative. The investigation of more general well-being has not been studied in the previous literature and this gap will be addressed by the current investigation.

Following the previous research outlined in relation to age (Mayr & Freund, 2020), it is evident that age could be an influencing factor when measuring prosocial behaviours and while adults may be able to develop prosocial behaviours, it is unclear about the links between prosocial behaviours and age in children. Thus, it is key to establish if age, measured by year group of children in primary school, using a wider age span than preceding research, can impact a child’s prosocial behaviour. Age will be measured by using a sample of children in school year groups 1–6 (ranged from age 5–11) and this age range has yet to be studied within the same investigation. As a result, one hypothesis is presented suggesting that: ‘There will be a significant difference of year group on all prosocial behaviours (sharing, comforting, helping).’

**METHODS**

**Participants**

The parents, who completed the questionnaires about their child, consisted of nine males and 176 females, totalling 185 participants, with a mean age of 36 (SD = 5.90). Among the children, the subjects of the questionnaires, there were 92 males and 93 females. To ensure adequate sample sizes in each age group, the school year groups were collapsed into three categories: a younger age group (including years 1 and 2, corresponding to ages 5–7, totalling 76 participants, mean age 5.37, SD = .48), a middle-age group (years 3 and 4, corresponding to ages 7–9, totalling 56 participants, mean age of 7.32, SD = .47) and an older age group (years 5 and 6, corresponding to ages 9–11, totalling 53 participants, mean age 9.52, SD = .50). Parent participation was recruited by posting the link to the online survey on several social media platforms, through the use of opportunity sampling. The criteria to complete the questionnaire required the parent to have been at least 18 years of age and must have at least one child who is currently in years 1–6 at primary school.

**Materials**

The child prosocial behaviour questionnaire. The Child Prosocial Behaviour Questionnaire (Grazzani et al., 2016) consisted of 10 items, measuring three separate constructs of prosocial behaviour: helping, sharing, and comforting (see appendix A). The questionnaire involved a five-point Likert scale, selecting one answer between ‘never’, ‘rarely’, ‘sometimes’, ‘often’, and ‘always’. Questions 2, 4, and 8 measured helping behaviours and involved statements such as ‘picks up something that I have accidentally dropped and hands it to me’. Questions 1, 7, 9, and 10 measured sharing behaviours, such as ‘willingly shares toys with other children without being asked’. Questions 3, 5, and 6 measured behaviours shown to comfort others, and included statements such as ‘hugs others when they are upset’. An average score out of five was calculated for each prosocial construct for each child. A higher score meant the child displays more sharing, helping or comforting behaviours (they had more positive behaviours). The measure has demonstrated very good internal reliability scores for all constructs of helping (α = .726), comforting (α = .782), and sharing (α = .695).

The Personal Wellbeing Index – School Children. The Personal Wellbeing Index – School Children (Cummins & Lau, 2005) is a 7-item questionnaire, measuring child well-being (see appendix B). This questionnaire involved an 11-point Likert scale for each question, selecting answers ranging from 0 (very sad) to 10 (very happy). An example question is ‘How happy is your child with the things they want to be good at?’. The measure has shown very good internal reliability, α = .840.

After completing the questionnaires, the well-being scores were categorised into groups of negative well-being (a score of 60% and under) and positive well-being (over 60%), using a median split of the well-being raw data.

**Procedures**

Upon obtaining ethical clearance from the Loughborough University Ethics Committee (HPSC Approval R19-P201), the online questionnaire was advertised on various social media platforms and posted in numerous online groups. The participants clicked on the link, which took them directly to the online survey. Firstly, participant information was presented for the parent to read, providing information about the purpose of the research, requirements of the participant, any personal information that will be collected, and the researcher...
’s contact email address for further questions, or to withdraw from the study. This information allowed the participants to give informed consent. If participants were happy to continue, the consent box was ticked. The parents then completed demographic questions about themselves, including their age and gender, then about their child, including their gender and school year group. The first questionnaire, The Child Prosocial Behaviour Questionnaire, and the second questionnaire, The Personal Wellbeing Index – School Children, then followed. The questionnaires required participants to select their responses by clicking on the box next to the answer most appropriate. Finally, the participants were debriefed, thanked for their time, and presented with a button to submit their answers if they were still happy to do so. The online questionnaires lasted around ten minutes and participants were able to complete them at a time most convenient for them, therefore placing no constraints on the opportunity to participate.

RESULTS

Year groups. A one-way independent groups ANOVA was conducted to look at the main effect of a year group on prosocial sharing. There was a significant main effect between year group and prosocial sharing, $F(2, 182) = 7.648, p = .001$. Tukey HSD post hoc comparisons revealed that the older age group has a higher mean prosocial sharing score of 4.57 ($SD = .45$) than both the younger group with a mean of 4.12 ($SD = .68$), $p < .001$, and middle age group with a mean of 3.87 ($SD = .76$), $p < .001$. A one-way independent groups ANOVA was conducted to look at the main effect between year group and prosocial helping. There was a significant main effect between year group and prosocial helping, $F(2, 182) = 16.521, p < .001$. Tukey HSD post hoc comparisons revealed that the older age group has a higher mean prosocial helping score of 3.81 ($SD = .75$) than the middle group with a mean of 3.34 ($SD = .73$), $p = .002$. The younger age group has a higher mean prosocial helping score of 3.78 ($SD = .72$) than the middle group with a mean of 3.34 ($SD = .73$), $p = .002$. A one-way independent groups ANOVA was conducted to look at the main effect between year group and prosocial comforting. There was a significant main effect between year group and prosocial sharing, $F(2, 182) = 6.919, p = .001$. Tukey HSD post hoc comparisons revealed that the older age group has a higher mean prosocial comforting score of 4.01 ($SD = .74$) than the middle group with a mean of 3.43 ($SD = .94$), $p = .001$. The younger age group has a higher mean prosocial helping score of 3.79 ($SD = .82$) than the middle group with a mean of 3.43 ($SD = .94$), $p = .037$. Please see Table 1 for the means and standard deviations of the three independent groups’ ANOVAs.

<table>
<thead>
<tr>
<th>Prosocial Sharing</th>
<th>Prosocial Helping</th>
<th>Prosocial Comforting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger age group</td>
<td>4.12 (.68)</td>
<td>3.78 (.72)</td>
</tr>
<tr>
<td>Middle age group</td>
<td>3.87 (.76)</td>
<td>3.34 (.73)</td>
</tr>
<tr>
<td>Older age group</td>
<td>4.57 (.45)</td>
<td>3.81 (.75)</td>
</tr>
</tbody>
</table>

Well-being. An independent samples $t$-test revealed a significant effect between well-being and prosocial sharing, $t(183) = -3.308, p = .001$. The high well-being group had more sharing behaviours with a mean of 4.34 ($SD = .63$) than the low well-being group with a mean of 4.01 ($SD = .74$). An independent samples $t$-test revealed a significant effect between well-being and prosocial helping, $t(183) = -3.216, p = .002$. The high well-being group had more helping behaviours with a mean of 3.84 ($SD = .71$) than the low well-being group with a mean of 3.49 ($SD = .76$). An independent samples $t$-test revealed a significant effect between well-being and prosocial comforting, $t(183) = -2.368, p = .019$. The high well-being group had more comforting behaviours with a mean of 3.90 ($SD = .79$) than the low well-being group with a mean of 3.60 ($SD = .90$). Please see Table 2 for the means and standard deviations of the independent samples $t$-tests.

<table>
<thead>
<tr>
<th>Prosocial Sharing</th>
<th>Prosocial Helping</th>
<th>Prosocial Comforting</th>
</tr>
</thead>
<tbody>
<tr>
<td>High well-being</td>
<td>4.34 (.63)</td>
<td>3.84 (.71)</td>
</tr>
<tr>
<td>Low well-being</td>
<td>4.01 (.74)</td>
<td>3.49 (.76)</td>
</tr>
</tbody>
</table>
DISCUSSION

Overview of the study findings

The current study aimed to expand and advance upon existing knowledge and understanding, concerning the impact of age (measured by school year group) and well-being, upon prosocial behaviours displayed by primary school children. To enhance that of preceding research, prosocial behaviour was separated into three distinct constructs of prosocial sharing, prosocial helping, and prosocial comforting behaviours. Although the current investigation provides a direction for results and explanation for findings, it must be noted that this study may be viewed as correlational and not directly causation. This will be discussed in more detail about potential other influencing factors such as personality.

Overall, the results of the current study presented a significant difference in well-being upon prosocial sharing. This suggests that children with positive (higher) levels of well-being are more likely to share with others. The results also demonstrated a significant difference of year group upon prosocial sharing, with the older age group demonstrating more sharing behaviours. A significant difference of well-being upon prosocial helping was found. This suggests children with positive levels of well-being are more likely to help others. There was a significant difference of year group on prosocial helping, suggesting age influences prosocial helping. The older age group presented more helping behaviours than the middle age group, however, the younger age group also presented similar behaviours (with more helping behaviours than the middle group). This discovery could suggest that a larger difference in age does not indicate more or less helping behaviours, but irrespective of age, the children will still help others. There was a significant difference in well-being upon prosocial comforting, suggesting that the children with higher levels of well-being displayed more comforting behaviours. A significant difference of year group upon prosocial comforting was found, suggesting age has an influence on comforting behaviours and showing final support for the hypothesis. Again, the older children displayed more comforting behaviours than the middle-aged children.

Comparison to previous research

The current findings link back to the previous research in suggesting that age could be an influencing factor in the presentation of prosocial behaviours (Mayr & Freund, 2020). Similar to the current investigation, Mayr and Freund (2020) suggested that older individuals have developed more prosocial behaviours, similar to the current investigation suggesting that older children demonstrate more sharing behaviours. Although there is a similarity in the results, it must not be ignored that the research from Mayr and Freund (2020) focussed heavily upon charitable behaviours in adults. As the current research used children, charitable behaviours may not have fully developed as children may not have experienced the opportunity to give to others, therefore the comparisons between the research must be considered with caution.

The findings of the current investigation align with previous research (e.g., Aknin et al., 2015), providing evidence for an apparent association between higher levels of positive well-being, and sharing with others. This outcome could perhaps be due to parents socialising their children to share with siblings and peers from a young age. However, the research from Aknin et al. (2015) was conducted within a small American population and the current investigation used a UK-wide sample and this makes any results have the potential to be influenced by cultural and societal differences.

Alongside parents, siblings act as a source of influence on prosocial development, as children learn to respond to each other’s needs by sharing (Smith & Hart, 2002) and this is one thing that the current investigation considered as the prosocial behaviour measure was not solely related to school unlike the previous research (e.g. Lui et al., 2020; Su et al., 2019) Also, parenting style has a meaningful role to play in the development of a child’s sharing behaviours (McGrath et al., 2003) and this is one thing that neither the previous research nor the current study has investigated. For example, an authoritative parenting style, when the parent is firm yet responsive towards their child’s needs, engenders more prosocial behaviours in the child, both at home and in school (Krevans & Gibbs, 1996). Moreover, giving and sharing with others could grant the child a sense of purpose, happiness, and allow them to feel satisfied, which in turn can improve their well-being. However, one uncertainty is that it cannot be certain as to whether the well-being can be a cause of the prosocial behaviour of a result (Miller et al., 2015).

Results are also similar to existing research (e.g. Liu et al., 2016) that uncovered the proportion of children who shared with their peers increased with age, strengthening this claim. It is plausible that increasing age results in increased sharing behaviours, as the children have presumably experienced a higher volume of encounters with other individuals, increasing the opportunities to practice sharing behaviours. Moreover, the
sample of children in Liu et al.’s (2016) research were Chinese children, suggesting the knowledge that sharing behaviours increasing with age may be applied cross-culturally, establishing the ground for future research to strengthen or dispute this claim.

Results surrounding helping behaviours could perhaps be due to children with higher levels of well-being are more willing, or more inclined to help others, as they may have a stronger desire to increase the well-being and happiness of others to align with their state of well-being. Interestingly, this finding is dissimilar to the findings from Miller et al. (2015), who concluded that children from more wealthy families are less likely to altruistically help others, compared to children from less wealthy families, who are more likely to help others. This effect was found even when the helping involved sacrificing their treats to benefit another. As increased wealth is strongly associated with positive well-being and prosocial behaviours (Mayr & Freund, 2020), this finding is inconsistent with the idea that higher levels of well-being lead to increased helping behaviours, as found by the current study. Consequently, the findings of the current study are consistent with existing research by Smith and Hart (2002), who also found children help others when in need, particularly those children who exhibit more empathy and sympathy towards others.

Age-related differences from the current study, although similar to the previous work of Chen et al. (2020), need to be considered in terms of the study design. Chen et al. (2020) used a longitudinal study design, clearly showing the progression of prosocial behaviours as children age whereas the current study used a cross-sectional design with different children in each group. This difference in design could be a reason for results and from the current study, it cannot be inferred that prosocial behaviours change as we age, just that they may be different in terms of age. Perhaps in the future, a longitudinal approach for the current investigation would allow researchers to show the clear development.

A possible explanation of the finding of the display of different prosocial behaviours, in particular comforting behaviours, could be due to dispositional factors or individual differences that vary amongst children, such as personality. The Five-Factor Model of Personality Traits (Digman, 1990) proposes five main personality traits which all individuals possess, but with varying levels. Of interest about the Big 5 is agreeableness. Agreeableness is a personality trait that refers to an individual’s overall level of kindness and empathy. Research has found levels of agreeableness in children can predict empathy and also can be linked with prosocial behaviour (Habashi et al., 2016; Sneed, 2002), and as levels of this personality trait vary between children, this attribute could impact when, how, and even if children engage in behaviours to comfort another. If a child is seen as more empathetic then they may display more prosocial behaviours such as comforting if they know how someone else is feeling. More specifically, Caprara et al. (2010) found agreeableness accounted for a large proportion of variance in prosocial behaviours in children, further supporting the indication that individual differences can influence prosocial behaviours, thus potentially contributing to this finding. Researchers could also account for personality in terms of the HEXACO Model (Ashton & Lee, 2007). Hilbig et al. (2014) suggested that a person who scores highly on the honest-humility construct of personality is more likely to engage in more prosocial behaviours. This research was conducted within an adult sample; however, considerations could be made as to whether this is the same within children. In terms of the relationship between personality, health, and well-being, Goodwin & Friedman (2006) have suggested strong links between conscientiousness (the ability to be organised and perform well) and both physical and mental well-being. This could be a potential influence within the current investigation and warrants further investigation.

