“Not too sure on how that would be defined, to be honest”: Exploring students’ understandings of the health effects of lifetime stress

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Lifetime stress is stress which accumulates over the lifespan, with high levels linked with poorer health. How we understand the risks to our health affects how we respond to them, both in terms of our mindset (e.g., how much stress is perceived and whether that stress is interpreted positively or negatively) and our behaviour. Understanding how individuals perceive lifetime stress is important to mitigate its potential negative health effects. This is resonant for university students, who have reported an increased amount of stress over the past two decades. In a method made unique by the accessibility needs of a partially deaf researcher, this study explored ten university students’ understandings of the health effects of lifetime stress through online questionnaires and text-based interviews. Reflexive thematic analysis created three themes: “unfamiliarity”; “stress is damaging”; and ‘individuals are agents’, which spoke to lacking understanding of lifetime stress despite knowing stress could be damaging to health, and the importance of viewing stress as under one’s control. Considering that understanding a health threat increases the likelihood of changing behaviour, and that perceptions and experiences of stress influence each other, education could improve the effects of lifetime stress. Participants’ coping methods could be defined as pro-active or re-active, an easily understood model which fits well with cognitive behavioural therapy as a way for clients to create personalised coping strategies. Future research could address how individuals develop understandings of the personal implications of stress (including lifetime stress), and their understanding of control over its development and management.

Keywords: lifetime stress; university students; health belief model; thematic analysis; well-being

Lifetime stress is a relatively new area of research showing that stress has cumulative effects over a lifespan, high levels of which can cause deleterious health effects (Graham et al., 2006; Slavich, 2016). Research is currently limited (Slavich & Shields, 2018), but links lifetime stress with poorer physical, cognitive, and mental health, including the shortening of telomeres in DNA, a process associated with chronic disease (Mayer et al., 2019); poorer reaction times (Marshall et al., 2016); and higher symptoms of anxiety and depression (Toussaint et al., 2016; Vinkers et al., 2014). Effects have been shown in young adults with an average age of 19 (Toussaint et al., 2016), and older individuals with an average age of 68 (Marshall et al., 2016). This demonstrates that lifetime stress is a concern across the lifespan, especially since individuals are living longer lives (World Health Organization, 2022), and an increasing amount are doing so with chronic health conditions (Araujo-Soares et al., 2018). As the World Happiness Report 2022 found moderately increasing global stress levels over the past decade (Helliwell et al., 2022), lifetime stress appears relevant to many.

Historically, stress research began with investigations into physical reactions to physical stressors (Robinson, 2018), such as Cannon's (1927) study into the biological responses underpinning fear, rage, hunger and pain, including adrenaline release and blood directed to the muscles. Stress was considered the body's preparation for fighting or running from an aggressor (Cannon, 1927), a type of stress we now term "acute stress" (Rohleder, 2019). Later, Selye (1974) introduced the concept of psychological forces being interlinked with physical stress, arguing that continuous or repeated stressors cause "chronic stress", which worsens health. From approximately 2006, with Graham et al.'s and Lupien et al.'s considerations of stress across the lifespan (Graham et al., 2006; Lupien et al., 2009), the literature has investigated lifetime stress as a measurable concept (Slavich, 2016).

This accumulation of stress over time is thought to cause biological "wear and tear" which raises the risk of disease (Shields & Slavich, 2017; Slavich & Shields, 2018 p. 17). Although exactly when the transition occurs is undefined (Rohleder, 2019), when stress becomes chronic (i.e. repeated or continuous exposures to a stressor, or a past stressor with continuing health effects) this is known to affect hormones, the immune system, genes, and inflammation, which promotes disease (Mariotti, 2015; Shields & Slavich, 2017; Slavich & Cole, 2013), reduces well-being, and increases mortality (Cazassa et al., 2020; Slavich, 2016; Toussaint et al., 2016). There are links from chronic stress to cardiovascular disease (Esler, 2017; Kivimäki & Steptoe, 2018), poor mental health and depression (Benoit et al., 2016; Romero-Martínez et al., 2020), and premature death (Holt-Lunstad et al., 2010; Prior et al., 2018). Though the evidence base for lifetime stress is still developing and tends to be dominated by the researchers Slavich and Shields (e.g. Slavich and Shields, 2018), it is clear that lifetime stress has a negative effect on health and well-being via the plethora of literature regarding acute and chronic stress.

Modern western society appears well-versed on the detrimental effects of stress on health (Crum et al., 2020; Robinson, 2018), with awareness increased and maintained by the media (Slavich, 2016), which, encompassing the internet, social media, television, newspapers and magazines, is where the majority of health information is obtained (Westerman et al., 2014; Yeo & Picard, 2011). Digital media, particularly social media, are widely used as tools for coping with stress, including seeking social support and searching for information (Wolfers & Schneider, 2021). However, the focus tends to regard how stress can impact health, rather than why; Slavich (2016) argues that this is partly due to scientific understanding being incomplete. In comparison, lifetime stress appears little reported on in the media with a thorough online search in December 2023 finding the concept used only once in *The Guardian*, and not at all in *The Time*s and the BBC. (In comparison, in the past year alone across these three sites "acute stress" was counted 17 times, "chronic stress" 29 times, and just "stress" featured 15,542 times). This may be because, as Slavich et al. (2019) notes, lifetime stress is a relatively new and still developing area of research.

