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RESEARCH ARTICLE

Different self-damaging behaviours, similar motives? Testing measurement invariance of motives for nonsuicidal self-injury, disordered eating and substance misuse

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Abstract

Objectives: Theory and research suggest that distinct self-damaging behaviours (SDBs; e.g., nonsuicidal self-injury [NSSI], restrictive eating, binge eating, drug misuse, alcohol misuse) share similar motives. However, few studies have used a common self-report inventory to investigate the shared relevance and relative salience of motives for SDBs. Accordingly, the present study: (1) examined whether self-report scales assessing *intra*personal motives (i.e., relieving negative emotions, enhancing positive emotions, punishing oneself) and *inter*personal motives (i.e., bonding with others, conforming with others, communicating distress, communicating strength, reducing demands) have invariant factor structures across SDBs; and (2) compared the salience of these motives across SDBs.

Methods: 1018 adults (54.6% men, M_{age} = 35.41 years) with a history of SDBs were allocated to the following groups: NSSI (n = 213), restrictive eating (n = 200), binge eating (n = 200), drug misuse (n = 200) or alcohol misuse (n = 205). Participants reported on their motives for engaging in their allocated SDB. Measurement invariance analyses compared the factor structures and latent means of the motive scales across SDBs.

Results: The motive scales had comparable factor structures across SDBs. Intrapersonal motives were most strongly endorsed for NSSI and drug misuse. Interpersonal motives

were most strongly endorsed for drug and alcohol misuse. All motives were least salient to restrictive eating.

Conclusions: Results suggest that common motives underlie distinct SDBs and that they can be adequately assessed using a single self-report inventory. However, certain motives are more relevant to some SDBs than others, with restrictive eating being the most motivationally distinct SDB. This knowledge can inform transdiagnostic models and interventions for SDBs.

KEYWORDS

confirmatory factor analysis, dysregulated behaviour, function, health-risk behaviour, motive, self-destructive behaviour, transdiagnostic

Practitioner points

- Nonsuicidal self-injury, disordered eating and substance misuse can be enacted for similar reasons (i.e., motives).
- Clinicians and researchers can use the same set of self-report items to measure the shared motives for engaging in nonsuicidal self-injury, disordered eating and substance misuse.
- Intrapersonal (i.e., internal) motives are highly relevant to nonsuicidal self-injury and drug misuse, while interpersonal (i.e., social) motives are highly relevant to drug and alcohol misuse.
- Restrictive eating is more motivationally distinct than other behaviours, and future research is needed to identify additional motives that could be important for this behaviour.

Self-damaging behaviours (SDBs) encompass behaviours that carry a high risk of direct or indirect physical harm, including *nonsuicidal self-injury* (NSSI; i.e., direct and intentional damaging to one's body tissue without suicidal intent), *disordered eating* (i.e., maladaptive eating behaviours such as binge eating, purging and restrictive eating) and *substance misuse* (i.e., using alcohol or drugs in a risky or hazardous way; Turner, 2022). A growing body of research suggests that SDBs are mechanistically linked by virtue of shared etiological factors (Bresin, 2020) and appetitive and/or aversive motivations (Bresin & Hunt, 2023). Given that SDBs are associated with distress and functional impairment (American Psychiatric Association [APA], 2022), it is important to improve our understanding of *why* some people engage in SDBs, as this knowledge can inform transdiagnostic theories and interventions to reduce SDBs and their associated consequences.

Motivational models of NSSI, disordered eating and substance misuse have largely been siloed in independent literatures, with little integration across theories (e.g., Cooper, 1994; Jackson et al., 2003; Nock & Prinstein, 2004). Likewise, the motives for SDBs have typically been assessed using separate self-report inventories, such as the *Inventory of Statements About Self-Injury* for NSSI (Klonsky & Glenn, 2009), *Motivations to Eat Questionnaire* for disordered eating (Jackson et al., 2003) and *Drinking Motives Questionnaire* for alcohol use (Cooper, 1994). However, a close examination of motivational models and their corresponding assessment inventories reveals that SDBs may share a common set of *intra*personal motives aimed at regulating one's internal experiences and *inter*personal motives aimed at regulating one's social experiences. Intrapersonal motives include engaging in SDBs to *relieve negative emotions* (e.g., 'To stop bad feelings'), *enhance positive emotions* (e.g., 'To cheer myself up') and *punish*

oneself (e.g., 'To express anger towards myself for being worthless or stupid'; Cooper, 1994; Hooley et al., 2010; Jackson et al., 2003; Klonsky & Glenn, 2009; Nock & Prinstein, 2004). Conversely, interpersonal motives include engaging in SDBs to affiliate with others, such as to *bond with others* (e.g., 'To create a sign of friendship or kinship with others') or *conform with others* (e.g., 'To fit in with others'; Cooper, 1994; Jackson et al., 2003; Klonsky & Glenn, 2009; Nock & Prinstein, 2004). Interpersonal motives also encompass engaging in SDBs to communicate one's social needs, such as to *communicate distress* (e.g., 'To let others know the extent of my emotional pain'), *communicate strength* (e.g., 'To prove to others that I am tough or strong') or *reduce demands* (e.g., 'To avoid having to do something unpleasant I do not want to do'; Nock, 2008). Taken together, motivational models suggest that NSSI, disordered eating and substance misuse can be enacted for similar reasons, despite their unique topographical features.

Several studies support the idea that SDBs share similar motives. For example, similar factor structures emerged when a self-report measure of NSSI motives was adapted to assess motives for binge eating and purging (Wedig & Nock, 2010), as well as restrictive eating (Wang et al., 2021). However, some motives appear to be more relevant to certain SDBs than others. For instance, Robillard et al. (2022) compared the salience of motives for NSSI, binge eating, purging, restrictive eating and binge drinking among 513 first-year university students with a history of SDBs. Participants reported on their engagement in and motives for each SDB once per month for seven months using a modified version of the *Inventory of Statements About Self-Injury* (Klonsky & Glenn, 2009). The relative salience of motives across SDBs was examined using three-level multilevel models (i.e., motives [level 1] were nested within SDBs [level 2], which were nested within participants [level 3]). Results revealed that intrapersonal motives were most strongly endorsed for NSSI, followed by disordered eating and then binge drinking. Conversely, interpersonal motives were most strongly endorsed for binge drinking, followed by disordered eating and then NSSI. A few exceptions to this pattern emerged, however. First, communicating distress was more relevant to NSSI than other SDBs, suggesting that this behaviour may be a powerful communication signal. Second, enhancing positive emotions was most salient to binge drinking, which may be due to the social context of alcohol use among university students (e.g., binge drinking at parties). Third, relieving negative emotions and enhancing positive emotions were least relevant to restrictive eating, which could be explained by the delayed physiological consequences of this behaviour. Motivational differences were also found across specific disordered eating behaviours, underscoring the importance of separating binge eating, purging and restrictive eating when investigating the motives for these behaviours.

A significant limitation of this research is that it either examined the factor structure of an established measure in a new population, without explicitly testing whether the same measurement assumptions can be made across groups (i.e., single-group confirmatory factor analysis [CFA]; Wang et al., 2021; Wedig & Nock, 2010) or used manifest scales without testing the factor structure and measurement properties of the items (Robillard et al., 2022). Measurement invariance (MI) analyses within a CFA framework is a more rigorous approach to assessing whether the same motivational model applies across SDBs. This approach allows researchers to: (1) explicitly test the factor structure of the proposed motive scales; (2) examine whether this factor structure is the same (i.e., invariant) across respondents who report on distinct SDBs; and if MI is achieved, then (3) compare the strength of endorsement (i.e., salience) of motives across SDBs.

