

SUPPLEMENTARY MATERIALS

Appendix A

Procedure Flow-Chart and Explanation

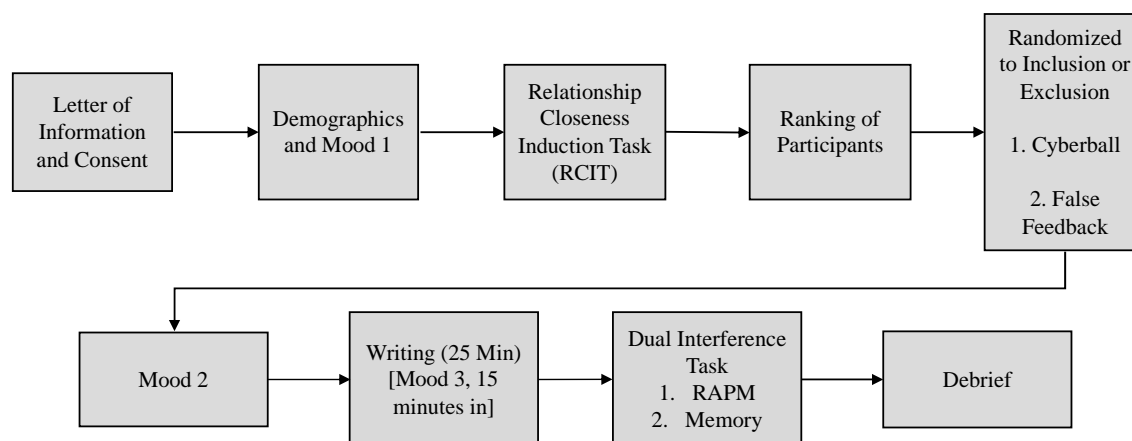


Figure A.1. A step-by-step description of the procedure (see text for description of Figure).

LOI/Consent: Participants arrived in the room where they read a deceptive Letter of Information.

Characteristics/Mood 1: Participants, in individual rooms, completed the characteristics questionnaire, the PHQ-9, and the VAMP (Mood, Time 1).

Relationship Closeness Induction Task (RCIT): Back in the group room, participants were instructed to get to know each other using the RCIT, a list of 29 questions that become progressively more personal over time. This task strengthened the impact of the subsequent exclusion manipulations and promoted rumination.

Ranking: Back in their individual rooms, Participants were given instructions to list, in order of preference, the names of two participants they wished to work with for an anticipated partner task. These rankings were disregarded.

Manipulation: Participants were randomly assigned to either the Inclusion group or the Exclusion group.

Cyberball: In their individual rooms, participants engaged in the online ball-tossing game (believing it was happening in real time with the other participants. However, the game was pre-programmed: participants in the Inclusion group received a fair distribution of tosses throughout the game; participants in the Exclusion group received far less.

False Feedback: After playing *Cyberball*, all participants in the Exclusion group were given false feedback that they were no one's first or second choice and would therefore be transferred to the "Solo" mode of playing. In contrast, all participants in the Inclusion group were moved to the "Solo" mode of playing under the pretense that a participant (the confederate) had to leave.

Mood 2: All participants completed the VAMP for a second time (Mood, Time 2).

Writing: Participants engaged in a 25-minute writing task that asked them to anonymously reflect on their experiences, thoughts, and feelings regarding the online *Cyberball* game. Fifteen minutes into writing, participants filled out the final VAMP (Mood, Time 3), before resuming the writing task for 10 more minutes.

Dual-Interference Task: Participants were given 10 minutes to complete the RAPM while tasked with remembering a list of words. The five words were either priming words related to exclusion (P) or neutral words (N). Given the Inclusion (I) or Exclusion (E) groups, the design for this paradigm has four conditions: IP, IN, EP, EN.

Debrief: Refer to Appendix J.

Appendix B

Characteristics Questionnaire and Results

Please answer the following questions:

1. Age (years)

2. What is your sex?

Female

Male

Other: _____

3. Ethnicity

Indigenous

Arab/West Asian

Black

East Asian

Latin American

South Asian

South East Asian

White (Caucasian)

Mixed

Other

4. Your family's socioeconomic status

Lower class

Lower-middle class

Middle class

Middle-upper class

Upper class

5. What continent were you born in?

North America

South America

Europe

Africa

Asia

Oceania

6. Program of study/major

7. Level of study

Are you currently taking any medications for any of the following reason? If yes, which medications?

___ Sadness or depression / Medication: _____

___ Anxiety or panic / Medication: _____

___ Pain / Medication: _____

___ Sleeping problems / Medication: _____

___ Acne Medication / Medication: _____

___ Birth control Medication / Medication: _____

Have you ever been diagnosed with any of the following disorders? Check all that apply.