Literature which explains how individuals behave regarding their health highlights the importance of health beliefs – the understandings we have about health "threats" which feed into subsequent healthy or unhealthy behaviours. In particular: how severe we perceive a threat to be, how susceptible we believe we are to this, how beneficial we believe changing our behaviour will be, the barriers we perceive to stand in our way, and how much we are able to affect the threat, all influence (and predict) how we will respond (The Health Belief Model – HBM, Naslund et al., 2017; Rosenstock, 1974). This model has been used to investigate stress-related health behaviours, including stress responses to the COVID-19 pandemic (Pourhaji et al., 2022), the stress management of college students (K. A. King et al., 2012), and the social cognitive influences on stress reduction (St.Hilaire, 2016).

Interestingly, when stress is understood to be positive it leads to a more positive experience of it, resulting in lower perceived stress levels, more effective coping skills, and greater well-being (Rabenu et al., 2017; Heikkilä et al., 2019). Positive thinking about stress enhancing stress-related outcomes has a strong research base, both correlational and experimental (Crum et al., 2020; Jamieson et al., 2018). Liu et al's (2019) meta-analysis questioned whether positive understandings affected physiological stress responses, but supported the positive psychological benefits which are significant on their own. Conversely, believing that stress is incapacitating bears negative physical and psychological health implications. A small study by S. Fischer et al. (2016) found that university students who believed stress was negative had higher reporting of symptoms like stomach aches during high stress exam periods. Furthermore, a much larger study (n=186 million) found more serious implications for both physical and mental health, with a 43% increased risk of premature death (Keller et al., 2012). Stress mindset is therefore an important factor to understand and relate to lifetime stress.

Understandings about a health risk and the individual's ability to manage it develop according to the attention paid to the threat. Attention to a subject is necessary for learning to take place and be remembered, and is influenced by associated emotions and experiences (Morales et al., 2016). Another influence on attention is perceived threat-level; people naturally focus on what they consider a significant personal threat (Ganesan et al., 2019). Attendance to risk is further affected by attentional control, the ability to intentionally pay attention, which is different for different individuals (Son et al., 2018). If we apply this learning to lifetime stress, it is reasonable to assume that perceived threat level, individual attentional control, emotions, and memories are likely to affect understandings (of lifetime stress), which in turn affect behaviour and mindset. However, as understandings of lifetime stress are currently under-researched, this can only be hypothesised.

Despite lifetime stress having serious implications for both physical and mental health, and understandings of health threats influencing individuals' responses to these, there appears to be little research into understandings of lifetime stress. Research conducted about lifetime stress mainly consists of quantitative evidence using scales to measure stressors and health, with a focus on discovering health effects (Cazassa et al., 2020), rather than on understandings. Qualitative research tends to look at lifetime stress in terms of an element in a specific circumstance, such as relating themes of trauma and loss to post traumatic stress symptoms in children who have experienced disasters (L. S. King et al., 2015). One limited exception was Amnie's (2018) predominately quantitative study into how participants coped with lifetime stress, which analysed two qualitative survey questions with selective thematic analysis. Adaptive responses were found to utilise problem-solving or emotion-focused techniques such as mindfulness and social support, and maladaptive responses were characterised by avoidance or substance abuse (Amnie, 2018). Another found that many individuals with breast cancer believed their lifetime stress contributed to their cancer (Niebauer et al., 2021). As understandings are an important part of health behaviours, a rich overall description of perceptions of lifetime stress (rather than detailed investigation into selected areas of this) appears warranted.

A wider search for qualitative research specifying understandings of stress in general produced only one study (Kilby et al., 2020), but further information could be gleaned from qualitative research into experiences of stress. Kilby et al. (2020) used descriptive thematic analysis to find that participants saw stress as the way their bodies reacted mentally, physically and emotionally to a stressor. Participants saw cognitive and emotional effects as mainly negative, although some experienced positive emotions after the stressor had finished, such as calmness, or elation after a performance. Physical effects were believed to include symptoms of ill health but also positive increases in performance. Participants tended to use multiple coping strategies, both emotion and problem based, and other people were seen to have positive and negative influences on stress levels (Kilby et al., 2020). Interestingly, indirect data from studies on participants' experiences of stress highlighted only positive influences of social support on stress levels, evidenced with aid workers (Young et al., 2018), adults with stressful childhoods (Pliske, 2020), and children aged 9-12 (Stapley et al., 2020). Overall, the sparseness of the qualitative research base meant that a population with fresh understandings was essential for this current study.

University students are a population under increased stress levels (Fischer et al., 2016; Shankar & Park, 2016; Stillwell et al., 2017), particularly over the past two decades due to UK government policy first encouraging less affluent students then reducing financial support (Denovan & Macaskill, 2017). Students are often in a position where they are developing their autonomy (Aherne, 2001),

experiencing overwork (Freire et al., 2019), and experiencing pressure to perform academically (Bedewy & Gabriel, 2015). A survey of over 1800 students reported the vast majority were affected by the latter, with 90.5% reporting assessments to be significantly stressful, 75.2% finding their future career to be a source of stress, and 83.3% feeling stressed by time management (National Union of Students Scotland, 2010). Another study of 6504 students found that 41% had often felt stressed or worried in the four weeks prior to the survey, and 21% always felt like that (Neale et al., 2016). These statistics were reported before the recent major stressors of the COVID-19 pandemic and the cost-of-living crisis (Allen et al., 2023; National Union of Students, 2022), highlighting that this stress is a persistent issue. Stress can lead to poorer quality of life for university students (Ribeiro et al., 2018), and poorer academic performance (Talib & Zia-ur-Rehman, 2012). Consequently, students are likely to have fresh understandings of stress, and are an important population to study due to their vulnerability to it. This study therefore asked: what do university students understand about the health effects of lifetime stress?

