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Cybervictimisation of adolescents predicts higher rumination, which in turn, predicts worse sleep over time[☆]



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ABSTRACT

Introduction: Research has suggested that cybervictimised adolescents experience poorer health outcomes, including less sleep. The present study was designed to determine whether cybervictimisation's ability to predict sleep adequacy (i.e., number of nights in the previous week of 8 h or more of sleep) would be mediated by adaptive coping (i.e., problem solving) as well as maladaptive coping (i.e., rumination).

Methods: A three year longitudinal study with an initial sample of 2179 New Zealand adolescents (854 females and 920 males; 10–15 years old at T1) obtained self-report data on frequencies of cybervictimisation, use of problem solving and rumination coping strategies, and sleep adequacy. Results: Findings from longitudinal cross-lag path analyses indicated that: 1) cybervictimisation predicted lower levels of sleep one year later; and 2) rumination, but not problem solving, mediated the temporal relationship of cybervictimisation on sleep adequacy. Cybervictimisation predicted increases in rumination, and it, in turn, predicted diminished sleep.

Conclusions: Cybervictimised adolescents not only reported higher rumination and sleep inadequacy concurrently, but levels of cybervictimisation predicted these ill effects one and two years later as well. Negative consequences of being cybervictimised were discerned long after the experience of being victimised online.

The internet has become an essential tool for communication across the globe in recent decades. Many, perhaps most, adolescents rely on the internet as their primary method of communication and it has become a fundamental aspect of their daily life. It has been reported that 95% of American teenagers actively use the internet, and adolescents have the highest rate of web use of any age group (Lenhart, Madden, Smith, Purcell, Zickhur, & Raine, 2011). Communication through the internet and through texting plays an important role in building social and peer relationships during the teenage years (Brown, 2004). Researchers have started to look at this area of interest, Information Communication Technology (ICT), in order to examine its growing impact on individuals. ICT consists of different modes of communication including internet use, social network use, and mobile telephone use, and these media seem to exert a variety of different influences on cognitions, emotions, and behaviours of adolescents (Christensson, 2010). Recent research has indicated that ICT use impacts adolescents' identity as well as behaviour (Jose & Fu, in press).

At the same time that teens enjoy positive aspects of digital communication, many of them also experience peer victimization through digital media, resulting in increased distress (Tu, Erath, & El-Sheikh, 2015). Due to absence of supervision, accountability for perpetrators, and increased permanence of hurtful messages, cyberaggression is potentially more harmful than traditional face-to-

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face victimization (Nixon, 2014; Patchin & Hinduja, 2006). Cyberaggression is defined as persistent, hurtful acts perpetrated on another individual through electronic text or pictures (Patchin & Hinduja, 2006). Consequently, 'virtual' victimization is becoming more prevalent and deleterious among adolescents. Research has noted that 75% of school-aged children report that they have experienced cyberaggression one or more times over the past year (Juvonen & Gross, 2008; Katzer, Fetchenhauer, & Belschak, 2009). A study conducted by Patchin and Hinduja (2006) showed that 60% of individuals who were cybervictimised reported that these events adversely affected several aspects of their lives including functioning at home, at school, and with peers (see also Hager & Leadbeater, 2016). It is important to understand the effect cyberaggression has on adolescents' psychological and physical health in order to provide the most effective treatment, prevention, and intervention measures for individuals. The outcome for the present study was adequacy of sleep. In the present study we sought to document that cybervictimisation would be predictive of poorer sleep over time, and further, we proposed two coping strategies, problem solving and rumination, as potential mediators of this longitudinal relationship.