___ Anorexia nervosa

___ Avoidant personality disorder

___ Bulimia

___ Anxiety disorder

___ Post-traumatic stress disorder

___ Bipolar disorder

___ Major depression

___ ADHD

___ Alcoholism

___ Drug addiction or dependence

___ Obesity

___ Panic disorder

___ Obsessive compulsive disorder

Full Participant Characteristics

Variable	Exclusion	Inclusion
	<i>N</i> (%)	<i>N</i> (%)
Total N	71(53)	63(47)
Mean Age	18.46	18.73

Sex/Gender

Female (%)	58(81.7)	54(85.7)
Male (%)	13(18.3)	9(14.3)

Socioeconomic Status

Lower Class	1(1.41)	0
Lower-Middle Class	10(14.1)	7(11.1)
Middle Class	32(45.1)	34(54.0)
Upper-middle class	22(31.0)	20(31.7)
Upper Class	6(8.45)	2(3.17)

Ethnicity

Black	3(4.23)	0
South Asian	10(14.1)	19(30.2)
East Asian	7(5.2)	10(7.5)
Southeast Asian	2(1.5)	1(0.7)
West Asian/Arab	5(3.7)	6(4.5)
Mixed	9(6.7)	8(6.0)
Latin American	2(1.5)	1(0.7)
White	32(23.9)	16(11.9)
Other	1(0.7)	2(1.5)

Continent of Birth

Africa	4(3.0)	2(1.5)
Asia	11(8.2)	20(14.9)
Europe	1(0.7)	2(1.5)
North America	52(38.8)	39(29.1)
Oceania	1(0.7)	0
South America	2(1.5)	0

Has ever been diagnosed with:

Major Depressive Disorder (MDD)	12(9.0)	9(6.7)
Anxiety	14(10.4)	11(8.2)

Anorexia	2(1.5)	1(0.7)
Avoidant Personality Disorder	0	0
Bulimia	1(0.7)	0
PTSD	1(0.7)	1(0.7)
Bipolar Disorder	0	0
ADHD	1(0.7)	4(3.0)
Alcoholism	0	1(0.7)
Drug Addition or Dependency	0	0
Obesity	1(0.7)	1(0.7)
Panic Disorder	2(1.5)	0
OCD	4(3.0)	0
Taking medication for:		
Depression*	8(6.0)	4(3.0)
Anxiety*	8(6.0)	3(2.2)
Pain	3(2.2)	3(2.2)
Sleeping	5(3.7)	3(2.2)
Acne	6(4.5)	2(1.5)
Birth Control	12(9.0)	12(9.0)

*While rates of medication use for depression and anxiety are doubled between groups, the results of a t-test reveal that they are not significantly different. Regardless, all analyses were re-run controlling for medication use and our results did not change. Furthermore, the unbalanced distribution of White and South Asian participants between groups was noted; all analyses were re-run while controlling for these two ethnicities and, again, our results did not change.

Appendix C

Valence-Arousal Mood Profile (VAMP)

The following pages will provide you with adjectives describing your feelings and emotions. Using the number scale provided in the answers, please rate each adjective on how accurately it describes how you are feeling right now.

For example: I am having a great day, so I may choose a high rating for the adjective 'happy'. If you feel uncomfortable providing a rating for any adjective, you can skip it by choosing 'no answer'.

1 = this adjective is very inaccurate as a self-description

9 = this adjective is very accurate as a self-description

X= I do not understand the meaning of this word

1. ____ Content
2. ____ Happy
3. ____ Worried
4. ____ Calm
5. ____ Sad
6. ____ Low
7. ____ Tense
8. ____ Peaceful
9. ____ Uneasy
10. ____ Depressed
11. ____ Joyful
12. ____ Satisfied
13. ____ Overjoyed
14. ____ Down
15. ____ Anxious
16. ____ Nervous

Scoring information: Sadness scores are comprised of items 5, 6, 10, and 14; Happiness scores are comprised of items 2, 11, and 13; Anxiety scores are comprised of items 3, 7, 9, 15, and 16; and Calmness scores are comprised of items 1, 4, 8, and 12.

Appendix D

Inter-rater reliability scores

Inter-rater reliability for the first 39 writings (Weighted Kappa 1) and the remaining 95 (Weighted-Kappa 2)

Variable	Weighted-Kappa 1	Weight-Kappa 2
Causal reconstruction	0.839	0.884
Counterfactual thoughts	0.929	0.815
Self-blame	0.931	0.885
Presence of a problem	0.895	0.909
Low self-esteem	0.842	0.882

Note: All values were found to be statistically significant ($p < 0.0001$).

Appendix E

Writing Prompts

Prompt #1:

For the next 25 minutes, we would like you to write and reflect on your experience, thoughts, and feelings about the online game you just played with other students at _____ University. In your writing, we want you to really let go and explore your deepest emotions and thoughts regarding this experience. All of your writing will be completely confidential. Please remember that if writing about certain aspects of this experience will make you feel distressed you can choose to write about a different aspect that may be less important or less distressing. Do not worry about spelling or grammar, but try to make your text as legible as possible. After writing for 15 minutes, you will be asked to pause and complete a brief questionnaire. After completing the questionnaire, you will continue writing for another 10 minutes.

Prompt #2:

15 minutes have now elapsed since you began writing. Your ten minutes will resume after completing the following questionnaire: The following pages will provide you with adjectives that describe feelings and emotions. Using the number scale provided in the answers, please rate each adjective on how accurately it describes how you are feeling right now. For example: I am having a great day, so I may choose a high rating for the adjective 'happy'. If you feel uncomfortable providing a rating for any adjective, you can skip it by choosing 'No Answer'