METHODOLOGY

Participants

Ten students, aged 18 or over and studying psychology at a UK North West University, were recruited through online research and messaging programs hosted by their university. Participants recruited through the research program were studying at undergraduate and master's level and were rewarded with credits they were required to collect if they wanted to recruit participants in the same manner for their own studies. Students had a wide range of projects to choose from hence were not unduly pressured to participate in this particular study. Participants recruited through the messaging program were studying at master's level on the same course as the interviewer but had no other relationship.

After seeking ethical approval for an amendment from the Manchester Metropolitan University Ethics Team, individual demographic data was requested following data collection, with half the sample responding (text-based interviews - n = 4; questionnaire - n = 1). It was not possible to match one participant with their previous data other than that they were a questionnaire responder.

Demographic details for the five responding participants is presented below:

Table 1
Demographic Details for the Five Responding Participants

Participant	Data Type	Gender	Age
Robin	Interview	Female	31–35
Terry	Interview	Female	31–35
Abby	Interview	Female	46–50
Hannah	Interview	Female	56–60
Unknown	Questionnaire	Female	21–25

Table 2
Course Information

Participant	Year of Study	Other Commitments	General Stress Level at Time of Interview (Out of Ten)
Robin	Third	Work	5
Terry	No answer	Other	7
Abby	Second	Childcare	3
Hannah	Third	Work	8
Unknown	Second	Other	7

Three participants identified as White British, one as White European, and one as Mixed Asian. Four participants were studying part time and one studied full time.

The researchers

Recruitment, data collection, and the bulk of data analysis was conducted by Amy Sparrow (female, master's student in psychology). This was her first experience of conducting interviews. AS is partially deaf which shaped the methods of data collection. AS was supervised by DrJennie Dayes (female, qualified counselling psychologist, senior lecturer in psychology) who is an experienced qualitative researcher and contributed to data analysis, interpretation and discussion of findings, and the write up of this paper.

Design

A qualitative research design was chosen to produce detailed descriptions of participants' understandings and to allow spontaneous, detailed responses and flexibility during analysis (Willig, 2013). Reflexive thematic analysis (Braun & Clarke, 2013) underpinned by a critical realist epistemological stance (e.g. Archer et al., 1998; Willig, 2013) was used to analyse the data, with the researchers understanding the health effects of lifetime stress to be a phenomenon which existed in the real world but knowledge of this to be filtered through the lenses of both the participants' and researchers' (Willig, 2013). Accordingly, the authors understand the findings to be an interpretation rather than the interpretation of the data (Braun & Clarke, 2013).

Data collection

Data was collected through interviews (n = 5) and open-ended questionnaires (n = 5) which were text-based according to AS's accessibility needs. Qualitative questionnaires have been used successfully to discover participants' understandings (Amnie, 2018; Toerien & Wilkinson, 2004; Travers et al., 2015), have been found more naturalistic than focus groups (Joffe, 2012), and have been acknowledged by Braun and Clarke (2017, p. 298) as an "emerging method" of data collection. Eleven questions were asked, designed to encourage free-association as much as imposed questions can (Willig, 2013), for example, "What is your understanding of chronic stress?" (Question 5). These questions were hosted on a secure online research program, with data downloaded on the 26th March 2020. Text-based interviews have been found to offer privacy, comfort and a sense of anonymity, while still allowing the continuity of a discussion (Pearce et al., 2014). They can provide more detailed responses (Schober et al., 2015), particularly with sensitive topics (Thunberg & Arnell, 2022), and although they may take longer and elicit shorter answers, quality is comparable to in-person interviews (Shapka et al., 2016). In the first half of March 2020, text-based interviews lasting between 30-40 minutes were conducted via Slack, an instant messaging program used by the University. Questions were the same as in the questionnaire, with the semi-structured interview method acknowledging that meaning is constructed by participants and researcher, allowing the interviewer to ask follow-up questions based on the information given (Joffe, 2012).

Braun and Clarke (2013) recommend six to ten participants for small projects using interviews and thematic analysis; this was closest to the research design. Ten participants were recruited to ensure richness and range of data in case of potential brevity (Shapka et al., 2016).

Data analysis

In thematic analysis, themes are generated from the data and organised to represent findings unique to the data set (Braun & Clarke, 2006; Clarke & Braun, 2017). In this way, different perspectives and unexpected insights can be explored (Nowell et al., 2017). The flexibility of Braun and Clarke's (2006) guidance allowed for an overall perspective of the data to be generated, rather than a detailed look into specific areas. This met the research aim to generate an overview of the area, thought useful when there is little research into a subject (Braun & Clarke, 2006).

