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Herein, we provide additional details regarding prior literature, methods, results, and discussion that supplement the main text and provide further insights and details. We hope that this additional information will not only increase this study's transparency but also its utility for future research and meta-analyses.

Table S1. Summary of prior literature on propranolol and affect in healthy adults, organized chronologically.

Study	Propranolol Dosage	Sample Size	Context	Affect or Stress Measures	Findings
Turner et al. (1965)	5 mg	Crossover design with: **8** with thyrotoxicosis **8** in an anxiety state	All patients across 4 days given either 5 ml placebo saline, 5 mg propranolol, 5 mg phentolamine, vs. 62.5 mg amylobarbitone sodium	Heart rate during anxiety state (no subjective measure)	Propranolol significantly blunted heart rate during anxiety state compared to placebo or other drugs
Lader & Tyrer (1972)	120 mg	Cross-over design with **6** subjects on 120 mg propranolol, 240 mg sotalol, vs. placebo across three separate days	Various cognitive tests such as reaction time, key tapping, card-sorting, digit symbol substitution test, symbol copying test, etc.	Mood rating scale (16-items) with sedation, contentedness, and anxiety subscales	Propranolol increased drowsiness, "muzziness," and feeling troubled, but not anxiety
Stone et al. (1973)	6 doses of 10 mg	**12** propranolol **12** placebo	Acute stressor of speech task where participants discussed life events that upset, worried or evoked anxiety for them	Post-stressor interview; two independent coders rated verbal samples of the interviews for anxiety	Propranolol reduced anxiety reports post-stressor
Tyrer & Lader (1974)	120 mg	**8** placebo **8** propranolol **8** propranolol (racemic) **8** diazepam	Three stressors including click-shock task, exposure to phobic objects, etc.	Mood rating scale (16-items) with sedation, contentedness, and anxiety subscales	Propranolol reduced anxiety ratings relative to placebo but was less effective than diazepam
Gottschalk et al. (1974)	60 mg	**12** propranolol **12** placebo	Pre- to post-drug at rest; 10-min stress interview	Anxiety ratings	Propranolol reduced anxiety at rest but anxiety during the stressor was equivalent across groups
Ashton et al. (1976)	60 mg	**27** propranolol **27** diazepam **27** placebo	Pre- to post-drug at rest; Acute stressor of mental arithmetic in front of peers	VAS ratings of anxiety	No effect of propranolol on anxiety at rest or post-stressor
Nakano et al. (1978)	40 mg	**24** healthy young men **12** propranolol **12** placebo	Mental stressors: mirror drawing test & Stroop	STAI measures of anxiety pre-drug at rest and post-drug/post-stressor Subjective mood ratings	No effect of propranolol on changes in anxiety or mood post-stressor
Landauer et al. (1979)	80 mg	Cross-over design with **18** healthy young men across 3 days receiving either 100 mg atenolol, 80 mg propranolol, or placebo	Variety of motor and cognitive tests 18 hrs after each dose	"How you feel" measure (22 bipolar adjectives, e.g. sad-happy, lethargic-energetic) POMS mood ratings	When on propranolol, participants rated feeling more gregarious, optimistic, less sorry for themselves, less anxious and less tense compared to when on placebo

Study (Continued)	Propranolol Dosage	Sample Size	Context	Affect or Stress Measures	Findings
Taylor et al. (1981)	80 mg	Cross-over design with **12** healthy young adults on two separate days with propranolol vs. placebo	Experimental stress induced by having participant hold right leg with knee extended above a chair for as long as possible	VAS ratings of anxiety, alertness, and concentration	No effect of propranolol on ratings of anxiety, alertness, and concentration after experimental stress
Brantigan et al. (1982)	Not reported	Cross-over design with **29** music students who on separate days received propranolol vs. placebo	Musical performances in front of other peers and judges	Stage fright self-reports on overall performance, nervousness, & physical symptoms STAI ratings of anxiety	Propranolol reduced state anxiety during the stage performance but did not alter trait anxiety at rest Propranolol reduced nervousness & physical symptoms of stage fright
Hartley et al. (1983)	40 mg	Study 1: Cross-over design with **16** health young adults (8 males, 8 females) high in self-rated trait anxiety; separate lab visits with placebo vs. 40 mg propranolol Study 2 & 3: Cross-over design with **12** healthy young adults high in self-rated state and trait anxiety vs. **12** healthy adults low in state/trait anxiety; separate lab visits with placebo vs. 40 mg propranolol	One minute to prepare for a speech and then 3-min to give a speech in front of a video camera about counterbalanced topics (e.g., anxiety-provoking life experiences; feelings on administering electric shocks to volunteers)	STAI ratings of anxiety Three independent raters also scored the videos for how anxious participants appeared to be from scale 1-20	Study 1: Propranolol reduced both self-reported state anxiety and independently observed anxiety Study 2: Propranolol reduced self-reported state anxiety across both the trait-anxious and non-anxious participants. However, propranolol appeared to reduce independently observed anxiety in the trait-anxious group but not in the non-anxious group
Salem & McDevitt (1984)	40 mg 80 mg 160 mg 320 mg	Cross-over design with **6** young men on 40, 80, 160, and 320 mg of propranolol vs. placebo	Various cognitive tests (e.g., reaction time, digital copying test, symbol digit modalities test, etc.)	VAS ratings of alertness, tension, detachment, and anxiety measured after the cognitive testing ended	At 40 mg, propranolol increased ratings of detachment, and at 80 and 320 mg doses, decreased alertness, but no impact on tension or anxiety
Drew et al. (1985)	120 mg	Cross-over design with **35** medical students who took either propranolol or placebo on two different exam days	Mental arithmetic and verbal reasoning exams	Asked to indicate (post-exam) if they had felt no, mild, moderate, or severe anxiety right before the exam	Propranolol improved exam performance, especially in those who reported that they felt more anxious before the exam