1. Does cybervictimisation predict poorer sleep?

Numerous studies have examined the link between traditional victimization and poor sleep quality. A meta-analysis across 21 studies found a significant relationship between traditional peer victimization and inadequate sleep (Geel, Goemans, & Vedder, 2016). Additionally, Gini (2008) found that victims of traditional bullying have increased sleep difficulties and are more at risk for social maladjustment than individuals who were not victims to bullying. With the advent of increased cyberaggression in adolescence, researchers have begun to examine the specific effects of *cybervictimisation* on adolescent's sleep patterns, finding that individuals victimised by instances of cyberaggression report more severe negative psychosomatic symptoms, including difficulty sleeping (Beckman, Hagquist, & Hellström, 2012; Kowalski & Limber, 2007, 2013; Sourander et al., 2010). In one study, this relationship remained after controlling for traditional forms of bullying (Låftman, Modin, & Östberg, 2013), suggesting that cyberbullying might exert a unique negative impact on a young person's physical health over time. Since cyberaggression is a relatively new form of peer victimization, few studies have been conducted to examine the impact of cybervicimisation on individuals over time. An exception is a study conducted by Rose and Tynes (2015) that found cybervictimisation predicted both depression and anxiety over a three year time period among individuals in grades 6 through 12. Yet no research, to our knowledge, has examined 'virtual' victimization and its impact on adolescent health over an extended period of time. Furthermore, research has not yet examined potential mediators between cybervictimisation and poor sleep in a longitudinal study. The present study sought to fill this gap in the literature.

2. Possible links between cybervictimisation and coping strategies

In order to unpack the connections between reports of cybervictimisation and subsequent reports of poor health outcomes such as inadequate sleep, we need to consider possible intermediate states. In the present study we propose two prospective mediators: rumination and problem solving. We will take up rumination first. Previous research suggests a relationship exists between cybervictimisation and maladaptive emotional coping strategies, such as rumination (Machmutow, Perren, Sticca, & Alsaker, 2012; Mathieson, Klimes-Dougan, & Crick, 2014). Rumination is defined as repetitively thinking and obsessing about distressing thoughts, emotions, and memories (Nolen-Hoeksema, 2000). Increasing levels of rumination are observed during the teenage years, particularly among females (Jose & Brown, 2008; Feinstein, Bhatia, & Davila, 2014; Nolen-Hoeksema, 2000). Feinstein et al. (2014) surveyed college-aged young adults and found that rumination mediated the link between cyber-victimization and depressive symptoms, showing that cybervictimisation results in increased rumination over time. Additionally, Völlink, Bolman, Dehue, and Jacobs (2013) found that individuals who reported incidents of being cybervictimised were more likely to use depression-fostering coping strategies and internalize their problems more than other individuals (see also Gámez-Guadix, Orue, Smith, & Calvete, 2013).

Little research has directly looked at the relationship between adaptive coping strategies, such as problem-solving, and cybervictimisation. We were not able to find a study, for example, that linked cybervictimisation and problem solving. Instead we will briefly review related or associated constructs that suggest that cybervictims are likely to engage in poor adaptation. Returning to rumination, we know that individuals who are likely to ruminate also tend to exhibit poor problem solving skills (Lyubomirsky, Tucker, Caldwell, & Berg, 1999). This finding in the literature suggests that cybervictimisation may not only increase intrusive ruminative thoughts, but may also simultaneously dampen problem solving and related adaptive coping mechanisms in adolescents. Problem solving coping is associated with good social skills, and studies have shown a positive relationship between peer victimization in a school setting and poor social skills (e.g., Fox & Boulton, 2005). In the same vein, Arseneault et al. (2006) found that peer victimization resulted in fewer prosocial behaviors and poor adjustment skills in children. In regards to cybervictimisation specifically, research has found a positive correlation between cybervictimisation and low social support and self efficacy as well as increased reports of loneliness and anxiety (Heiman & Olenik-Shemesh, 2016; Olenik-Shemesh & Heiman, 2017). Cybervictimisation has also been found to predict negative self-referential cognitions and victimization-related reactions (Cole et al., 2016). Although the literature apparently does not include a study documenting a link between cybervictimisation and poorer problem solving per se, the thrust of the existing literature suggests that it is very possible that this association may be found among adolescents.

3. Possible links between coping strategies and poor sleep

Limited research has been conducted regarding the impact of repetitive intrusive thoughts, i.e., rumination, on sleep quality in

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