Analysis embodied an inductive approach, with themes generated directly from the data rather than previous knowledge and frameworks being imposed (Willig, 2013). In accordance with Braun and Clarke's (2006, 2019) reflexive thematic approach, chosen to reflect the meaning generated between researchers and participants, findings are created to best answer the research questions and tell the story of the data; there is no clear end point to analysis. Thus, saturation was considered achieved

when rereading stopped generating new codes or themes and data was judged to be sufficient for the above purposes (Braun & Clarke, 2019).

Braun and Clarke's (2006, 2019) six step guidance to reflexive thematic analysis was followed, involving reading and re-reading, coding and re-coding, and grouping and re-grouping codes into themes. In acknowledgement to the researcher's interpretive influence (Braun & Clarke, 2019), AS engaged in reflexive analysis throughout via use of a diary to help with the "bracketing" process (C. T. Fischer, 2009; Willig, 2013), whereby pre-existing knowledge is acknowledged and set to the side with the aim of meeting the data anew. To protect against "thin" themes, the number of these was limited to three (Braun & Clarke, 2012). Findings and interpretations were discussed fully with JD to support triangulation (Heale & Forbes, 2013).

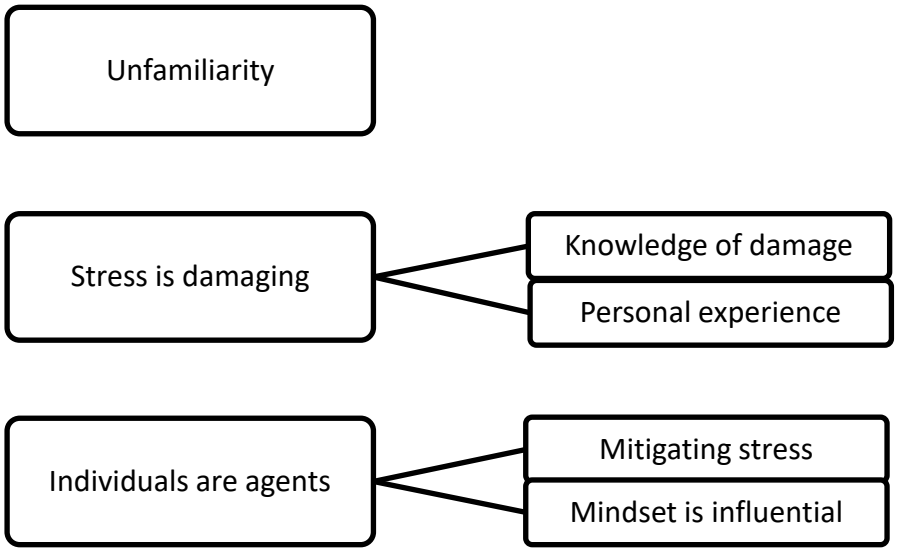
Ethics

The study was given ethical approval by Manchester Metropolitan University's Ethics team on the 9th March 2020, ID number 20804. All participants gave informed consent which was achieved via an information sheet and a consent statement agreed to before the interview or questionnaire started (British Psychological Society, 2021). Participants were given ample chance to ask questions. It was made clear that participation was voluntary and that individuals could withdraw themselves and/or their data until four weeks after this had been shared, without giving a reason and without penalty (none withdrew). Individuals were informed that discussing stress and health might bring up unexpected thoughts and emotions, and were provided with sources of support before data collection.

ANALYSIS

Three themes were identified in the data and labelled "unfamiliarity", "stress is damaging" and "individuals are agents". Nine out of ten participants were unfamiliar with the concept of lifetime stress, though all were aware that stress could damage health, with three having personal experience of this. All ten participants believed they had agency in managing stress through mitigation techniques like agreeing to fewer demands and adopting particular mindsets.

Figure 1
Themes and sub-themes identified within the data



Theme 1: Unfamiliarity - "Not too sure on how that would be defined to be honest." (Robin, 135-136)

All participants excluding Sam were unfamiliar with the term "lifetime stress". For example, Terry said she hadn't read anything about it and had "never [come] across any research papers" on the subject (139). Two participants (Abby and Robin) appeared to understand the concept, referring to "accumulative" stress when discussing health effects, but not relating this to the actual term 'lifetime stress'. Being unfamiliar with the term, five participants were led to guess what it meant, with Terry, Robin and Jo suggesting that lifetime stress was caused by constant exposure to stressful events. Jo's understanding was that "lifetime stress is something that you experience over a long period due to constant exposure to stressful events, such as work. Unless they're properly dealt with, these can occur throughout an individual's lifetime" (Jo, 86-87). Abby and Robin guessed that major events could cause it. For example:

I suppose that suggests to me circumstances that affect you across your lifetime, or a significant part of your life, such as living in poverty or [in] an abusive situation. Or perhaps [lifetime stress] alludes to any major stressful event that happens in your life and then affects you profoundly. So, a traumatic event or something. (Robin, 132-135)

Sasha theorised that lifetime stress had "serious negative [effects]" (90), and all but one participant (Alex) spontaneously described wanting to find out more. For example, Jo said, "I would like to know the common symptoms…so that I can properly deal with it" (Jo, 115). This quote embodies what the other eight participants indicated, that lifetime stress was felt to be damaging and needed to be personally addressed.

Theme 2: Stress is Damaging - "Ultimately too much stress … it damages your body and your mental health in the end." (Robin, 175-176)

Knowledge of Damage

Although 9 out of 10 participants did not have a clear idea of what "lifetime stress" was, all indicated the belief that stress was damaging to health, as is embodied in Robin's statement that "too much [stress] can obviously wreak havoc with your physical and mental health" (22-23).