Study (Continued)	Propranolol Dosage	Sample Size	Context	Affect or Stress Measures	Findings
File & Lister (1985)	80 mg	Cross-over design with **17** participants on lorazepam vs. propranolol vs. placebo	Various cognitive tests (e.g., reaction time, digit-symbol substitution, & symbol copying tasks) as well as a 9-min stressor "IQ test"	Mood rating scale (16-items) with sedation, contentedness, and anxiety subscales STAI measure of anxiety post-stressor	No effect of propranolol on mood or post-stress anxiety ratings
Krantz et al. (1987)	.2 mg/kg	Cross-over design with **12** healthy young men on propranolol vs. isoproterenol vs. placebo	Structured interview (speech) and mental arithmetic task	Multiple Affect Adjective Checklist State-Trait Personality Inventory (state-form)	No effect of propranolol (bolus injection) on anxiety, hostility, or anger ratings after a speech and math task
Mazzuero et al. (1987)	120 mg	Male patients with history of myocardial infarction **16** propranolol **16** atenolol **16** chlordesmethyldiazepam **16** placebo	Acute stressor of mental arithmetic plus the Sacks & Levy sentence completion test	STAI measure of anxiety both pre- and post-stressor	No effect of propranolol on anxiety either at rest nor post-stressor
Currie et al. (1988)	40 mg 80 mg 160 mg	Cross-over design with **12** healthy young men taking 40, 80, and 160 mg of propranolol vs. placebo	Cognitive and executive functioning tasks	VAS ratings of wakefulness, tension, calm, energetic, alert, concentration, efficient, irritable, aggressive, sociable, depressed, anxious	Propranolol blunted anxiety
Dyck & Chung (1991)	80 mg	Women undergoing surgery **31** diazepam **32** propranolol **30** placebo	Prior to a surgical operation	STAI ratings of anxiety pre- and post-surgery	No significant differences in anxiety between groups
Jakobsson et al. (1995)	40 mg	Women undergoing surgery **30** ketobemidone **30** lorazepam **30** propranolol **30** placebo	Prior to a surgical operation	Anxiety rated on the Linear Analogue Anxiety Scale	No significant differences in anxiety between groups

Study (Continued)	Propranolol Dosage	Sample Size	Context	Affect or Stress Measures	Findings
Head et al. (1996)	40 mg 80 mg	Cross-over design with **20** young adults, taking placebo, 50 mg metaprolol, 100 mg metaprolol, 40 mg propranolol, & 80 mg propranolol	Treadmill walking exercise	POMS mood and STAI anxiety ratings assessed pre- and post-exercise	Compared to placebo, those on propranolol reported greater tension, depression, and mood disturbances at rest and greater fatigue and confusion both pre- and post-exercise; no drug effect on anxiety
Mealy et al. (1996)	10 mg	Patients undergoing same-day surgery **~25** propranolol **~25** placebo	Same-day surgical procedure	Hospital Anxiety and Depression Scale	Propranolol reduced anxiety on the day of surgery
Elman et al. (1998)	40 mg	**3** young male medical residents performing 40 surgeries on propranolol vs. **33** on placebo (double-blinded)	Surgery performance	Sliding scale rating of how anxious the resident seemed as rated by an attending surgeon observer	For surgeries conducted under propranolol, third-person blinded anxiety ratings were lower than for surgeries conducted under placebo
Harmer et al. (2001)	80 mg	**10** propranolol **10** placebo	Emotion perception task	VAS ratings of tense, angry, sad, happy, alert, & tired Befindlichkeits Scale as additional mood measure	No effect of propranolol on subjective ratings of mood, alertness, or task speed at rest nor when completing an emotion perception task
Rogers et al. (2004)	80 mg	**15** propranolol **17** placebo	Mood ratings taken at rest pre- and post-drug but before a gambling task	PANAS ratings of state negative and positive affect VAS ratings of mental sedation, physical sedation, tranquility, etc.	Propranolol increased feelings of tranquility at rest post-drug, but no effects of propranolol on PANAS ratings at rest
Alexander et al. (2007)	40 mg	Cross-over design with **16** healthy young adults who took propranolol vs. placebo	Acute stressor of the TSST vs. non-stressful control task (reading, counting)	Anticipated stressfulness of the task (pre-TSST but after being informed about it)	No effect of propranolol on anticipated stressfulness of the TSST
Andrews & Pruessner (2013)[a]	80 mg	**15** propranolol **15** placebo	Acute stressor of TSST	Subjective stress rated on a VAS	No effect of propranolol on ratings of stress
Dreifus et al. (2014)	60 mg	**24** propranolol **25** placebo **24** no drug	Pre- to post-drug at rest; Acute stressor as TSST	German versions of the PANAS, SAM ratings of valence and arousal, STAI anxiety ratings, as well as other mood measures	Propranolol blunted state anxiety and arousal ratings at rest. Propranolol reduced TSST-related anxiety, nervousness, and TSST-related changes to well-being and SAM arousal and valence ratings

Study (Continued)	Propranolol Dosage	Sample Size	Context	Affect or Stress Measures	Findings
Ernst et al. (2016)	40 mg	**20** propranolol **20** methylphenidate **20** placebo	Working memory tasks under cognitive load and with conditions of safety vs. threat of shock	STAI anxiety ratings	Propranolol had no effect on changes in anxiety across the tasks
Ali et al. (2017) [b]	80 mg	**22** both dexamethasone and propranolol **22** placebo	Acute stressor of TSST	VAS on "How stressed do you feel right now?" POMS mood ratings	Combined dexamethasone and propranolol group were not significantly different from placebo on stress or mood ratings across time, including post-TSST
Steptoe et al. (2018)	80 mg for 7 days prior	**32** propranolol **32** placebo	Stress tasks of TSST and mirror tracing	HADS (Hospital Anxiety & Depression Scale) to assess anxiety Positive affect subscale of PANAS 7-point single item scale measures of subjective stress and task difficulty	No effect of propranolol on anxiety, positive affect, subjective stress, or task difficulty ratings