Only one known study has used MI analyses to investigate the shared motives for distinct SDBs (Muehlenkamp et al., 2019). Community adults who engaged in either NSSI ($n = 333$) or disordered eating ($n = 343$) reported on their motives for their respective SDB using a modified version of the *Inventory of Statements About Self-Injury* (Klonsky & Glenn, 2009). MI analyses revealed that the motive scales had comparable factor structures across the NSSI and disordered eating groups. Moreover, comparing the latent means revealed that scales assessing intrapersonal motives (e.g., relieving negative emotions) were more strongly endorsed for NSSI than disordered eating, whereas scales assessing interpersonal motives (e.g., bonding or conforming with others) were more strongly endorsed for disordered eating than NSSI. One exception to this pattern was found for communicating distress, which was more strongly endorsed

for NSSI than disordered eating. To build on this study, it would be valuable for future research to use MI analyses to examine the shared relevance and relative salience of motives for NSSI, specific disordered eating behaviours (e.g., binge eating, restrictive eating) and substance misuse, as they may have unique motivational profiles (Robillard et al., 2022).

THE PRESENT STUDY

Previous research underscores the value of adopting a transdiagnostic framework for understanding the motives for SDBs. However, one major limitation of prior research is that it has not investigated the shared relevance and relative salience of motives across a wide variety of topographically distinct SDBs in tandem. To address this limitation, the present study used MI analyses within a CFA framework to: (1) examine whether self-report scales measuring the motives for NSSI, restrictive eating, binge eating, drug misuse and alcohol misuse have the same (i.e., invariant) factor structures across SDBs; and (2) compare the salience of these motives across SDBs. MI analyses require that observations (i.e., motive item ratings) are provided by unique participants in each group (i.e., SDB type); in other words, participants can only report on their motives for one SDB. However, given that SDBs often co-occur (Bresin & Mekawi, 2022; Cucchi et al., 2016; Nøkleby, 2012), we designed this study to maximize the ecological validity of the SDB groups and did not exclude participants with a history of multiple SDBs. Rather, participants were assigned a priori to one of five SDB groups (i.e., NSSI, restrictive eating, binge eating, drug misuse or alcohol misuse) and only reported on their motives for engaging in their allocated SDB.

Integrating across motivational models of SDBs (Cooper, 1994; Hooley et al., 2010; Jackson et al., 2003; Klonsky & Glenn, 2009; Nock, 2008; Nock & Prinstein, 2004), we examined three intrapersonal motives (i.e., relieving negative emotions, enhancing positive emotions, punishing oneself) and five interpersonal motives (i.e., bonding with others, conforming with others, communicating distress, communicating strength, reducing demands). We hypothesized that the motive scales would have the same (i.e., invariant) factor structures across SDBs (Muehlenkamp et al., 2019). However, we hypothesized that comparing the latent means would reveal differences in motivational salience across SDBs. Specifically, we anticipated that intrapersonal motives would be most salient to NSSI and least salient to restrictive eating (Muehlenkamp et al., 2019; Robillard et al., 2022). We expected to find one exception to this pattern, such that enhancing positive emotions would be most relevant to drug and alcohol misuse (Robillard et al., 2022). We further hypothesized that interpersonal motives would be most salient to drug and alcohol misuse and least relevant to NSSI (Muehlenkamp et al., 2019; Robillard et al., 2022). We expected that communicating distress would be one exception to this pattern, such that this motive would be most salient to NSSI (Muehlenkamp et al., 2019; Robillard et al., 2022).

METHODS

Participants and procedures

All procedures were approved by the first author's institutional review board. Participants were drawn from a sample of 1516 adults living in the United States or Canada who had a recent history of SDBs. Participants were recruited on *Amazon's Mechanical Turk* (MTurk), an online platform where people can complete surveys for pay. To access a brief description of the study, individuals had to have a completion rate of 95% or higher for other MTurk surveys. Interested individuals completed a screening survey assessing whether they met criteria for one of the SDB groups, as follows: (1) *NSSI* (i.e., at least 10 lifetime episodes of NSSI, with two or more episodes in the past year); (2) *restrictive eating* (i.e., at least 10 lifetime episodes of restrictive eating, defined as going eight or more waking hours without eating; consuming less than 1000 calories per day; or skipping two or more meals in

a row with the goal of changing one's shape/weight, with two or more episodes in the past year); (3) *binge eating* (i.e., at least 10 lifetime episodes of binge eating, defined as eating an objectively large amount of food in a manner that felt out of control, with two or more episodes in the past year); (4) *alcohol misuse* (i.e., responding affirmatively to at least one item on the *CAGE Substance Abuse Screening Tool*; Ewing, 1984); and (5) *drug misuse* (i.e., responding affirmatively to at least one item on the *CAGE Adapted to Include Drugs*; Brown & Rounds, 1995). These inclusion criteria were informed by research showing that 10 lifetime episodes of NSSI is associated with clinical impairment (e.g., Muehlenkamp & Brausch, 2016). We expected that similar frequencies would be sufficient to delineate repetitive (versus occasional) engagement in disordered eating. Furthermore, we selected participants with at least two past-year episodes of NSSI, restrictive eating and binge eating to reduce recall bias when responding to questions on SDB motives. A similar rationale informed our inclusion criteria for drug and alcohol misuse, such that we aimed to recruit participants who were experiencing recent and impairing substance use. Participants who met criteria for more than one SDB group were sequentially allocated to the NSSI, restrictive eating, binge eating, drug misuse and alcohol misuse groups until there were roughly 200 participants per group. We selected this allocation sequence a priori based on the expected relative prevalence of each SDB (Esser et al., 2014; Swannell et al., 2014). All participants provided informed consent. Participants who provided includable data were compensated $1.50 USD.

Data quality screening procedures were performed prior to analysis (Mason & Suri, 2012). We excluded participants who: (1) responded uniformly across two or more self-report measures; (2) failed an attention-check question; and (3) responded in a way that would have deemed them ineligible in the screener (e.g., reporting 10 lifetime restrictive eating episodes on the screener but only two lifetime episodes on the survey).[1] The final sample included 1018 adults (54.6% men, 83.6% White, M_{age} = 35.41 [SD = 10.52]). Full demographic information of the whole sample and each SDB group is in Table 1.

Measures

SDB engagement

NSSI, restrictive eating and binge eating

Participants in the NSSI, restrictive eating and binge eating groups reported on the lifetime frequency of their allocated SDB on the following scale: 0 (Never), 1 (1 time), 2 (2–4 times), 3 (5–9 times), 4 (10–14 times), 5 (15–19 times), 6 (20–24 times), 7 (25–29 times) and 8 (30 or more times).