All participants mentioned that stress could have temporary physical effects, such as "headaches, stomach aches, muscle tension and so on" (Robin, 23-24), and eight described negative psychological effects such as "anxiety, worry, fear etc" (Abby, 32-33).

For seven individuals, these health impacts were seen as extremely serious. For example, four participants believed stress could cause depression: "I know that stress can impact your mental … health, [for example causing] depression" (Alex, 29), and Abby linked stress to Post Traumatic Stress Disorder (PTSD): "ongoing stress … for example domestic violence … it ultimately leads to PTSD" (77-81). Three participants saw stress as the cause of heart attacks, and Terry believed it could cause cancer, explaining "I constantly hear that heart problems are linked to stress. You know when someone gets a heart attack when they are extremely stressed. I read some research that linked some types of cancer to stress" (Terry, 48-51).

Seven participants expressed desire to know more about the health effects of lifetime stress and how to manage them: "I would like to know more about … whether some of the damage done by lifelong stress can be reversed or improved in any way" (Terry, 156-158). Interestingly, for three participants this desire for more knowledge was particularly important as they had personally experienced stress damaging their health.

Personal Experience

For three participants (Hannah, Robin and Terry), their understanding of the damage caused by stress was influenced by personal experiences of stress leading to negative health effects. These individuals believed that stress interacted with their long-term pre-existing conditions, namely anxiety, arthritis, asthma, back problems, insomnia, irritable bowel syndrome, joint issues, and PTSD. Stress was understood to both co-create and exacerbate these conditions, as Robin described: "As a result of stress…I was diagnosed with Irritable Bowel Syndrome…and many other physical

conditions [which] I have…been told were linked to my stress levels e.g. asthma flare ups, insomnia, back problems" (Robin, 43-47).

Robin and Terry also experienced short-term health effects of stress which highlighted how damaging it could be. Terry spoke about the impact of stress on hair loss: "chunks of hair started falling out … I feel like my physical and mental health took a big hit" (34-36), and Robin experienced immune system effects, saying "My immune system went into overdrive…which resulted in sore joints, swollen lips and blotches all over my body. …an immunologist…concluded that stress had played a big part in causing this issue" (47-50).

With all participants believing stress to be harmful to health, and seven regarding these as extremely serious, all had coping strategies and four highlighted the importance for themselves and/or others to manage stress levels to mitigate impact.

Theme 3: Individuals are Agents - "You have to learn to cope with [it]." (Frankie, 150)

Mitigating Stress

As well as a risk with potentially serious effects, stress was seen by all participants as manageable by the individual. This is epitomised in Robin's quote about personal responsibility:

[My Doctor] strongly recommended managing stress so I guess since then I've [] been very aware of how I can try to manage it as best I can. I know that if I don't then I will get physical symptoms, or it will lead to mental health problems such as anxiety or depression. (Robin, 50-53)

Specific methods to manage stress were discussed by everyone. The most popular, used by five participants, were mindfulness techniques, as described by Robin: "I think meditation, yoga, [and] breathing helps with that awareness and acceptance … It's just a feeling that will pass" (94-96).

Three participants (Frankie, Robin and Terry) thought it was important to control the situation to remove the stressor, by either proactively agreeing to fewer demands or by reactively leaving the situation. Frankie said, "If the stress is ongoing, I think instead of coping, we should change the stressor" (116) and "[I] try not to take [on] too [many] responsibilities. One job at a time" (203-204).

The belief that stress could be mitigated was especially important for eight participants, as they regarded stress as something which was not always possible to avoid. For example, Frankie asserted that "stress you cannot escape, you have to learn to cope with" (150), and Abby said that "The most stressful [events] are things that are out of your control, and [that] have significant consequences" (22-23). Work and academia were common sources of stress which were seen as unavoidable, with five participants (Abby, Hannah, Terry, Taylor, and Jo) directly referring to them. For example, Taylor explained, "I can't [prevent it]. I work in an environment that provides constant stress" (100). The three participants with pre-existing medical conditions (Robin, Hannah, and Terry) saw these as an unavoidable source of stress. As Robin explained, "I was diagnosed with PTSD so I think my body/brain has a tendency to perhaps go into high alert mode quite easily" (83-84). As well as exemplifying how pre-existing medical conditions were thought to cause stress, Robin's quote highlights how participants' mindsets were considered by individuals to influence the impact and effects of stress.

Mindset is Influential

As well as actions taken to mitigate stress, mindset was believed to be important in managing this, with seven participants discussing how they changed their perspective of the stressful situation, saw stress as positive, and accepted the situation. Frankie explained how she understood perceiving stress differently to change its effects, saying "stress is not something independent from us. It actually depends on us. How we perceive stress can change its effect on us. Stress can [a]ffect us depending on how we perceive it" (77-79).

