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Title: Exploring thematic Nightmare content and associated self-harm risk

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Abstract:

Nightmares have been shown to be robust predictors of self-harm risk, beyond depressive symptoms and hopelessness at times. However, few studies have investigated associations between nightmare content and increased self-harm risk. The present study explored associations of thematic nightmare content with history of self-harm, and risk of self-harm phenomena the morning following a nightmare. A mixed-method diary study was employed. Prospective nightmare reports were obtained from 72 participants. A total of 47 nightmare reports met inclusion criteria and were analyzed for themes using inductive thematic analysis. Chi-square and bootstrap Pearson's correlation tests were performed to assess the associations between nightmare themes and self-harm history and risk of self-harm phenomena following a nightmare. 'Powerlessness to Change Behavior' was associated a history of self-harm engagement, whereas 'Financial Hardship' indicated reduced risk. Themes were not significantly associated with increased risk of self-harm phenomena following a nightmare. Content may be of use in detecting lifetime history of self-harm engagement particularly in populations where disclosure is seen as taboo. However, nightmare symptom severity remains better indicators of risk. Evidence for the utility of nightmare content in assessing immediate self-harm risk is presently lacking. Replication with increased power is recommended.

Keywords: *Nightmares; self-harm; prospective diaries; thematic analysis*

Introduction

Sleep disturbances have been linked cross-sectionally (Sjöström, Waern, & Hetta, 2007) and longitudinally (Sandman et al., 2017; Sjöström, Hetta, & Waern, 2009; Tanskanen et al., 2001) to increased risk of suicide (Bernert, Kim, Iwata, & Perlis, 2015; Bernert & Nadorff, 2015). In particular, nightmares – vivid dysphoric dreams which provoke awakening from REM sleep (Nielsen & Levin, 2007) – have been shown to be a potent risk factor for suicidal thoughts, attempts, and death by suicide (Pigeon, Titus, & Bishop, 2016). Nightmares have been uni-directionally linked to an increased risk of self-harm engagement (regardless of suicidal intent), with this relationship being partially mediated by post-sleep negative affect in a student sample (Hochard, Heym, & Townsend, 2015). Additionally, recent findings from Ennis et al. (2017) have shown the relationship between nightmares and non-suicidal self-injury to be fully mediated by emotion dysregulation.

Building on the work of researchers proposing psychological mechanisms to explain the link between sleep disturbances and suicide (McCall & Black, 2013; Winsper & Tang, 2014; Woznica, Carney, Kuo, & Moss, 2015), a recent systematic review by Littlewood and colleagues (Littlewood, Kyle, Pratt, Peters, & Gooding, 2017) critically appraised the evidence-base behind psychological factors shown to influence the relationship between sleep variables and suicide.

Research (Golding, Nadorff, Winer, & Ward, 2015; Nadorff, Anestis, Nazem, Harris, & Winer, 2014) has shown the associations between nightmares and suicidality to be independent from two of the three variables which compose the Interpersonal Theory of Suicide (Joiner, 2009; Van Orden et al., 2010). That is, perceived burdensomeness and low belongingness. However, findings regarding the role of acquired capability for suicide has been equivocal (Golding et al., 2015; Hochard, Heym, & Townsend, 2016; Nadorff et al., 2014) and warrants further research. Variables from the Cry of Pain model (Williams, 1997), namely; defeat (Littlewood, Gooding,

Panagioti, & Kyle, 2016), entrapment (Hochard et al., 2016; Littlewood, Gooding, Panagioti, et al., 2016) and hopelessness (Littlewood, Gooding, Panagioti, et al., 2016) have also been shown to account for some of the variance explained in the nightmare to suicidality relationship. This has been further reinforced by qualitative data (Littlewood, Gooding, Kyle, Pratt, & Peters, 2016) suggesting participants viewed sleep as a temporary escape, previously hypothesized by Shneidman (1964).