Appendix F

Rating Guide

	0	1	2	3
Causal Reconstruction The participant attempts to reconstruct the causal chain of events that led to a mistake, failure, or some other problem; they identify points in the causal chain where actions may have been taken.	Makes no mention of this.	Slightly hints at that being the case or begins the thoughts that may lead to that conclusion.	Implies that this is the case without clearly communicating it.	Clearly communicates this.
Counterfactual Thoughts The participant reflects on their beliefs about the causal chain of events and imagines possible alternatives to life events that have already occurred.	Makes no mention of this.	Slightly hints at that being the case or begins the thoughts that may lead to that conclusion.	Implies that this is the case without clearly communicating it.	Clearly communicates this.
Self-blame The participant identifies themselves as the primary cause of a problem (negative feeling, event, or outcome).	Makes no mention of this.	Slightly hints at that being the case or begins the thoughts that may lead to that conclusion.	Implies that this is the case without clearly communicating it.	Clearly communicates this.
Presence of a problem The participant acknowledges the presence of a problem (negative feeling, event or outcome).	Makes no mention of this.	Slightly hints at that being the case or begins the thoughts that may lead to that conclusion.	Implies that this is the case without clearly communicating it.	Clearly states this.
Low Self-esteem	Makes no	Slightly hints at that being the case or begins	Implies that this is the case	Clearly communicates this.

The participant has a negative perception of their own self-worth, value, or importance.	mention of this.	the thoughts that may lead to that conclusion.	without clearly communicating it.	
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How to score the writing:

- Read the definitions of each construct and use your best judgement
- If you read a sentence and find evidence for level 1 self-blame and then later find evidence for level 3 self-blame in the same piece, score the entire piece as level 3 self-blame.
 - **Do this for each construct such that the highest level is the score for that piece**
 - Here's another example: If you find evidence for both level 1 and level 2 self-blame then score everything as level 2 for self-blame.
- The examples below are **not an exhaustive list** for each level. They're types of sentences that should definitely be categorized as belonging to the level they're listed under, but there may be sentences that belong to that level that I didn't list.
- Use the examples below as a guide to get a feeling for the kinds of things you might encounter in each level and how to interpret some of the writing you will read.
- These categories are **not mutually exclusive**. For example, it is possible for a piece to be scored as level 3 for self-blame and level 3 for low self-esteem at the same time.

Appendix G

Pilot Results



Figure G.1. Linear regression model coefficients for group (with Inclusion as the reference group) as a predictor of mood at T2 while controlling for the corresponding mood at T1. Error bars show twice the standard error.

Pilot Discussion

Participants in the Exclusion group reported a significant increase in sadness, one of the symptoms of depression, but they did not report any significant changes in happiness, anxiety, or calmness. The fact that anxiety did not change suggests that the paradigm may have some specificity; despite frequently co-occurring with depression, anxiety is not a symptom of depression. On the other hand, if our paradigm was effective at triggering the syndrome of depression, participants in the Exclusion group should have experienced a significant decrease in happiness (representing anhedonia); however, the decrease in their reported happiness was not statistically significant.

In this experiment, we did not compare the effects of our paradigm on those having and those lacking a previous history of psychopathology. Moreover, our sample consisted only of female participants. We utilized female participants for two reasons: (1) it was an initial investigation with a relatively small sample size and, considering that psychology student pools are well-known to have a female bias, we did not want our findings to be confounded by sex gender; and (2) because of the sex and gender differences in depression, female participants were of greater theoretical importance. We therefore conducted a follow-up experiment with a larger sample size to investigate the replicability of these findings, to investigate additional symptoms, and to investigate the effects of sex and a previous history of depression or anxiety.

Appendix H

Experimental Results

1. Mood Linear Regressions for Pilot Study
2. Mood Linear Regressions: testing for differences in variables at baseline (Time 1)
3. Mood Linear Regressions: testing for differences in variables at Time 2 (controlling for Time 1)
4. Mood Linear Regressions: testing for differences in variables at Time 3 (controlling for Time 1)
5. Mood Linear Regressions: testing for differences in variables at Time 2 (controlling for Time 1, PHQ-9, ethnicity variables)
6. Mood Linear Regressions: testing for differences in variables at Time 3 (controlling for Time 1, PHQ-9, ethnicity variables)
7. Mood Linear Regressions: testing for differences in variables at Time 2 among those with no history of diagnosed psychopathology (controlling for Time 1)
8. Mood Linear Regressions: testing for differences in variables at Time 3 among those with no history of diagnosed psychopathology (controlling for Time 1)
9. Rated Variables, Descriptive Statistics for those with no history of diagnosed psychopathology
10. Rated Variables, Linear Regressions: testing for differences between the conditions in the rated variables (controlling for PHQ-9)
11. Correlation Matrix of Rated Variables
12. Linear Mixed-Effects Model: testing for differences for latent sadness factor scores between conditions
13. Linear Mixed-Effects Model: testing for differences for latent happiness factor scores between conditions
14. Linear Mixed-Effects Model: testing for differences for latent anxiety factor scores between conditions
15. Linear Mixed-Effects Model: testing for differences for latent calmness factor scores between conditions

Table 1) A series of linear regressions conducted on mood data at Time 2 with Condition as a fixed factor (Pilot Study)

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.80(.63,.96)***	0.84(.68,.99)***	0.75(.52,.98)***	0.85(.69,1.01)***
Cond	0.22(.01,.42)*	-0.12(-0.3,0.07)	0.039(-0.15,.23)	-0.15(-0.4,.09)

*** <.001, ** <.01, * <.05

Table 2) A series of linear regressions conducted on mood data at Time 1 with Condition as a fixed factor

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
Cond	<0.01(-0.17,.18)	-0.07(-0.25,.11)	0.04(-0.14,.22)	-0.11(-0.39,.17)