These findings of comforting behaviours support previous research, such as Catherine and Schonert-Reichl (2011), that used a sample of children in grades 1–7, a similar span of ages to the present study, which may explain the comparable findings. Additionally, Eisenberg et al. (1996) also found differences between age and levels of comfort. However, they found younger children often comfort others less when compared to other age groups, as it was found younger children have higher levels of shyness. Younger children may wish to comfort peers, but potentially lack the assertiveness and confidence to do so. This research contrasts with the current findings, as the younger age group displayed higher levels of comforting behaviours. The difference in the findings may be a result of only adopting parental input in the present study. The results may have been different if, like previous studies (e.g., Eisenberg et al., 1996), teacher perspectives were also used. Children often behave differently at home compared to when at school, and, for example, if levels of shyness were incorporated into the current study, teachers may report higher levels of shyness for particular children, which can alter the results and possibly explain the identified discrepancy. Further, this difference between the findings may be due to situational factors, as comforting is only likely to occur when a child has experienced empathy towards another in a particular context and learned how to respond to their needs. Empathy is likely to lead to increased prosocial actions, as the primary goal of the child who is comforting another, is to increase the other’s welfare (Chavez et al., 2019; Smith & Hart, 2002). These empathic experiences are likely to vary between children, therefore no significant difference between the younger and older age groups may be suitably explained as a consequence of these situational factors. Additionally, there was a significant difference
found between middle and older age groups, with the older age group obtaining higher mean prosocial comforting scores, confirming what has been widely reported in the literature regarding prosocial behaviours increasing with age (Catherine & Schonert-Reichl, 2011; Takagishi et al., 2010).

Potential limitations

Several limitations of the present study must be acknowledged. Firstly, the data collection was largely committed to the use of questionnaires, perhaps limiting the investigation of prosocial behaviours and well-being, two large and complex areas of research regarding child development. It must also be noted that there are alternative methods of data collection, which may have been more suitable for the investigation of these variables. For example, peer and self-report methods (e.g., Wentzel & McNamara, 1999), or observations of particular behaviours during laboratory experiments (e.g., Miller et al., 2015) as these would have provided researchers with further control of the complete environment within the study. Additionally, the children in this study were in years 1–6 (aged 5–11 years old), covering a much wider age span than the samples used in most existing research. However, in the current study, to increase the number of participants for each age group, the year groups were combined, creating three categories (younger, middle, and older age groups). Although this is comparable with previous research (e.g., Liu et al., 2016; Zahn-Waxler et al., 1983), future research using a similar span of ages may find it beneficial to carry out the data analysis with the year groups remaining separate, to detect any specific differences at each age. Lastly, the present study does not consider external influences that differ between children (parenting style, personality influences, socioeconomic status), which could potentially alter the results. This could involve the different cultures, social environments, or economic situations that the children are living in, or varying parenting styles that the children are exposed to (Petito & Cummins, 2000; Røysamb, et al., 2018).

Despite these limitations, the current study offers a unique contribution by extending the understanding around child well-being and age, and the impact these variables may have on the types of prosocial behaviours that children display. This study was unique in that it quantitatively measured well-being, using a sample of primary school children, in years 1–6 (aged 5–11), while investigating three separate constructs of prosocial behaviour: helping, sharing, and comforting behaviours. The current findings, suggesting that higher levels of well-being across all ages, can motivate positive prosocial actions amongst children, could be implemented into classroom initiatives. For example, teachers could aim to encourage cooperative group work, problem-solving tasks, and activities to improve teamwork skills so the children are consistently presented with opportunities to develop solid peer relationships, that primarily focus on helping, sharing, or comforting others. Further, encouraging the development of these desirable prosocial behaviours has positive associations with academic achievement (Caprara et al., 2000; Morrison-Gutman & Feinstein, 2008; Wentzel, 1993; 2015). Therefore, prosocial behaviours should be managed in the classroom, using praise and reward to encourage and promote these types of positive behaviours, with the expectation of detecting a positive correlation when monitoring the children’s academic achievement. Outside of the classroom, teachers could liaise with parents regularly, to promote child well-being as a priority, whilst emphasising the importance that well-being has on their child’s prosocial behavioural development, and further, academic achievement. Alternative research methods may have considered going into classrooms to test and measure the children directly, to gain knowledge of how prosocial they view themselves and the extent to which they understand their well-being. Caprara and Pastorelli (1993) concluded that children can be a reliable source when reporting their level, or view of their prosocial behaviours, and the issue of social desirability bias is less present in children. Perhaps the current investigation can be criticised for using parental views only and not investigating the views of the children themselves as this would have been an insightful way to improve the investigation.

Future research directions

There are several directions for future research which could be implemented from the current investigation, with the main direction being the consideration of personality. Previous research has shown that personality traits can influence how an individual may behave in terms of their behaviours (Habashi et al., 2016; Hilbig et al., 2014), therefore this could be investigated in terms of future research. Future research may want to include a measure of personality such as that of the Ten Item Personality Inventory (Gosling et al., 2003) which could look specifically at agreeableness.

Another future research direction could be to look at the type of parenting style parents have about their children. Previous research (Krevis & Gibbs, 1996) has suggested that parental actions can influence how a child may behave and think and this concept could be used to see if an authoritarian parenting style has the same reflection upon a child’s type of prosocial behaviour. Therefore, variable parenting styles could explain the difference between the level of well-being and the effect this has on prosocial sharing.
A final direction for future research could be to consider the cross-cultural differences within prosocial behaviours. In the research discussed (such as Liu et al., 2016; Aknin et al., 2015), different cultures were used and in the current investigation, these cultures were not replicated. It would be interesting to see if cultural differences were present by conducting the current investigation again within an American sample of children and adults.

CONCLUSION

It is apparent that positive levels of child well-being have a positive effect on helping, sharing, and comforting behaviours displayed by children in primary school, however, the effects of age were not fully in line with previous literature as both prosocial helping and sharing demonstrated higher levels in the older and younger ages, rather than a steady progression across the ages. This ignites ground for future research, to account for these potentially confounding influencing factors. Thus, a further suggestion for future research could consider additional perspectives, such as teachers, to gain a multifaceted view of each child. Overall, the findings have provided a valuable insight into the different elements of a child’s life, regarding their age and level of well-being, which can be applied into both educational environments and home settings, to promote and encourage more positive and prosocial behaviours during childhood.

REFERENCES


Youth Care Forum, 49(1), 77–95. https://doi.org/10.1007/s10566-019-09518-4


73


The present paper explores current theories and research on the transactional model of stress and coping and how this can affect our ability to perform at all levels, particularly within elite performers. In post-pandemic COVID-19, this paper presents an important topic for discussion and has significant practical implications on elite performers’ overall well-being and mental health. The aim is to present an alternative understanding of how we respond to stressors and reflections from a practitioner perspective working with elite performers. Firstly, sport and exercise psychology literature presents an overview of what constitutes a stressor and how this can affect an individual. It looks at drawing parallels with sports performance psychology and how different sources of stress and anxiety can lead to the adoption of different coping styles. Secondly, a model of coping styles is illustrated to shed light on how different perceptions of stressors and anxiety are managed individually and in groups. To conclude, some practical implications and reflections for clinical practice are presented, highlighting the significance and value of creatively teaching and fostering opportunities for individual learning coping and tolerance skills. Furthermore, it explores how exposure to stressors can provide unique opportunities to foster the implementation of effective transformational coping, greater inner strength, and personal growth through self-reflection and self-management.

Keywords: avoidance coping; coping styles; emotion-focus coping; problem-focus coping; transactional model
Before defining stress in the context of this paper, a reminder of the World Health Organization definition of health and well-being is here well placed. It highlights health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (WHO, 1948). It is often thought that to experience well-being, an individual has to be free from illnesses and diseases, which in part becomes counterintuitive from what the literature in neuroscience, sport and performance psychology suggests, where a level of stress and pressure is often experienced and necessary for our resilient systems to grow and flourish. (Seligman & Csikszentmihalyi, 2000). The definition emphasises the role of prevention and health determinants. It also emphasises how health is shaped by the cultural constructs within which it is situated and how it can be promoted at both an individual and a society level (Wilkinson & Marmot, 2003). Individual and social perspectives are included within this definition, emphasising that health and well-being are complex systems interacting and influencing each other. Social perspectives through theoretical paradigms aim to explain how society influences individuals and how individuals shape and influence society as agents in a canvas rather than in a vacuum. Complex systems require complex answers and solutions. Therefore, inhibitors and barriers to our health and well-being can be defined as demands placed on our systems, both within individual and collective perspectives, which outweigh the coping resources available at any given moment. Stressors have been defined as ‘environmental demands encountered by an individual’ and categorised within some sports literature into three main groups: competitive, organisational, and personal (Fletcher et al., 2006). In this article, I aim to present some reflections which my professional experience has shaped as a practitioner sport and exercise psychologist in supporting elite performers in the performing arts and draw on theoretical psychological understanding on how formulations and transformational growth has occurred (or not), reflecting and challenging how stressors are understood and managed throughout this process.

**Demands from competitive stressors**

Competitive stressors are defined as ‘an ongoing transaction between an individual and the environmental demands associated primarily and directly with competitive performance’ (Fletcher et al., 2006). Therefore, only stressors that are related to competitive performance are named competitive stressors. For example, opponents in a competition or team game will be perceived as threats to the acquisition of winnings and rewards (Hanton & Fletcher, 2005). Other examples can include preparation for competition, environmental issues related to selection, finances, accommodations when travelling, training environment, and competitive environment. Team issues have been identified as the team atmosphere, the available support network, roles-definition, and communication (Fletcher & Hanton, 2003). The unpredictability of the opponent’s preparation, the eventuality of injuries, and technique issues have also been identified as further sources of competitive stressors (Thelwell et al., 2007). In Thelwell et al. (2007) study of professional cricket batters and through a combination of inductive and deductive content analysis, they suggested that despite the overlap between stress and coping interventions, the specific demands of a sport (or performing art discipline), the specific techniques issues and barriers need to be understood by practitioners for the interventions to be successful. In a study by Neil et al. (2011), appraisal, emotion-reactions, further appraisals, and athletes’ behavioural responses were examined to the exposure of performance and organisational stressors within a competitive environment. The transaction between the individual perceived stressors and the competitive environmental stressors gave rise to negative emotions and appraisals (Relojo et al., 2015). However, through a further appraisal, thoughts and feelings were interpreted as facilitative through increased effort and focus. It is arguable that the demands placed on elite performers in an art/performing environment is or can be highly competitive, even with the absence of individual opponents, teams or competing for winning medals. It can cause perceived stressors and anxiety that, if exceeding the performer coping resources available, within and outside the working environment, can impact their individual and collective performance quality (Ogwuche et al., 2020).

Performance anxiety can also be a consequence of other individual anxiety levels caused by different factors which can stem from the environment, both at the group and systemic levels. It is not because there are no medals or rewards at the end of a performance that stressors and anxiety are experienced less frequently or intensely. Fear of failure, low self-esteem and self-efficacy, low sense of locus of control, concerns with deselection, peer pressure can all be contributing factors in experiencing a high level of competitive stress.

**Demands from systemic stressors**

The organisational stressors are defined as ‘the environmental demands associated primarily and directly with the organisation in which s/he is operating’ (Fletcher et al., 2012). Research in sports literature has proposed a framework of five key organisational themes (Fletcher et al., 2006). Factors intrinsic to sport such as training environment, travel, accommodation: roles in sport organisations such as role conflict and ambiguity; organisational structure and climate such as cultural issues; sports relationships and interpersonal demands
such as either absence or inadequate access to social support; and finally athletic career and performance development issues such as position insecurity, opportunities for career progression and promotions.

Understanding organisational stressors within a sporting and performance environment are thought to be significant due to its disruptive nature towards overall performance. And these themes can well translate into arts-based performing environments with similar observable challenges. Contemporary evidence proposes that organisational stressors have the strongest influence on athletic performance (Fletcher et al., 2012). These key organisational themes highlight the significance of contributing factors that might not necessarily be causally related to the individual experience of stress and performance. In other words, it emphasises the importance and impact that supporting the whole person within their context – and not as a performer in isolation – ought to guide reflections and interventions which are connected and beyond the biological/physical component of stress management. The way an individual perceives their level of autonomy, competence and belonging – key psychological human needs – being met (or not) also play a significant role in managing stressors and anxiety (Ryan & Deci, 2007).

**Demands from individual stressors**

Personal stressors are defined as ‘an ongoing transaction between an individual and the environmental demands associated primarily and directly with personal life events’. Examples can include lifestyle issues and financial issues (Thelwell et al., 2007). The COVID-19 pandemic has provided a fertile landscape in the last 18 months, where artists and performers have been either laid-off or made temporarily or permanently redundant. At least 7,442 theatre and live events workers have been made redundant due to the COVID-19 pandemic, new figures from entertainment union BECTU have revealed (Masso, 2020). In specific artistic endeavours, the unemployment rates for pre-Covid hover at around 90%, with only about 2% of actors able to make a living from their career (Williams et al., 2020).

Psychological stress is a particular relationship between a person and the environment that the individual appraises as taxing or exceeding their resources and endangering their well-being (Lazarus & Folkman, 1984). From a theoretical perspective, Lazarus and Folkman’s (1984) suggested a transactional model of stress and coping helping to understand the stress appraisal (and re-appraisal) and coping relationship as a process that is fluid and changeable (see Figure 1).

Figure 1
The Adopted Transactional Model of Stress, Adapted from Folkman & Lazarus (1988).

Folkman et al. (1987) suggested two central processes that determine the outcome of a stressful experience in each situation: a cognitive process and a coping process. The first includes three basic forms of appraisal: a *primary appraisal* where the individual assesses the significance of the situation and gauges whether the situation is positive, stressful or irrelevant and through this appraisal makes a judgement on whether the level
of ‘threat’ is negatively affecting their homeostasis or optimal arousal level for individual optimal performance. A secondary appraisal is an assessment of coping resources and options available depending on the situation appraised, such as a threat, a challenge, an opportunity, or a loss. The third is the notion of re-appraisal, which is a state of being ‘on guard’ as processes are in constant motion due to possible changes in the environment and the individual’s developing coping skills. Emotional responses and emotional self-regulation need to be mastered, and this is when cognitive appraisals leave the stage for different coping processes (Boltivets & Relojo, 2019).