Promisingly for clinicians assessing patients for suicide risk, the reporting of nightmare symptoms can outperform depression and hopelessness as predictors of suicidality (Nadorff, Nazem, & Fiske, 2011; Ribeiro et al., 2012). Alongside prioritizing a compassionate approach (Cole-King, Green, Gask, Hines, & Platt, 2013) that facilitates patient disclosure of suicidality, discussions of nightmares may bolster this process and potentially allow for improved detection of at-risk individuals. This has been suggested to be the case (Ribeiro et al., 2012) in populations where disclosing suicidal tendencies is seen as taboo, such as males in the military.

Nightmare symptom severity continues to be a reliable predictor of risk for suicide ideation, attempts, and suicide death (Bernert & Nadorff, 2015). However, little is known about the thematic content of nightmares. Littlewood et al. (2017) propose that nightmare dream content be explored as an avenue for future research. Based on their review, Littlewood and colleagues suggest that suicidal imagery could increase perceptions of entrapment or hopelessness. To date, research on nightmare content linked to self-injurious acts (Evans, 1990; Firth, Blouin, Natarajan, & Blouin, 1986; Glucksman, 2014; Langs, 1966; Maltsberger, 1993; Raphling, 1970) has relied on retrospective nightmare reporting between 2 days to 6 months following self-harm (e.g. Firth, Blouin, Natarajan, & Blouin, 1986; Raphling, 1970). As dream recall is susceptible to re-interpretation and memory biases (Robert & Zadra, 2008; Zadra & Donderi, 2000), the existing literature supporting themes of death and destruction as being more prevalent in suicidal

individuals (Firth et al., 1986; Raphling, 1970) is of limited clinical utility in assessing the impact of nightmares on subsequent self-harm.

Using mixed methods, this exploratory study examined themes in prospectively obtained nightmare reports for individuals who self-harm. We contrast these against nightmare content for a control group of individuals with no history of self-harm. Further, we explored the prevalence of resulting themes in nightmares eliciting self-harm urges on awakening in order to identify themes associated with increased risk of self-harm urges. Although no explicit hypotheses are formulated due to the exploratory nature of the study, we aim to provide initial indications as to the utility of nightmare content in assessing self-harm risk.

Methodology

Design & Procedure

A 5-day fixed interval diary study design was implemented, with recruitment taking place between October 2011 and March 2013. This study used daily prospective dream logs to reduce recall biases associated with retrospective designs (e.g., underestimation of nightmare frequency and inaccurate recall of content; Robert and Zadra, 2008; Zadra and Donderi, 2000). Participants attended a compulsory training session on diary completion at the beginning of the study, where the importance of accurate, timely responses was stressed. To facilitate the latter, daily automatic Short Message Service (SMS) text message reminders were sent to participants at an agreed wake up time for the duration of their participation in the study. Diaries were to be completed for 5 consecutive weekdays, providing 5 post-sleep entries per participant. They were instructed to complete their entry as soon as they woke up (or no more than one hour after waking). Participants were required to date and time the completion of individual post-sleep diary entry sheets and submit those daily using the provided researcher-addressed internal mail envelopes. These were to be handed in directly to a collection box by 1pm on the day of completion. Late entries were excluded.

On completion of the study, diary entries meeting inclusion into the study were assessed. In the event of multiple nightmares per participant and to avoid inflated representations of nightmare content from those, only the nightmare with the highest cumulative score on intensity, vividness, and distress (as rated on 5-point Likert) was retained for inclusion in the study and subsequent analysis.