*** <.001, ** <.01, * <.05

Table 3) A series of linear regressions conducted on mood data at Time 2 with Condition as a fixed factor, and while controlling for mood at Time 1

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.89(.83,.95)***	0.863(.77,.96)***	0.88(.81,.95)***	0.95(.89,.1.0)***
Cond	0.21(.11,.31)***	-0.22(-.34,-.10)***	0.10(0.0,.20)	-0.18(-.32,-.05)**

*** <.001, ** <.01, * <.05

Table 4) A series of linear regressions conducted on mood data at Time 3 with Condition as a fixed factor, and while controlling for mood at Time 1

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.82(.74,.91)***	0.81(.71,.91)***	0.86(.79,.93)***	0.843(.71,.98)***
Cond	0.19(.08, .30)***	-0.21(-.33,-.09)***	0.049(-.06,.16)	-0.02(-.02,.12)

*** <.001, ** <.01, * <.05

Table 5) A series of linear regressions conducted on mood data at Time 2 with Condition as a fixed factor, while controlling for PHQ-9 scores

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.87(.80, .95)***	0.85(.73, .96)***	0.88(.81, .95)***	0.94(.87, 1.00)***
Cond	0.22(.11, .32)***	-0.22(-.34, -.09)**	0.09(-0.02, .20)	-0.18(-0.33, -.04)*
PHQ-9	0.07(-.05, .20)	-0.10(-.25, .04)	0.02(-0.10, .15)	-0.07(-0.23, .10)
White	-0.03(-0.14, .07)	-0.03(-.14, .09)	-0.02(-0.12, .09)	-0.07(-0.18, .05)
South Asian	0.02(-.08, .12)	-0.03(-.15, .08)	-0.05(-0.17, .07)	-0.08(-0.21, .05)

*** <.001, ** <.01, * <.05

Table 6) A series of linear regressions conducted on mood data at Time 3 with Condition as a fixed factor, and while controlling for PHQ-9 scores

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.79(.69, .89)***	0.81(.71, .91)***	0.86(.79, .93)***	0.84(.71, .97)***
Cond	0.16(.05, .28)**	-0.23(-.35, -.10)***	0.04(-.07, .16)	-0.02(-.16, .13)
PHQ-9	0.13(-.03, .28)	-0.02(-.16, .13)	0.00(-.14, .13)	-0.03(-.19, .14)
White	0.04(-.08, .16)	0.01(-.11, .12)	-0.04(-.15, .08)	-0.01(-.15, .12)
South Asian	-0.01(-.13, .11)	-0.09(-.23, .045)	-0.10(-.23, .023)	-0.05(-.21, .11)

*** <.001, ** <.01, * <.05

Table 7) A series of linear regressions conducted on mood data at Time 2 with Condition as a fixed factor, and while controlling for mood at T1. Only participants with no history of diagnosed psychopathology were used (n=98)

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.86(.78, .94)***	0.84(.72, .96)***	0.82(.71, .93)***	0.93(.85, 1.0)***
Cond	0.25(.13, .37)***	-0.19(-0.33, -.06)**	0.142(0, 0.28)*	-0.18(-.36, 0)

*** <.001, ** <.01, * <.05

Table 8) A series of linear regressions conducted on mood data at Time 3 with Condition as a fixed factor, and while controlling for mood at T1 Only participants with no history of diagnosed psychopathology were used (n=98)

	Sadness	Happy	Anxiety	Calm
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
T1	0.80(.69, .91)***	0.82(.71, .93)***	0.81(.70, .93)***	0.84(.65, 1.0)***
Cond	0.24(.11, .37)***	-0.21(-.35, -.08)**	0.07(-.07, .20)	-0.05(-.23, .12)

*** <.001, ** <.01, * <.05

Table 9) Descriptive statistics of rated variables using only participants with no history of diagnosed psychopathology (n=98)

Variable	Exclusion		Inclusion	
	M	SD	M	SD
Causal reconstruction	1.442***	1.243	0.500	0.960
Counterfactual thoughts	0.327	0.734	0.109	0.379
Self-blame	1.058**	1.320	0.370	0.853
Presence of a problem	2.192***	1.067	1.087	1.132
Low self-esteem	1.346**	0.947	0.783	1.094

*** <.001, ** <.01, * <.05

Table 10) A series of linear regressions conducted on rated variables with Condition as a fixed factor, controlling for PHQ-9 scores and the White and South Asian dummy variables.

Rated Variable	Est. (95% CI)
Presence of a problem	
Condition	0.39(.25, .54)***
PHQ-9	0.32(.14, .49)***
White	-0.06(-.22, .10)
South Asian	-0.14(-.32, .03)
Causal reconstruction	
Condition	0.34(.17, .50)***
PHQ-9	0.22(.06, .38)**
White	<0.01(-.17, .17)
South Asian	0.04(-.17, .24)
Self-blame	
Condition	0.22(.03, 0.4)*
PHQ-9	0.28(.11, .44)**
White	0.08(-.11, .28)
South Asian	-0.03(-.20, .19)
Low self-esteem	
Condition	0.25(.04, .45)*
PHQ-9	0.29(.11, .46)**
White	0.06(-.10, .23)
South Asian	0.07(-.14, .28)
Counterfactual Thoughts	
Condition	0.16(-.13, .44)
PHQ-9	0.25(.04, .45)*
White	0.11(-.18, .39)
South Asian	0.10(-.15, .34)

