Supplemental materials for:

A test of the interpersonal function of non-suicidal self-injury in daily life

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Demographic and clinical sample characteristics

Table S1

Demographic and clinical characteristics

	N	%	Range	Mean	*SD*
Demographic variables					
Years of education			8-15	11.87	1.44
Employment status					
Employed	17	33.33			
Student or pupil	16	31.37			
Unemployed	14	27.45			
Disability pension	4	7.84			
Current DSM-IV diagnoses					
Mood disorders					
Major depression	33	64.71			
Dysthymia	4	7.84			
Anxiety disorders					
Social phobia	11	21.57			
Specific phobia	6	11.76			
Generalized anxiety disorder	2	3.92			
Panic disorder	6	11.76			
Agoraphobia without panic	2	3.92			
Posttraumatic stress disorder	25	49.02			
Obsessive compulsive disorder	6	11.76			
Substance abuse	2	3.92			
Somatic pain disorder	1	1.96			
Eating disorders					
Anorexia	6	11.76			
Bulimia	5	9.80			
Attention deficit disorder	1	1.96			
Borderline personality disorder	32	62.75			
Any mental disorder	51	100	1-5	2.24	1.45

Ambulatory assessment prompt types and variables per prompt

As described in the main manuscript, interpersonal events were only assessed during random prompts and self-initiated NSSI reports. However, the study design included a number of additional prompt types that are illustrated by Figure 1 in the main manuscript. In the following paragraphs, we describe in detail all included prompt types and the variables that were assessed during them (even though they were not the focus of the current investigation of interpersonal functions of NSSI). See also Störkel et al. (in press) for a detailed description of the biological component of the parent study and analyses on salivary beta endorphine.

Random prompts

The sampling scheme included five pseudo-randomized prompts per day that were presented at random time-points within five three-hour intervals. During each random prompt, all of the following items were assessed (in addition to NSSI and interpersonal events, as described in the main manuscript).

Momentary Affect: We assessed current mood ("At the moment, I feel….") with the Multidimensional Mood Questionnaire (Wilhelm & Schoebi, 2007), using the items 'tired-awake', 'content-discontent', 'agitated-calm', 'full of energy-without energy', 'unwell-well', 'relaxed-tense' (bipolar scale with the visual anchors +++, ++, +, 0, -, --, ---). We used six items from the Positive and Negative Affect Scale (PANAS-X, Röcke & Grühn, 2003) to assess positive affect ("At the moment, I feel…."), specifically the items 'daring', 'attentive', 'delighted', 'bold', 'happy', and 'focused' (Likert-scale, 1-5). We assessed negative affect with the PANAS-X items 'disgusted, 'loathing', 'downhearted', 'afraid', 'hostile', 'nervous', and 'blameworthy' (Likert-scale, 1-5). Additionally, we included two items 'dead inside' and 'empty inside' to capture feelings of emptiness, which are discussed with regard to NSSI (Gratz, 2003; Rallis et al., 2012) and are also a diagnostic criterion for borderline personality disorder (APA, 2013).

Dissociative symptoms: We assessed dissociation via the Dissociation Tension Scale (DSS-4) (Stiglmayr et al., 2009). Participants answered four items ("At the moment I have the impression that….") on a 10 point Likert scale from 0 = "not present" to 9 = "very strong". 1) "My body does not belong to me" (depersonalization), 2) "I have problems hearing, e.g. I hear sounds from nearby as if they come from far away" (somatoform dissociation), 3) "Other people or things around me are unreal" (derealization), and 4) "My body or parts of it are insensitive to pain" (analgesia).

If participants reported an NSSI event during a random prompt, they were also presented with instructions to provide saliva samples and the following items to assess details on NSSI: *Time since NSSI:* "Since I have hurt myself, XX minutes have passed" (sliding wheel, list of minutes). *NSSI Method:* "I have hurt myself through…" (checkboxes/multiple answers possible) cutting, wound manipulation, scratching, burning/ice burning, head banging/punching self, other. *NSSI Motives*: "I have hurt myself because I…" (checkboxes/multiple answers possible) wanted to reduce aversive tension or overwhelming emotions, wanted to express my self-hatred/ self-contempt, wanted to feel something (other than nothing), wanted help/ attention of others, had another reason, don't know why I self-harmed. *NSSI Effectiveness*: "Did the NSSI act have the desired effect?" (forced choice: "yes", "no", "I don't know"). *NSSI Severity*: "The severity of my wound is..." (forced choice): Mild/superficial wound (superficial cuts, bruise, scratching), Moderate wound (not only skin, but also underlying tissue is damaged, strongly bleeding cuts, $2^{nd}/3^{rd}$ degree burns), Severe wound (cuts to fat tissue, damaged sinews, bone fractures, inner bleeding). *Intensity/painfulness during NSSI*: "During self-injury, the intensity of pain was…" (visual analog scale: 0 = "no pain"; 10 = "worst imaginable pain"). *Pleasantness of pain during NSSI*: "During self-injury, the pain was..." (visual analog scale: 0 = "pleasant"; 10 = "unpleasant") *Actual pleasantness of pain*: "At the moment pain is…" (visual analog scale: 0 = "pleasant"; 10 = "unpleasant"). *Actual intensity/painfulness*: "At the moment, intensity of pain is…" (visual analog scale: 0 = "no pain"; 10 = "worst imaginable pain")