Participants

A convenience sample of n=113 undergraduate university students, responding to calls for individuals experiencing frequent nightmares, volunteered to take part in a nightmare and wellbeing diary study. From these, 36 were excluded as they did not return any diary entry within the specified times, 5 reported being on antidepressant medication or had sleep co-morbidity issues (question 5 of the Pittsburg Sleep Quality Index; Buysse et al., 1989). The remaining 72 participants (8 males) were aged between 18-32 years (M = 21.04, SD = 3.40) and of these, 43 participants (5 males) reported a history of self-harm engagement. All 72 participants provided at least one diary entry. However, only 47 participants provided detailed descriptions of a nightmare when returning their entry (14 in the no self-harm group, 8 in the morning self-harm group, and 25 in the no morning self-harm group). Participants were naïve to the aims of this study. No monetary compensation was provided, but course credits were granted in exchange for participation.

Ethics Statement

This study was approved by the **[removed for anonymity]** School of Psychology ethics committee.

Measurements

The present study followed operational definitons of self-harm set out by Hawton et al., (2003) as intentional self-injury or self-poisoning, regardless of motivation or suicidal intent and with

a nonfatal outcome. To measure self-harm, the *modified-Deliberate Self-Harm Inventory* (mod-DSHI; Lundh et al., 2007) was employed. The mod-DSHI assesses self-harm behavior history over the lifetime using 17 dichotomous items (Yes/No). Participants responding positively to any of these were categorized as having a history of self-harm (SH group), contrastingly, individuals reporting no self-harm behaviors were categorized as having no history of self-harm (no SH group). The mod-DSHI displayed good levels of reliability (Cronbach's alphas = .80).

A *Diary Entry* consisted of a single A4 page (per day) printed booklet format. Occurrence of self-harmful thoughts (*'have you had thoughts of deliberately injuring yourself since waking up?'*) or self-harm acts (*'have you deliberately injured yourself since waking up?'*) were recorded with a dichotomous answer format (Yes/No). Participants experiencing nightmares were asked to provide detailed written descriptions ('*Please describe the negative dream or nightmare you remember most from last night in as much detail as possible [Try to include details on: Descriptive elements e.g. time, Characters, Activities, Events, Interaction, Settings, Objects, Success or failures, Fortune or misfortune & Emotions*]) and ratings of vividness, intensity and distress on 1-5 Likert scales ('*Please rate the properties of your dream/nightmare on the following scale'*, 1= 'Not at all', 2= 'A little', 3= 'Moderate', 4= 'Quite a lot' 5= 'Extreme').

Thematic Coding

A coding frame was developed to investigate the nightmare content and determine how frequently themes occurred across all participants. Inductive thematic analysis (Braun & Clarke, 2006) of all reports was performed (by authors KDH, SA and JC) to generate the themes, ensuring the coding frame consisted of content derived from the participants rather than from the pre-existing literature. Further, to avoid bias and ensure that themes derived would remain generic across both individuals with and without a history of self-harm, each researcher independently coded the data and generated initial themes. Once data saturation occurred, these provisional

themes were reviewed as a group until agreement was reached concerning the final themes. These final themes were defined and used as the coding frame (see table 1 for each theme and definition). Using the coding frame, nightmares were then recoded by one researcher (JC), providing quantitative indicators of the presence (Yes/No) and frequency of themes (Means and SDs).

[INSERT TABLE 1 ABOUT HERE]

Statistical analysis

Due to the low frequency of self-harm acts reported, the dichotomous variables measuring self-harm thoughts and acts were pooled into a single dichotomous variable named SH-phenomenon. Chi-square tests were performed to investigate the relationship of theme presence within a nightmare (dichotomous variable) with self-harm engagement across the lifetime (control/self-harm history), and self-harm following a nightmare (no SH phenomenon /SH phenomenon). To investigate the associations of theme frequency with lifetime self-harm engagement, and post-nightmare self-harm phenomenon, bootstrapped (1000 resample) Pearson's zero-order correlations were performed. Bootstrapping allowed for the derivation of confidence intervals, which, combined with the correlation coefficients allowed for odds ratios to be obtained for each test.