Note: We have striven to only include studies here that focused on healthy adults without diagnosed anxiety, phobic, panic, or chronic mood disorders. See Steenen et al. (2016) *Journal of Psychopharmacology* for a review and meta-analysis on the effectiveness of propranolol in treating anxiety and related disorders. [a] **Andrews & Pruessner (2013)** also administered appraisal measures such as the Primary and Secondary Appraisal Questionnaire and the COPE Inventory, but do not report any findings with regards to appraisals (as far as we can find). [b] **Ali et al. (2017)** reported that they likely had sufficient power to detect propranolol effects on subjective ratings by taking the mean of effect sizes for drug effects on physiology (salivary alpha amylase, heart rate, and cortisol) and generating a hypothetical effect size for subjective ratings. This assumes that propranolol impacts psychological phenomenon to the same degree as physiology and that there is close coupling between psychology and physiology. We suggest that the effect size of propranolol on mood is likely much smaller than that of propranolol on physiology, given that drug works directly on physiology but states like emotion or appraisals reflect multiple intra-individual processes besides just physiology. As such, propranolol samples larger than n~20 are likely needed to detect reliable effects on mood/emotion.

Supplemental Information on Study Procedure

Recruitment

Participants were told that the study assessed "physiology and cognition," that propranolol is used to treat hypertension, and that common side effects include feeling lightheaded or dizzy. Participants completed an initial visit to ensure they met health eligibility criteria (i.e., did not have low heart rate or blood pressure) and provided written informed consent. The lab visit occurred three to seven days after this prescreening visit. We were careful to avoid mentioning stress or emotion throughout the study prescreening, intake, and procedures, so as not to bias participants' expectations.

Table S2. Additional sample characteristics compared by condition.

Demographics	Placebo	Propranolol	Total	*p*-value
Mean Depressive symptoms [a]	1.40 ± 1.64	1.30 ± 1.44	1.36 ± 1.54	.755
Mean Anxiety symptoms [b]	37.07 ± 9.20	34.77 ± 7.58	35.96 ± 8.49	.204
Mean Perceived stress [c]	10.62 ± 4.92	10.24 ± 4.60	10.44 ± 4.75	.709
Mean Fear of evaluation [d]	31.28 ± 8.52	33.86 ± 8.86	32.49 ± 8.73	.165

Note: Difference tested with independent samples t-tests. [a] PHQ-9 (Kroenke, Spitzer, & Williams, 2001); [b] State-Trait Anxiety Inventory (Spielberger, Gorssuch, Lushene, Vagg, & Jacobs, 1983), [c] 14-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983); [d] brief Fear of Negative Evaluation Scale (Leary, 1983).

Trier Social Stress Test

Participants met two interviewers who were supposedly "experts in the fields of persuasion and nonverbal communication." Participants had 2-min to mentally prepare alone for a 10-min speech about "Why I would be a good candidate for my dream job." After preparation, the interviewers entered the room, sat at a table facing the participant, ostensibly started a video recorder, and the speech began, lasting for 10-min. After the speech ended, the interviewers surprised the participant with an impromptu mental arithmetic task that supposedly assessed their "cognitive capabilities." Participants counted backwards out loud from the number 996 in steps of seven, as quickly as possible. If they made a mistake or lost their place, they were instructed to start again. This task lasted for 5-min. Interviewers wore white laboratory coats and remained neutral and stoic throughout the TSST, providing no feedback but taking copious notes about the performance.

Supplemental Information on Study Measures

Autonomic Psychophysiology

For ECG, three non-invasive spot electrodes were placed on the torso (- on the collarbone, + and ground on the lower ribs). For ICG, two non-invasive spot electrodes were placed on the torso and two on the back. ECG and ICG were collected continuously at a sampling rate of 1000 Hz. Two of the authors (EAC, MMG) visually inspected and independently scored all data, with disagreements resolved by the first author (JKM). Initial agreement between the two scorers was 97.5% for ECG (based on the number of R-spikes identified per segment) and 87.6% for ICG (based on PEP values per segment). RSA was calculated from high frequency HRV after parsing out respiration. Respiration was estimated from ICG; all ECG segments were visually inspected to ensure that respiratory values remained within appropriate respiratory bands.

Emotion Reports

Items within each quadrant of the affective circumplex within each timepoint demonstrated acceptable internal reliability ($M\propto$ = .80).

- **Negative high arousal items (16-items)**: *afraid, angry, annoyed, anxious, ashamed, distressed, embarrassed, frustrated, hostile, irritable, jittery, nervous, panicky, scared, stressed, upset*

- **Negative low arousal items (6-items)**: *bored, disgusted, guilty, sad, unhappy, weary*
- **Positive high arousal items (8-items)**: *amused, determined, enthusiastic, excited, happy, inspired, proud, strong*
- **Positive low arousal items (7-items)**: *calm, content, attentive, interested, pleased, relaxed, quiet*

Additional items measured but that were too neutral in valence and thus not included in the means (3-items): *alert, hyper, sleepy*

Appraisal Reports

The prospective/retrospective measure of challenge and threat appraisals included 6 challenge items (Pre-TSST ∝ =.79; Post-TSST ∝ =.73) and 6 threat items (Pre-TSST ∝ =.75; Post-TSST ∝ =.73). All challenge and threat appraisal items were rated on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree)*.