Alcohol and drug misuse

Participants in the alcohol and drug misuse groups completed the 10-item *Alcohol Use Disorders Identification Test* (AUDIT; Saunders et al., 1993) and 11-item *Drug Use Disorders Identification Test* (DUDIT; Berman et al., 2002), respectively. On the DUDIT, participants were instructed not to include alcohol, tobacco or caffeine in their drug use ratings. The first eight items (for the AUDIT) and nine items (for the DUDIT) were rated on a five-point Likert scale ranging from 0 (Never) to 4 (Daily or almost daily). The last two items were scored on a three-point Likert scale: 0 (Never), 2 (Yes, but not in the last year) and 4 (Yes, during the last year). Responses were summed to generate

[1]The specific criteria for this data screening criterion were as follows: NSSI group (reporting fewer than 10 lifetime episodes and/or two past-year episodes of NSSI); restrictive eating group (reporting fewer than 10 lifetime episodes and/or two past-year episodes of restrictive eating); binge eating group (reporting fewer than 10 lifetime episodes and/or two past-year episodes of binge eating); drug misuse (reporting 'never' using drugs other than alcohol and no drug-related consequences on the *Drug Use Disorders Identification Test* [based on items 1 and 5 through 11]); and alcohol misuse (reporting 'never' using alcohol and no alcohol-related consequences on the *Alcohol Use Disorders Identification Test* [based on items 1 and 4 through 10]).

TABLE 1 Demographic characteristics of the whole sample and each SDB group.

	Whole sample ($N=1018$)	NSSI group ($n=213$)	Restrictive eating group ($n=200$)	Binge eating group ($n=200$)	Drug misuse group ($n=200$)	Alcohol misuse group ($n=205$)
Age (*M*, SD)	35.41 (10.52)	36.62 (11.11)	36.53 (10.61)	34.39 (9.85)	34.49 (10.34)	34.98 (10.48)
Gender (*n*, %)						
Man	556 (54.6)	99 (46.5)	107 (53.5)	112 (56.0)	119 (59.5)	119 (58.0)
Woman	458 (45.0)	113 (53.1)	90 (45.0)	88 (44.0)	81 (40.5)	86 (42.0)
Transgender, gender queer or non-binary	4 (.4)	1 (.5)	3 (1.5)	0 (0)	0 (0)	0 (0)
Ethnicity (*n*, %)						
White (e.g., German, English, Polish, Italian)	851 (83.6)	184 (86.4)	163 (81.5)	171 (85.5)	165 (82.5)	168 (82.0)
East Asian (e.g., Chinese, Korean, Japanese)	14 (1.4)	2 (.9)	3 (1.5)	3 (1.5)	5 (2.5)	1 (.5)
South Asian (e.g., Indian, Pakistani, Sri Lankan)	16 (1.6)	2 (.9)	4 (2.0)	6 (3.0)	4 (2.0)	0 (0)
Southeast Asian (e.g., Vietnamese, Thai, Filipino)	13 (1.3)	3 (1.4)	3 (1.5)	3 (1.5)	3 (1.5)	1 (.5)
Black or Caribbean (e.g., Somalian, Ethiopian, Haitian)	127 (12.5)	22 (10.3)	29 (14.5)	21 (10.5)	30 (15.0)	25 (12.2)
South or Central American (e.g., Mexican, Colombian, Brazilian)	36 (3.5)	4 (1.9)	8 (4.0)	9 (4.5)	7 (3.5)	8 (3.9)
Middle Eastern or North African (e.g., Lebanese, Iranian, Egyptian)	11 (1.1)	0 (0)	2 (1.0)	5 (2.5)	3 (1.5)	1 (.5)
Indigenous (e.g., First Nations, Métis, Inuit, Native American)	11 (1.1)	1 (.5)	5 (2.5)	4 (2.0)	1 (.5)	0 (0)
Pacific Islander or Native Hawaiian	7 (.7)	0 (0)	3 (1.5)	3 (1.5)	1 (.5)	0 (0)

TABLE 1 (Continued)

	Whole sample ($N=1018$)	NSSI group ($n=213$)	Restrictive eating group ($n=200$)	Binge eating group ($n=200$)	Drug misuse group ($n=200$)	Alcohol misuse group ($n=205$)
Prefer not to say	5 (.5)	0 (0)	1 (.5)	1 (.5)	0 (0)	3 (1.5)
Other	3 (.3)	2 (.9)	0 (0)	0 (0)	1 (.5)	0 (0)
Mixed ethnicity (endorsed more than one category)	18 (1.8)	2 (.9)	6 (3.0)	5 (2.5)	4 (2.0)	1 (.5)
Sexual orientation (*n*, %)						
Heterosexual/Straight	685 (67.3)	128 (60.1)	151 (75.5)	138 (69.0)	139 (69.5)	129 (62.9)
Gay or Lesbian	5 (.5)	1 (.5)	2 (1.0)	2 (1.0)	0 (0)	0 (0)
Bisexual	308 (30.3)	81 (38.0)	41 (20.5)	57 (28.5)	58 (29.0)	71 (34.6)
Pansexual	7 (.7)	2 (.9)	2 (1.0)	2 (1.0)	1 (.5)	0 (0)
Asexual	7 (.7)	1 (.5)	2 (1.0)	1 (.5)	2 (1.0)	1 (.5)
Prefer not to say	6 (.6)	0 (0)	2 (1.0)	0 (0)	0 (0)	4 (2.0)
Socioeconomic status (*n*, %)						
$0–19,999	45 (4.4)	11 (5.2)	13 (6.5)	5 (2.5)	5 (2.5)	11 (5.4)
$20,000-39,999	168 (16.5)	28 (13.1)	40 (20.0)	40 (20.0)	28 (14.0)	32 (15.6)
$40,000-59,999	333 (32.7)	81 (38.0)	59 (29.5)	68 (34.0)	64 (32.0)	61 (29.8)
$60,000-79,999	258 (25.3)	57 (26.8)	42 (21.0)	51 (25.5)	52 (26.0)	56 (27.3)
$80,000-99,999	123 (12.1)	19 (8.9)	29 (14.5)	16 (8.0)	31 (15.5)	28 (13.7)
$100,000–$119,999	50 (4.9)	12 (5.6)	6 (3.0)	9 (4.5)	15 (7.5)	8 (3.9)
$120,000-149,999	28 (2.8)	4 (1.9)	9 (4.5)	7 (3.5)	4 (2.0)	4 (2.0)
$150,000 or more	10 (1.0)	1 (.5)	1 (.5)	4 (2.0)	1 (.5)	3 (1.5)
Prefer not to say	3 (.3)	0 (0)	1 (.5)	0 (0)	0 (0)	2 (1.0)

Note: Participants could endorse more than one ethnicity.

Abbreviations: *M*, mean; NSSI, nonsuicidal self-injury; SD, standard deviation.

TABLE 2 Descriptive statistics of the motive scales.