Results

Descriptive statistics for the presence (%) and the mean frequency (SD) of theme occurrence within a nightmare for controls (n=14) and individuals reporting a lifetime self-harm engagement (n=33) is reported in Table 2. Additionally, Chi-square analyses and Bootstrapped Pearson's correlations (1000 resamples) are reported, along with odds ratios (CI 95%) indicating risk of participants reporting a history of self-harm.

[INSERT TABLE 2 ABOUT HERE]

Findings indicate that presence of the theme *Powerlessness to Change Behavior* within a nightmare was significantly associated with an increased likelihood of reporting lifetime self-harm engagement (OR = 1.41, 95% CI= 1.13-1.77, *p* =.024). Conversely, presence of the theme *Financial Hardship* was indicative of a significantly reduced likelihood of reporting lifetime self-harm engagement (OR = .12, 95% CI = .01-1.30, *p* =.047). Findings for theme frequency mirrored those reported for presence of theme. The frequency of *Powerlessness to Change Behavior* was significantly associated with an increased likelihood of reporting a history of self-harm (OR = 3.41, 95% CI= 2.02-6.55, *p* = .030) whereas *Financial Hardship* was associated with a reduced likelihood (OR = .27, 95% CI = .09-1.24, *p* = .020).

[INSERT TABLE 3 ABOUT HERE]

Participants indicating self-harm engagement across the lifetime were split based on the occurrence of a self-harm phenomenon following their nightmare. Descriptive statistics for presence and frequency of themes in nightmares for individuals who experienced a self-harm phenomenon following the nightmare (SH event, n= 8), and those who did not (SH no event, n=25) are presented in Table 3. Analyses investigating the association between nightmare themes (both presence and frequency) and the triggering of a self-harm phenomenon following the nightmare

indicated that no theme was significantly associated with a self-harm phenomenon on the morning following a nightmare.

Discussion

We investigated if nightmare thematic content could serve as a marker of increased vulnerability for self-harm from longitudinally obtained nightmare content, with themes inductively derived from our sample. This allowed us to examine the associations of particular themes with (i) reporting of lifetime self-harm, and (ii) increased risk of a morning self-harm phenomenon following a nightmare.

The themes identified in the current study reflect previously identified content in nightmares and bad dreams, including aggression, conflict, death and unrealistic environments (Gauchat, Séguin, McSween-Cadieux, & Zadra, 2015; Robert & Zadra, 2014). Although the majority of the content was negative, more positive content such as *Attempts to Change Behavior* and *Successful Escape* indicate that positive outcomes, however brief they may be, do occur. Importantly, our data indicates that within the nightmares of our participants, more positive themes were self-induced, with the dream representation of the participant taking positive actions (e.g. "I managed to hide from them despite a lot of close calls" [P42 D2]). The literature into the role of positivity in nightmares is limited (Robert & Zadra, 2014) and so the function it plays in the nightmares of those who do and do not self-harm requires further investigation.

Financial Hardship was also identified in the nightmares of both self-harm and non-self-harm participants. Nightmares often involve social interactions (e.g. being chased, violence from or onto others, etc.), and consequently the role of economics may mirror this socially constructed reality. However, the negative valence of this theme (through a lack of money or financial opportunities) did not clearly indicate whether the theme was simply a precursor for other events in the nightmare or if it was representative of participants' actual reality. Conclusions regarding the importance of this theme, and seemingly protective nature (due to its apparent prevalence in the control group over that of the self-harm group) should be made with caution. Rather, the relatively

small sample and exploratory nature of the present study suggest further exploration of this theme is required.

Is thematic content associated to reports of self-harm history and next-day self-harm phenomena?