The model asserts that individuals’ cognitive appraisals of potentially stressful situations will be influenced by an interaction between the person (e.g., personality, goals) and the situation (e.g., social interactions, the environment). The transactional model provides a conceptual framework that addresses that stressors, rather than a quantifiable entity out there (or at times perceived as internal and unique to the individual), needs to be seen as a fluid and transactional process which encompasses the overall journey, including: (a) stressors – the source of the problem issue; (b) appraisals – the way people perceive the issue, strain and; (c) coping – the way individuals resolve or try to resolve rather than to explain it as a single phenomenon (Hanton et al. 2005). The physical symptoms of stress are generally categorised into three areas: (a) physiological – increased heart rate, sweaty hands, and muscle tension; (b) cognitive – perceptual changes and narrowing, decision-making, memory, and response selection; (c) emotional – aggression, frustration, confusion, and withdrawal from the situation.

Physiologically, hormones such as serotonin, dopamine, adrenaline, oxytocin, and cortisol play a fundamental role in coping. Hormones carry messages from where they are produced to different parts of the body. They help switch on or switch off cellular processes that control our appetite, growth, stress, blood sugar, sleep cycles, sex drive, and sexual function (Aaron et al., 2019). Dysregulation in serotonin production can affect our moods and our ability to implement effective passive or active coping mechanisms (Carhart-Harris & Nutt, 2017). Automatic responses, also known as the ‘fight-or-flight’ response, activates the sympathetic nervous system in the form of increased focus levels, adrenaline, and epinephrine. These responses are activated for survival in the face of threats and have played a crucial role throughout our evolution. These responses are experienced by all of us throughout our lives, with different levels of intensity, frequency, duration, and range, and I would argue that these challenges have an important function to play in our psychological resilience and growth. Normalising these experiences and supporting them in understanding their role and usefulness has been beneficial in promoting more effective and efficient stress management techniques in elite performers. Differences are also accounted for by the individual perception of the stressors in question and availability and access to their resources, their ability to do so effectively, and their ability to recognise those coping resources to autonomously and competitively reach out and source them in the first place.

**Coping: problem-focus and emotion-focus coping styles**

In this context, coping refers to the individual’s response to a psychological stressor which the individual has experienced – long and intensely enough – to provoke a reaction, as stressors are often related to the adverse event(s) or perceptions of negative situations that causes an individual’s anxiety. However, as illustrated above, stressors can be classified into different areas which do not necessarily amount only to adverse events: the ability to sit uncomfortably with an unpredictable situation that causes anxiety and an ability to cope with it till the relevant resources for managing effectively are available and sourced by the individual, become an essential part of this process of growth and transformational coping (Dryden, 2019).

Though Lazarus & Folkman (1984) have identified two broad categories, individuals may adopt a range of coping styles: problem-focus coping styles and emotion-focus coping styles. Individuals that adopt problem-focus coping styles aim to deal with the source of the problem, often tackling the situation and effortfully committing to making changes: finding out information on the problem or issue experienced and committing to learning new skills to manage them. Problem-focus coping is aimed at changing or eliminating the source of the stress. Folkman and Lazarus (1988) have also identified three types within this category: (a) taking control; (b) information seeking, and (c) evaluating negatives and positives of a given situation. Taking control of what is controllable is a modality often adopted with elite performers and the ability to recognise what is out of their control so that these elements – out of their control – can either be parked for a later time when resources to positively manage the situation become available or let go of them in such a way that it becomes a conscious and effortful individual’s decision. Elements from acceptance and commitment therapeutic models (ACT) can help support this process (Hooper & Larsson, 2015). Information seeking can keep the individual’s sense of meaning-making and opportunities to challenge pre-conceptions or belief systems that are unhelpful to cope with the situation effectively. The evaluative process can be promoted in challenging assumptions that again are either maladaptive or unhelpful to the individual, seeking instead and empowering a self-discovery and solution-focus approach to the issue.
Emotion-focused coping styles instead aim to manage the emotional responses to the perception of a stressful event/situation. Emotion-focus coping styles aim to reduce, alleviate, contain and minimise the unpleasant, stressful feeling associated with the stressor. The focus of this coping style is to guide away, accept and manage or contain the emotional responses to an unpredictable and uncontrollable situation. It is also important to distinguish between an avoidance coping mechanism related to the emotional response and coping style and a positive re-appraisal. The latter is preferable as a long-term emotion-focused coping style mechanism instead of distancing or avoiding a situation that can become detrimental to the individual over an extended period. Labelling emotions can be a good process where individuals are empowered and guided to identify and label what they are experiencing and feeling. Often not quite knowing what an individual is experiencing can be very debilitating and limiting, where recognising and labelling and compassionately noticing which emotions are permeating can be extremely helpful (Hooper & Larsson, 2015).

**Appraisal-focus coping style**

A third classification proposed by Carver et al. (2010) is identified as the appraisal-focus coping style, which aims at challenging the assumption of an individual’s perception of a specific stressor through a change of cognitive re-evaluation and ultimately a process of re-framing. People tend to use various coping styles according to the stressor and situation they are facing and managing. However, what seems to be happening in situations when the issue and source of stress continue to affect the performer negatively, is often their inability to adopt the appropriate coping style for a specific situation or lacking the ability to implement cognitive restructuring and a positive re-evaluation for their perceived stressor. Individuals tend to adopt problem-focused coping styles for uncontrollable situations whereas they would benefit from adopting an emotion-focused coping style as the situation cannot be changed at the time of their appraisal. Conversely, they tend to adopt emotion-focused coping styles to address the situation by acquiring new skills such as further information or implementing an alternative evaluation through solution-focused styles.

The investment of elite performers who are often extremely focused on their ultimate endeavours can present a barrier to potential transformational change as their rigidity of thinking prevents them from seeing the alternative(s). Their commitment to reaching positive results is characterised by a strong determination and motivation, which hinder the necessary flexibility to embrace a different perspective or see the value of safely containing a situation before specific drivers can be effectively implemented. Often, they may not necessarily have the ability or skills to perform this mechanism of re-appraisal without external support and guidance. Understanding these mechanisms – behind the source of stressors – remains key if we want to ensure that the most appropriate level of psychological and educational support is provided. In the next section, I aim to illustrate through some practical examples how this process of understanding that stress and low levels of performance anxiety can lead to proactive and transformational resolutions when appropriate appraisals and coping styles are adopted within a wider context.

**How to cope with competitive stressors**

Coping with competitive stressors in elite performers is often related to the individual drive for perfection. It is not the scope of this article to delve into perfectionism, but in my professional practice, it is strictly related to the self-management of stressors and how these are perceived and conceptualised by the individual (Pickard, 2020; Stoeber & Otto, 2006). Positive education and transformational growth can occur by promoting self-awareness of their limitations and, more importantly, recognising and effectively adopting their characters’ strengths (Seligman & Csikszentmihalyi, 2000).

This is the process that would be followed for an elite athlete to achieve optimal results in competition. The transaction between the individual and their environmental demands related to their performance should be considered a starting point, rather than considering the environment as a static vessel where the individual has to perform with only medals and winnings as the focus of their efforts. Reducing, mitigating and safely containing or re-framing stressors means being able to be tuned in with what the individual wants to achieve and how they are going to get there. Through clear process goal-oriented tasks and, more significantly, process-oriented activities, this can be achieved by using pathways appropriate to each individual in terms of skills acquisition, mastery and eventually integrating generalisation and transferability to different competitive contexts.

**How to cope with organisational stressors**

The process of coping with organisational stressors is undoubtedly challenging when financial and aesthetic pressures compound the organisation. This remains the most significant step to be adopted for any stress
management reduction intervention. In the context of organisational stressors, this will ensure that as far as possible and within the constraints and pressures of any performing organisation, the elite performer has a voice and can make supported and structured choices within the performing environment. Each individual will be adapting and adopting individualised coping mechanisms to make sense of the situation they are managing and reduce any potential conflicts of values. Reaching a ‘good fit’ between the individual belief system and the organisational values become an important and essential factor.

How to cope with individual stressors

When coping with personal stressors, knowing the individual’s case history, educational background, previous overcomes challenges, and lesson learnt from those experiences, the current personal situation outside the organisation – their social support environment, their emotional environment – can help in the understanding of what other contributing factors amount to sources of experienced stress. This can be achieved by building a trusting working relationship that places the performer at the centre and a collaborative, co-produced plan that promotes development (Keegan, 2016; Tod & Anderson, 2012). Supporting individual performers in cultivating and nurturing self-reflection and knowledge of the self has been essential when empowering individual performers in acquiring the necessary and effective tools for self-management. Promoting well-being and wellness when mental health issues are more and more talked about will be key if we want to ensure that professional performers live long and healthy professional lives (Pilao et al., 2017). Reducing the effect of prolonged exposure to poorly managed stressors that can lead to serious mental health conditions such as eating disorders, depression, and suicidal ideation ought to be an ongoing priority. Equipping performers with the necessary tools that not only enhance their performances; however these are measured, but support them to nurture a sense of agency, a sense of competence and effective ways of coping in the face of adversities ought to be all of the allied health professionals and practitioners’ priorities.

CONCLUSION

This paper aimed to understand better the stress appraisal process and subsequent coping styles and responses to different situations/events in elite performers within arts-based environments. By drawing from knowledge in the sport and exercise psychology literature, but also other modalities of therapeutic approaches, the paper illustrated how stressors and stress management and containment is conceptualised and aimed at clarifying the notion of a process that is fluid and changeable rather than a static event/situation in time. As ‘performers’ in our societies, we can all be experiencing stress differently and frequently. Accepting and committing to this notion that stress and stressors are part of our lives might be transformational. Understanding coping mechanisms and styles behind stress management can help us reach better outcomes in prevention, management, health promotion, and treatment - when treatment becomes necessary. The realisation that stress is more common than what we normally assume or think of may also help us embrace the opportunities for growth that come with it.

By exploring current coping styles and by reflecting on new ways in which levels of stress and anxiety can be addressed through acknowledgement, acceptance, awareness, and observation, noticing what is going on rather than providing an immediate reactive response to the symptoms (both observable and non-observable) will better equip the elite performer in self-managing their stressors.

This article looked at the perception of stress and stressors from a growth and developmental perspective, where obstacles and barriers to learning become an essential part of our growth. Through uncomfortable situations and events, we test ourselves, and it is through risk taking we learn, adapt, and adopt new skills to be able to cope with the occurring situation positively. Teaching ways on how to understand and address the relationship between our thoughts and feelings and subsequently our responses/actions to it – our behaviours – can ultimately support individuals to better be attuned to the self and in some ways attuned to others, so that the transformational growth does not happen in isolation, in a meaningless vacuum, but as part of a wider social and cultural context where all individuals healthily, dynamically and creatively function, develop and contribute.

REFERENCES


Another perspective on the relations of personality to suicides, suicide attempts, and suicide ideations

Stewart J.H. McCann
Cape Breton University, Canada

Correspondence: stewart_mccann@cbu.ca

The relative frequency of suicides, suicide attempts, suicide plans, and suicide thoughts differs widely. This has prompted researchers to assume that both common and divergent factors such as personality might influence the occurrence of these four types of suicidal phenomena. The present geographical psychology study examined the relationship between personality and these suicidal events using the 50 American states as analytical units. Based on 2008-2009 data, relations of rates of suicides, suicide attempts, suicide plans, and suicide thoughts to the Big Five personality variables and six sociodemographic variables (i.e., socioeconomic status, White population percent, urban population percent, unemployment rate, religiosity, and depression) were determined using sequential multiple regression. Separate analyses were conducted for five population categories: total, male, female, younger, and older. In each equation, the six sociodemographic variables are entered first as a block. The Big Five entered second stepwise. The results showed a high degree of consistency across the five population categories. For example, lower neuroticism and lower agreeableness were associated with higher suicide rates in all five, but neither neuroticism nor agreeableness was related to suicide attempts, plans, or thoughts in any of the five. The magnitude of the suicide rate variance accounted for by neuroticism and agreeableness far exceeded the variance accounted for by the block of six socioeconomic variables, even though the personality variables had the disadvantage of entering the equation after the six socioeconomic controls. It is cautiously speculated that these state-level relations are grounded in corresponding relations at the individual level of analysis. As well, it is suggested that clinicians may miss the mark somewhat if they are not particularly vigilant for suicide risk signs in clients from states with characteristically lower resident neuroticism or lower agreeableness, in those who are less neurotic or more disagreeable, or in those who do not outwardly display evidence of attempted suicide or suicidal ideation.

Keywords: neuroticism; personality; suicide; suicide attempts; suicide ideations
There are large differences in the frequencies of suicides, suicide attempts, suicide plans, and suicidal thoughts in the US. For example, in 2018, there were 48,244 suicides, but approximately 1,300,000 adults attempted suicide, 2,800,000 made suicide plans, and 9,800,000 had serious suicidal thoughts. As well, of the 1,300,000 who attempted suicide, it is estimated that 300,000 attempted suicide without developing any previous suicide plan (National Institute of Mental Health, 2019). Therefore, it is not surprising that researchers have assumed that there might be divergent and common factors underlying these four categories of suicidal phenomena (e.g., Branley-Bell et al., 2019; Conner et al., 2007; Marie et al., 2020).

One such line of enquiry has centred on the role of the Big Five personality dimensions (e.g., Costa & McCrae, 1995; Goldberg, 1990; John & Srivastava, 1999) in relation to suicide, suicide attempts, and suicidal thoughts, and plans. The well-established Big Five model comprises five major personality dimensions: openness to experience; conscientiousness; extraversion; agreeableness; and neuroticism. Each continuum consists of several facets. For example, persons higher on openness demonstrate greater diversity tolerance and willingness to experiment; conscientiousness emphasises order and dutifulness; extraversion is gregarious, and excitement is seeking; agreeableness shows greater trust and compliance, and neuroticism is more anxious and vulnerable (Costa & McCrae, 1995).

Neuroticism has been the personality dimension most researched in suicide, with individuals as the units of analysis. For example, despite obvious major obstacles to studying the personality of those who take their own lives (Brezo et al., 2006), researchers usually have found that higher neuroticism is associated with suicides, but there are exceptions. Suicide completers are higher on the neuroticism dimension than comparable controls (e.g., Draper et al., 2014; Duberstein et al., 1994; Tsoh et al., 2005; Useda et al., 2007). Batty et al. (2018) also found that across five large cohort samples containing 464,251 persons observed for an average of 8.1 years, higher neuroticism was associated with a greater number of deaths attributed to suicide. A literature review by Wasserman (2016) concluded that neuroticism was positively related to suicide. However, Tsoh et al. (2005) and Useda et al. (2007) reported that suicide completers are less neurotic than attempters, and Beautrais (2004) found in a sample of suicide attempters followed for five years that neuroticism was unrelated to future suicides.