	NSSI group			Restrictive eating group			Binge eating group			Drug misuse group			Alcohol misuse group		
	M	**SD**	***α***	***M***	**SD**	***α***	***M***	**SD**	***α***	***M***	**SD**	***α***	***M***	**SD**	***α***
Relieving negative emotions	2.69	.60	.78	2.17	.99	.90	2.57	.72	.84	2.66	.55	.78	2.56	.62	.80
Enhancing positive emotions	2.49	.83	.88	2.20	1.00	.90	2.62	.62	.77	2.68	.52	.74	2.67	.51	.71
Punishing oneself	2.64	.59	.69	2.00	1.08	.88	2.36	.95	.87	2.57	.71	.81	2.44	.75	.79
Bonding with others	2.26	1.28	–	1.93	1.34	–	2.46	1.22	–	2.61	1.00	–	2.61	1.03	–
Conforming with others	2.29	1.08	.92	2.05	1.06	.91	2.42	.91	.87	2.60	.67	.82	2.57	.62	.76
Communicating distress	2.38	1.00	.91	1.95	1.11	.92	2.40	.95	.90	2.59	.67	.83	2.58	.71	.82
Communicating strength	2.37	1.05	.89	1.99	1.12	.88	2.35	.94	.85	2.61	.65	.72	2.50	.72	.75
Reducing demands	2.37	1.02	.87	1.82	1.89	.88	2.35	.93	.85	2.57	.70	.77	2.50	.80	.79

Note: Minimum score of scale = 0; Maximum score of scale = 4.

Abbreviations: *M*, mean; NSSI, nonsuicidal self-injury; SD, standard deviation; *α*, Cronbach's alpha.

total alcohol and drug misuse scores. The Cronbach's alphas of the AUDIT and DUDIT scales were both .85.

Motives for SDBs

Motives for each SDB were measured using items from the *Inventory of Statements About Self-Injury* (Klonsky & Glenn, 2009), *Functional Assessment of Self-Mutilation* (Lloyd et al., 1997), *Motivations to Eat Questionnaire* (Jackson et al., 2003) and *Drinking Motives Questionnaire* (Cooper, 1994). Participants were asked: 'Do you engage in (ALLOCATED SDB) for any of the reasons below?', with responses rated on the following five-point Likert scale: 0 (Not at all relevant), 1 (A little relevant), 2 (Moderately relevant), 3 (Very relevant) and 4 (Extremely relevant). Participants only reported on their motives for their allocated SDB. Of the 53 items presented to participants, the first and last author selected 40 items through consensus that were hypothesized to fit within the eight motive scales. The means and Cronbach's alphas of the motive scales are presented in Table 2, and the means and standard deviations of the motive scales are illustrated in Figure 1.

Data analytic strategy

Our research questions were addressed using MI analyses within a CFA framework in MPlus 8.7 (Muthén & Muthén, 1998-2017). MI analyses were performed for seven of the eight motive scales. Bonding with others was not included in the MI analyses because it contained only one item (i.e., 'To create a sign of friendship or kinship with others'). MI analyses evaluate the psychometric equivalence of a construct (e.g., motives) across distinct groups of respondents (e.g., SDB groups), which can elucidate if the construct has the same meaning to those groups (Putnick & Bornstein, 2016). We considered three MI steps: (1) configural; (2) metric; and (3) scalar. Configural invariance evaluated whether the same number of items loaded onto each factor across SDB groups (Putnick & Bornstein, 2016). We evaluated the fit of the configural invariance model based on a non-significant chi-square (χ^2), root mean square error of approximation (RMSEA) below .08 and comparative fit index (CFI) above .90 (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). If configural invariance was achieved, we then tested for metric invariance (i.e., whether the factor loadings were equivalent across SDB groups by constraining factor loadings to be equal; Putnick & Bornstein, 2016). The metric invariance model was fully nested within the configural invariance model, enabling model fit comparisons. As χ^2 tests are too stringent in large samples (Barrett, 2007), we used a CFI reduction greater than .01 to indicate significant model worsening (Cheung & Rensvold, 2002). If the model fit did not significantly worsen, then metric invariance was achieved (Putnick & Bornstein, 2016). If metric invariance was achieved, we then tested for scalar invariance by constraining the motive item intercepts to be equal across SDB groups. Scalar invariance suggests that mean differences in the latent constructs capture all mean differences in the shared variance of the items, which is needed to make mean comparisons across groups (Putnick & Bornstein, 2016). The scalar invariance model was then compared to the metric invariance model to determine if the constraints significantly worsened model fit. If model fit did not significantly worsen, then scalar invariance was achieved. If metric or scalar invariance were not supported, we tested for partial invariance by releasing the constraints on the items that were not invariant so that the change in the CFI was .01 or less. Once full or partial MI was achieved, we used effects coding to compare the scalar latent means across SDB groups. We performed separate MI analyses for each motive scale because including all scales in one CFA model resulted in a non-positive definite latent variable covariance (Muehlenkamp et al., 2019). All CFA models were estimated using the robust maximum likelihood estimator to account for potential non-normality in the data. Full information maximum likelihood handled missing data.

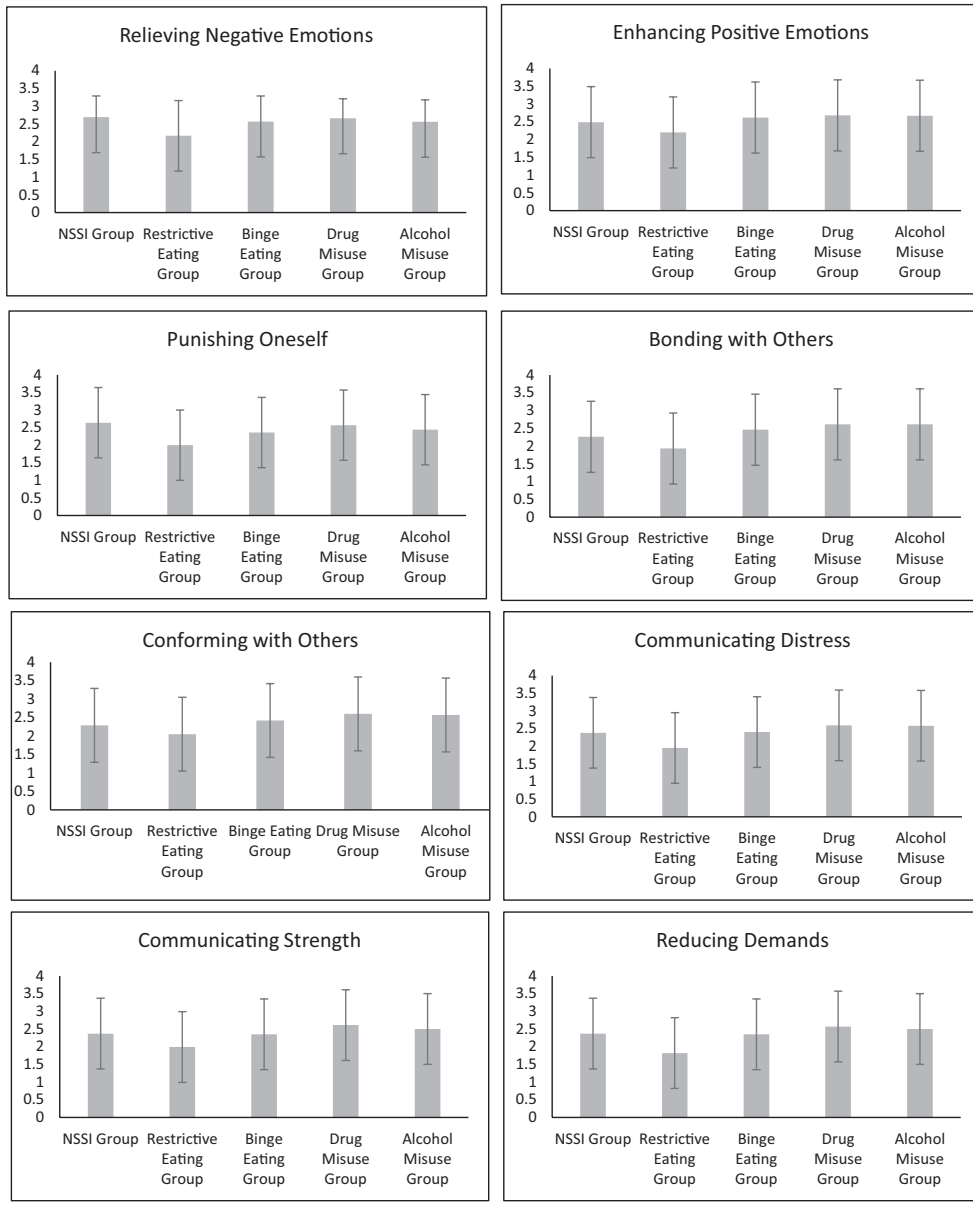

FIGURE 1 Means and standard deviations of the motive scales across SDB groups.