Whilst nightmares' thematic content relating to '*Powerlessness to Change Behavior* (both presence of a theme and its frequency within a nightmare) was significantly associated with increased risk of participants reporting a history of self-harm whereas *Financial Hardship* was associated with a reduced risk, none of the themes identified were significantly linked to the occurrence of a self-harm phenomenon (thought or act of self-harm) after the nightmare. However, themes *Powerlessness to Change Behavior*, *Financial Hardship* and *Disconnection with Reality* did show marginally non-significant trend (.06) associations with risk of self-harm phenomena following a nightmare. Interestingly, although findings should be treated as tentative, positive intrapersonal future thinking and low levels of financial positive future have been linked to repeated suicidal behavior (O'Connor, Smyth, & Williams, 2015). Our nightmare themes relating to *Financial Hardship* align with these findings, whereas *Powerlessness to Change Behavior* (which incorporates an intrapersonal element) may be a nightmare-based representation of the unattainability of intrapersonal future thoughts, suggested by O'Connor and colleagues to increase feelings of entrapment (O'Connor et al., 2015).

Comparison with previous research

Research investigating the links between dream content and self-harm behaviors (Evans, 1990; Firth et al., 1986; Glucksman, 2014; Langs, 1966; Maltsberger, 1993; Raphling, 1970) has focused on the association between negative dream content and acts with clear suicidal intent. These studies reported on the negative dream content of suicide attempters compared to depressed or psychiatric in-patients controls. Contrastingly to our findings, suicide attempters

showed greater proportions of themes pertaining to; death, exhaustion, disintegration, annihilation, murder and killing, surrender, peaceful departures and, reunion with the dead (Evans, 1990; Firth et al., 1986; Langs, 1966; Maltsberger, 1993; Raphling, 1970). Our theme pertaining to *Violence* (theme 5) appears to be the closest approximation to themes in prior research, though no association was demonstrated here.

Importantly, frequent ambivalence or uncertainty regarding suicidal intent is expressed by patients reporting in hospitals following self-harm (Skegg, 2005). Indeed, recent data suggests suicidal intent to be a continuous rather than dichotomous variable (Kapur, Cooper, O'Connor, & Hawton, 2013; Orlando, Broman-Fulks, Whitlock, Curtin, & Michael, 2015). For this reason, our study investigated nightmare content in relation to self-harm regardless of suicidal intent. Previous studies' focus on participants who had attempted suicide may imply suicidal intent to be a key extraneous variable that could increase death related content within nightmare reports. Thus, the discrepancy between our finding and those previously reported in the literature may be explained by the inclusion of all self-harm episodes regardless of intent.

Further, the temporal distance between the self-injurious act and the preceding negative dream used in prior studies to infer thematic difference between suicidal individuals and controls may be an important factor. For instance, Firth et al. (1986) reported participants' negative dreams that occurred within a window of 6 months prior to the self-injurious act, whereas Raphling (1970) recorded negative dreams between 2-21 days (M= 7.3 days) prior. Moreover, these studies rely on retrospective assessments, and as such dream reports are open to re-interpretation and memory biases. Participants were asked to recall the worst dream they had experienced prior to their suicide attempt, which could have led participants to subjectively reinterpret of their dreams in the context of the salient suicide attempt, and introduced a stronger death-themed bias within their reports. This is in stark contrast to our longitudinal methodology where reports are obtained on the

day (typically less than half a day) of the nightmare occurring, ensuring minimization of contextual influence on interpretation (i.e. “worst dream prior to suicide attempt”) and obtaining accurate level of details without overestimation or embellishment (Robert & Zadra, 2008; Zadra & Donderi, 2000).

Dreams are thought to reflect recombined memories for fear extinction (Nielsen & Levin, 2007). More precisely, the affective load presently experienced by an individual is said to dictate the need for the formation of new fear extinction memories. These memories are created during the dream process, which dissociate and recombine attributes of fear memories. The memories are then recreated into a new potentially fear extinguishing context. However, nightmares occur due to a failure within this process whereby the recombined memory is consistent to waking state fear memories, akin to phobias or social anxiety. The association between presence and frequency of themes relating to feeling powerless to change a behavior and lifetime self-harm engagement within our study may reflect the incorporation of distressing memories related to our theme of powerlessness into negative dream content. Thus, this theme may be more prevalent due to the increased affective load associated with *Powerlessness to Change Behavior* (perceived lack of control, unable to change behavior or being submitted to the will of others), common in individuals who have a lifetime history of self-harm engagement (O’Connor et al., 2015).