*** <.001, ** <.01, * <.05

Table 11) Spearman's rho correlation matrix for rated variables

Variable	Causal reconstruction	Counterfactual thoughts	Self-blame	Low self-esteem	Presence of a problem
Causal reconstruction	—	—	—	—	—
Counterfactual thoughts	0.456***	—	—	—	—
Self-blame	0.674***	0.487***	—	—	—
Low self-esteem	0.47***	0.329**	0.613***	—	—
Presence of a problem	0.456***	0.265*	0.479***	0.487***	—

*** <.001, ** <.01, * <.05

Table 12) Linear Mixed-Effects Model for Point Estimates of Latent Sadness with Condition and Time Predictors

	Estimate(SE)	df	t value	Pr(> t)	CI 95%
(Intercept)	0.05(.12)	174	0.425	0.671	[-.19, .30]
Cond	0.03(.17)	174	0.175	0.861	[-.30, .36]
Time 2	-0.26(.08)***	268	-3.435	<0.001	[-.41, -.11]
Time 3	-0.36(.08)***	268	-4.653	<1 ⁻⁰⁵	[-.50, -.20]
Cond:Time 2	0.44(.11)***	268	4.224	<1 ⁻⁰⁴	[.24, .65]
Cond:Time 3	0.34(.11)**	268	3.194	0.002	[.13, .54]

*** <.001, ** <.01, * <.05

Table 13) Linear Mixed-Effects Model for Point Estimates of Latent Happiness with Condition and Time Predictors

	Estimate(SE)	df	t value	Pr(> t)	CI 95%
(Intercept)	0.19(.12)	180	1.597	0.112	[-.45, .43]
Cond	-0.14(.17)	180	-0.819	0.414	[-.47, .19]
Time 2	0.11(.08)	268	1.334	0.183	[-.05, .26]
Time 3	-0.02(.08)	268	-0.238	0.812	[-.18, .14]
Cond:Time 2	-0.43(.11)***	268	-3.944	<0.001	[-.65, -.22]
Cond:Time 3	-0.42(.11)***	268	-3.854	<0.001	[-.64, -.21]

*** <.001, ** <.01, * <.05

Table 14) Linear Mixed-Effects Model for Point Estimates of Latent Anxiety with Condition and Time Predictors

	Estimate(SE)	df	t value	Pr(> t)	CI 95%
(Intercept)	0.20(.12)	171.4	1.601	0.111	[-.45, .44]
Cond	0.11(.17)	171.4	0.653	0.515	[-.22, .44]
Time 2	-0.42(.07)***	268	-5.711	<1 ⁻⁰⁷	[-.57, -.28]
Time 3	-0.49(.07)***	268	-6.660	<1 ⁻⁰⁹	[-.64, -.35]
Cond:Time 2	0.18(.10)	268	1.819	0.070	[-.02, .38]
Cond:Time 3	0.09(.10)	268	0.907	0.365	[-.11, .29]

*** <.001, ** <.01, * <.05

Table 15) Linear Mixed-Effects Model for Point Estimates of Latent Calmness with Condition and Time Predictors

	Estimate(SE)	df	t value	Pr(> t)	CI 95%
(Intercept)	0.13(.12)	182.6	0.422	0.291	[-.11, .37]
Cond	-0.30(.17)	182.6	0.174	0.083	[-.63, .04]
Time 2	0.14(.08)	268	-3.409	0.103	[-.03, .30]
Time 3	0.03(.08)	268	-4.618	0.725	[-.13, .19]
Cond:Time 2	-0.22(.11)	268	4.192	0.058	[-.44, .01]
Cond:Time 3	0.05(.11)	268	3.170	0.645	[-.17, .28]

*** <.001, ** <.01, * <.05

Appendix I

Linguistic Inquiry and Word Count (LIWC) Results

We tried to corroborate the self-reported mood results by analyzing the emotional content of the participants' writings with the LIWC program. As shown in Table 4, participants in the Exclusion group used words that were significantly more negative than participants in the Inclusion group. In the LIWC program, Negative Emotion is comprised of sadness, anger, and anxiety. Since a significant effect was only found for sadness, the increase in Negative Emotionality can be attributed to sadness, rather than anger or anxiety. Thus, the LIWC results corroborate the self-report sadness and anxiety mood results.

Table I.1. Number of written words related to negative emotion in the Exclusion (E) and Inclusion (I) groups[†]

Variable	Negative emotion***	Sadness***	Anger	Anxiety
Mean (SD)	E: 2.42 (1.51) I: 1.60 (1.00)	E: 0.66 (0.75) I: 0.31 (0.48)	E: 0.23 (0.35) I: 0.17 (0.35)	E: 0.80 (0.85) I: 0.71 (0.72)
Cohen's Effect Sizes	-0.64	-0.54	-0.15	-0.11

[†]The Linguistic Inquiry and Word Count programs was used for these results (see text)

Appendix J

Debriefing

1) Outline of the Debriefing Process

Probe for suspicion: Participants were asked leading questions to determine whether they caught on to the deceptive nature of the study.

For each of the following steps, the experimenter ensured that participants had multiple opportunities to ask questions and request clarification. Furthermore, throughout these next steps, the experimenter repeatedly asked the participant how they were feeling.