RESULTS

SDB engagement

The modal number of lifetime episodes of NSSI, restrictive eating and binge eating in each group was 15–19 episodes. The average AUDIT and DUDIT scores were 22.34 (SD = 7.41) and 25.34 (SD = 7.27) in the alcohol and drug misuse groups, respectively, exceeding the cut-off values of risky substance use (Berman et al., 2002; Saunders et al., 1993). The most common NSSI methods in the NSSI group were hitting (71.4%), cutting or carving skin (61.5%) and pulling out hair (56.8%). The most commonly used drugs in the drug misuse group were cannabis (61.0%), cocaine/crack (42.5%)

and psilocybin/salvia divinorum/other plant-based hallucinogens (26.0%). SDBs were highly comorbid in the sample (Table S1); 63.1% ($n = 642$) of participants engaged in all five SDBs, 14.2% ($n = 145$) in four SDBs, 11.9% ($n = 121$) in three SDBs, 8.2% ($n = 83$) in two SDBs and 2.5% ($n = 25$) in one SDB.[2]

MI analyses

Complete MI results are in Table 3 and standardized factor loadings of the motive scales are in Table 4. The configural invariance models fit the data well for each scale. Additionally, the metric invariance models did not have worse fit than the configural invariance models. Finally, the acceptability of the scalar invariance models varied by motive. Full scalar invariance was achieved for punishing oneself, communicating distress, communicating strength, reducing demands and conforming with others. However, constraining the item intercepts to be equal resulted in worse model fit relative to the metric invariance models for relieving negative emotions and enhancing positive emotions. Accordingly, we tested for partial invariance by releasing the constraints on the items that were not invariant, as follows: 'To relieve feeling numb or dead' and 'To stop feeling sad' for the relieving negative emotions scale; and 'To do something to generate excitement or exhilaration', 'To comfort myself', 'To feel connected to or real in my body' and 'To feel alive' for the enhancing positive emotions scale. Partial invariance was achieved for both scales, enabling latent mean comparisons. As MI analyses could not be performed for bonding with others, we compared manifest means (rather than latent means) for this item.

Mean comparisons

Full results of the scalar latent or manifest mean comparisons are in Table 5. Moreover, Figure 1 presents the mean endorsement of each motive scale across SDBs.

Relieving negative emotions

Relieving negative emotions was more salient to NSSI than restrictive eating ($p < .001$) and alcohol misuse ($p = .046$), but not binge eating ($p = .077$) or drug misuse ($p = .557$). Relieving negative emotions was more salient to drug misuse than restrictive eating ($p < .001$), but not binge eating ($p = .201$) or alcohol misuse ($p = .142$). Relieving negative emotions was more salient to alcohol misuse than restrictive eating ($p < .001$), but not binge eating ($p = .929$). Relieving negative emotions was more salient to binge eating than restrictive eating ($p < .001$).

Enhancing positive emotions

Enhancing positive emotions was more salient to drug misuse than NSSI ($p = .009$) and restrictive eating ($p < .001$), but not alcohol misuse ($p = .833$) or binge eating ($p = .326$). Enhancing positive emotions was more salient to alcohol misuse than restrictive eating ($p < .001$) and NSSI ($p = .014$), but not binge eating ($p = .426$). Enhancing positive emotions was more salient to binge eating than restrictive eating ($p < .001$) but not NSSI ($p = .103$). Enhancing positive emotions was more salient to NSSI than restrictive eating ($p = .002$).

[2]NSSI, binge eating and restrictive eating were considered present if participants reported at least one lifetime episode of the behaviour. Drug and alcohol misuse were considered present if participants met the cut-off scores of six and eight on the DUDIT and AUDIT, respectively. Two participants in the alcohol misuse group (.20% of the total sample) did not meet the AUDIT cut-off score or endorse other SDBs.

TABLE 3 MI analyses.

	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	SRMR	Model comparison	Satorra–Bentler scaled χ^2 (df)	ΔCFI	ΔTLI	Decision
Relieving negative emotions										
M1: Configural invariance	84.782 (70)	.990	.986	.032 [0, .054]	.033	–	–	–	–	–
M2: Metric invariance	115.564 (94)	.986	.984	.034 [0, .053]	.059	M1	31.0679 (24)	.004	.002	Accept
M3: Scalar invariance	163.365 (118)*	.971	.974	.043 [.026, .059]	.071	M2	51.0141 (24)*	.015	.01	Reject
M3a: Partial scalar invariance	147.403 (114)*	.978	.980	.038 [.016, .054]	.068	M2	44.1228 (20)*	.008	.004	Accept
Enhancing positive emotions										
M1: Configural invariance	130.898 (70)**	.962	.942	.065 [.048, .083]	.040	–	–	–	–	–
M2: Metric invariance	174.824 (94)**	.949	.943	.065 [.050, .080]	.071	M1	43.8646 (24)*	.013	.010	Accept
M3: Scalar invariance	217.974 (118)**	.937	.944	.065 [.051, .078]	.081	M2	42.8910 (24)*	.012	.001	Reject
M3a: Partial scalar invariance	201.547 (106)**	.940	.940	.067 [.052, .080]	.075	M2	27.4742 (12)*	.009	.003	Accept
Punishing oneself										
M1: Configural invariance	25.062 (25)	1.00	1.00	.003 [0, .056]	.022	–	–	–	–	–
M2: Metric invariance	50.876 (41)	.991	.990	.034 [0, .062]	.055	M1	28.2334 (16)*	.009	.010	Accept
M3: Scalar invariance	74.929 (57)	.985	.986	.039 [0, .062]	.066	M2	24.6839 (16)	.006	.004	Accept
Conforming with others										
M1: Configural invariance	75.174 (45)*	.985	.974	.057 [.033, .080]	.030	–	–	–	–	–
M2: Metric invariance	107.112 (65)**	.979	.976	.056 [.036, .075]	.052	M1	31.1075 (20)	.006	.002	Accept
M3: Scalar invariance	134.213 (85)**	.976	.979	.053 [.035, .070]	.060	M2	26.3560 (20)	.003	.003	Accept
Communicating distress										
M1: Configural invariance	30.048 (45)	1.00	1.00	0 [0, 0]	.017	–	–	–	–	–
M2: Metric invariance	46.530 (65)	1.00	1.00	0 [0, 0]	.034	M1	18.7942 (20)	0	0	Accept

TABLE 3 (Continued)