Control questions: To assess possible confounders of beta-endorphin, participants indicated "In the last 1, 5 hours I have…" (checkboxes/multiple answers possible) exercised, consumed drugs, consumed alcohol, had sex, nothing of the above.

NSSI report (self- initiated) and follow-up prompts

In case of an NSSI event, participants were asked to self-initiate the app as soon as possible. During the event-related prompts, the following information was assessed (for full list of items, see paragraph on random prompts above): Time since NSSI, saliva sample, NSSI Method, NSSI Motive, NSSI Effectiveness, NSSI Severity, Intensity/painfulness during NSSI, Pleasantness of pain during NSSI, Actual pleasantness of pain, Actual intensity/painfulness, Momentary Affect, dissociative symptoms, interpersonal events, control questions. Each NSSI event triggered three follow up prompts 10, 20 and 30 minutes later that contained the same items as the NSSI reports.

Control condition prompts

If participants reported an NSSI urge greater than 6 (0 = "no urge at all", 10 = "I can hardly contain myself") during a random prompt, but did not engage in NSSI, a control condition was triggered. To reduce participant burden, control conditions occurred only as frequently as NSSI acts (determined individually for each participant). Control conditions comprised a saliva sample and control questions. Each control condition triggered three follow up prompts (10, 20 and 30 minutes later), entailing a saliva sample and assessment of momentary affect and momentary dissociation.

Pilot of interpersonal events items

Items for positive and negative interpersonal events were pre-tested in an online survey with 376 participants. Participants were between the ages of 18 – 65 ($M = 30.2$, $SD = 10.2$), the majority were women ($n = 283$), and many scored above the clinical cut-off for Borderline Personality Disorder features ($n = 119$) in the German version of the Borderline scale of the *Personality Assessment Inventory* (Engel & Groves, 2013; Stein et al., 2007). In this pre-test, we asked participants to describe one positive and one negative interpersonal event they experienced with a significant other person during the last seven days. Next, participants were asked to indicate whether each event (positive and negative) fit into nine different categories of events. For negative events, these were: someone 1) criticized me, 2) rejected/excluded me, 3) ignored my needs or feelings, 4) behaved angry/ aggressive towards me, 5) let me down/ disappointed me, 6) had a fight with me, 7) demanded too much of me, 8) ridiculed me, 9) abused me. For positive interpersonal events, the categories were: 1) supported/ helped me, 2) showed me affection, 3) respected my needs or feelings, 4) gave me their attention or time, 5) was interested in me, understood me, 6) stood up for me, 7) made me a compliment or praised me, 8) took time for me, 9) did something for me. We selected the five categories with the highest endorsement rates for each, positive and negative events. We did this, because we wanted to include interpersonal events that were relatively common and not so rare that there would only be a small chance of observing them during the study period.

Detailed results for Hypothesis 1A

Table S2

Predicting engagement in non-suicidal self-injury with the number of current and lagged negative interpersonal events and covariates in a logistic multilevel model.

	Estimate	OR	95% CI	SE	p
Intercept	-3.89	0.02	[0.01; 0.03]	0.22	<.001
Concurrent negative events	0.43	1.54	[1.24; 1.91]	0.11	<.001
Lagged negative events	0.11	1.11	[0.77; 1.60]	0.19	.565
Person-average negative events	-0.25	0.78	[0.46; 1.33]	0.27	.359
Hour after wake	0.10	1.10	[1.05; 1.16]	0.03	<.001

Note. OR = odds ratio.

Table S3

Predicting engagement in non-suicidal self-injury with the level of distress caused by current and lagged negative interpersonal events and covariates in a logistic multilevel model.

	Estimate	OR	95% CI	SE	p
Intercept	-3.77	0.02	[0.02; 0.03]	0.21	<.001
Concurrent distress by negative events	0.32	1.37	[1.20; 1.58]	0.07	<.001
Lagged distress by negative events	0.19	1.21	[1.01; 1.45]	0.09	.040
Person-average negative events	-0.11	0.90	[0.60; 1.33]	0.20	.583
Hour after wake	0.09	1.10	[1.04; 1.15]	0.03	<.001

Note. OR = odds ratio.

Detailed results for Hypothesis 1B

Table S4

Predicting the number of negative interpersonal events following NSSI in a generalized multilevel model with a log link function (specifying a Poisson distribution for the outcome).