Reveal experimental manipulations: The experimenter subsequently revealed the deceptive nature of the study by going through, step-by-step, every experimental manipulation and how they worked. For participants in the Exclusion condition, the experimenter assured them on at least three separate occasions that, at no point, were they excluded by the other participants in the study.

Explanation: All participants were provided with the rationale behind the study and the experimental manipulations employed. Citing evolutionary literature and existing studies, the participant was led to understand the purpose behind the study.

Consent Form: Participants signed a second consent form for the experimenters to use their data, now that the full scope of the study was made known to them. Participants were given the opportunity to withdraw their data from the study.

Mental Health Forms and Call Backs: Participants were provided with a sheet of mental health resources and asked if they would like to be called by an experimenter in a few days for a brief check-up.

Walk Out: Participants randomly assigned to our exclusion condition were walked out of the building and offered an opportunity for the experimenter to walk with them to the _____, should they wish to go there.

Debriefing Process Duration

The debriefing process for these studies differed between conditions. For participants in our Inclusion (control) condition, the process typically lasted about 5-10 minutes; for participants in our Exclusion condition, the process typically lasted about 15 minutes. These times are for each participant.

2) Safety Provisions

PHQ-9 Provision

Within the Letter of Information, under the subheading ‘questionnaires’, are the following sentences:

“Please note that if you report having suicidal thoughts in the PHQ-9, you will lose confidentiality and anonymity with respect to this one question. After the study is complete, a researcher who has not had contact with you will check your answers to the suicide question in the PHQ-9. If you report having suicidal thoughts, your name and phone number will be placed in a sealed envelope with your Student ID written on the outside of the envelope. A researcher who has not had contact with you will bring the sealed envelope to Dr. _____. Dr. _____ will provide your name and phone number to the _____ so that you may be anonymously contacted by a counsellor. If Dr. _____ is unavailable, then Dr. Paul Andrews will break confidentiality to ensure the _____ is notified. Please note that if you are currently experiencing suicidal thoughts, and you would like to anonymously request help from the _____, you may do so by indicating this on the suicide question of the PHQ-9”.

Confederate Provision

This study involves four participants engaging in the Relationship Closeness Induction Task. One or two of the participants in each session is a confederate working with the lab. Their role is two-fold: to ensure the conversation maintains its momentum by providing answers to each question of their own; and more importantly, to critically listen to the answers of the other participants and notify the experimenter if any details are shared that imply a pre-existing history with depression, social rejection, or severe symptoms related to mental health. Should the confederate notify the experimenter, the experimenter will ensure that a participant who has been randomly assigned to the Exclusion condition will be removed from the study and not experience the subsequent experimental manipulations.

Writing Provision

All writings provided by participants, within 72 hours of their submission, were investigated for the presence of a list of keywords related to self-harm and suicide. Should any of these words appear, the protocol for the PHQ-9 Provision would be followed.

Mental Health Sheet Provision

All participants enrolled in the study, after being debriefed, were presented with a list of a dozen relevant mental health services, both on and off campus. Participants randomly assigned to the exclusion condition were offered on multiple occasions after the debriefing process.

Call-Back Provision

All participants enrolled in the study, after being debriefed, were offered an opportunity to be called by an experimenter a few days after the completion of the study. The purposes of this phone call would be to check up on them. Notably, this opportunity was offered verbally by the experimenter, and provided on paper along with their second consent form; thus, should a participant want a call, but not feel comfortable verbalizing their request, they could still write it

down. Participants randomly assigned to the exclusion condition were offered a call-back on multiple occasions after the debriefing process.

3) Debriefing Prototype Script

The beginning of the debriefing process begins with a semi-structured series of questions to probe for the mood of the participant and suspicion. Each line beginning with a dash represents a question and, depending on the answer, may necessitate the addition of further questions.

Suspicion Probe

-So how do you feel about the experiment overall?

-Do you have any questions?

-How are you feeling right now?

-Let's look at it chronologically: how did you find meeting everyone?

-How did you find Cyberball?

-[If Exclusion]: So, I noticed that the ratio of passes seemed a bit off; I was wondering how you felt about that?

-[If Exclusion]: Even though we have a provision for this scenario, we do have to ask how you felt about being moved into the solo condition. How did that make you feel?

-How was the writing portion? Of course, it is anonymous, so I am mostly asking how you felt about the exercise and if there was any part of it you wanted to discuss?

-How did you find the RAPM puzzles at the end?

-Alright, all that is left is for me to debrief you on the study, and you will be on your way. Does that sound good?

The following is an attempt to replicate the way in which the experimenter naturally revealed the nature of the study to the participant. Experimenters took care to provide space for the participant, at any moment, to interrupt and ask a question.

This experiment involved a significant amount of deception, meaning that the premise you were brought here under is not what the experiment was about. You were told that the purpose of the experiment was to look at the effects of mental visualization on social co-operation, mood, and problem solving; however, this study was actually about the effects of depressed cognition and sad mood on causal thinking. As I go through the experiment step by step, this will become clearer.

You were told participants were randomly assigned to a 'teamwork' or 'solo' condition. In your case, you began in the teamwork condition and were later moved to the solo condition. The truth is, everyone is assigned to the teamwork condition, and everyone is subsequently transferred into

the solo condition. The real conditions are called ‘Inclusion’: our control group (*explain what control group means, if they do not know*); and ‘Exclusion’: our experimental manipulation. These conditions dictated the way in which this transition from the ‘team’ to ‘solo’ condition took place.