	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	SRMR	Model comparison	Satorra–Bentler scaled χ^2 (df)	ΔCFI	ΔTLI	Decision
M3: Scalar invariance	67.167 (85)	1.00	1.00	0 [0, .014]	.039	M2	21.5915 (20)	0	0	Accept
Communicating strength										
M1: Configural invariance	10.412 (10)	1.00	.999	.014 [0, .078]	.014	–	–	–	–	–
M2: Metric invariance	24.249 (22)	.998	.997	.022 [0, .064]	.037	M1	14.0702 (12)	.002	.002	Accept
M3: Scalar invariance	41.111 (34)	.993	.993	.034 [0, .064]	.049	M2	17.9840 (12)	.005	.004	Accept
Reducing demands										
M1: Configural invariance	6.452 (10)	1.00	1.00	0 [0, .052]	.011	–	–	–	–	–
M2: Metric invariance	12.089 (22)	1.00	1.00	0 [0, 0]	.025	M1	4.9020 (12)	0	0	Accept
M3: Scalar invariance	19.389 (34)	1.00	1.00	0 [0, 0]	.030	M2	7.3528 (12)	0	0	Accept

Note: Bonding with others is omitted from this table because only one item was used to assess this motive, precluding measurement invariance testing.

*$p < .05$. **$p < .001$.

Punishing oneself

Punishing oneself was more salient to NSSI than restrictive eating ($p < .001$), binge eating ($p = .001$) and alcohol misuse use ($p = .009$), but not drug misuse ($p = .339$). Punishing oneself was more salient to drug misuse than restrictive eating ($p < .001$) and binge eating ($p = .021$), but not alcohol misuse ($p = .107$). Punishing oneself was more salient to alcohol misuse than restrictive eating ($p < .001$) but not binge eating ($p = .399$). Punishing oneself was more salient to binge eating than restrictive eating ($p = .001$).

Conforming with others

Conforming with others was more salient to drug misuse than restrictive eating ($p < .001$), NSSI ($p = .001$) and binge eating ($p = .041$), but not alcohol misuse ($p = .684$). Conforming with others was more salient to alcohol misuse than restrictive eating ($p < .001$) and NSSI ($p = .003$), but not binge eating ($p = .084$). Conforming with others was more salient to binge eating than restrictive eating ($p = .001$) but not NSSI ($p = .217$). Conforming with others was more salient to NSSI than restrictive eating ($p = .032$).

Communicating distress

Communicating distress was more salient to drug misuse than NSSI ($p = .019$), restrictive eating ($p < .001$) and binge eating ($p = .030$), but not alcohol misuse ($p = .865$). Communicating distress was more salient to alcohol misuse than binge eating ($p = .047$), restrictive eating ($p < .001$) and NSSI ($p = .031$). Communicating distress was more salient to binge eating than restrictive eating ($p < .001$) but not NSSI ($p = .863$). Communicating distress was more salient to NSSI than restrictive eating ($p < .001$).

Communicating strength

Communicating strength was more salient to drug misuse than NSSI ($p = .013$), restrictive eating ($p < .001$) and binge eating ($p = .004$), but not alcohol misuse ($p = .157$). Communicating strength was more salient to alcohol misuse than restrictive eating ($p < .001$) but not binge eating ($p = .114$) or NSSI ($p = .204$). Communicating strength was more salient to NSSI than restrictive eating ($p = .001$) but not binge eating ($p = .820$). Communicating strength was more salient to binge eating than restrictive eating ($p = .002$).

Reducing demands

Reducing demands was more salient to drug misuse than NSSI ($p = .039$), restrictive eating ($p < .001$) and binge eating ($p = .016$), but not alcohol misuse ($p = .464$). Reducing demands was more salient to alcohol misuse than restrictive eating ($p < .001$) but not binge eating ($p = .101$) or NSSI ($p = .181$). Reducing demands was more salient to NSSI than restrictive eating ($p < .001$) but not binge eating ($p = .812$). Reducing demands was more salient to binge eating than restrictive eating ($p < .001$).

Bonding with others

Bonding with others was more salient to drug misuse than NSSI ($p = .002$) and restrictive eating ($p < .001$), but not binge eating ($p = .179$) or alcohol misuse ($p = .998$). Bonding with others was more salient to alcohol misuse than restrictive eating ($p < .001$) and NSSI ($p = .002$), but not binge eating ($p = .183$). Bonding with others was more salient to binge eating than restrictive eating ($p < .001$) but not NSSI ($p = .109$). Bonding with others was more salient to NSSI than restrictive eating ($p = .010$).

TABLE 4 Standardized factor loadings of the motive scales.

	NSSI group		Restrictive eating group		Binge eating group		Drug misuse group		Alcohol misuse group	
	Loading	**SE**	**Loading**	**SE**	**Loading**	**SE**	**Loading**	**SE**	**Loading**	**SE**
Relieving negative emotions										
To relieve feeling numb or dead	.60	.04	.74	.03	.67	.04	.60	.05	.61	.04
To stop bad feelings	.60	.04	.73	.03	.67	.04	.52	.04	.60	.04
To release emotional pressure that has built up inside me	.48	.04	.69	.05	.55	.04	.51	.04	.55	.04
To reduce anxiety, frustration or other overwhelming emotions	.61	.04	.81	.03	.70	.04	.59	.04	.60	.04
To obtain relief from a terrible state of mind	.62	.04	.78	.04	.70	.04	.60	.04	.59	.03
To stop feeling sad	.56	.04	.78	.03	.66	.04	.60	.04	.60	.04
To forget my worries	.60	.04	.78	.03	.68	.04	.62	.04	.64	.04
Enhancing positive emotions										
To experience a sort of rush (e.g., a 'kick')	.71	.04	.71	.04	.51	.04	.49	.03	.48	.04
To do something to generate excitement or exhilaration	.74	.04	.81	.03	.59	.04	.61	.04	.57	.04
To feel relaxed	.73	.04	.78	.04	.61	.04	.56	.04	.51	.04
To comfort myself	.63	.04	.74	.05	.50	.04	.52	.04	.47	.04
To cheer myself up	.75	.04	.79	.03	.63	.04	.56	.04	.55	.04
To feel connected to or real in my body	.71	.04	.71	.03	.56	.05	.50	.04	.46	.04
To feel alive	.72	.03	.76	.04	.57	.05	.57	.04	.53	.04
Punishing oneself										
To punish myself	.64	.05	.84	.03	.77	.03	.72	.04	.66	.04
To stop feeling self-hatred or shame	.48	.04	.71	.03	.73	.04	.61	.05	.60	.04
To express anger towards myself for being worthless or stupid	.56	.04	.79	.04	.79	.04	.71	.04	.66	.04
To react to feeling unhappy or disgusted with myself	.55	.04	.73	.03	.69	.04	.64	.05	.63	.05
To prove to myself that I'm bad or unworthy	.55	.05	.82	.03	.80	.03	.69	.04	.71	.04
Conforming with others										
To feel more a part of a group	.86	.02	.85	.03	.78	.03	.74	.04	.64	.05
To fit in with others	.82	.03	.80	.03	.77	.03	.70	.04	.64	.05
To be like someone you respect	.84	.02	.81	.03	.78	.03	.70	.04	.65	.05
To be liked	.80	.03	.80	.03	.75	.04	.63	.05	.56	.05