	Estimate	IRR	95% CI	SE	p
Intercept	-1.94	0.14	[0.10; 0.21]	0.18	<.001
Lagged NSSI	-0.31	0.73	[0.25; 2.09]	0.54	.555
Person-average NSSI	-6.01	0.00	[0.00; 57.43]	5.13	.242
Hour after wake	0.02	1.02	[1.01; 1.04]	0.01	.008

Note. IRR = incidence rate ratio.

Table S5

Predicting the level of distress caused by negative interpersonal events following NSSI in a linear multilevel model.

	Estimate	β	95% CI	SE	p
Intercept	0.45			0.09	<.001
Lagged NSSI	0.10	0.01	[-0.02; 0.05]	0.14	.488
Person-average NSSI	-0.85	-0.02	[-0.16; 0.11]	2.57	.742
Hour after wake	0.01	0.04	[0.00; 0.07]	0.01	.025

Note. IRR = incidence rate ratio.

Detailed results for Hypothesis 2

Table S6

Predicting the number of positive interpersonal events following NSSI in a generalized multilevel

model with a log link function (specifying a Poisson distribution for the outcome).

	Estimate	IRR	95% CI	SE	p
Intercept	-0.63	0.53	[0.41; 0.70]	0.14	<.001
Lagged NSSI	-0.10	0.91	[0.58; 1.43]	0.23	.679
Person-average NSSI	-7.87	0.00	[0.00; 1.18]	4.10	.054
Hour after wake	0.03	1.03	[1.02; 1.04]	0.01	<.001

Note. IRR = incidence rate ratio.

Exploratory Analysis for NSSI Urges

Table S7

Predicting NSSI urge with the number of current and lagged negative interpersonal events and covariates in a linear mixed model.

	Estimate	β	95% CI	SE	p
Intercept	3.59			0.26	<.001
Concurrent negative events	0.86	0.26	[0.19, 0.33]	0.12	<.001
Lagged negative events	0.12	0.03	[-0.01, 0.08]	0.07	.125
Person-average negative events	0.28	0.05	[-0.13, 0.24]	0.48	.571
Hour after wake	0.03	0.05	[0.02, 0.08]	0.009	<.001

Note. Effect sizes (β) represent standardized parameters and were computed using the R package sjstats.

Table S8

Predicting NSSI urge with the level of distress caused by current and lagged negative interpersonal events and covariates in a linear mixed model.

	Estimate	β	95% CI	SE	p
Intercept	3.59			0.26	<.001
Concurrent distress by events	0.53	0.23	[0.19; 0.27]	0.05	<.001
Lagged distress by events	0.04	0.02	[-0.02; 0.05]	0.05	.436
Person-average distress by negative events	0.27	0.06	[-0.10; 0.23]	0.36	.466
Hour after wake	0.03	0.05	[0.02; 0.08]	0.01	<.001

Note. Effect sizes (β) represent standardized parameters and were computed using the R package sjstats.

Exploratory Day Level Analyses

We conducted additional exploratory analyses to determine whether the expected associations between momentary NSSI and subsequent interpersonal events might be better captured at the day level of analysis. This procedure was consistent with Turner et al. (2016), who assessed whether NSSI predicted a change in positive and negative interpersonal events following NSSI days. We specified two linear MLMs using the average number of negative interpersonal events in a day as outcome in the first model (Table S6) and the same for positive interpersonal events (Table S7). The predictors of interest were whether NSSI was reported at any moment on the concurrent or lagged day. We also included the proportion of days across the study that each participant endorsed any NSSI as a person-level covariate. We specified random person intercepts. We originally also specified random slopes for the two day-level predictors, but in both models, we set those effects as fixed due to non-convergence.

Table S9

Predicting the average number of negative interpersonal events in a day with whether NSSI was reported during the same day or previous day, in a linear multilevel model.

	Estimate	β	95% CI	SE	p
Intercept	0.28			0.07	<.001
Same day NSSI	0.12	0.08	[0.02; 0.13]	0.04	.005
Past day NSSI	-0.01	0.00	[-0.06; 0.05]	0.04	.904
Person average NSSI	-1.49	-0.08	[-0.29; 0.13]	2.03	.466

Note. Effect sizes (β) represent standardized parameters and were computed using the R package sjstats.

Table S10

Predicting the average number of positive interpersonal events in a day with whether NSSI was reported during the same day or previous day, in a linear multilevel model.

	Estimate	β	95% CI	SE	p
Intercept	0.88			0.10	<.001
Same day NSSI	-0.14	-0.06	[-0.11; 0.00]	0.07	.062
Past day NSSI	0.08	0.03	[-0.03; 0.09]	0.07	.263
Person average NSSI	-4.14	-0.14	[-0.34; 0.05]	2.92	.162

Note. Effect sizes (β) represent standardized parameters and were computed using the R package sjstats.

Supplement References

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