Studies also tend to support an association between higher neuroticism and suicide attempts in a research area less fraught with procedural difficulties. As noted in the previous paragraph, suicide attempters may be more neurotic than completers (Tsoh et al., 2005; Useda et al., 2007). Beautrais (2004) also found in the sample of suicide attempters who followed for five years that neuroticism was positively related to making further suicide attempts. Su et al. (2018) compared mood disorder patients to community controls and found that higher neuroticism was associated with greater risk for suicide attempts and that this association was elevated among those with suicidal thoughts. In addition, Wasserman’s (2016) review also concluded that neuroticism is associated with suicide attempts. However, Rappaport et al. (2017) found in a study of 5,864 Chinese women with major depressive disorder and 5,783 without that neuroticism assessed with the Eysenck measure decreased the chances of a suicide attempt. Somewhat in contrast to research on the relations of neuroticism to suicides and attempted suicides, research rather consistently supports an association between higher neuroticism and aspects of suicidal ideation, which comprises suicide thoughts and plans (e.g., Batterham & Christensen; 2012; Kim & Ahn, 2014; Rappaport et al., 2017; Stefa-Missaglia et al., 2019; Su et al., 2018; Wasserman, 2016).

The other Big Five personality factors have received less attention in the realm of suicidal phenomena. Nevertheless, a relatively high number of studies have found that lower extraversion is associated with suicides (e.g., Draper et al., 2014), suicide attempts (e.g., Wiktorsson et al., 2013), and suicide ideations (e.g., Singh & Pathak, 2017). Based on comparatively less research, suicides, suicide attempts, and suicide ideations generally be associated with higher openness (e.g., Blumle et al., 2013; Draper et al., 2014; Rozanov & Mid’ko, 2011), lower conscientiousness (e.g., Cole, Littlefield, Gauthier, & Bragg, 2019; Dutta & Gupta, 2013; Lester, 2001), and lower agreeableness (e.g., Batty et al., 2018; Kerby, 2003; Mousavi et al., 2015). Although support for these relations involving extraversion, openness, conscientiousness, and agreeableness is relatively consistent, exceptions also have been reported (e.g., Ayuh, 2015; Batty et al., 2018; Blumle et al., 2013; Stankovic et al., 2006; Rozanov & Mid’ko, 2011; Singh & Rani, 2014; Velting, 1999).

Relations between suicide and the Big Five personality dimensions also have been explored within US states rather than individuals as the units of analysis (Lester & Voracek, 2013; McCann, 2010; Voracek, 2009). ¹The

¹Both Voracek (2009) and McCann (2010) asserted that their work was the first to research the relation between state suicide rates and the state-level Big Five personality scores produced by Rentfrow et al. (2008). However, the two articles were conceived and produced on an entirely independent basis. The ‘first’ claim by McCann (2010) occurred because of a lack of awareness of the publication of the Voracek (2009) article caused by overlapping acceptance, publication, and PsycINFO
main analysis in the Voracek (2009) study used combined suicide rates from 1990 to 1994 as the criterion and included the 50 states and Washington, DC. State gross domestic product (GDP) data from 1999 served as the lone statistical control. Voracek used partial correlation controlling for GDP and the other four Big Five personality variables to determine the link between suicide rates and each Big Five personality dimension. Both partial and Pearson correlation showed that higher suicide rates were associated with lower neuroticism. Higher suicide rates showed an association with lower agreeableness using partial correlation, but the relation was not found using Pearson correlation. No other relations between suicide and the Big Five were significant. Voracek (2009) concluded that ‘the topic appears worthy of further inquiry’ (p. 211).

McCann (2010), also using a geographical psychology approach (Rentfrow, 2010, 2014; Rentfrow et al., 2008; Rentfrow & Jokela, 2016), examined the relation of combined 2004 and 2005 state suicide rates to the Big Five using the 50 states as analytical units. A state composite socioeconomic status (SES) variable based on the years 2000 and 2005, a state White population per cent composite based on 2000 and 2005, a state urban population per cent variable based on 2000, and a state depression rate composite based on 2004 and 2005 served as controls in a sequential multiple regression analytic strategy. Higher suicide rates were associated with lower neuroticism and lower agreeableness to a lesser extent in both the Pearson correlation and the multiple regression analysis. Together, state resident neuroticism and agreeableness accounted for a substantial 48% of the variance in 2004 to 2005 state suicide rates.

Lester and Voracek (2013) explored the correlation in the 48 contiguous US states of the state Big Five personality scores (Rentfrow et al., 2008) to suicides in 2008 and to suicide thoughts, suicide plans, and suicide attempts in the 2008–2009 period based on data provided by Crosby et al., (2011). Suicide rates correlated positively with suicide thoughts but did not correlate with suicide plans or attempts. Neuroticism correlated negatively with suicides and suicidal thoughts but did not correlate with suicide plans or attempts. Conscientiousness and suicide plans correlated negatively but this was neither expected nor addressed. Agreeableness was not significantly correlated with any of the four suicide phenomena. Attempted suicide did not correlate with any of the Big Five variables.2

The finding that stands out most in these three studies (i.e., Lester & Voracek, 2013; McCann, 2010; Voracek, 2009) is that higher suicide rates occur in states with lower levels of resident neuroticism. There also was a somewhat weaker association between higher suicide rates and lower agreeableness in the Voracek (2009) and McCann (2010) studies. Why should these relations occur? Based on earlier postulations by Useda et al. (2007), who had found in an individual-level study that those who take their own lives were less neurotic than suicide attempters, McCann (2010) speculated that fewer neurotic persons likely have and express less negative emotion and thereby draw relatively less attention to themselves when troubled and considering suicide and that less agreeable persons also are more likely to end their own lives without drawing attention to their plight because of their tendencies to discourage emotional support. Therefore, we should expect suicide-prone persons in less neurotic and less agreeable American states more often to end their own lives without seeking help, and we should expect suicide-prone persons in more neurotic and more agreeable states more often to seek personal or professional assistance and thereby perhaps reduce their chances of suicide.

Formulating expectations for the relations of personality to suicide attempts, plans, and thoughts were more challenging. For example, based on the preponderance of individual-level research evidence that higher neuroticism is associated with suicide attempts (e.g., Su et al., 2018; Useda et al., 2007; Wasserman, 2016) and suicide ideations (e.g., Batterham & Christensen; 2012; Kim & Ahn, 2014; Stefa-Missaghi et al., 2019), it was tempting to speculate that similar relations might exist with states as the analytical units. However, individual-level connections were not supported in the state-level research of Lester and Voracek (2013), the only study to examine such relations.

Therefore, even though the exploratory analysis of Lester and Voracek (2013) found no relation between neuroticism and suicide attempts, it seems more likely that higher state resident neuroticism should be associated with higher suicide attempt rates but lower suicide rates. Their Pearson correlation analysis showed no consistent significant correlations between the Big Five personality and the three suicide-related variables.

release dates. The McCann (2010) article was submitted on 26 February 2010, accepted on 30 June 2010, and first published online on 15th November 2010. The Voracek (2009) article was first published on 01 August 2009, but the PsycINFO release date was not until 10 July 2010. McCann was unaware of the Voracek article until a personal communication by Voracek on 09 December 2010, in which he was alerted that the Voracek(2009) article existed.

2Quite surprisingly, Lester and Voracek (2013) did not cite the directly relevant research and speculation of McCann (2010) even though their article was not accepted for publication until 20 March 2013. McCann’s e-mail correspondence records show that Voracek had requested and received a copy of the McCann (2010) article on 09 December 2010.
They found no significant correlations between Big Five personality variables and suicide attempts, and only modest significant negative correlations between conscientiousness and suicide plans and between neuroticism and suicide thoughts. Therefore, no expectations were held for personality and the three suicide-related variables in the present state-level research.

The present study

Initiated in the pursuit of greater clarity in this area of inquiry, the present research more comprehensively addressed the relation of state resident Big Five personality to suicides, suicide attempts, suicide plans, and suicide thoughts. This study differed in several key respects from the earlier work by Lester and Voracek (2013). For example, the present research used the full complement of 50 states, while Lester and Voracek, without explanation, excluded Alaska and Hawaii even though data were readily available. Also, while Lester and Voracek did not include any covariates in their analysis, the present study included six state demographic controls: SES, White population per cent, urban population per cent, unemployment rate, religiosity, and depression. Finally, while Lester and Voracek used only Pearson correlations, the present study used Pearson correlation and relied strongly on planned sequential multiple regression strategies to further isolate the main relations among the variables. Although theory and past research results suggested, albeit rather equivocally, certain expectations regarding the nature of some of these relations, no firm hypotheses were drawn. Consequently, all the analyses in the present study should be viewed as exploratory.

Another thrust unique to the present research was determining whether relations of the Big Five personality variables to suicides, suicide attempts, suicide plans, and suicide thoughts were similar for the whole population, males, females, younger persons, and older persons. For example, some studies with individuals as the analytical units have found that neuroticism is differentially associated with suicide risk, suicide attempts, and suicide ideation according to sex (Blum et al., 2013, Rozanov & Mid’ko, 2011; Velting, 1999). Others have found that neuroticism is differentially associated with suicides and attempts according to age (Draper et al., 2014; Szucset et al., 2020). Some researchers also report that the prevalence of suicidal ideations is different for males and females (Kim & Burlaka, 2018; Lu et al., 2020) and younger and older persons (Betz et al., 2016; Cukrowicz et al., 2009). The present research examined relations about the general population 18 years of age and over and, for the first time, performed separate analyses for males, females, younger persons aged 18 to 29 years, and older persons aged 30 and above.

Past studies at the individual and/or state level have shown that the six-state demographic controls also may be related to suicides, suicide attempts, suicide thoughts, or suicide plans, as well as one or more of the Big Five personality variables. Suicidal phenomena variables have been found to relate to SES (e.g., McCann, 2010), race (e.g., Woodbury, Manton, & Blazer, 1988), urbanization (e.g., Hedegaard et al., 2018; McCann, 2010), unemployment (e.g., Fountoulakis, 2020; Uysal & Pohlmeier, 2011), religiosity (e.g., Gebauer et al., 2014; Sansone & Wiederman, 2015), and depression (e.g., Klein et al., 2011; McCann, 2010). Therefore, it was reasonable to control for each of these state variables at the state level when evaluating the relations of the Big Five personality variables to suicides, suicide attempts, suicide plans, and suicide thoughts.

The present research is important from a theoretical and a practical standpoint. There is much room for further contribution focused on untangling the relations of personality factors and other sociodemographic variables to suicides, suicide attempts, and suicidal ideations. Currently, such relations are not well understood in several respects. Such dynamics also may have applied implications. For example, support for the view that state resident differences in personality predict whether state suicide rates or suicide attempt rates are relatively higher or lower would suggest that state suicide reduction programmes perhaps should be tailored somewhat to state resident personality profiles. In addition, healthcare professionals may fall short if they are not cognizant of possible parallel dynamics concerning personality and suicide-related variables at the individual level.

METHODS

Measures

This study is based on 2008 and 2009 because those are the years for which state data on suicide attempts, plans, and thoughts were available. Data were obtained for both years whenever possible. If not, data for the nearest and most appropriate years were substituted for 2008 and 2009. State personality scores (Rentfrow et al., 2008) were based on data collected between 1999 and 2005, but empirical evidence also pertains effectively to 2008 and 2009 (Elleman et al., 2018). Religiosity data were based on 2008. Depression data were based on 2006 and 2008.
Suicides - The CDC Wonder (2020) interactive source provided population age-adjusted state suicide rates per 100,000 for those 18 years of age and over for the 2008–2009 period. The source also provided age-adjusted suicide rates for males and females and non-age-adjusted suicide rates for younger persons 18–29 years of age and older persons 30 years of age and over. These data were based on the intentional harm (suicide) category of the ICD-10 113 cause list.

**Suicide attempts.** Percentage estimates of attempted suicides among adults 18 years or over for each state during 2008–2009 were taken from a large-scale survey (Crosby et al., 2011). State sample sizes ranged from 876 to 3,830. Regarding the previous 12 months, respondents answered a question is asking whether they had serious thoughts about taking their own lives. Those who answered affirmatively then were asked whether they had any suicide plan and whether they had attempted suicide. The survey also provided suicide attempt rates for four demographic categories: males, females, younger persons, and older persons.

**Suicide plans.** The present research also utilised state percentage estimates of those with suicide plans among those aged 18 years and over in 2008–2009 (Crosby et al., 2011). The survey also provided suicide plan rates for the four demographic categories.

**Suicide thoughts.** State percentage estimates of those with suicide plans among those aged 18 years and over in 2008–2009 also were taken from Crosby et al. (2011). The survey also provided suicide thought rates for the sex and age categories.

**Big Five personality variables.** Rentfrow et al. (2008) provided Big Five personality z scores for each state and the District of Columbia based on 619,397 respondents to the 44-item Big Five Inventory (John & Srivastava, 1999) in an internet survey conducted from December of 1999 to January of 2005. They reported that the respondents were representative of the American population and drawn from each state proportionately to the 2000 census state populations. The Big Five variables also had high reliabilities with mean individual-level Cronbach alphas of .81 and state-level alphas of .89. Elleman et al. (2018) have demonstrated that such state scores maintained temporal stability and consistent relations to sociodemographic variables from 1999 through 2015.

**Socioeconomic status (SES).** A composite of two educational and two economic variables gauged SES. For each state in 2008 and 2009, the US Census Bureau (2012) provided the percent of persons 25 years and older who had at least high school graduation and the percent with at least a bachelor’s degree. The Bureau of Economic Analysis (2011) provided state per capita personal income for 2008 and 2009. The US Census Bureau (2019) provided the state percent of persons living below the poverty line in 2008 and 2009. The 2008 and 2009 variables correlated from .89 to 1.00 for each of the four variables. Values were subsequently reversed for the poverty line by multiplying by −1. The mean score for each state on each of the four resulting variables in 2008 and 2009 was computed and then transformed to a z score. The z values for the four variables then were summed, divided by 4, and subsequently standardised to form a composite SES variable with a Cronbach alpha reliability of .86.

**White population percent.** The state per cent of the population self-identified as White in 2008 and 2010 were obtained from the US Census Bureau (2010, 2012). Data for 2009 could not be located. The 2008 and 2010 correlated highly (.94). For each state, the mean of the two years substituted for 2009. They were resulting state 2008 and 2009 values correlated to a high degree (.98). State White population per cent for the present study was the mean of the 2008 and 2009 percentages. Original Hawaii values were beyond −3.00 standard deviations and were reset to that mark to prevent outlier distortions in relevant correlations.

**Urban population percent.** State urban population in 2000 and 2010 (Iowa State University, 2019) served as the basis for producing prorated values for 2008 and 2009. Correlations between the 2000 and 2010 values, and between the prorated 2008 and 2009 values, each rounded to 1.00. For each state, the mean of the resulting 2008 and 2009 values served as the urban population percent.