The negative appraisal questionnaire listed 25 negative internal/external appraisal descriptors, listed below (Pre-TSST ∝ =.93; Post-TSST ∝ =.90). This measure was included to capture core evaluations of personal responsibility for performance (internal attributions or self-evaluations) vs. appraisals about the situation's controllability and unexpectedness (external attributions or evaluations of the experimenters and the situational features), rated on a Likert scale from 1 (*not at all*) to 6 (*extremely*). These items were: *Defeated, Challenged, Abandoned, Disgraced, Insulted, Incompetent, Cheated, Loss, Failure, Bad news, Lonely, Made a mistake, Offended, Overwhelmed, Rejected, Threat, Thwarted, Wronged, Uncertain, Uneventful, Unfair, Uninteresting, Unknown, Unresolved, Vulnerable*

Finally, participants rated the nature of the TSST on a "Task Appraisal" measure with 6-items assessing how difficult, stressful, and enjoyable participants found the speech and math tasks, respectively: ∝ =.63. For example, participants rated both the speech and math tasks with wordings such as "The math task was difficult" "The speech task was stressful" or "The math task was enjoyable."

Evaluation of Possible Covariates

At BL1, we assessed trait anxiety via the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorssuch, Lushene, Vagg, & Jacobs, 1983), depressive symptoms via the PHQ-9 (Kroenke, Spitzer, & Williams, 2001), recent perceived stress via the 14-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), and evaluation concerns via the brief Fear of Negative Evaluation Scale (Leary, 1983). These measures were included to confirm no group differences (i.e., no randomization failure) for subclinical mood symptoms, perceived life stress, and fear of evaluation. Given that the groups did not differ on any of these measures (see Table S2 above), they were ultimately not included as covariates

Supplemental Information on Study Results

The Problem of Single-Item Stress Reports

Given that prior beta-blockade studies have used single-item measures of stress and found null effects of propranolol (Alexander, Hillier, Smith, Tivarus, & Beversdorf, 2007; Andrews & Pruessner, 2013), we specifically examined task stressfulness ratings to compliment prior research. This measure was a mean score of two stress items from the "Task Appraisal" measure ("How stressful was the speech task you just completed?" "How stressful was the math task you just completed?"). There were no group differences on this measure between the drug vs. placebo groups $t(88)=.60$, $p=.55$, suggesting that participants found the TSST to be similarly stressful in nature regardless of drug condition. This underlines the importance of assessing emotions or more "internal" psychological states, rather than narrowly focusing on one or two-item

reports of stress, which may instead reflect appraisals and perceptions about the external environment (i.e., the task itself) in line with people's cognitive schemas, rather than their affective states per se.

Parasympathetic Nervous System Reactivity

There were no effects of the TSST on RSA, nor was there an effect of propranolol on RSA at BL2 nor any other timepoint during or after the TSST (all *ps*>.10; see Table 4 in main text). Beyond RSA, we also examined HR to be consistent with other studies exploring the effects of propranolol on reactivity to acute stress. HR results replicated PEP findings, wherein individuals on propranolol had a lower heart rate relative to placebo throughout the TSST prep, main tasks, and recovery periods. See Figure S2 and Tables S2-S3 for more details.

Hypothalamic-Pituitary-Adrenal (HPA) Axis Reactivity

As would be expected in the context of an acute stressor, salivary cortisol was significantly higher at 15-min and 30-min post-TSST relative to BL2 (*bs*= .87, .60, *SEs*= .13, *ps*<.001). We also observed a significant main effect of *drug* at BL2: cortisol was higher in the propranolol group relative to placebo (*b*=.45, *SE*= .18, *p*=.013). There were no *drug x timepoint* interactions at any later timepoint (*ps*>.25), suggesting that propranolol did not buffer against TSST-related cortisol reactivity (Table 4 in main text). However, it is worth noting that there was a small but significant difference in cortisol between the propranolol and placebo groups at BL1, suggesting randomization failure for this particular measure. As such, cortisol results should be interpreted with caution.

Additional Figures and Tables

See below in this document for additional figures and tables.

Discussion

It is worth observing that the specificity of effects of propranolol on SNS markers but not on RSA or cortisol is in line with degeneracy. *Degeneracy* is a common biological principle whereby a system includes mechanistic redundancies in order to promote survival (Edelman & Gally, 2001). For example, in the context of a stressor, it is likely adaptive for organisms to recruit multiple neurophysiological systems (e.g., HPA-axis) when managing metabolic resources to cope with stressful situations, even when one pathway (e.g., beta-adrenergic signaling) becomes disrupted.