Study strengths and limitations

Our study addressed important definitional issues by focusing on self-harm regardless of intent. This was done because suicidal intent has been conceptualized on a continuum rather than being dichotomous in more contemporary work (Kapur et al., 2013; Orlando et al., 2015). This allowed us to test for associations between nightmare content and self-harm; which may or may not involve suicidal intent (Kapur et al., 2013); hence increasing the clinical utility of our findings.

In addition, our longitudinal method of data collection enabled us to test, with a narrower temporal range and reduced likelihood of re-interpretation or recall bias, the associations of the

thematic content of nightmares with both self-harm history and risk of self-harm phenomena following a nightmare. We suggest this method yields more accurate content data (Robert & Zadra, 2008; Zadra & Donderi, 2000). Further, it allowed us to test discrete associations between specific nightmare content and proximal risk of self-harm, increasing the clinical relevance of our findings.

We advise a degree of caution when interpreting our findings as the sample of nightmare reports used in our analyses was relatively limited. This was due primarily to the short temporal proximity between a nightmare event and a self-harm phenomenon in the morning. Considering research has shown that nightmare events increase risk of self-harm in the morning (Hochard et al., 2015), self-harm phenomena so close to awakening remain infrequent within such a narrow time window. We performed multiple comparisons without statistical corrections (e.g. Bonferroni) due to the exploratory nature of the study. As such there is potential for our findings to be due to type on errors. Conversely, the observed power of our analyses, particularly for comparisons between individuals with a history of self-harm following a nightmare (See Table 3, no self-harm phenomenon vs. self-harm phenomenon) was low. This calculations is of observed power indicate these analyses to reached observed power levels (based on sample size n= 33, df= 1, α=.05) for Chi-squared tests and correlations of 1-β= .41 and 1-β= .42 respectively. Considering our research is exploratory, the potential for Type I errors due to multiple comparisons, compounded by the low statistical power and likelihood of Type II errors serves to highlight that findings should be taken as highly tentative.

Replications with a larger sample of participants currently engaging in self-harm, particularly with a more prominent male representation, is required to validate these findings and increase generalizability. This larger self-harm sample would increase the likelihood of observation of self-harm phenomena following a nightmare, allowing for a greater volume of nightmare content reports to be analyzed to detect relevant thematic associations to self-harm risk. To this end, the

present exploratory study does provide researchers with initial effect size estimates, allowing for more accurate sample size calculations in future replication efforts.

Future studies may wish to explore the relationship between nightmare content and suicidal intent at the time of a report. This may help elucidate if suicidal intent explains the links between negative dream content and themes of death reported in prior research (Evans, 1990; Firth et al., 1986; Langs, 1966; Maltsberger, 1993; Raphling, 1970). We recommend that as with the present study, replications follow a longitudinal method of nightmare content acquisition to minimize re-interpretation and memory biases (Robert & Zadra, 2008; Zadra & Donderi, 2000).

Implications for services

Our findings indicate that thematic content of nightmares relating to *Powerlessness to Change Behavior* and *Financial Hardship* could tentatively be of use for identifying individuals with a lifetime history of self-harm. This may benefit clinicians assessing self-harm risk in populations where self-harm disclosure could be seen as taboo, for instance in male military personnel (Ribeiro et al., 2012).