(Continues)

TABLE 4 (Continued)

	NSSI group		Restrictive eating group		Binge eating group		Drug misuse group		Alcohol misuse group	
	Loading	SE	Loading	SE	Loading	SE	Loading	SE	Loading	SE
So I won't feel left out	.80	.03	.79	.03	.71	.04	.63	.04	.53	.05
Because I feel like I can't say no	.75	.03	.69	.04	.65	.04	.58	.05	.53	.05
Communicating distress										
To communicate or let others know how desperate I am	.81	.03	.80	.03	.80	.03	.70	.05	.61	.05
To get help	.80	.03	.81	.03	.81	.03	.66	.04	.67	.05
To get someone to understand or notice me	.79	.03	.80	.03	.80	.03	.66	.05	.70	.05
To let others know the extent of my emotional pain	.79	.03	.76	.03	.76	.03	.69	.05	.66	.05
To seek care or help from others	.81	.03	.79	.03	.79	.03	.69	.04	.67	.04
To keep a loved one from leaving or abandoning me	.77	.03	.73	.04	.73	.04	.63	.05	.65	.05
Communicating strength										
To prove to others that I am tough or strong	.82	.03	.80	.03	.75	.04	.66	.05	.68	.05
To show I do not need other people	.78	.03	.80	.04	.74	.04	.59	.05	.60	.05
To create a boundary between myself and others	.86	.02	.83	.03	.81	.03	.66	.05	.69	.05
To establish that I am autonomous/independent	.78	.03	.79	.03	.75	.04	.63	.05	.64	.05
Reducing demands										
To avoid school, work or other activities	.78	.03	.78	.03	.75	.04	.65	.04	.71	.04
To avoid having to do something unpleasant I do not want to do	.81	.03	.81	.03	.76	.04	.70	.04	.67	.04
To avoid being with people	.82	.03	.81	.03	.78	.03	.67	.04	.72	.04
To reduce or avoid conflict	.78	.03	.82	.03	.81	.03	.68	.04	.69	.04

Abbreviations: NSSI, nonsuicidal self-injury; SE, standard error.

DISCUSSION

Motivational models of NSSI, disordered eating and substance misuse suggest that people engage in these SDBs for similar reasons (e.g., Cooper, 1994; Jackson et al., 2003; Nock & Prinstein, 2004). However, limited research has used a common self-report inventory to investigate the shared relevance and relative salience of motives for distinct SDBs. Therefore, the present study: (1) evaluated whether self-report scales assessing motives for NSSI, disordered eating and substance misuse have the same (i.e., invariant) factor structures across SDBs; and (2) compared the salience of these motives across

SDBs. Regarding the first goal, we found that the multi-item scales examined had good internal consistencies, similar factor structures and loadings, and, for all but two out of seven scales, similar latent item intercepts. This aligns with past work suggesting that common motives underlie distinct SDBs and that they can be adequately assessed using a single self-report inventory (Muehlenkamp et al., 2019). Regarding the second goal, results are consistent with past research suggesting that motives differ in salience across SDBs (Muehlenkamp et al., 2019; Robillard et al., 2022). Partially consistent with our hypotheses, intrapersonal motives were more relevant to NSSI than other SDBs, except drug misuse, which was similarly enacted for intrapersonal reasons. Furthermore, interpersonal motives were more relevant to drug and alcohol misuse than most other SDBs. Finally, restrictive eating was distinguishable from all SDBs by lower endorsement of all motives, suggesting that this behaviour is the most motivationally distinct. Overall, this study builds on a growing body of work articulating and testing transdiagnostic motivational models of SDBs (e.g., Bresin, 2020; Bresin & Hunt, 2023; Muehlenkamp et al., 2019; Robillard et al., 2022).

Emotion regulation is a central feature of theoretical models of SDBs (e.g., Cooper, 1994; Jackson et al., 2003; Nock & Prinstein, 2004). Consistent with these theories and past research (Muehlenkamp et al., 2019; Robillard et al., 2022), relieving negative emotions was a particularly relevant motive for NSSI, whereas enhancing positive emotions was a particularly relevant motive for substance misuse. Thus, NSSI and substance misuse may both be used to change one's emotional experience, although the direction of the intended change differs across behaviours. Furthermore, emotion regulation motives were least salient to restrictive eating, as expected (Robillard et al., 2022). Although this may seem contrary to theoretical models of disordered eating (Jackson et al., 2003), it is important to emphasize that our analyses focused on the *relative* salience of motives. Accordingly, our results do not suggest that emotion regulation motives are unimportant to restrictive eating; rather, they may be less relevant to restrictive eating than other SDBs. Unlike other SDBs, restrictive eating may not result in immediate emotion regulatory benefits because it transpires over several hours and has delayed physiological consequences.

Theoretical models implicate self-punishment as a particularly relevant motive for NSSI (Hooley et al., 2010). Consistent with this idea, self-punishment motives were more strongly endorsed for NSSI than alcohol misuse and disordered eating. Unexpectedly, however, self-punishment motives were equally salient to NSSI and drug misuse. Characteristics associated with both NSSI and drug misuse, such as negative self-concept, may render self-punishment as an especially attractive motivation for these behaviours (Claes, Houben, et al., 2010; Claes, Robinson, et al., 2010; Yan et al., 2020). At the same time, it is noteworthy that *all* motives were strongly endorsed for drug misuse. This could suggest that drug misuse has the most varied motivational profile of the assessed SDBs. Alternatively, it may reflect idiosyncrasies of the response style of participants in the drug misuse group. Future research could evaluate these possibilities by examining the relative salience of self-punishment motives in participants who engage in both NSSI and drug misuse, and report on their motives for both behaviours.

Another key finding is that in general, interpersonal motives were most salient to substance misuse and relatively less salient to NSSI. Notably, drug and alcohol misuse stood apart from all other SDBs on the relevance of communicating distress, and from most other SDBs on bonding and conforming with others. These findings support theories emphasizing the role of substance use in meeting interpersonal needs (Cooper, 1994) and could be related to the fact that substance use often occurs in social settings (Creswell, 2021). Conversely, NSSI may be less interpersonally motivated than substance misuse because it often occurs in private (Klonsky & Olino, 2008). In addition, we did not find support for our hypothesis that communicating distress would be most relevant to NSSI, contrary to past research (Muehlenkamp et al., 2019; Robillard et al., 2022). Interpersonal motives for NSSI have been shown to be less salient among people with severe NSSI histories (Muehlenkamp et al., 2013). Given that participants in the NSSI group had severe NSSI histories, our findings for communicating distress may have diverged from prior studies conducted in less severe samples (e.g., Robillard et al., 2022).

A final notable finding is all motives were least salient to restrictive eating. This pattern is consistent with some suggestions that restrictive eating does not fall within the broader category of SDBs (e.g., Bresin, 2020). There are three potential reasons for this finding. First, restrictive eating requires

TABLE 5 Scalar latent or manifest mean comparisons.