Supplementary References

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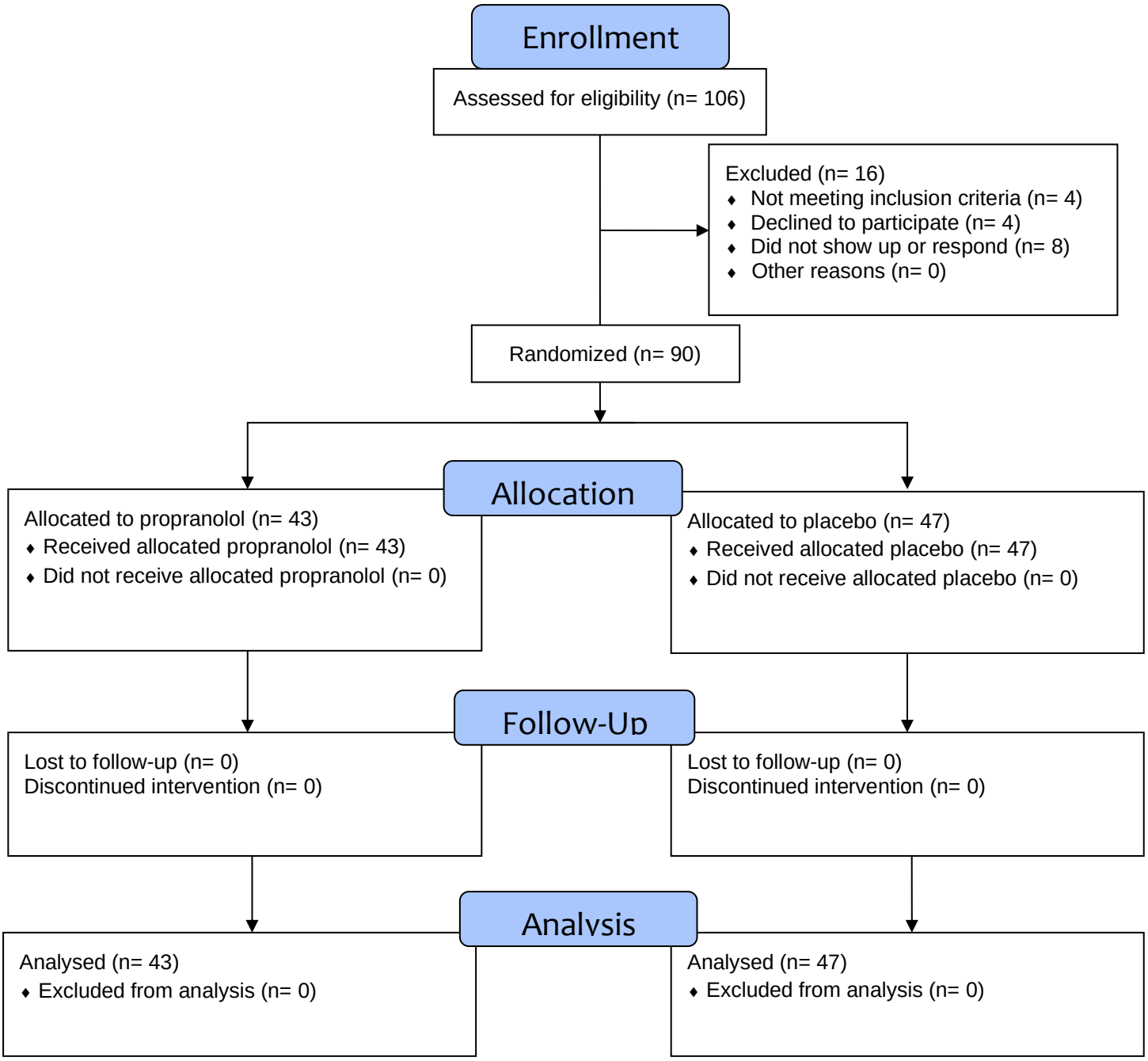
CONSORT
TRANSPARENT REPORTING of TRIALS

CONSORT 2010 Flow Diagram



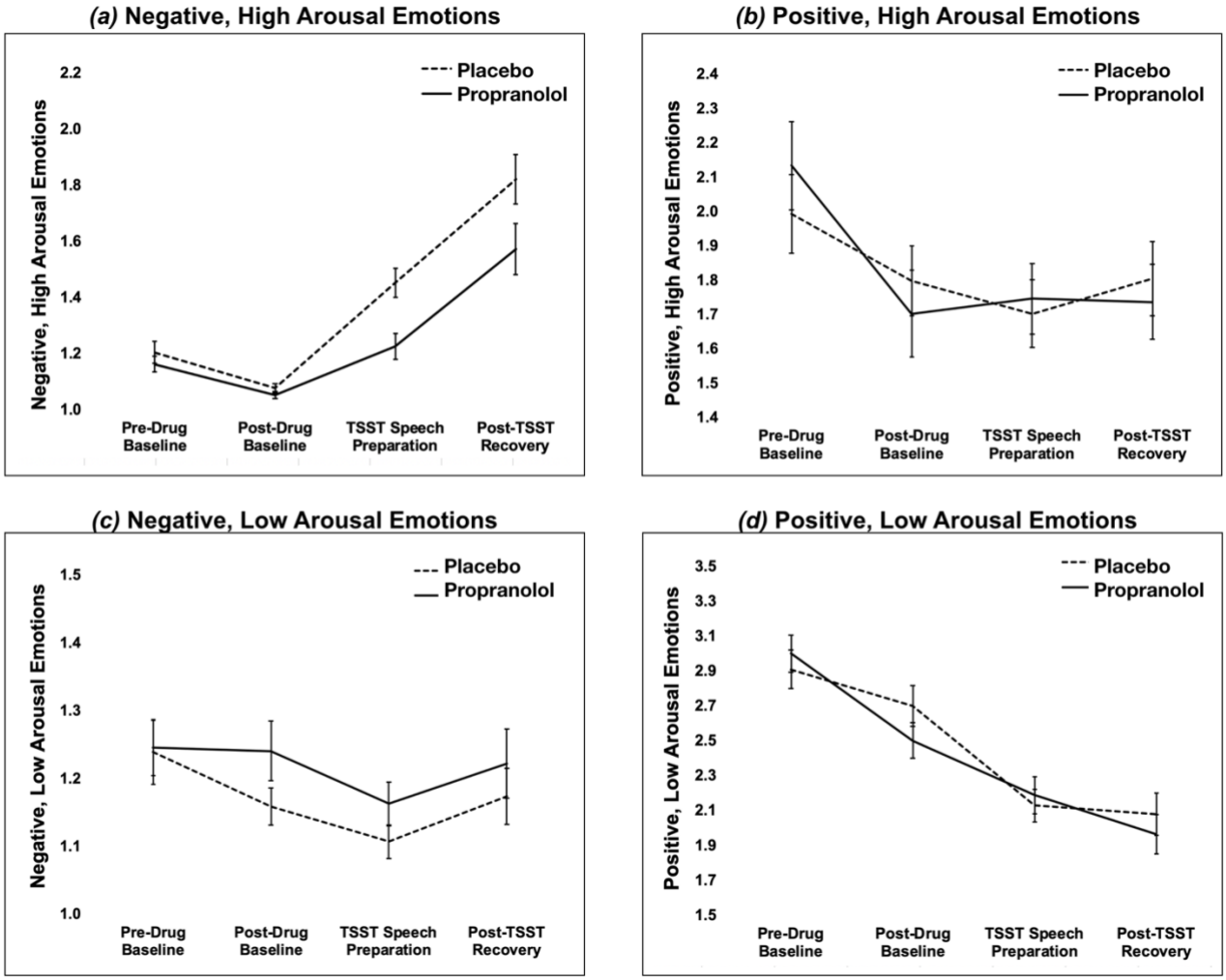


Figure S1. Findings showing effects on (a) negative, high arousal emotions, (b) positive, high arousal emotions, (c) negative, low arousal emotions, and (d) positive, low arousal emotions across measured timepoints with marginal means and standard errors. See Table 2 in the main text for multilevel models assessing statistical significance.