However, caution must be taken when using nightmare content to identify immediate risk of self-harm engagement. Although our data supports the application of nightmare thematic content to identify self-harm engagement across the lifetime, which itself is a marker of increased risk for subsequent self-harm and suicide (Zahl & Hawton, 2004), we did not find any themes to be associated with a self-harm phenomenon the morning following a nightmare. However, numerous studies have indicated frequent nightmares, insomnia (Bernert & Nadorff, 2015), and general nighttime wakefulness (Perlis et al., 2016) to be potent and reliable predictors of suicidality. Further, estimates of immediate risk for self-harm engagement in individuals with a pre-existing history of self-harm have been found to be 4.17 times (95% CI 1.02 to 17.11) more likely following a nightmare (Hochard et al., 2015). Hence, clinicians ought to not rely on nightmare content to

identify immediate risk. Instead, we suggest that clinicians wishing to use nightmares as an indicator of immediate risk base their evaluations on a comprehensive and compassionate (Cole-King et al., 2013) psychosocial assessment (NICE, 2011) including an evaluation of nightmare frequency and severity rather than content.

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Table 1- Inductive Nightmare Content Coding Frame

Theme	Definition	Example
1a. Escape (Successful)	Successfully removing oneself from situation	Then I pull my parachute cord and speed away from him [P21, D1]
1b. Escape (Thwarted)	Unable to remove oneself from threatening situation /event, despite making possible attempt to do so	We tried to hide at some place but every time we were found by others [P25, D2]
2. Disconnection with Reality	Distorted perspective of reality including mythical creatures and physical morphing	Enormous lizard crawling over the world [P75, D1]
3. Description of Physical Environment	Description of scene, objects, contextual cues, travel and transport	It was cold; the house looked abandoned with crooked patio flags [P65, D4]
4a. Power to Change Situation (Attempts Made to Change Something)	Attempts to change the situation but failing to do so (process of change)	I run towards her and I'm moving but not getting any closer [P39, D4]
4b. Power To Change Situation (Powerlessness to Change Behavior)	Lack control, unable to change behavior or being submitted to the will of others	I feel scared but I can't move [P17, D1]
5. Violence	Violent acts or behavior (committed by others or by oneself), death and violent descriptions (gore, weapons)	There's blood and guts and it all looks so real [P3, D2]
6a. Negative Experiences (Emotions)	Negative emotions experienced by oneself or empathizing with negative emotions of others	In my dream I feel depressed and hopeless [P26, D2]
6b. Negative Experiences (Intra-Personal Relationships)	Arguing or trying to avoid arguing with others, being subjected to negative behavior of others (e.g. mocking, betrayal)	Everything I said I ended up getting mocked for [P30, D1]
7. Financial Hardship	Lack of financial opportunities	I offered to pay him £10 but then I realized I had no cash [P32, D3]

Table 2 – Risk of self-harm history associated with theme presence and frequency following a nightmare event