Further to Frankie's assertion that mindset played a role in co-creating stress, four participants (Abby, Frankie, Robin, and Sam) presented a different conceptualisation of stress than discussed earlier; the idea that stress could be something positive. It was not that participants were presenting opposing understandings, rather that stress was considered damaging when long-term and chronic,

but when acute, could be helpful if perceived in the right way. Namely, acute stress was described as providing opportunities, being motivating, and serving to protect participants from harm, as exemplified in Abby's quote, "we need a certain amount to survive and motivate us to act" (49-50), and Frankie's example of "losing [a] job might cause a negative stress, but also might be a new opportunity to learn new skills" (85-86). Robin also pointed out the potential to "miss out on so many positive experiences" (188-190) if one seeks to avoid stress altogether.

In terms of managing stress that was not considered helpful, five participants (Jo, Terry, Frankie, Robin, and Hannah) reported a change of perspective to help them cope, described by Jo as "putting things in perspective" (Jo, 42). Terry demonstrated a process of looking at situations from different angles, drawing upon probability, time, and personal resilience, explaining "I … ask myself various questions, such as 'how likely that the worst case scenario will actually happen?', 'how likely this will matter in a year or in 5 years?', 'do I have resources to cope with it?'" (62-64). In this way, a new perspective (which Terry also referred to as "put[ting] things into perspective" (64-65)) was gained, resulting in reduced anxiety about the situation: "I … stop freaking out" (65).

As well as developing a calmer take on the situation, Terry and Robin also found an accepting mindset to be useful. For example, Terry said, "I try to just accept things…there is nothing I can do with it at the moment" (98-99), a perspective promoted by mindfulness techniques which four other participants also reported engaging in.

DISCUSSION

Findings showed a lack of specific understanding about lifetime stress, widespread knowledge that stress is damaging to health, and a strong sense that stress can be managed by the individual. These three themes will be discussed in line with the relevant research base.

Theme 1: Unfamiliarity

Consistent with Slavich (2016), participants showed a good general understanding about stress, but the specific concept of lifetime stress was unfamiliar to all but one. Interestingly, psychology students study stress during their degree, yet these findings still occurred. In the demographic survey conducted after the original data collection, participants were asked if they had studied stress as part of their psychology course. Four out of the five who responded had. (It is possible that Hannah's negative response was due to not studying that subject yet, but they were in their third year of study on the same course as the other interviewees so it seems likely that Hannah had studied stress but not identified this as such.) As all participants were on the same course, most (if not all) were likely to have studied stress.

This unfamiliarity with lifetime stress is reflected in what participants had to say about the subject; six made attempts to relate it to what they already knew, which was that stress could negatively impact health. These attempts at explanations involved constant exposure to stressors and major events suggesting that early understandings of lifetime stress are assumed relevant only for those under unusual stress. According to the HBM (Naslund et al., 2017; Sari, 2018), people are more likely to act when they have personally relevant information, so only Sam, the one participant already familiar with the term (and who also understood chronic stress to be damaging), may have changed their behaviour to account for lifetime stress (Naslund et al., 2017; Sari, 2018). However, the expressed wishes for more information suggest that participants were willing to learn more, which may then lead to change.

This widespread unfamiliarity may be due to attentional biases. Health information is attended to and recalled selectively, with personal relevance a likely influence (Ganesan et al., 2019). Participants' assumptions about lifetime stress involved unusual circumstances rather than everyday occurrences they would be likely to experience, which may be why they had not retained what specific information they had access to.

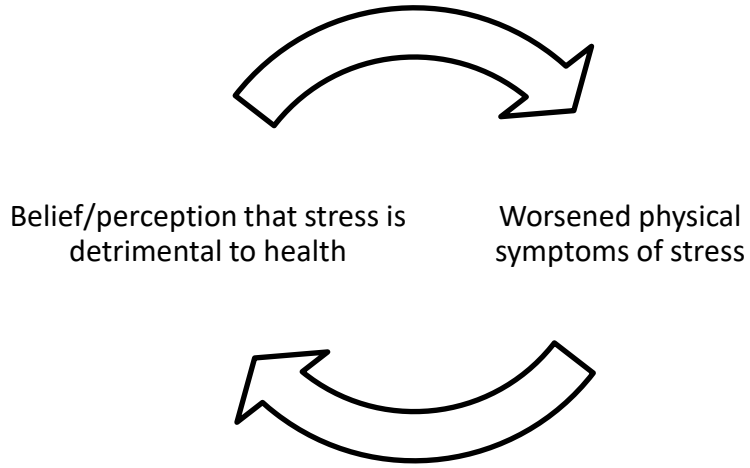
Despite all studying stress at university, only one participant from this group knew about lifetime stress. The question of what is included in the curriculum arises, and further work into how students get information about lifetime stress would be interesting. Further, if students are selectively attending to information about stress, it is worth considering what they deem relevant and how this can be related to lifetime stress. The later demographic survey showed that four of the five

participants rated their general stress level at the time of the original data collection between five and eight out of ten, so stress was a known part of their lives. They also all reported other commitments than studying in their lives, such as work or childcare, increasing demands on their time and possibly increasing stress. Education about general stress has been found to improve well-being (Gelberg & Gelberg, 2005; Lupien et al., 2013). Personal relevance perceptions of other health conditions have been increased through HBM-based education programs; results showed that the other factors in the HBM also improved (perceived severity of the threat, and costs, barriers, and benefits to change) as did the targeted health behaviours (Azadi et al., 2021; Cal et al., 2020; Shabibi et al., 2017). It seems reasonable to suggest that targeted education interventions could increase attention to and management of lifetime stress, and therefore improve health outcomes.