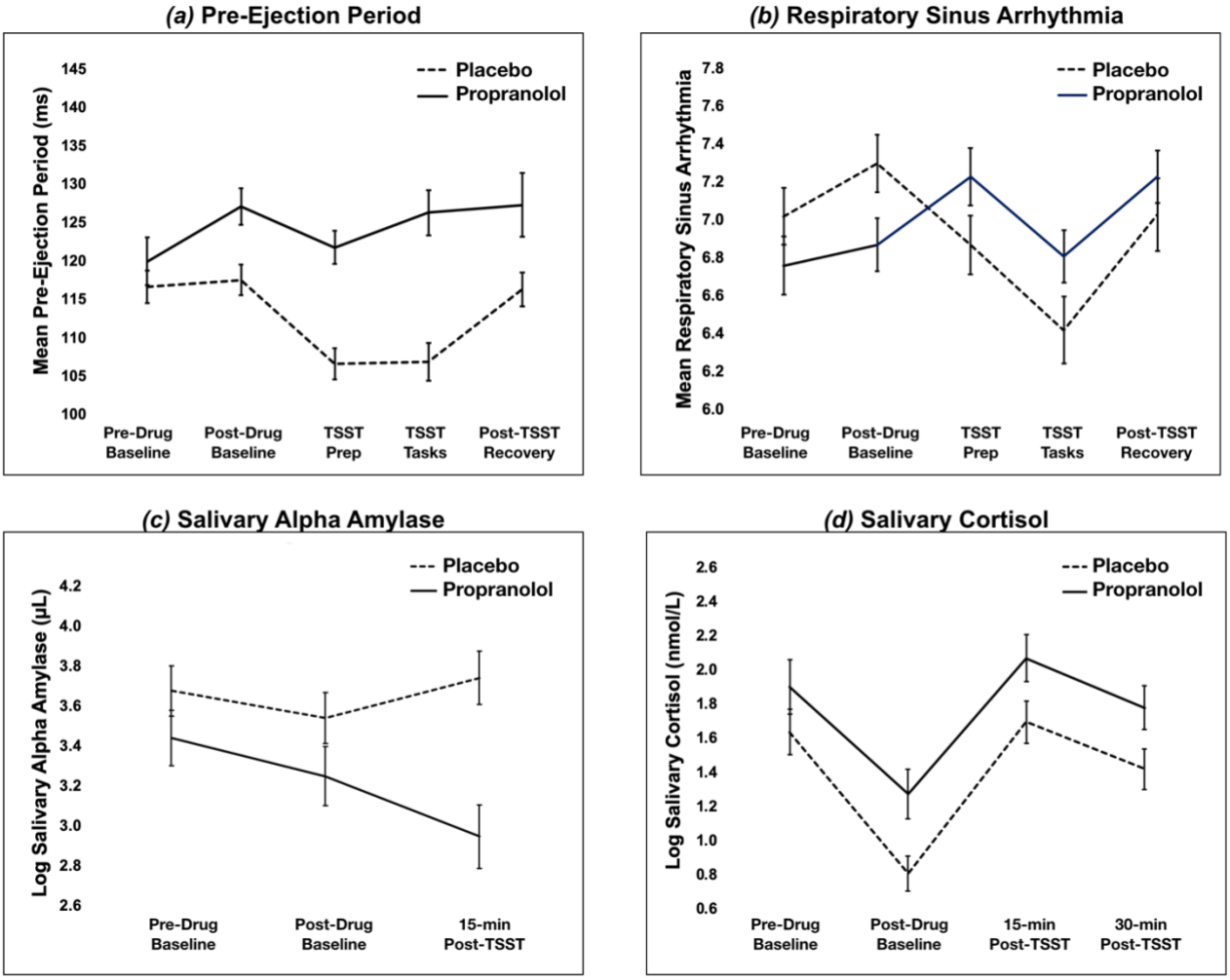


Figure S2. Findings showing effects on (a) pre-ejection period, (b) respiratory sinus arrhythmia, (c) salivary alpha amylase, and (d) salivary cortisol across measured timepoints with marginal means and standard errors. See Table 4 in the main text for multilevel models assessing statistical significance.

Table S3. RSA fixed effects unadjusted for HR, with the post-drug baseline (BL2) as the reference category.