	Theme	Control (n= 14)	Self-harm (n= 33)	$\chi 2$	OR (CI 95%)	*p*
		Presence [%]				
Presence predicting self-harm history	1a.	21.4%	16.1%	0.19	.71 (.14 to 3.48)	.667
	1b.	14.3%	16.1%	0.03	1.15 (.20 to 6.82)	.874
	2.	42.9%	29.0%	0.83	.55 (.15 to 2.03)	.362
	3.	85.7%	87.1%	0.02	1.13 (.18 to 7.00)	.899
	4a.	14.3%	16.1%	0.03	1.15 (.20 to 6.82)	.874
	4b.	0.0%	29.0%	5.08	1.41 (1.13 to 1.77)	.024
	5.	35.7%	41.9%	0.16	1.30 (.35 to 4.80)	.693
	6a.	50.0%	61.3%	0.50	1.58 (.44 to 5.65)	.478
	6b.	28.6%	22.6%	0.19	.73 (.17 to 3.06)	.665
	7.	21.4%	3.2%	3.95	.12 (.01 to 1.30)	.047
		Mean frequency (SD)		*Bootstrap R* (CI 95%)		
Frequency predicting self-harm history	1a.	.36 (.74)	.21 (.60)	-.10 (-.43 to .19)	.69 (.18 to 2.02)	.485
	1b.	.21 (.58)	.33 (.92)	.07 (-.24 to .24)	1.29 (.40 to 2.45)	.659
	2.	.64 (.84)	.82 (1.72)	.05 (-.24 to .23)	1.20 (.41 to 2.36)	.720
	3.	2.86 (3.25)	2.55 (2.84)	-.05 (-.38 to .23)	.83 (.23 to 2.36)	.743
	4a.	.14 (.36)	.21 (.55)	.06 (-.27 to .26)	1.24 (.36 to 2.66)	.666
	4b.	.00 (.00)	.27 (.45)	.32 (.19 to .46)	3.41 (2.02 to 6.55)	.030
	5.	.43 (.65)	.97 (1.63)	.18 (-.35 to .34)	1.94 (.26 to 3.71)	.238
	6a.	.79 (.89)	.79 (.82)	.00 (-.29 to .31)	1.00 (.33 to 3.26)	.994
	6b.	.50 (.85)	.36 (.86)	-.07 (-.41 to .18)	.78 (.20 to 1.94)	.621
	7.	.57 (1.28)	.03 (.17)	-.34 (-.55 to .06)	.27 (.09 to 1.24)	.020

Table 3 – Risk of morning self-harm phenomenon associated with theme presence and frequency following a nightmare event

	Theme	No SH phenomenon (n=25)	SH phenomenon (n=8)	*χ2*	OR (CI 95%)	*p*
		Presence [%]				
Presence predicting SH event	1a.	16.7%	14.3%	0.02	.83 (.08 to 8.95)	.880
	1b.	16.7%	14.3%	0.02	.83 (.08 to 8.95)	.880
	2.	20.8%	57.1%	3.47	5.07 (.84 to 30.41)	.063
	3.	87.5%	85.7%	0.02	.86 (.08 to 9.82)	.901
	4a.	12.5%	28.6%	1.04	2.80 (.37 to 21.46)	.309
	4b.	20.8%	57.1%	3.47	5.07 (.84 to 30.41)	.063
	5.	45.8%	28.6%	0.66	.47 (.08 to 2.94)	.415
	6a.	62.5%	57.1%	0.07	.80 (.15 to 4.42)	.798
	6b.	25.0%	14.3%	0.36	.55 (.05 to 5.04)	.551
	7.	0.0%	14.3%	3.54	1.17 (.86 to 1.58)	.060
		Mean frequency (SD)		*Bootstrap R* (CI 95%)		
Frequency predicting SH event	1a.	.24 (.66)	.13 (.35)	-.08 (-.27 to .30)	.75 (.36 to 3.13)	.644
	1b.	.32 (.90)	.38 (1.06)	.03 (-.27 to .44)	1.12 (.36 to 5.91)	.886
	2.	.64 (1.68)	1.38 (1.85)	.19 (-.14 to .60)	2.02 (.60 to 15.19)	.301
	3.	2.60 (1.68)	2.38 (2.07)	-.03 (-.27 to .38)	.90 (.36 to 4.44)	.849
	4a.	.20 (.58)	.25 (.46)	.04 (-.20 to .45)	1.16 (.48 to 6.22)	.825
	4b.	.20 (.41)	.50 (.53)	.29 (-.11 to .64)	3.00 (.67 to 20.52)	.103
	5.	.92 (1.32)	1.13 (2.48)	.05 (-.38 to .44)	1.20 (.23 to 5.91)	.762
	6a.	.76 (.72)	.88 (1.23)	.06 (-.39 to .44)	1.24 (.22 to 5.91)	.736
	6b.	.44 (.96)	.13 (.35)	-.16 (-.31 to .11)	.56 (.31 to 1.49)	.375
	7.	.00 (.00)	.13 (.35)	.31 (.23 to .61)	3.26 (2.36 to 16.32)	.077