The Bureau of Labor Statistics (2010) furnished annual state unemployment rates for 2008 and 2009. The two rates correlated highly (.93). For each state, the mean for the two years was used here.

**Religiosity.** State religiosity was assessed through Gallup Poll Daily tracking throughout 2008 (Newport, 2009). Phone interviews with representative state samples of those 18 and over produced a database of 355,334 respondents who were asked, ‘Is religion an important part of your daily life?’ The state percentage answering affirmatively served as the religiosity variable.
Depression. Reeves et al. (2011) reported state prevalence estimates of depression among those 18 and over in the previous two weeks for 2006 and 2008 using responses to phone interviews conducted by the Centres for Disease Control and Prevention (CDC) through the Behavioural Risk Factor Surveillance System (BRFSS). The survey included 38 states in 2006, seven remaining states in 2008, and nine states in 2006 and 2008. Kentucky, New Jersey, North Carolina, Pennsylvania, and South Dakota did not provide any data. State depression prevalence rates for 2008–2009 in the present study were based on 2006 if that was the sole assessment year and 2008 if that was the only year assessed. If both 2006 and 2008 were assessed, the mean for the two years served as the 2008–2009 value. For those five states not assessed, the mean of 16.75 for the other states served as a 2008–2009 substitute.

Analytic strategy

After computing descriptive statistics and correlations, sequential multiple regression strategies were planned to determine relations of the Big Five personality variables and the six demographic control variables to state rates of suicides, suicide attempts, suicide plans, and suicide thoughts. The six state demographic variables (SES, White population per cent, urban population per cent, unemployment rate, religiosity, and depression) were entered as a block on the first step and subsequently controlled for each equation. The Big Five were entered on the second step in stepwise mode.

The study employed two-tailed tests and an alpha of .05. Both population and sample are the same 50 states, thus negating the logic of providing confidence intervals. It could be argued that inferential statistics are neither required nor logical when the population is the sample. However, reported significance tests suggest comparison benchmarks for those in a study in which a sample of this size contains randomly selected cases from a larger population.

Although Bonferroni corrections (e.g., Cabin & Mitchell, 2000; Rice, 1989) remain quite controversial, they are provided for the many correlations and multiple regressions in the present report. Such alpha level adjustments are made by dividing the accepted standard of .05 by the number of correlates or predictors of each variable considered in the correlations or regressions. The result is that an often much lower and conservative probability (p) value is necessary for the relation in question to be accepted as statistically significant. The statistical results and their discussion in the present study are predicated on the original alpha levels, but the Bonferroni corrections also are included in the tabled results and briefly discussed for readers who might prefer a much more cautious approach. This was judged to be a wise strategy given the exploratory nature of the research and the reluctance to dismiss potentially important relations simply because they were exposed to the potent power reducing effects of an extraordinarily conservative statistical threshold.

RESULTS

Table 1 displays mean, standard deviations, and Pearson correlations for the 15 variables in the study. Note that all suicide rates are expressed as the number of persons per 100,000 population, while all suicide attempt, plan, and though rates are expressed as the percent of the respondents in the Crosby et al. (2011) survey. Note that the state Big Five z scores are based on the 50 states and Washington, DC; but the following analyses include only the 50 states. The state SES composite scores are expressed as z scores, and the other five control variables are expressed as estimated state percentages.

Most noteworthy among the Pearson correlations, suicide rates correlated significantly with neuroticism (−.50), agreeableness (−.30), suicide thoughts (.38), depression (.39), and urban population per cent (−.31). Suicide attempts correlated significantly with suicide plans (.66), suicide thoughts (.57), and White population percent (.30), but not with suicide rates or any Big Five personality variables. As well, suicide plans correlated with suicide thoughts (.76), depression (.29), White population per cent (.38), unemployment rate (.30), and religiosity (−.40). Suicide thoughts also correlated with depression (.36), White population per cent (.49), and religiosity (−.34).

The relation of the two Big Five variables (neuroticism and agreeableness) to suicide rates but not to the rates of suicide attempts, plans, or thoughts, and the intercorrelation of suicides, suicide attempts, suicide plans, and suicide thoughts, prompted a principal components analysis of these four suicide phenomena. The results are shown in Table 2. Two components were extracted with eigenvalues greater than 1.00, which cumulatively accounted for 87.1% of the variance. Suicide attempts, plans, and thoughts each had heavy positive loadings...
on Component 1 (i.e., .78, .92, and .91, respectively), while suicides had a small positive loading of .33, barely above the conventional .30 for consideration. In contrast, suicides had a heavy positive loading, and suicide attempt had a moderate negative loading on Component 2 (i.e., .91 and -.48, respectively), while the loadings for suicide plans and suicide thoughts were well below the conventional .30 threshold (i.e., -.08 and .15, respectively). Component 1 can be referred to most aptly as the suicidal behaviour and ideation (SBI) factor, and Component 2 can be best referred to as a suicide (S) factor.

Table 3 displays the results of sequential multiple regression equations with the SBI factor scores and the S factor scores serving as the criterion variables. In each of the two equations, the six demographic variables were entered as a block on the first step, and the Big Five were selected in stepwise mode on the second. In Equation 1, with SBI factor scores as the criterion, the six controls accounted for a significant 42.9% of the variance, but no Big Five variables were selected. The sole significant β occurred for the White population percent (.43).

In Equation 2, with S factor scores as the criterion, the six controls accounted only for a nonsignificant 21.6% of the variance. However, neuroticism and agreeableness emerged as significant predictors. Neuroticism accounted for another 35.3% of the criterion variance, and agreeableness accounted for a final increment of 10.6%. Significant βs occurred for neuroticism (−.68), SES (−.44), agreeableness (−.40), and urban population percent (−.27).

Table 4 presents the sequential multiple regression equation results pertaining to the whole population with suicides, suicide attempts, suicide plans, and suicide thoughts analysed separately. In Equation 1, with suicide rates as the criterion, the six demographic variables jointly accounted for a significant 29.8% of the criterion variance. The only predictors to emerge from the stepwise selection were neuroticism and agreeableness. Neuroticism accounted for an additional 32.2% of the criterion variance, and agreeableness accounted for a final increment of 14.4%. For the full equation, the standardized regression coefficients (βs) were significant for neuroticism (−.66), SES (−.53), agreeableness (−.47), and urban population per cent (−.23).

In Equation 2, with suicide attempt rates as the criterion, the six demographic variables jointly accounted for only a nonsignificant 21.2% of the variance. No Big Five personality variables were selected in stepwise mode. The β was significant only for the White population percent (.38).

In Equation 3, with suicide plan rates as the criterion, the six demographic variables jointly accounted for a significant 39.6% of the variance. No Big Five personality variables were selected for entry. The β was significant only for the unemployment rate (.37).

In Equation 4, with suicide thought rates as the criterion, the six demographic variables jointly accounted for a significant 46.2% of the variance. No Big Five personality variables were selected. The βs were significant for the White population per cent (.48) and urban population per cent (.41).

Table 5 shows the Pearson correlations between suicides, suicide attempts, suicide plans, and suicide attempts for the whole population, males, females, younger persons, and older persons. Notably, suicides and suicide attempts were not correlated for any of the five demographic groups. Suicides and suicidal plans also were not correlated for any of the five groups, while suicides and suicide thoughts only were correlated for the whole population (.38), females (.39), and older persons (.44). In contrast, suicide attempts correlated highly with suicide plans for the whole population (.66), males (.78), females (.56), younger persons (.55), and older persons (.59). Suicide attempts also correlated with suicide thoughts for the whole population (.57), males (.58), females (.46), and older persons (.41). Suicide plans and thoughts also correlated highly for the whole population (.76), males (.75), females (.77), younger persons (.60), and older persons (.70).

Table 6 displays the Pearson correlations of the suicide, suicide attempt, suicide plan, and suicide thought variables with the Big Five and the six control variables for males, females, younger persons, and older persons. Most notably, in the present context, suicide and neuroticism correlated negatively for males (−.47), females (−.51), younger persons (−.48), and older persons (−.46). Correlations between suicide and agreeableness were negative for all four groups but only significant for females (−.34) and younger persons (−.37). On the other hand, suicide attempts did not correlate significantly with neuroticism for any four groups except older persons (−.29). Agreeableness also did not correlate with suicide attempts for any of the groups. Neither neuroticism nor agreeableness correlated with suicide plans or suicide thoughts for any of the four demographic groups.
Table 7 shows the details of the sequential multiple regression equation results pertaining to males, females, younger persons, and older persons with suicide rates, suicide attempt rates, suicide plan rates, and suicide thought rates serving as the criterion variables. With suicide rates as the criterion (Equation 1 through Equation 4), neuroticism and agreeableness emerged as significant predictors for males, females, younger persons, and older persons.

Together, these two Big Five personality variables accounted for between 38.8% and 48.8% of the suicide rate variance, and the significant $\beta$ coefficients ranged from -.61 to -.68 for neuroticism and from -.28 to -.59 for agreeableness across the four groups. Extraversion also surfaced as a minor Big Five predictor for females and older persons. It accounted for a final 3.3% of the criterion variance for females and a final 4.4% of the variance for older persons. The significant $\beta$s were -.25 and -.28, respectively. In stark contrast, with one exception, no Big Five personally dimensions emerged as predictors of suicide attempts, suicide plans, or suicide thoughts (Equation 5 through Equation 16). The lone exception occurred for older persons with suicide attempts as the criterion in Equation 8, wherein neuroticism accounted for a final increment of 7.4%, and the significant $\beta$ was .29.

Regarding the independent predictive capacities of the six sociodemographic control variables in Table 7, with suicide rates as the criterion (Equation 1 through Equation 4), SES had significant $\beta$s for males, females, and older persons ranging from -.49 to -.68. Urban population percent had significant $\beta$s of -.27 for males and -.34 for younger persons. Also, the unemployment rate had a significant $\beta$ of -.23 for younger persons, and the White population percent had a significant $\beta$ of .25 for older persons.

With suicide attempt rates as the criterion (Equation 5 through Equation 8), none of the six control variables was a predictor for males, females, or younger persons. For older persons, the unemployment rate had a significant $\beta$ of .38, and the White population percent had one of .35.

With suicide plan rates as the criterion (Equation 9 through Equation 12), the unemployment rate had a significant $\beta$ of .41 for males and one of .43 for older persons. Religiosity had a significant $\beta$ of -.45 for females and one of -.47 for younger persons.

Finally, with suicide thought rates as the criterion (Equation 13 through Equation 16), the White population percent had a significant $\beta$ of .41 for males, .40 for females, and .52 for older persons. Urban population percent had a significant $\beta$ of .54 for females and one of .45 for older persons. SES had a significant $\beta$ of -.54 for females.
Table 1
Means, Standard Deviations, and Pearson Correlations for Suicides, Attempts, Plans, Thoughts, Big Five, and Control Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>14.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Suicides</td>
<td>13.28</td>
<td>3.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Suicide attempts</td>
<td>.48</td>
<td>.25</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Suicide plans</td>
<td>1.11</td>
<td>.46</td>
<td>.21</td>
<td>.66***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Suicide thoughts</td>
<td>3.94</td>
<td>1.04</td>
<td>.38**</td>
<td>.57***</td>
<td>.76***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Openness to experience</td>
<td>-.07</td>
<td>.89</td>
<td>-.21</td>
<td>.17</td>
<td>.14</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Conscientiousness</td>
<td>.01</td>
<td>1.01</td>
<td>.06</td>
<td>-.10</td>
<td>-.27</td>
<td>-.07</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Extraversion</td>
<td>-.03</td>
<td>.98</td>
<td>-.19</td>
<td>.04</td>
<td>-.14</td>
<td>-.10</td>
<td>-.51***</td>
<td>.43**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Agreeableness</td>
<td>.04</td>
<td>.96</td>
<td>-.30*</td>
<td>-.04</td>
<td>-.16</td>
<td>-.16</td>
<td>-.12</td>
<td>.67***</td>
<td>.55***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Neuroticism</td>
<td>.01</td>
<td>1.01</td>
<td>-.50***</td>
<td>.21</td>
<td>-.06</td>
<td>-.23</td>
<td>.13</td>
<td>-.27</td>
<td>-.15</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. SES</td>
<td>.00</td>
<td>1.00</td>
<td>-.23</td>
<td>-.01</td>
<td>.09</td>
<td>.03</td>
<td>.14</td>
<td>-.45***</td>
<td>-.17</td>
<td>-.23</td>
<td>-.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. White population %</td>
<td>81.14</td>
<td>10.33</td>
<td>.26</td>
<td>.30*</td>
<td>.38**</td>
<td>.49***</td>
<td>-.04</td>
<td>.01</td>
<td>.14</td>
<td>.09</td>
<td>-.10</td>
<td>.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Urban population %</td>
<td>73.31</td>
<td>14.61</td>
<td>-.31*</td>
<td>.09</td>
<td>.01</td>
<td>.12</td>
<td>.39**</td>
<td>.06</td>
<td>-.07</td>
<td>-.09</td>
<td>-.20</td>
<td>.31*</td>
<td>-.33*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Unemployment rate</td>
<td>6.86</td>
<td>1.59</td>
<td>-.15</td>
<td>.21</td>
<td>.30*</td>
<td>.13</td>
<td>.31*</td>
<td>.04</td>
<td>-.15</td>
<td>-.04</td>
<td>.23</td>
<td>-.34*</td>
<td>-.26</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Religiosity</td>
<td>64.06</td>
<td>9.97</td>
<td>-.04</td>
<td>-.17</td>
<td>-.40**</td>
<td>-.34*</td>
<td>-.32*</td>
<td>.54***</td>
<td>.38**</td>
<td>.45***</td>
<td>.12</td>
<td>-.70***</td>
<td>-.37**</td>
<td>-.21</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>15. Depression</td>
<td>16.75</td>
<td>2.41</td>
<td>.39**</td>
<td>.21</td>
<td>.29*</td>
<td>.36**</td>
<td>.10</td>
<td>-.02</td>
<td>-.17</td>
<td>-.07</td>
<td>.06</td>
<td>-.19</td>
<td>.51***</td>
<td>-.46***</td>
<td>-.01</td>
<td>-.07</td>
</tr>
</tbody>
</table>

Note: The correlations in italics are those that did not reach the Bonferroni corrected significance level of .0035714 (i.e., .05/14).
* p < .05. ** p < .01. *** p < .001.