Here are the two main differences between the conditions. While playing Cyber-ball, you believed you were playing with the other participants; however, you were really playing a preprogrammed computer simulation. Those in the inclusion condition played a game programmed to pass to them a fair and equal number of times; and those in the exclusion played a game programmed to pass to them significantly less than the others.

Additionally, I told you to rank the top two people you wanted to work with. Those in the ‘Inclusion’ condition were told that a participant misunderstood the time restraints of the study and therefore had to leave, meaning that the odd number of participants left over would have to move to the solo condition. Those in the ‘Exclusion’ condition were told that no one wanted to work with you, and as your selections did not match up with any of the other participants, you would be moved to the solo condition. The truth is, I threw out everyone’s selections as soon as I received them from you.

[*For Exclusion*]: To clarify, what this means is that at NO point during this experiment were you socially excluded by any of the other participants. Any time where you felt that you were excluded was a result of our experimental manipulation. In fact, every single one of the participants here experienced the same experimental manipulation you did and are likely feeling similar to how you do right now.

I recognize that I have yet to explain the rationale behind the study, but I wanted to take a moment first to ask you how you’re feeling?

[*For Exclusion*]: I also want to stress that it is very common for people to still feel bad, even after hearing they were never actually excluded, because in the moment, those negative emotions were real. How do you feel?

Now, as I said, all the participants were in the same condition as yourself, but there is one exception. One of the participants today was actually a confederate working with the lab (*explain what a confederate means if participant does not know*). Out of curiosity, can you guess who the Confederate was?

Now I will explain the rationale behind the study:

What follows is a casual explanation of the rationale behind our study. All participants were given a more detailed debriefing form to take home with them: that form can be found below.

The theories behind our study are rooted in evolutionary psychology: namely, that certain painful emotions and feelings, evolved for some reason. Evolutionary psychology suggests that there may be a certain utility to these emotions. For example, fear prevents us from getting into dangerous situations; without anxiety we would never look both ways when we cross the street, or double check our doors before we leave our houses; without jealousy, infidelity would be far

more common. Essentially, we believe the same applies to depression. Now, to clarify, we are not talking about the condition diagnosed as Major Depressive Disorder.

Evidence suggests that those who are experiencing depression seem to be able to engage in higher levels of analysis. On a biological level, it appears that resources are re-allocated to parts of the brain dedicated to analyzing and ruminating on exceptionally challenging problems, some of which do not have an immediate answer. Often, in those experiencing depression, we see appetite and pleasure-seeking traded in for ruminative thoughts about a difficult subject causing significant distress, and in the cases where these subjects are resolved, the depressed individual experiences a notable improvement in their mood. For example, let's say a person found out they are being cheated on by their partner. This individual will often be angry at their partner for what they have done, yet will experience depression as they ruminate on exceptionally difficult questions like: What do I do now? Do I break up with them? What does this mean about me?

In this experiment, we have manufactured a reason for sadness: social exclusion. This experience of social exclusion intended to prompt a practically unanswerable question: Why was I excluded? Furthermore, the guided conversation you participated in served to strengthen the effects of the manufactured social exclusion by getting you to reveal personal information about yourself. *During the writing section of the experiment, we expected people who had been excluded to try and understand why they had been excluded, and they would think about what they had said during the guided conversation to try and find those reasons.*

During the writing part of the experiment, we expected that participants who had been excluded would try to understand why they had been excluded, and that this is a form of causal thinking.

what we refer to as: causal analysis. Causal analysis can take the form of root cause analysis, involving questions like: Why did this happen? Is it something I said? Was it because of this or that?; and counterfactual thoughts, involving ruminative statements like: if only I had done this, or if only I had not done that.

We evaluated your mood multiple times throughout the experiment so that we could see how your mood changed after the exclusion.

Finally, I wanted to touch on those problem-solving tasks you completed at the end. The purpose of this was to see how social exclusion affects your ability to problem solve. We hypothesized that the negative mood caused by exclusion would make it more difficult for you to solve these problems. The rationale behind this hypothesis is that, while you are working on these problems that require a lot of your working memory, typically referred to as Type II processing, you are also ruminating about your experience of social exclusion. Considering working memory is a finite resource, we believe those assigned to our exclusion condition will perform worse.

(We expected that if you were excluded, you would be thinking about your exclusion and that it would interfere with your ability to solve these problems).

I know that this is a lot of information to take in. Do you have any questions?

[*Exclusion*] I just want to reiterate once again, that at no point were you actually excluded. Everyone here today, besides our confederate(s), experienced the same manipulation. It is a powerful experimental paradigm and, while we believe the goal of our experiment is an important one, it is still important to me that you let me know how you are feeling. As I said earlier, it is very common to still have negative feelings associated with the study lingering after the debrief. How are you?

Well, on that note, all that is left is for you to sign some forms and you can be on your way.

First, we have a debrief form, just outlining the details of our study further. You can take this home.

Second, we need you to sign a re-consent form for us to use your data, as the consent form you initially signed was done so without knowing the full scope of the study. Your participation at this point is still voluntary, if you wish to withdraw your data, just mark it on the sheet.

Third, I have here a form for us to contact you in a few days. This form, which is optional, is one we encourage you to sign if you are still not feeling well as a result of this study.

Finally, I have here a list of mental health resources for you to have if you need any sort of support either now or in the future. I will leave you for a minute or two to sign.