	NSSI versus restrictive eating			NSSI versus binge eating			NSSI versus drug misuse			NSSI versus alcohol misuse			Restrictive eating versus binge eating			Restrictive eating versus drug misuse			Restrictive eating versus alcohol misuse			Binge eating versus drug misuse			Binge eating versus alcohol misuse			Drug misuse versus alcohol misuse		
	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*	MD	SE	*p*
Relieving negative emotions	.53	.09	<.001	.13	.07	.077	.04	.07	.557	.14	.07	.046	−.40	.09	<.001	−.49	.09	<.001	−.39	.09	<.001	−.09	.07	.201	.01	.07	.929	.10	.07	.142
Enhancing positive emotions	.30	.10	.002	−.13	.08	.103	−.19	.07	.009	−.18	.07	.014	−.42	.09	<.001	−.49	.09	<.001	−.48	.09	<.001	−.07	.07	.326	−.05	.07	.426	.01	.06	.833
Punishing oneself	.64	.10	<.001	.28	.09	.001	.07	.07	.339	.20	.08	.009	−.36	.11	.001	−.57	.10	<.001	−.44	.10	<.001	−.21	.09	.021	−.08	.09	.399	.13	.08	.107
Bonding with others	.33	.13	.010	−.20	.12	.109	−.35	.11	.002	−.35	.11	.002	−.53	.13	<.001	−.68	.12	<.001	−.68	.12	<.001	−.15	.11	.179	−.15	.11	.183	.00	.10	.998
Conforming with others	.24	.11	.032	−.13	.10	.217	−.31	.09	.001	−.28	.09	.003	−.37	.11	.001	−.54	.10	<.001	−.52	.09	<.001	−.18	.09	.041	−.15	.09	.084	.03	.07	.684
Communicating distress	.43	.11	<.001	−.02	.10	.863	−.21	.09	.019	−.20	.09	.031	−.44	.11	<.001	−.63	.10	<.001	−.62	.10	<.001	−.19	.09	.030	−.18	.09	.047	.01	.08	.865
Communicating strength	.38	.12	.001	.02	.11	.820	−.24	.09	.013	−.12	.10	.204	−.36	.11	.002	−.62	.10	<.001	−.50	.10	<.001	−.26	.09	.004	−.15	.09	.114	.11	.08	.157
Reducing demands	.55	.11	<.001	.03	.10	.812	−.19	.09	.039	−.13	.10	.181	−.53	.11	<.001	−.75	.10	<.001	−.69	.10	<.001	−.22	.09	.016	−.16	.10	.101	.06	.09	.464

Abbreviations: NSSI, nonsuicidal self-injury; NSSI versus restrictive eating MD, latent or manifest mean difference between NSSI group (code = 0) and restrictive eating group (code = 1), etc.

sustained (versus immediate) effort, which may render it less responsive to motives involving immediate changes in emotional or social context (e.g., relief from negative emotions; Robillard et al., 2022). Second, restrictive eating is linked to unique personality traits (e.g., effortful control) that are not as strongly implicated in other SDBs (Claes, Houben, et al., 2010; Claes, Robinson, et al., 2010), suggesting that motives related to self-control may be more relevant to this behaviour. Third, restrictive eating may be more strongly related to negative evaluations of one's body size/shape versus global negative self-evaluations (Muehlenkamp et al., 2012), suggesting that motives related to physical self-perception may be needed to understand this behaviour. Accordingly, it would be valuable for future research to include additional items tapping self-control and physical self-perception to enhance our understanding of the motives for restrictive eating.

Together, our findings suggest that transdiagnostic motivational models are likely useful in understanding and treating SDBs. From a theoretical standpoint, our results can inform motivational models by providing clues about why some SDBs more commonly co-occur than others. For example, NSSI may more commonly co-occur with bulimia nervosa than anorexia nervosa (Cucchi et al., 2016) because NSSI is more motivationally similar to binge eating than restrictive eating. Clinically, our findings highlight the potential value of assessing a client's motives for engaging in SDBs, as this information may highlight important treatment targets. For instance, a client who engages in NSSI and drug misuse to punish themselves may experience concomitant decreases in both SDBs through the provision of self-compassion techniques, in addition to strategies that are indicated by the behaviours themselves (e.g., harm reduction). In a similar vein, a client who engages in multiple SDBs to downregulate negative emotions (e.g., anger, sadness) may benefit from clinical strategies aimed at bolstering distress tolerance and/or emotion regulation skills. Our findings also highlight the importance of being alert to other SDBs that could fill motivational needs created by a reduction in one SDB (i.e., symptom shifting). To highlight this idea, consider a client who drinks alcohol to enhance positive emotions. If this client decreases their alcohol use during treatment, but does not learn to fulfil their need for positive emotions in a more adaptive way, then they may start to engage in a different SDB, such as binge eating, to fulfil this motivational need. These transdiagnostic clinical strategies may have the potential to improve the efficiency of interventions, as targeting shared motives could lead to simultaneous reductions in multiple SDBs. Moreover, these strategies are consistent with the growing application of transdiagnostic interventions for emotional disorders and emotion dysregulation, such as *unified protocol cognitive-behavioural therapy* (Barlow et al., 2004) and *dialectical behaviour therapy* (see Chapman & Hope, 2020, for a review).

Our study has several limitations. First, we relied on self-reported motives for SDBs. Individuals who engage in SDBs may not be aware of the contingencies that maintain their SDBs and/or may provide socially desirable responses. Future research could use *ecological momentary assessment* (EMA), whereby participants report on their emotions, thoughts and behaviours multiple times per day, to directly assess the functions of SDBs. Second, given the sequential allocation to SDB groups, participants did not necessarily report on their most salient or preferred SDB, which may have revealed meaningful differences in motives. Third, although the between-group design was necessary for MI analyses, participants allocated to each SDB group may have differed from one another on unobserved constructs. Notably, the strong endorsement of all motives in the drug misuse group and the weak endorsement of all motives in the restrictive eating group could reflect differences in the salience of motives for these SDBs, differences in the participants' response styles or both. Future research can probe these possibilities by having participants who engage in multiple SDBs rate their motives for each behaviour. Another limitation inherent to the between-group design is that we could not compare motivational salience across SDBs *within* participants who engaged in multiple SDBs. Such research could reveal whether individuals are motivated to use different SDBs in varying circumstances and/or in the pursuit of different anticipated outcomes. Fourth, we found that self-hitting was the most common NSSI method in the NSSI group, contrary to past research (Cipriano et al., 2017). Given that self-hitting is an important marker of NSSI severity (Ammerman et al., 2019), which in turn is associated with NSSI motives (Muehlenkamp et al., 2013), future studies could investigate whether NSSI methods moderate motivational salience. Finally, although

participants had recent and severe histories of SDBs, our results may not generalize to clinical samples. Given the potential relevance of our findings to clinical practice, replication in a clinical sample is warranted.

The present study adds to a growing literature that supports transdiagnostic motivational models of SDBs. Our results suggest that common motives underlie distinct SDBs and that these motives can be adequately assessed using a single self-report inventory. At the same time, our findings reveal that certain motives are more relevant to some SDBs than others, highlighting the value of conducting thorough motivational assessments in treatment contexts and tailoring interventions accordingly.

AUTHOR CONTRIBUTIONS

Christina L. Robillard: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; writing – original draft; visualization; writing – review and editing. **Gabriel J. Merrin:** Formal analysis; supervision; writing – review and editing. **Nicole K. Legg:** Conceptualization; writing – review and editing. **Megan E. Ames:** Supervision; conceptualization; writing – review and editing. **Brianna J. Turner:** Conceptualization; data curation; investigation; methodology; project administration; supervision; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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