Table 2
Total Variance Explained in the Principal Component Analysis of Suicides, Suicide Attempts, Suicide Plans, and Suicide Thoughts, and Their Loadings

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial eigenvalues</th>
<th>Extraction sums of squared loading</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total % of variance</td>
<td>Cumulative % of variance</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2.39</td>
<td>59.74</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.10</td>
<td>27.36</td>
<td>87.11</td>
</tr>
<tr>
<td>3</td>
<td>.29</td>
<td>7.35</td>
<td>94.46</td>
</tr>
<tr>
<td>4</td>
<td>.22</td>
<td>5.55</td>
<td>100.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Suicides</th>
<th>Attempts</th>
<th>Plans</th>
<th>Thoughts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Suicides</td>
<td>.33</td>
<td>.78</td>
<td>.92</td>
<td>.91</td>
</tr>
<tr>
<td>2. Suicide attempts</td>
<td>-.48</td>
<td>-.08</td>
<td></td>
<td>.15</td>
</tr>
<tr>
<td>3. Suicide plans</td>
<td>.59</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Suicide thoughts</td>
<td>.66</td>
<td>.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3
Sequential Multiple Regression Equations Demonstrating the Relations of the Big Five Personality Variables to Factor 1 and Factor 2 Scores When Controlling for the Six Demographic Variables

<table>
<thead>
<tr>
<th>Equation</th>
<th>Criterion</th>
<th>Step</th>
<th>Entry method</th>
<th>Predictor pool</th>
<th>Stepwise predictors</th>
<th>df</th>
<th>( R^2 ) change</th>
<th>( F )</th>
<th>Significant independent predictors</th>
<th>( \beta )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Component 1</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>(none entered)</td>
<td>6.43</td>
<td>.429</td>
<td>5.38**</td>
<td>White population %</td>
<td>.43</td>
<td>2.77**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Component 2</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>Neuroticism</td>
<td>6.43</td>
<td>.216</td>
<td>1.98</td>
<td>Neuroticism</td>
<td>-6.8</td>
<td>-7.07***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td>Agreeableness</td>
<td>1.42</td>
<td>.353</td>
<td>34.45***</td>
<td>SES</td>
<td>-4.4</td>
<td>-2.90**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.41</td>
<td>.106</td>
<td>13.36***</td>
<td>Agreeableness</td>
<td>-0.40</td>
<td>-3.65***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Urban population %</td>
<td>-0.27</td>
<td>-2.25*</td>
</tr>
</tbody>
</table>

Note: The variables and values in italics are those that did not reach the Bonferroni corrected significance level of 0.0045454 (i.e., .05/11).

*Component 1 is the suicidal behavior and ideation (SBI) factor and Component 2 is the suicide (S) factor.

\*\( p < .05 \). **\( p < .01 \). ***\( p < .001 \).

Table 4
Sequential Multiple Regression Equations Demonstrating the Relations of the Big Five Personality Variables to Suicides, Suicide Attempts, Suicide Plans, and Suicide Thoughts When Controlling for the Six Demographic Variables

<table>
<thead>
<tr>
<th>Equation</th>
<th>Criterion</th>
<th>Step</th>
<th>Entry method</th>
<th>Predictor pool</th>
<th>Stepwise predictors</th>
<th>df</th>
<th>( R^2 ) change</th>
<th>( F )</th>
<th>Significant independent predictors</th>
<th>( \beta )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Suicides</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>Neuroticism</td>
<td>6.43</td>
<td>.298</td>
<td>3.05*</td>
<td>Neuroticism</td>
<td>-66</td>
<td>8.04***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td>Agreeableness</td>
<td>1.42</td>
<td>.322</td>
<td>35.62***</td>
<td>SES</td>
<td>-5.3</td>
<td>-4.07***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.41</td>
<td>.144</td>
<td>25.17***</td>
<td>Agreeableness</td>
<td>-47</td>
<td>-5.02***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Urban population %</td>
<td>-23</td>
<td>-2.22*</td>
</tr>
<tr>
<td>2</td>
<td>Suicide attempts</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>(none entered)</td>
<td>6.43</td>
<td>.212</td>
<td>1.92</td>
<td>White population %</td>
<td>.38</td>
<td>2.09*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Suicide plans</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>Unemployment rate</td>
<td>6.43</td>
<td>.396</td>
<td>4.71***</td>
<td></td>
<td>.37</td>
<td>2.55*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td>(none entered)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Suicide thoughts</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>White population %</td>
<td>6.43</td>
<td>.462</td>
<td>6.15***</td>
<td></td>
<td>.48</td>
<td>3.17**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>stepwise</td>
<td>Big Five</td>
<td>Urban population %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.41</td>
<td>2.83**</td>
</tr>
</tbody>
</table>

Note: The variables and values in italics are those that did not reach the Bonferroni corrected significance level of 0.0045454 (i.e., .05/11).

\*\( p < .05 \). **\( p < .01 \). ***\( p < .001 \).
### Table 5

**Pearson Correlations Among Suicides, Attempts, Plans, and Thoughts for the Whole Population, Males, Females, Younger Persons, and Older Persons**

<table>
<thead>
<tr>
<th>Suicide variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>14.</th>
<th>15.</th>
<th>16.</th>
<th>17.</th>
<th>18.</th>
<th>19.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Suicides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attempts</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Plans</td>
<td>.21</td>
<td>.66***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Thoughts</td>
<td>.38**</td>
<td>.57***</td>
<td>.76***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Male suicides</td>
<td>.99***</td>
<td>-.12</td>
<td>.19</td>
<td>.34*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Male attempts</td>
<td>-.06</td>
<td>.76***</td>
<td>.63***</td>
<td>.41**</td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Male plans</td>
<td>.09</td>
<td>.55***</td>
<td>.79***</td>
<td>.46***</td>
<td>.07</td>
<td>.78***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Male thoughts</td>
<td>.28*</td>
<td>.54***</td>
<td>.73***</td>
<td>.77***</td>
<td>.25</td>
<td>.58***</td>
<td>.75***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Female suicides</td>
<td>.95***</td>
<td>-.03</td>
<td>.26</td>
<td>.46***</td>
<td>.91***</td>
<td>-.01</td>
<td>.12</td>
<td>.37**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Female attempts</td>
<td>-.12</td>
<td>.75***</td>
<td>.39**</td>
<td>.43**</td>
<td>-.15</td>
<td>.18</td>
<td>.05</td>
<td>.22</td>
<td>-.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Female plans</td>
<td>.22</td>
<td>.47***</td>
<td>.74***</td>
<td>.70***</td>
<td>.19</td>
<td>.19</td>
<td>.19</td>
<td>.34*</td>
<td>.26</td>
<td>.56***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Female thoughts</td>
<td>.33*</td>
<td>.42**</td>
<td>.56***</td>
<td>.89***</td>
<td>.30*</td>
<td>.18</td>
<td>.12</td>
<td>.40**</td>
<td>.39**</td>
<td>.46***</td>
<td>.77***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Younger suicides</td>
<td>.87***</td>
<td>-.15</td>
<td>.01</td>
<td>.15</td>
<td>.86***</td>
<td>-.15</td>
<td>-.05</td>
<td>.10</td>
<td>.76***</td>
<td>-.14</td>
<td>.05</td>
<td>.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Younger attempts</td>
<td>.04</td>
<td>.65***</td>
<td>.53***</td>
<td>.44***</td>
<td>.04</td>
<td>.46***</td>
<td>.37***</td>
<td>.34*</td>
<td>.06</td>
<td>.57***</td>
<td>.48***</td>
<td>.37***</td>
<td>-.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Younger plans</td>
<td>.21</td>
<td>.33*</td>
<td>.62***</td>
<td>.53***</td>
<td>.19</td>
<td>.23</td>
<td>.36***</td>
<td>.37***</td>
<td>.23</td>
<td>.28</td>
<td>.60***</td>
<td>.48***</td>
<td>.15</td>
<td>.55***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Younger thoughts</td>
<td>.23</td>
<td>.26</td>
<td>.40***</td>
<td>.57***</td>
<td>.21</td>
<td>.12</td>
<td>.13</td>
<td>.33*</td>
<td>.27</td>
<td>.25</td>
<td>.50***</td>
<td>.58***</td>
<td>.21</td>
<td>.25</td>
<td>.60***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Older suicides</td>
<td>-.06</td>
<td>-.07</td>
<td>.29</td>
<td>.45***</td>
<td>.95***</td>
<td>-.02</td>
<td>.13</td>
<td>.33*</td>
<td>.95***</td>
<td>-.10</td>
<td>.30*</td>
<td>.40***</td>
<td>.70***</td>
<td>.06</td>
<td>.21</td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Older attempts</td>
<td>-.28*</td>
<td>.81***</td>
<td>.53***</td>
<td>.38**</td>
<td>-.30*</td>
<td>.68***</td>
<td>.44***</td>
<td>.41**</td>
<td>-.19</td>
<td>.58***</td>
<td>.36*</td>
<td>.26</td>
<td>-.36*</td>
<td>.29*</td>
<td>.17</td>
<td>.11</td>
<td>-.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Older plans</td>
<td>.14</td>
<td>.63***</td>
<td>.91***</td>
<td>.66**</td>
<td>.12</td>
<td>.64***</td>
<td>.77***</td>
<td>.72***</td>
<td>.21</td>
<td>.32</td>
<td>.63***</td>
<td>.44***</td>
<td>-.08</td>
<td>.40**</td>
<td>.32*</td>
<td>.21</td>
<td>.24</td>
<td>.59***</td>
<td></td>
</tr>
<tr>
<td>20. Older thoughts</td>
<td>.35*</td>
<td>.56***</td>
<td>.75***</td>
<td>.97***</td>
<td>.31*</td>
<td>.43**</td>
<td>.49***</td>
<td>.79***</td>
<td>.43**</td>
<td>.41**</td>
<td>.66***</td>
<td>.83***</td>
<td>.09</td>
<td>.41**</td>
<td>.42**</td>
<td>.34*</td>
<td>.44**</td>
<td>.41**</td>
<td>.70***</td>
</tr>
</tbody>
</table>

Note: The correlations in italics are those that did not reach the Bonferroni corrected significance level of .0026315 (i.e., .05/19).

*p < .05, **p < .01, ***p < .001.
### Table 6
Pearson Correlations of the Male, Female, Younger Person, and Older Person Suicide Variables with Big Five and Control Variables

<table>
<thead>
<tr>
<th>Suicide variable</th>
<th>Openness</th>
<th>Conscientiousness</th>
<th>Extraversion</th>
<th>Agreeableness</th>
<th>Neuroticism</th>
<th>SES</th>
<th>White population</th>
<th>Urban population</th>
<th>Unemployment rate</th>
<th>Religiosity</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Male suicides</td>
<td>-.24</td>
<td>.08</td>
<td>-.16</td>
<td>-.27</td>
<td>-.47**</td>
<td>.27</td>
<td>-.37**</td>
<td>-.16</td>
<td>.02</td>
<td>.40**</td>
<td></td>
</tr>
<tr>
<td>2. Male attempts</td>
<td>.13</td>
<td>-.10</td>
<td>-.00</td>
<td>-.01</td>
<td>.23</td>
<td>-.08</td>
<td>.29*</td>
<td>-.04</td>
<td>.25</td>
<td>-.14</td>
<td>.18</td>
</tr>
<tr>
<td>3. Male plans</td>
<td>.09</td>
<td>-.24</td>
<td>-.15</td>
<td>-.13</td>
<td>.06</td>
<td>.06</td>
<td>.21</td>
<td>-.04</td>
<td>.29*</td>
<td>-.23</td>
<td>.21</td>
</tr>
<tr>
<td>4. Male thoughts</td>
<td>.08</td>
<td>-.17</td>
<td>-.10</td>
<td>-.11</td>
<td>-.18</td>
<td>.11</td>
<td>.47***</td>
<td>-.05</td>
<td>.11</td>
<td>-.29*</td>
<td>.37**</td>
</tr>
<tr>
<td>5. Female suicides</td>
<td>-.04</td>
<td>.03</td>
<td>-.29*</td>
<td>-.34*</td>
<td>-.51***</td>
<td>-.22</td>
<td>.19</td>
<td>-.15</td>
<td>-.03</td>
<td>-.15</td>
<td>.35*</td>
</tr>
<tr>
<td>6. Female attempts</td>
<td>.15</td>
<td>-.09</td>
<td>-.02</td>
<td>-.04</td>
<td>.11</td>
<td>.05</td>
<td>.17</td>
<td>.20</td>
<td>.11</td>
<td>-.16</td>
<td>.17</td>
</tr>
<tr>
<td>7. Female plans</td>
<td>.14</td>
<td>-.17</td>
<td>-.05</td>
<td>-.11</td>
<td>-.12</td>
<td>.07</td>
<td>.35*</td>
<td>.05</td>
<td>.15</td>
<td>-.38**</td>
<td>.23</td>
</tr>
<tr>
<td>8. Female thoughts</td>
<td>.19</td>
<td>-.03</td>
<td>-.07</td>
<td>-.15</td>
<td>-.20</td>
<td>-.03</td>
<td>.36**</td>
<td>.23</td>
<td>.12</td>
<td>-.27</td>
<td>.24</td>
</tr>
<tr>
<td>9. Younger suicides</td>
<td>-.38**</td>
<td>-.04</td>
<td>-.07</td>
<td>-.37***</td>
<td>-.48***</td>
<td>-.09</td>
<td>.16</td>
<td>-.35*</td>
<td>-.36**</td>
<td>.01</td>
<td>.24</td>
</tr>
<tr>
<td>10. Younger attempts</td>
<td>.11</td>
<td>.05</td>
<td>.01</td>
<td>.03</td>
<td>.21</td>
<td>-.20</td>
<td>.18</td>
<td>-.04</td>
<td>.07</td>
<td>-.03</td>
<td>.33*</td>
</tr>
<tr>
<td>11. Younger plans</td>
<td>.02</td>
<td>-.27</td>
<td>-.16</td>
<td>-.16</td>
<td>.03</td>
<td>.04</td>
<td>.13</td>
<td>-.11</td>
<td>.11</td>
<td>-.22</td>
<td>.14</td>
</tr>
<tr>
<td>12. Younger thoughts</td>
<td>.13</td>
<td>-.18</td>
<td>-.07</td>
<td>-.11</td>
<td>-.18</td>
<td>.13</td>
<td>.26</td>
<td>-.03</td>
<td>-.07</td>
<td>-.31*</td>
<td>.18</td>
</tr>
<tr>
<td>13. Older suicides</td>
<td>-.07</td>
<td>.10</td>
<td>-.25</td>
<td>-.25</td>
<td>-.46***</td>
<td>-.26</td>
<td>.28*</td>
<td>-.24</td>
<td>-.01</td>
<td>-.06</td>
<td>.41**</td>
</tr>
<tr>
<td>14. Older attempts</td>
<td>.19</td>
<td>-.19</td>
<td>.01</td>
<td>-.08</td>
<td>.29*</td>
<td>-.02</td>
<td>.19</td>
<td>.15</td>
<td>.39**</td>
<td>-.20</td>
<td>.11</td>
</tr>
<tr>
<td>15. Older plans</td>
<td>.18</td>
<td>-.20</td>
<td>-.06</td>
<td>-.11</td>
<td>-.07</td>
<td>.10</td>
<td>.34*</td>
<td>.04</td>
<td>.34*</td>
<td>-.37**</td>
<td>.26</td>
</tr>
<tr>
<td>16. Older thoughts</td>
<td>.16</td>
<td>-.03</td>
<td>-.10</td>
<td>-.15</td>
<td>-.19</td>
<td>.01</td>
<td>.49***</td>
<td>.15</td>
<td>.17</td>
<td>-.31*</td>
<td>.35*</td>
</tr>
</tbody>
</table>

Note: The correlations in italics are those that did not reach the Bonferroni corrected significance level of .0031250 (i.e., .05/16).