The experimenter leaves the room so the participant feels comfortable to sign what they feel comfortable signing.

Thank you so much for participating. Your SONA credits will be updated. It was great meeting you!

Do you know how to get out from here? (*Participants in the Exclusion condition were offered to be walked to the _____*).

Alright, have a great rest of the semester!

4) Debrief Form

The following is the debrief form that was physically provided to every participant enrolled in our study.

EMOTIONAL AND COGNITIVE RESPONSES TO SOCIAL COOPERATION TASKS

Thank you for completing the study. We greatly appreciate your time, honesty, and effort towards our research project. We ask that you do not discuss the nature of the study with others who may later participate in it, as this could affect the validity of our research conclusions.

What were we studying?

This research project investigates the relationship between emotion and cognition. Specifically, it tests whether ostracism-induced sadness and subsequent depressive rumination promote causal

analysis, avoidant behaviour, and Type II processing in a sample of undergraduate students at _____.

At the beginning of the experiment you were asked to complete a battery of questionnaires that assessed a number of cognitive, emotional, and behavioural measures including; depression, anxiety, mood-state, analytical rumination, and questions on the complexity of experiences.

We also had you participate in an online ball-tossing game called ‘CyberBall’ after you had answered personal questions about yourself in a group. This group was made up of other participants, like yourself, and one or two confederates. A confederate is someone who is working with the experiment and behaves as if they were a participant to deceive the genuine participants. Their role as a confederate was to help create a more powerful simulation of social exclusion. Though you believed that you were playing CyberBall against other participants, the game was actually rigged so that you would receive a certain number of throws, depending on which condition you were randomly assigned to (‘Inclusion’ or ‘Exclusion’). In order to accurately assess how one responds to experiencing social exclusion, we had to create the illusion that the other players were ‘real’ participants and that they threw the ball to you significantly less often than they did to other participants. As well, we had to create the illusion that no one selected you as a partner for a partner problem-solving task.

We understand that this deception may make some people feel uncomfortable. Now that you are aware of the true nature of the study, you will be given the opportunity to re-consent to keep your data included in the study or to withdraw your data from the study without penalty.

You were also asked to write about your deepest thoughts and feelings towards your experience playing CyberBall. You may be experiencing feelings of sadness, worry, or other upsetting emotions. It is important for you to know that these types of feelings are very normal, and that negative feelings are natural, adaptive reactions to negative situations or problems that happen in our day-to-day lives. Although describing negative emotions in a writing task can make people feel worse during or right after writing, studies suggest that it actually makes them feel better in the long run. However, if your participation in this study has caused you concerns, anxiety, or otherwise distressed you, you may contact the _____ at _____. We have also provided a list of mental health resources and counselling information.

All of the information that we collected in today’s study is confidential and your responses will not be linked to your personal information, except if you report recent or ongoing suicidal thoughts, self-harm, intent to commit suicide, criminal activity, or sexual or physical abuse. We are not interested in any one individual’s responses; rather, we want to look at the general patterns that emerge when the data is aggregated.

Why are we interested in this?

Social conflicts can often elicit depressed affect and require us to engage in problem-solving to understand, manage, and prevent current and future social problems. A common feature of depressed affect is rumination, a repetitive style of thinking that involves focused attention towards one’s problems, including the experience, causes, and consequences of the distress.

Some research suggests that rumination and depressed affect are associated with improved problem-solving skills when the task is socially relevant, requires more deliberate and analytical processing, and when more realistic assessments are beneficial.

Our independent variable is whether the participant is included or excluded and our dependent variables are mood, causal analysis, avoidant behaviour, and Type II processing. We hypothesize that those in the Exclusion condition will engage in more casual analysis, trying to understand why they were excluded. We are also interested in seeing if there is evidence for avoidant coping mechanisms, which involve avoiding painful feelings and distracting oneself rather than dealing feelings directly. Finally, we hypothesize that those in the Exclusion condition will engage in more Type II processing, which is a slow, effortful style of thinking that involves analytical reasoning and working memory. Type II processing is involved in both causal analysis and problem-solving, two key aspects of depressive rumination.

Encouraging ruminative processing through expressive writing tasks has been shown to elicit a temporary increase in depressed mood but is associated with a beneficial long-term decrease in depression and rumination, potentially by encouraging analytical thinking and social problem-solving.

However, there is limited research on the nature of social problem-solving during rumination and the role depressed affect has in promoting social problem-solving behaviours. Your participation today is greatly appreciated and will help uncover the nature of the relationship between complex social problems and depression. This research also has the potential to better delineate pathological depression from depressed affect and to help inform treatment options for individuals experiencing depression.

Where can I get more information and support?

If your participation in this study has caused you concerns, anxiety, or otherwise distressed you, you may contact the _____ at _____. We will also provide a list of mental health resources and counselling information.

If you have any questions, comments, or concerns, or need more information about the study itself, please feel free to contact Dr. Paul Andrews or any of the other researchers involved in the experiment. Remember that you can also e-mail us if you would to remove your data from the study; just remember to include your name and the date and time of your study session in your e-mail.

Principal Investigator:

Dr. Paul W. Andrews, PhD, JD

Student Investigators:

Max Altman

Candice Chiu

Lily Martin

This study has been reviewed by the _____ Research Ethics Board and received ethics clearance.

If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

Telephone: _____

Thank you for participating!