Predictors	*b*	*S.E.*	*p*	*Lower 95% CI*	*Upper 95% CI*
Mean respiratory sinus arrhythmia, unadjusted					
Intercept	**7.31**	**0.16**	**<.001**	**6.99**	**7.63**
Drug (at BL2)	-0.22	0.23	.336	-0.68	0.23
TSST Prep	**-0.44**	**0.19**	**.019**	**-0.80**	**-0.07**
TSST Tasks	**-0.89**	**0.18**	**<.001**	**-1.25**	**-0.53**
TSST Recovery	-0.30	0.19	.106	-0.67	0.06
Drug x Prep	**0.58**	**0.26**	**.028**	**0.06**	**1.10**
Drug x TSST	**0.58**	**0.26**	**.028**	**0.06**	**1.10**
Drug x Recovery	0.45	0.26	.091	-0.07	0.97
Mean respiratory sinus arrhythmia adjusted for all covariates except for heart rate					
Intercept	**8.58**	**0.73**	**<.001**	**7.15**	**10.01**
Drug (at BL2)	-0.24	0.22	.275	-0.68	0.19
TSST Prep	**-0.43**	**0.17**	**.015**	**-0.77**	**-0.08**
TSST Tasks	**-0.88**	**0.17**	**<.001**	**-1.22**	**-0.54**
TSST Recovery	-0.29	0.18	.103	-0.63	0.06
Drug x Prep	**0.57**	**0.25**	**.022**	**0.08**	**1.05**
Drug x TSST	**0.61**	**0.25**	**.015**	**0.12**	**1.09**
Drug x Recovery	0.43	0.25	.083	-0.06	0.92
Sex	-0.01	0.16	.967	-0.33	0.32
BMI	0.00	0.06	.963	-0.11	0.12
SES	-0.08	0.04	.076	-0.16	0.01

Note: Significant effects ($p<.05$) are bolded. Drug was coded 0=Placebo, 1=Propranolol. "TSST Tasks" are the Speech and Math tasks aggregated. Sex was coded 0=Female, 1=Male. Effects here are unadjusted for heart rate. Even after adjusting for the covariates of Sex, BMI, and SES (parental education), there are significant interaction effects of Drug x TSST that disappear when heart rate is added to the model (see Table 4 in main text).

Table S4. Emotion fixed effects, with the pre-drug baseline (BL1) as the reference category.

Predictors	*b*	*S.E.*	*p*	*Lower 95% CI*	*Upper 95% CI*
Mean negative, high arousal emotions					
Intercept	**1.28**	**0.25**	**<.001**	**0.79**	**1.76**
Drug	-0.05	0.08	.562	-0.20	0.11
Post-Drug BL2	**-0.13**	**0.06**	**.040**	**-0.25**	**-0.01**
TSST Prep	**0.25**	**0.06**	**<.001**	**0.13**	**0.37**
Post-TSST	**0.62**	**0.06**	**<.001**	**0.50**	**0.74**
Drug x BL2	0.02	0.09	.837	-0.16	0.19
Drug x TSST Prep	-0.17	0.09	.065	-0.34	0.01
Drug x Post-TSST	**-0.20**	**0.09**	**.024**	**-0.38**	**-0.03**
Sex	0.09	0.06	.109	-0.02	0.20
BMI	-0.00	0.02	.843	-0.04	0.04
SES	-0.01	0.02	.616	-0.04	0.02
Mean negative, low arousal emotions					
Intercept	**0.96**	**0.19**	**<.001**	**0.59**	**1.34**
Drug	0.02	0.06	.732	-0.09	0.13
Post-Drug BL2	-0.07	0.04	.091	-0.15	0.01
TSST Prep	**-0.12**	**0.04**	**.003**	**-0.21**	**-0.04**
Post-TSST	-0.06	0.04	.174	-0.14	0.03
Drug x BL2	0.06	0.06	.313	-0.06	0.18
Drug x TSST Prep	0.04	0.06	.546	-0.08	0.16
Drug x Post-TSST	0.03	0.06	.609	-0.09	0.15
Sex	0.04	0.04	.414	-0.05	0.12
BMI	0.00	0.02	.989	-0.03	0.03
SES	0.02	0.01	.174	-0.01	0.04
Mean positive, high arousal emotions					
Intercept	**1.97**	**0.60**	**.001**	**0.79**	**3.15**
Drug	0.14	0.16	.376	-0.17	0.44
Post-Drug BL2	**-0.25**	**0.09**	**.006**	**-0.42**	**-0.07**
TSST Prep	**-0.29**	**0.09**	**.001**	**-0.47**	**-0.12**
Post-TSST	**-0.19**	**0.09**	**.033**	**-0.36**	**-0.02**
Drug x BL2	-0.09	0.13	.496	-0.34	0.17
Drug x TSST Prep	-0.10	0.13	.449	-0.35	0.16
Drug x Post-TSST	-0.21	0.13	.107	-0.46	0.05
Sex	**0.33**	**0.14**	**.017**	**0.06**	**0.59**
BMI	-0.03	0.05	.562	-0.12	0.07
SES	-0.01	0.04	.827	-0.08	0.06
Mean positive, low arousal emotions					
Intercept	**2.72**	**0.56**	**<.001**	**1.61**	**3.82**
Drug	0.10	0.16	.526	-0.21	0.40
Post-Drug BL2	**-0.22**	**0.10**	**.034**	**-0.42**	**-0.02**
TSST Prep	**-0.78**	**0.10**	**<.001**	**-0.99**	**-0.58**
Post-TSST	**-0.83**	**0.10**	**<.001**	**-1.03**	**-0.63**
Drug x BL2	-0.28	0.15	.063	-0.57	0.02
Drug x TSST Prep	-0.03	0.15	.827	-0.33	0.26
Drug x Post-TSST	-0.19	0.15	.218	-0.48	0.11
Sex	0.09	0.13	.457	-0.15	0.34
BMI	-0.07	0.05	.149	-0.16	0.02
SES	0.01	0.03	.710	-0.05	0.08

Note: Significant effects ($p<.05$) are bolded. Drug was coded 0=Placebo, 1=Propranolol. Sex was coded 0=Female, 1=Male. TSST Prep effects reflect emotion ratings immediately after the 2-min TSST preparatory period before giving the speech. Post-TSST effects reflect emotion ratings given immediately after the TSST completed.

Table S5. Physiology fixed effects, with the pre-drug baseline (BL1) as the reference category.