*p < .05. **p < .01. ***p < .001.
Table 7
Sequential Multiple Regression Equations Demonstrating the Relations of the Big Five Personality Variables to Suicides, Suicide Attempts, Suicide Plans, and Suicide Thoughts for Males, Females, Younger Persons, and Older Persons When Controlling for the Six Demographic Variables

<table>
<thead>
<tr>
<th>Equation</th>
<th>Category</th>
<th>Criterion</th>
<th>Step</th>
<th>Entry method</th>
<th>Predictor pool</th>
<th>Stepwise predictors</th>
<th>df</th>
<th>R² change</th>
<th>F</th>
<th>Significant independent predictors</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>Suicides</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>6, 43</td>
<td>.313</td>
<td>3.26***</td>
<td></td>
<td>Neuroticism</td>
<td>-64</td>
<td>-7.61***</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>stepwise</td>
<td>Big Five</td>
<td>Neuroticism</td>
<td>1, 42</td>
<td>.300</td>
<td>32.55***</td>
<td>SES</td>
<td>-49</td>
<td>-3.68***</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>1, 41</td>
<td>.142</td>
<td>23.68***</td>
<td>Agreeableness</td>
<td>-46</td>
<td>-4.87***</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>1, 40</td>
<td>.033</td>
<td>6.10*</td>
<td>Urban population %</td>
<td>-27</td>
<td>-2.61*</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Suicides</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>6, 43</td>
<td>.313</td>
<td>3.27**</td>
<td></td>
<td>Neuroticism</td>
<td>-68</td>
<td>-8.45***</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>stepwise</td>
<td>Big Five</td>
<td>Neuroticism</td>
<td>1, 42</td>
<td>.327</td>
<td>38.19***</td>
<td>SES</td>
<td>-68</td>
<td>-5.36***</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>1, 41</td>
<td>.108</td>
<td>17.69***</td>
<td>Agreeableness</td>
<td>-33</td>
<td>-3.43***</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>1, 40</td>
<td>.033</td>
<td>6.10*</td>
<td>Extraversion</td>
<td>-25</td>
<td>-2.47*</td>
</tr>
<tr>
<td>9</td>
<td>Younger</td>
<td>Suicides</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>6, 43</td>
<td>.260</td>
<td>2.52*</td>
<td></td>
<td>Neuroticism</td>
<td>-61</td>
<td>-7.21***</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>stepwise</td>
<td>Big Five</td>
<td>Neuroticism</td>
<td>1, 42</td>
<td>.261</td>
<td>22.92***</td>
<td>Agreeableness</td>
<td>-59</td>
<td>-6.09***</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>1, 41</td>
<td>.227</td>
<td>37.10***</td>
<td>Urban population %</td>
<td>-34</td>
<td>-3.22**</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unemployment rate</td>
<td>-23</td>
<td>-2.28*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Older</td>
<td>Suicides</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>6, 43</td>
<td>.316</td>
<td>3.31**</td>
<td></td>
<td>Neuroticism</td>
<td>-65</td>
<td>-7.54***</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>stepwise</td>
<td>Big Five</td>
<td>Neuroticism</td>
<td>1, 42</td>
<td>.299</td>
<td>32.56***</td>
<td>SES</td>
<td>-61</td>
<td>-4.45***</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreeableness</td>
<td>1, 41</td>
<td>.089</td>
<td>12.35***</td>
<td>Extraversion</td>
<td>-28</td>
<td>-2.65*</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extraversion</td>
<td>1, 40</td>
<td>.044</td>
<td>7.03*</td>
<td>Agreeableness</td>
<td>-28</td>
<td>-2.71**</td>
</tr>
<tr>
<td>17</td>
<td>Male</td>
<td>Suicide attempts</td>
<td>1</td>
<td>forced block</td>
<td>Six demographic controls</td>
<td>6, 43</td>
<td>.206</td>
<td>1.86</td>
<td></td>
<td>White population %</td>
<td>.25</td>
<td>2.02*</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Suicide attempts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.151</td>
<td>1.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Younger</td>
<td>Suicide attempts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.192</td>
<td>1.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Older</td>
<td>Suicide attempts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.268</td>
<td>2.62*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Male</td>
<td>Suicide plans</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.210</td>
<td>1.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Female</td>
<td>Suicide plans</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.292</td>
<td>2.95*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Younger</td>
<td>Suicide plans</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.138</td>
<td>1.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Older</td>
<td>Suicide plans</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.379</td>
<td>4.37**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Male</td>
<td>Suicide thoughts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.323</td>
<td>3.41**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Female</td>
<td>Suicide thoughts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.417</td>
<td>5.13***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Younger</td>
<td>Suicide thoughts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.144</td>
<td>1.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Older</td>
<td>Suicide thoughts</td>
<td>1</td>
<td>forced block stepwise</td>
<td>Six demographic controls</td>
<td>Big Five</td>
<td>(none entered)</td>
<td>6, 43</td>
<td>.484</td>
<td>6.73***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The variables and values in italics are those that did not reach the Bonferroni corrected significance level of .0045454 (i.e., .05/11). 
*p < .05. **p < .01. ***p < .001.
DISCUSSION

What stands out most in the present research results is that the multiple regression results consistently demonstrated that neuroticism and agreeableness were predictors of state suicide rates but not of suicide attempts, plans, or thoughts. This pattern occurred when the SBI and S factor scores or the four individual suicidal phenomena variables served as the criteria. Higher suicide rates were associated with lower neuroticism for the whole population, males, females, younger persons, and older persons. Higher suicide rates also were associated with lower agreeableness for each of these five categories. The only exception to this pattern among the 22 regression equations occurred for the older person category in which neuroticism was a modest predictor of suicide attempts, wherein higher suicide attempt rates were associated with higher neuroticism. Extraversion also emerged as a minor predictor of suicide in the female and older person categories, with a small association between higher suicide rates and lower extraversion.

The magnitude of the variance accounted for in suicide rates by personality was not trivial. Neuroticism and agreeableness together accounted for considerably more variance than the six-state control variables (SES, unemployment rate, religiosity, depression, White population percent, and urban population per cent) after the variance in suicide rates that could be accounted for by these six variables already was removed. Based on the six relevant multiple regression equations (i.e., Equation 2 in Table 3, Equation 1 in Table 4, and Equation 1, 2, 3, and 4 in Table 7), the variance in suicide rates accounted for by neuroticism and agreeableness together was 22.8% to 112.5% greater than the variance accounted for by the six control variables combined. The mean additional contribution to the variance accounted for in the suicide rate criteria was 59.9%. Most striking was the finding that the additional suicide rate variance accounted for in the S factor score criterion by neuroticism and agreeableness together was 112.5% greater than the total increment attributable to the six control variables and that the additional variance accounted for by neuroticism alone was 63.4% greater.

It should be noted that two main outcome variables—suicide rates and suicide attempt rates—were not correlated with each other in the present state-level study. The independence of these two criteria of suicidal phenomena is evident from the nonsignificant negative Pearson correlations of −.09 for the whole population, −.07 for males, −.05 for females, −.04 for younger −.21 for older persons. Furthermore, the principal components analysis revealed that the suicide rate loads heavily on the S factor, and the suicide attempt rate loads heavily on the SBI factor. Therefore, it is not surprising that the multiple regression predictor patterns for suicide rates are quite different from the predictor pattern for suicide attempt rates. From the present results, it is evident that personality dimensions—particularly neuroticism and agreeableness—predict suicide rates but not suicide attempt rates, except for the older person category. Neuroticism predicts positively rather than the negative direction found in it the relations between neuroticism and suicide rates. The relatively high level of intercorrelation between suicide attempt, plan, and thought rates across the whole population, males, females, three younger persons, and older persons, as well as the high loadings of these three suicidal phenomena on the SBI factor in the principal components analysis, also suggest why personality also is not related to suicide plans and thoughts.

The relation of neuroticism to suicide at the state level was expected and is consistent with the corresponding results of earlier state-level research (i.e., Lester & Voracek, 2013; McCann, 2010; Voracek, 2009). The pattern of results for agreeableness also was generally expected, but somewhat less confidently so than was the pattern for neuroticism. It bolsters the similar results found by McCann (2010) and Voracek (2009) but runs counter to the lack of relationship found by Lester and Voracek (2013). However, the present work is the first to find these relations with such a large set of statistical controls and the whole population, males, females, younger persons, and older persons.

Although not the central focus of the present research, it is appropriate and beneficial to briefly summarize the contributions of each of the six control variables as predictors of suicides, suicide attempts, suicide plans, and suicide thoughts. Across the 20 multiple regression equations excluding the two using SBI and S factor scores, based on both significant and nonsignificant contributions, the six demographic controls accounted for a mean of 28.9% of the criterion variance, with values ranging from a nonsignificant 13.8% to a significant 48.6%. According to the independent contributions indicated by the significant β coefficients for the full equations excluding the two based on factor scores, higher suicide rates were associated with lower SES for the whole population, males, females, and older persons, with lower urban population percent for the whole population, males, and younger persons, with the lower unemployment rate for younger persons, and with higher White population percent for older persons. Higher suicide attempt rates were associated with higher White population percent for the whole population and older persons and a higher unemployment rate for older persons. Higher suicide plan rates were associated with higher White population percent for the whole
population, with the higher unemployment rate for males and older persons and lower religiosity for females and younger persons. Finally, higher suicide thought rates were associated with higher White population percent for the whole population, males, females, and older persons, with higher urban population percent for the whole population, females, and older persons, and with lower SES for females.

The research of McCann (2010) supported the present relation between suicide and SES and between urban population percent, but not the relation between suicide and White population per cent. Voracek (2009) or Lester and Voracek (2013) tested None of these relations involving these demographic control variables. In individual-level research, the present finding of a negative relation between SES and suicides is well supported (e.g., Agerbo et al., 2006; Page et al., 2014), but the general lack of relation between SES and suicide attempts, plans, and thoughts is contrary to what has been found (e.g., Kim et al., 2016; Taylor et al., 2004). Other research with individuals as the analytical units has found that suicide is associated with higher unemployment (e.g., Milner et al., 2013), greater urbanization (e.g., Goldman-Mellor et al., 2018), and being White (e.g., Garlow et al., 2005). Individual-level relations also have been reported between suicide attempts and being White (e.g., Stoliker & Galli, 2020), suicide plans and thoughts and being White (e.g., Ammerman et al., 2020), and suicide plans and lower religiosity (e.g., Toussaint et al., 2015). However, non-supportive results also have been reported. For example, the relation between suicide thoughts and urbanization was not supported by Goldman-Mellor et al. (2018). Therefore, existing individual-level research at least partially supports the present state-level results.

A foundational assumption of geographical psychology (e.g., Rentfrow, 2014; Rentfrow et al., 2008) is that the aggregate position on a dispositional dimension in a geographic area reflects the central tendency of the area's residents on that dimension and is associated with the prevalence in that area of the psychological and behavioural proclivities related to that dispositional dimension. The perspective also recognizes that aggregate-level and individual-level relations are logically independent. It cannot simply be assumed that aggregate-level results generalize to the individual level (Robinson, 1950), nor can it simply be assumed that individual-level results generalize to the aggregate level (Petitgrew, 1997). This does not mean that state-level results cannot stem from and be consistent with individual-level relations, but it does mean that cautious interpretation of cross-level extrapolations is necessary. The degree of confidence in interpretations should be dependent upon empirical verification.

So, with ample caution, it is plausible to speculate that relations found in the present research between state-level variables exist because of corresponding relations at the individual level. The best current interpretation is that the state-level relations mirror and result from the aggregation of individual-level relations. It should be noted that other state-level variables that might have explained the present results and which also have at least similar counterparts at the individual level do not do so. This includes state differences in SES, White population percent, urban population percent, unemployment rate, religiosity, and mental depression.

Compared to individual-level research results, the present state-level multiple regression findings involving the relation of neuroticism to suicides are largely but not wholly incompatible (e.g., Batty et al., 2018; Draper et al., 2014; Tsoho et al., 2005; Useda et al., 2007), while those involving the relation of agreeableness to suicides roughly correspond (e.g., Batty et al., 2018; Draper et al., 2014; Mousavi et al., 2015). Those involving the lack of relation of neuroticism to suicide attempts tend to be discordant (e.g., Rappaport et al., 2017; Su et al., 2018; Useda et al., 2007; Wasserman, 2016), while those pertaining to the lack of relation between agreeableness and suicide attempts correspond to at least one individual-level study (Stankovic et al., 2006).

However, none of the preceding individual-level studies used the same sequential multiple regression analytic strategy as the present state-level research. Nor did any of those studies use appropriately comparable control variables. Until research with individuals as the analytic units is conducted using comparable variables and a similar analytic approach, it is premature to firmly conclude that any of the state-level relations found in the present study do not mirror individual-level results. Although the present findings are rather convincing, further empirical inquiry is needed to bolster or refute the tentative conclusion that the present state-level results stem from individual-level dynamics. More research is warranted at both the aggregate and the individual level regarding relations between the Big Five personality factors, the six demographic variables, and suicides, suicide attempts, suicide plans, and suicide thoughts to reconcile discrepancies, not only at the individual or the state level but also aimed at relations between the two levels of analysis.