Theme 2: Stress is Damaging

Participants were all aware that stress is damaging, as predicted by the literature (Crum et al., 2020; Robinson, 2018; Slavich, 2016). Likely contributions to this understanding were that psychology courses include study of stress and mental health, and the media frequently report on stress, raising awareness of its potential effects. Further, knowledge of stress may also affect perceptions of stress which in-turn influences the stress which is experienced (see Figure 1) (Fischer et al., 2016; Keech et al., 2020). Believing stress is detrimental to health can result in worse physical symptoms during stressful periods (Fischer et al., 2016), which are then likely to further influence perceptions.

Figure 2
Cycle of Stress Perception and Experience



Positive aspects were mentioned briefly by four, but generally all had negative understandings of stress, as in Kilby et al.'s (2020) study discussed earlier. As experiencing stress negatively leads to poorer levels of physical and mental health (Fischer et al., 2016; Keller et al., 2012), and higher perceived stress levels (Heikkilä et al., 2019; Keech et al., 2020), which are correlated with higher levels of mortality (Malik et al., 2020; Prior et al., 2016), understandings and perceptions of stress have an important role in managing health long term. Evidence shows that viewing stress positively improves coping, performance, and perceived stress levels (Heikkilä et al., 2019; Jamieson et al., 2018). Reappraisal to a positive stress mindset has been shown to be an effective way to improve how general stress affects individuals (Jamieson et al., 2018; Liu et al., 2019). Indeed, in the student population, interventions to change views of stress to enhancing or a challenge have been shown to improve academic performance (Hagger et al., 2020; Jamieson et al., 2018; Jenkins et al., 2021), and mitigate depression and anxiety in high stress periods (Huebschmann & Sheets, 2020). Research into lifetime stress appraisal could be valuable. However, interventions should consider the possibility of inadvertent negative reinforcement through education about a new potential threat.

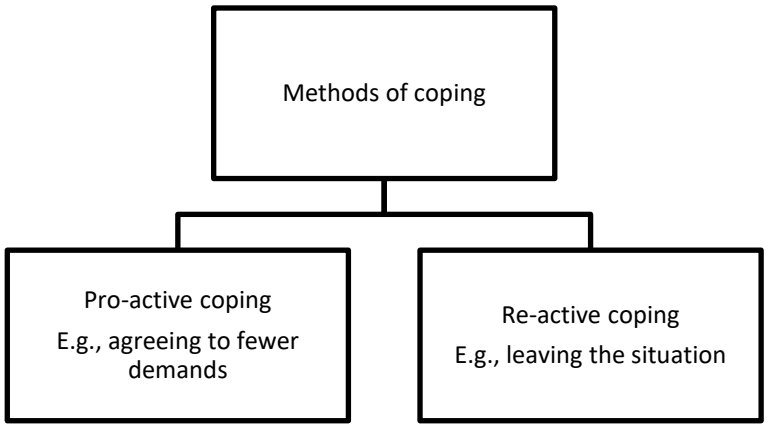
Certainly, negative understandings of stress leading to increased stress symptoms appeared resonant for the current participants. In particular, three individuals had personally experienced negative

health effects from stress and later reported stress levels of between five to eight out of ten at the time of the original data collection. Hannah reported that in response to a stressful situation she "was catastrophising and making things worse" which triggered her anxiety, causing "hyperventilating and feeling a failure". Terry explained that she "tends to get stressed even when there is not much to stress about". Robin said she knows stress triggers her medical conditions, but "[tries] not to always frame it negatively" (line 54). Furthermore, participants gave insight into what they, as students, found stressful. They collectively noted academic workload, coursework, exam revision, living alone, managing finances, work stress, physical and mental health issues, COVID-19 (interviews were conducted just before the start of the first lockdown on 23rd March 2020, and questionnaire data downloaded three days after), pregnancy, and personal relationships. This is similar to that reported in the literature (Aherne, 2001; Bedewy & Gabriel, 2015; Fruehwirth et al., 2021; Logan & Burns, 2021). Thus, it may be beneficial to target reappraisal interventions for students in these circumstances, framed from a lifetime stress perspective to educate about and minimise its deleterious effects, and to embed long term coping strategies for managing lifetime stress.

Theme 3: Individuals Are Agents

In the HBM, self-efficacy (confidence in one's abilities) is considered an indicator of change, as are beliefs about being susceptible to the threat and the threat being severe (Naslund et al., 2017). These aspects of the HBM were reflected in the accounts of the current participants, who believed they were susceptible to stress (susceptibility), believed that stress could have severe health consequences (severity), and believed they could mitigate the effects of stress through various coping strategies (self-efficacy). Mindfulness techniques were the most popular with participants (n=5, in line with studies finding this effective for stress reduction (Gotink et al., 2016; Klatt et al., 2017; Stillwell et al., 2017)), as well as changing perspective through tactics like considering likely outcomes, noticing improvement, and gathering new evidence (n=5, these techniques are commonly used in CBT (e.g. Greenberger et al., 2015; Leahy & Holland, 2000)). Our findings indicated a simple model of stress management which could be used to conceptualise stress-related coping strategies in intervention (see Figure 2).