With Bonferroni adjustments, regarding the correlates of suicidal phenomena in Table 1, only the following correlations were significant: suicide rates and neuroticism (−.50), suicide attempts and suicide plans (.66), suicide attempts and suicidal thoughts (.57), suicide plans, and suicide thoughts (.76), and suicide thoughts and White population percent (.49). In Table 3, regarding the regression coefficients for independent predictors of suicidal phenomena, only the following were significant: Component 2, on which suicide rates
loaded heavily, was predicted by neuroticism ($\beta = -0.68$) and agreeableness ($\beta = -0.40$). In Table 4, with suicide rates as the criterion, only the following were independent predictors: neuroticism ($\beta = -0.66$), agreeableness ($\beta = -0.47$), and SES ($\beta = -0.53$). With the other three suicidal phenomena as criteria, the only remaining significant predictor was the White population per cent ($\beta = 0.48$) with suicidal thoughts as the criterion. Regarding the male, female, younger, and older subcategories and the prediction of the four suicidal phenomena in Table 7, only the following were significant independent predictors: neuroticism was a negatively signed predictor of male, female, older, and younger suicide rates; agreeableness was a negative predictor of male, female, and older suicide rates; SES was a negative predictor of male, female, and older suicide rates; urban population percent was a negative predictor of younger suicide rates; urban population percent was a positively signed predictor of suicide thoughts for females and older persons, and White population per cent was a positive predictor of suicide thoughts for older persons.

Overall, with Bonferroni adjustments to the results of the multiple regression equations in Table 3, 4, and 7, White population per cent ceased to predict Component 1, suicide attempts, older suicides and attempts, and male and female suicide thoughts. Urban population percent ceased to predict Component 2, suicides, suicide thoughts, and male suicides. The unemployment rate ceased to predict suicide plans, younger suicides, older suicide attempts, and male and older suicide plans. Extraversion ceased to predict female and older suicides. Agreeableness ceased to predict older suicides. Neuroticism ceased to predict older suicide attempts. Religiosity ceased to predict female and younger suicide plans. Finally, SES ceased to predict female suicide thoughts.

The need for the application of the Bonferroni procedure in this exploratory research is questionable and perhaps imprudent. Critics of the Bonferroni approach (e.g., Armstrong, 2014; Nakagawa, 2004) point out that such statistical correction decreases the chances of making a Type 1 inferential error but can greatly increase the chances of making Type 2 errors, and that its routine use should not be encouraged. Instead, for example, Nakagawa (2004) suggests that attention should be placed on observed effect sizes such as $r$ and $R^2$, using Cohen's (1988) correlation benchmarks of .10, .30, and .50, respectively, for small, medium, and large effect sizes. Given the relatively low $N$ of 50 in the present analyses, Pearson correlations and standardized regression coefficients up to the low .40s were deemed nonsignificant with the Bonferroni correction. However, as mentioned earlier in the discussion of analytic strategy, because the sample and the populations are the same in the present study, there is much room for less emphasis on statistical significance and inference matters. Nevertheless, even with Bonferroni corrections, the most important findings of the present research remained intact: Higher suicide rates still were associated with lower neuroticism and lower agreeableness, while rates of suicide attempts, plans, and thoughts related to neither neuroticism nor agreeableness.

Limitations and issues

The usual cautions regarding the interpretation of correlational evidence of a link between personality and suicidal phenomena apply to the present study: Causal relations cannot be inferred from correlations. However, it is implausible that state levels of suicidal phenomena cause differences in state personality or state demographic variables. The converse is more likely. An unknown 'third variable' explanation remains possible. However, six of the more likely candidate sociodemographic variables (SES, White population per cent, urban population per cent, unemployment rate, religiosity, and depression) have been considered, and they do not explain. Therefore, even though the evidence is based on the correlations inherent in multiple regression equations, the speculation remains that the causal direction is from personality to suicidal phenomena. Similar directional speculation can be applied to the correlational evidence linking the sociodemographic variables to suicidal phenomena.

The multiple regression analysis of small samples may raise concerns for some readers. A degree of instability in predictors and regression coefficients can occur when the case-to-predictor ratio is far from optimal. However, such potential inferential drawbacks are minimised in the present research. Inferential statistics estimate the confidence that can be placed in generalizing to a population from a representative sample, but the present study has the unusual circumstance that the population and sample are the same—the 50 states. Therefore, the 'population' parameters do not have to be estimated through inferential statistics because they are already known from the 'sample' characteristics. Furthermore, regression strategies with small samples often have been used successfully (e.g., Barber, 2015; McCann, 2008, 2018; Pestal et al., 2012; Simonton, 1986).

Some of the effect sizes based on correlations, regression coefficients, and variance in the dependent variables may be larger than those produced in research with individuals as the analytical units. This is expected (e.g., Erikson et al., 1993; Ostroff, 1993). Measurement errors largely cancel each other in the aggregation process.
This results in elevated effect sizes, but they are also more stable than those computed with individuals rather than aggregates as the units of analysis. Aggregation also enhances the likelihood of statistically significant findings.

Because of the capacity of the geographical psychology approach (e.g., Rentfrow & Jokela, 2016) to produce results based on aggregates that possess less error variance, the present results provide signals for further nomothetic empirical inquiry at the more conventional individual level of analysis to search deeper for results that might not as readily emerge from the individual-level research paradigm (e.g., Ostroff, 1993). The signals emanating from the present results strongly suggest that parallel relations may exist between the corresponding variables at the individual level, giving rise to the relations between personality and suicidal phenomena found here. Nomothetic cross-validation research using similar variables and analytic strategies with individuals as the units of analysis would greatly bolster the conclusions reached here and more adequately alleviate concerns regarding cross-level generalisations (e.g., Robinson, 1950; Pettigrew, 1997).

Perhaps some concern is that the same sample provided state scores for suicide attempts, plans, and thoughts, while scores for suicide were based on official state data for the whole state population. Regarding personality, the results were markedly different for suicide compared to the other three suicidal phenomena. However, suppose it is assumed that the sample of Crosby et al. (2011) was representative of the state population. In that case, the correlation between personality and suicide and the lack of correlation between personality and the other suicide-related variables should be accepted as a genuine difference in the present pattern of findings. Ultimately, the differences between the two sources of data on the results pattern cannot be discerned from the available information.

Of course, with state-level data, the possibility can always be entertained that, for example, those in a state who end their own lives might not be low on neuroticism even though the average state resident is low on that personality dimension. A central assumption of the geographical psychology approach (e.g., Rentfrow et al., 2008) effectively maintains that the state position on a dispositional dimension is related to other state-level indicators according to the tendencies associated with that dimension at the individual level. Nevertheless, in rare circumstances, this assumption could prove untenable. However, it does not seem reasonable to expect such exceptions for so many states that these exceptions drive the state-level relations found in the present study.

**Potential applied implications**

Such research eventually could lead to a change of focus, or at least a greater depth of field, regarding suicide reduction campaigns and clinical approaches. For example, support indicating that state resident differences in neuroticism predict whether state suicide rates are higher would suggest that state suicide reduction efforts optimally should be adapted to state resident personality profiles. Pervasive preoccupation with suicide attempts may not be the most effective strategy for informational campaigns in states where neuroticism is characteristically lower.

As well, at the clinical level, healthcare professionals may be in danger of missing the mark if they are not particularly vigilant for suicide risk signs in clients from states with characteristically lower resident neuroticism or lower agreeableness, in those who are less neurotic or more disagreeable, or those who do not outwardly display evidence of attempted suicide or suicidal ideation. It also appears that state policymakers and clinicians should be cognizant that lower state SES usually is associated with higher state suicide rates but not with state suicide attempt rates, plan rates, or thought rates. For some of the five demographic groups, state urban population percent, White population percent, unemployment rate, and religiosity also show relations to at least some of the suicide, suicide attempt, suicide plan, and suicide thought variables. Ideally, all these relations should be considered in the context of suicide reduction campaigns and clinical practice.

**CONCLUSION**

The salient theme in the present research is the view that state residents' Big Five personality within the nonpathological spectrum is important in determining which states have residents more likely to intentionally end their own lives but not which states have residents more likely to attempt suicide or have suicidal ideations. Foremost, the Big Five dimensions of neuroticism and agreeableness have pivotal roles. It also is speculated that these state-level relations stem from parallel individual relations, although the extant research evidence garnered at the individual level is not generally harmonious with such speculation. Nevertheless, this
study has produced novel state-level results with adequate statistical controls that add substantially to the knowledge base on suicidal phenomena. The findings also may eventually contribute to further refinements concerning both suicide reduction campaigns and clinical practices.

REFERENCES


Lester, D., & Voracek, M. (2013). Big Five personality scores and rates of suicidality in the
United States. Psychological Reports, 112, 637-639. 10.2466/12.09.PR0.112.2.637–639


Film review of 'Swallow'

Betsy Edwards
University of Birmingham, United Kingdom

Correspondence: bhe701@student.bham.ac.uk

2020 saw the cinematic release of the psychological horror Swallow, directed by Carlo Mirabella-Davis. The film follows the life of protagonist Hunter, a young woman who has just moved in with her wealthy but abusive fiancée, Richard. Richard consistently ignores, interrupts, and humiliates Hunter, and keeps her sheltered from society. Craving freedom and productivity, Hunter develops the disorder pica, swallowing increasingly dangerous objects throughout the film including marbles, batteries, and drawing pins.

As a medical student, I had yet to come across pica within my studies when I first watched the film and had very little knowledge of the subject. I felt that the film provided an empathic insight into the condition, with most features – such as risk factors and behaviours – presented correctly upon further research (Hartmann et al. 2012; Munir et al. 2010). The film shows us the sense of control and relief Hunter experiences after swallowing each item, and we witness the power of this positive reinforcement as she attempts to swallow larger and more dangerous objects throughout the film. We grow to hate Richard and his family as they approach Hunter's condition with ignorance, anger, and condescension. The film takes us upon Hunter's emotional journey and provides scenes of graphic discomfort, keeping the audience on the edge of their seats, thus can be considered a cinematic success. But although I was entertained, I could not help but wonder how the film – and how films revolving around mental health in general – may affect the public and clinicians.

As previously stated, many features of the illness are portrayed with sensitivity and realism, demonstrating the power of the arts to educate the public about rare conditions. This is likely to promote a better understanding and awareness of the condition among lay people and may help to eradicate stereotypes against pica and potentially self-harming behaviours in general. It can provide a relatable role model to viewers suffering similar circumstances, helping them to feel less alone and boost their mood, even if only temporarily. These factors may help promote help-seeking behaviours in viewers with mental illnesses, as the film validates the need for psychiatric treatment and shows the potential for recovery, providing hope (Das et al. 2017).

The film may even provide a useful teaching tool to clinicians. Films can sometimes be used to teach medical students or junior members of staff about rare conditions. Alternatively, films such as Swallow can be used within cinema therapy, which research estimates has a success rate of up to 70% (Beachum, 2010). Cinema therapy is where a clinician uses a carefully selected film to aid a patient's management; for example aiding a difficult diagnosis, strengthening a therapeutic relationship, or providing a fictional role model to inspire hope or promote reproducible healthy coping behaviours (Beachum, 2010). During the film, Hunter seeks psychiatric therapy and realises that her environment is maladaptive; thereafter making the changes necessary for her to recovery from her condition, potentially inspiring hope to patients in similar scenarios.

Unfortunately, the presentation of pica within the film is not perfect. While Hunter engages with psychiatric treatment that seems to help, her main recovery is clearly due to confronting a figure from her distant past. This use of catharsis as a cure for mental illness is quite infuriating as it undermines evidence-based medical treatment, suggesting that mental illness is easy to cure if you face a long-suppressed emotion or interaction. Many films use a 'cathartic cure' or the similar "love cure" - where mental illness disappears after falling in love - to ensure that a happy ending is reached; for example Numb and Silver Linings Playbook, released in 2007 and 2012, respectively. These techniques could potentially discourage vulnerable viewers from seeking psychiatric care, which is presented as less effective and more difficult to comply with (Beachum, 2010).

Furthermore, the psychiatrist in Swallow – named Lucy – breaks confidentiality within the film; she is put into a difficult situation by Richard however agrees to his terms with minimal refusal. Admittedly, she is one of the
better Hollywood psychiatrists I have seen; common stereotypes of psychiatrists – as identified by Schneider in 1987 – include ‘Dr Evil’, ‘Dr Dippy’, and ‘Dr Sexy’; all of which are still highly prevalent within the arts despite society pushing for more positive attitudes towards mental illness (Beachum, 2010). Having said this, Lucy’s actions do not represent most competent psychiatrists, hence she conforms to Orchowski’s (2006) ‘Dr Flawed’. The problems this stereotype presents include discouraging help-seeking (as viewers are led to believe that even the most sensitive-seeming psychiatrists are untrustworthy), endangering therapeutic relationships, and consequently harming the ability of practitioners to help those in need effectively (Beachum, 2010).

Personally, my main concern with the film Swallow is the issue of viewers copying the behaviours they see on the screen. Swallow has not had enough popularity to generate academic interest, but research based on 2017 Netflix series 13 Reasons Why indicates that this may be a problem (Peel, 2017). 13 Reasons Why revolves around the suicide of fictional teenager named Hannah. Studies conducted after its release showed increases in suicidal ideation, internet searches, and crisis texts; and ultimately increased suicidal deaths and hospital admissions (Hong et al. 2019; Sinyor et al. 2019; Till et al. 2018). Perhaps viewers who relate to Hunter’s lack of control and freedom will observe how she is rewarded by the ingestion of non-edible items and will be motivated to imitate the behaviour. I feel that researchers should use Swallow as an opportunity to study the effect of films and similar media on mental health – particularly young adult mental health – in order to recognise the extent of problems such as this, and investigate potential solutions such as content warnings or edited scenes.

Overall, I enjoyed watching the film Swallow. It provided a thrilling cinematic experiencing while also teaching me about the disorder pica; instilling me with enough curiosity to conduct further research in my free time. However, while it provides a much better presentation of mental illness and psychiatric care than other films of this genre, its presentation is far from perfect and could potentially discourage vulnerable viewers from seeking care or trusting healthcare professionals. Furthermore, I worry that viewers who relate to Hunter’s living situation may feel motivated to copy the behaviours graphically depicted within the film, and I hope to read research confirming that this is not the case within the near future.

REFERENCES


DISCLAIMER

The publisher (Psychreg Ltd), the editors of Psychreg Journal of Psychology, its board members, and its reviewers cannot be held responsible for errors or any consequences arising from the use of information contained in this publication. The views and opinions expressed do not necessarily reflect those of the publisher, editors, board members, and reviewers.

CONTACT

editor@psychreg.org

Psychreg Ltd
2nd Floor College House
17 King Edwards Road
Ruislip, London
HA4 7AE
United Kingdom

An open access initiative of Psychreg
Copyright © 2021.
ISSN: 2515-138X

pjp.psychreg.org