Figure 3
Simple Model of Pro-Active and Re-Active Coping



Participants described pro-active coping strategies (such as agreeing to fewer demands, adopting a realistic mindset, and adopting an acceptance mindset) and re-active coping strategies (such as leaving the situation, taking a break or seeking distraction), both of which individuals reported as helpful. Although we cannot assume based on our sample of ten individuals that others will cope in similar ways, the concepts are so broad it is reasonable to assume they might. Further research may benefit from considering whether others' coping strategies can be considered as pro-active and re-active to provide support for the model which easily conceptualises coping strategies. We report the model because we believe it would be useful in psychotherapy sessions and health intervention.

For our participants, perceptions of control (over situations and stressors) were important for how they managed stress and for how they understood it. Qualitative research does not try to create objective generalisations but can be transferred to similar contexts (Kalu, 2017); other university students may also find control to be important. Furthermore, perceived lack of control has been found detrimental for stress levels and mental health in other literature using generalisable methodology (Bhanji et al., 2016; Guo et al., 2019; Makara-Studzińska et al., 2019). Thus, control and focusing on enhancing individuals' beliefs that they are in control may be a useful aspect for interventions targeting lifetime stress. In particular, interventions could suggest that individuals split what feels like unavoidable stress, (a barrier to change which is a strong predictor of action in the HBM (Carpenter, 2010; O'Connor et al., 2014; Sari, 2018)), into what can and cannot be controlled. Acceptance could be promoted for aspects which cannot be controlled, and action taken with that which can. This is consistent with the Acceptance and Commitment model of psychotherapy (e.g. Harris, 2019), where acceptance and committed action fostered by ACT interventions have been found beneficial for mental health (Stockton et al., 2019). (Although ACT and acceptance have been found helpful for stress management (Fung et al., 2018; Puolakanaho et al., 2019), the current authors found no studies linking stress and committed action specifically within a stress context. We argue, however, that as committed action is a fundamental part of the ACT model, this concept is likely to be linked to managing stress in ACT interventions.) Certainly, the current participants noted that situations which felt out of the individuals' control were more stressful than stress which was felt manageable. As Abby said, "The most stressful [events] are things which are out of your control and [that] have significant consequences" (22-23). They also reported adopting an acceptance mindset to be helpful for stress management, lending support from the current participants for looking further into Acceptance and Commitment informed interventions for lifetime stress.

STRENGTHS AND LIMITATIONS

This research succeeded in its aim to provide a rich overall description of an unstudied area found associated with poorer physical, cognitive, and mental health (Marshall et al., 2016; Mayer et al., 2019; Toussaint et al., 2016). However, as acknowledged by Braun and Clarke (2006), choosing this design did result in a loss of depth, as data was gathered which could not be fully captured within the scope of a broad analytic lens. Two particularly fruitful areas worth exploring in further papers include effective education interventions about lifetime stress, and the possibility of linking lifetime stress reappraisal interventions to specific stressors encountered by university students.

Socio-demographic details were not originally gathered. This was later rectified to an extent, but only half of participants responded. Yardley's first principle of quality qualitative research is sensitivity to context, and guidelines for reporting also require this (Tong et al., 2007; Yardley, 2000). Background information gives context to findings, so gathering socio-demographic details originally would have increased the richness of interpretation (Willig, 2013).

The method of data collection was designed to meet the hearing needs of the researcher. Advantages included a feeling of anonymity from typing to a screen rather than speaking to a person; no access to the facial expressions or body language of the interviewer, which convey meaning and can influence the participant (Willig, 2013); and the ability to consider and correct typed information for increased richness (Schober et al., 2015; Shapka et al., 2016). Possible criticisms are that much communication is expressed non-verbally, and typing is much slower than speaking so less may have been communicated. Furthermore, questionnaire answers were more cursory than text-based interview responses, which could be followed up to elicit further detail. Overall, the choice of data collection gave a unique perspective; although some data may have been missed, more may have been gained.

This study goes some way to providing representation for partially deaf researchers. There is a lack of research into the experiences of this population; the authors' search of the literature found the focus to be on D/deaf scholars within Deaf Studies (capital D denotes cultural Deafness) (e.g. Kusters et al., 2017), rather than their general research experiences. This study demonstrates how text-based interviews may, in some ways, have produced richer data. It also suggests that text-based interviews may produce longer, more detailed responses than open ended qualitative questionnaires.

CONCLUSION

In conclusion, themes from this study conceptualise three main understandings about lifetime stress: unfamiliarity, stress is damaging, and individuals are agents, providing a rich overview of understandings in the area. There was a lack of specific understanding about lifetime stress, despite participants studying stress as part of their psychology degree. All participants understood general stress to be damaging to health and there was evidence of a cycle of stress perception and experience, highlighting the potential impact of reappraisal interventions. Finally, there was an underlying sense of self-efficacy, with participants believing themselves able to manage stress with pro-active and re-active coping techniques and mindset changes. Encouragingly, as the current participants believed themselves susceptible to general stress, believed this could have severe consequences, and believed they had the efficacy to mitigate this, it seems reasonable that they (according to the HBM (Rosenstock, 1974)), would likely respond well to an intervention around lifetime stress. The strengths of a rich, contextual, unique perspective were discussed, alongside the limitations of methodology and socio-demographic data. Avenues for future research to benefit public health outcomes were suggested, including linking reappraisal interventions to stressors specific to the student population, and using ACT to teach long-term coping techniques to reduce the impact of lifetime stress.

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