Predictors	*b*	*S.E.*	*p*	*Lower 95% CI*	*Upper 95% CI*
Mean pre-ejection period					
Intercept	**129.96**	**10.83**	**<.001**	**108.67**	**151.26**
Drug	4.69	3.29	.156	-1.78	11.15
Post-Drug BL2	1.63	2.29	.476	-2.86	6.13
TSST Prep	**-9.09**	**2.30**	**<.001**	**-13.62**	**-4.56**
TSST Tasks	**-9.09**	**2.29**	**<.001**	**-13.59**	**-4.59**
TSST Recovery	-0.11	2.31	.963	-4.66	4.44
Drug x BL2	4.60	3.37	.173	-2.03	11.22
Drug x Prep	**9.59**	**3.40**	**.005**	**2.90**	**16.27**
Drug x TSST	**14.30**	**3.36**	**<.001**	**7.69**	**20.91**
Drug x Recovery	**6.96**	**3.39**	**.041**	**0.29**	**13.63**
Sex	**5.07**	**2.50**	**.046**	**0.15**	**9.99**
BMI	0.33	0.91	.720	-1.47	2.12
SES	-1.04	0.64	.107	-2.29	0.21
Mean respiratory sinus arrhythmia					
Intercept	**11.04**	**0.69**	**<.001**	**9.68**	**12.40**
Drug	-0.22	0.20	.269	-0.61	0.17
Post-Drug BL2	0.17	0.16	.275	-0.14	0.48
TSST Prep	0.31	0.16	.061	-0.01	0.63
TSST Tasks	**0.37**	**0.19**	**.048**	**0.00**	**0.74**
TSST Recovery	-0.02	0.16	.903	-0.33	0.29
Drug x BL2	-0.03	0.22	.878	-0.48	0.41
Drug x Prep	0.08	0.23	.737	-0.38	0.53
Drug x TSST	-0.21	0.24	.397	-0.68	0.27
Drug x Recovery	0.13	0.23	.560	-0.31	0.58
Heart rate	**-0.04**	**0.01**	**<.001**	**-0.05**	**-0.04**
Sex	-0.23	0.14	.103	-0.51	0.05
BMI	0.00	0.05	.930	-0.10	0.10
SES	-0.06	0.04	.130	-0.13	0.02
Log-transformed salivary alpha-amylase					
Intercept	**2.38**	**0.78**	**.003**	**0.85**	**3.91**
Drug	-0.22	0.20	.261	-0.62	0.17
Post-Drug BL2	-0.13	0.13	.290	-0.38	0.11
Post-TSST T15	0.07	0.12	.601	-0.18	0.31
Drug x BL2	-0.03	0.18	.866	-0.38	0.32
Drug x T15	**-0.53**	**0.18**	**.003**	**-0.88**	**-0.18**
Sex	0.12	0.21	.564	-0.30	0.55
Menses Cycle	0.04	0.07	.570	-0.10	0.18
BMI	-0.07	0.06	.280	-0.19	0.05
SES	0.08	0.05	.095	-0.01	0.16
Log-transformed salivary cortisol					
Intercept	**1.28**	**0.65**	**.050**	**0.01**	**2.55**
Drug	0.29	0.19	.129	-0.08	0.65
Post-Drug BL2	**-0.81**	**0.14**	**<.001**	**-1.08**	**-0.54**
Post-TSST T15	0.05	0.14	.710	-0.22	0.33
Post-TSST T30	-0.22	0.14	.120	-0.49	0.06
Drug x BL2	0.16	0.20	.422	-0.24	0.56
Drug x T15	0.10	0.20	.630	-0.30	0.49
Drug x T30	0.08	0.20	.704	-0.32	0.47
Sex	0.30	0.18	.092	-0.05	0.65
Menses Cycle	0.01	0.06	.834	-0.10	0.13
BMI	0.05	0.05	.291	-0.05	0.15
SES	0.01	0.04	.839	-0.07	0.08

Note: Significant effects ($p<.05$) are bolded. Drug was coded 0=Placebo, 1=Propranolol. "TSST Tasks" are the Speech and Math tasks aggregated. Sex was coded 0=Female, 1=Male.

Table S6. Heart rate fixed effects with pre-drug baseline (BL1) vs. post-drug baseline (BL2) as the reference.

Predictors	*b*	*S.E.*	*p*	*Lower 95% CI*	*Upper 95% CI*
Mean heart rate with respect to BL1 or pre-drug baseline					
Intercept	**61.26**	**8.21**	**<.001**	**45.11**	**77.40**
Drug	1.18	2.22	.597	-3.19	5.54
Post-Drug BL2	-2.40	1.39	.084	-5.13	0.32
TSST Prep	**10.18**	**1.39**	**<.001**	**7.45**	**12.90**
TSST Tasks	**21.95**	**1.38**	**<.001**	**19.24**	**24.66**
TSST Recovery	-0.51	1.40	.713	-3.26	2.23
Drug x BL2	-1.44	1.99	.471	-5.36	2.48
Drug x Prep	**-11.71**	**1.99**	**<.001**	**-15.63**	**-7.79**
Drug x TSST	**-18.92**	**1.99**	**<.001**	**-22.82**	**-15.01**
Drug x Recovery	**-7.12**	**2.00**	**<.001**	**-11.05**	**-3.19**
Sex	**-4.81**	**1.85**	**.011**	**-8.44**	**-1.18**
BMI	0.25	0.67	.711	-1.06	1.56
SES	0.47	0.49	.335	-0.48	1.43
Mean heart rate with respect to BL2 or post-drug baseline					
Intercept	**58.64**	**8.90**	**<.001**	**41.13**	**76.14**
Drug	-0.18	2.35	.939	-4.79	4.43
TSST Prep	**12.67**	**1.43**	**<.001**	**9.85**	**15.49**
TSST Tasks	**24.43**	**1.42**	**<.001**	**21.63**	**27.23**
TSST Recovery	2.08	1.44	.151	-0.76	4.92
Drug x Prep	**-10.37**	**2.04**	**<.001**	**-14.39**	**-6.35**
Drug x TSST	**-17.56**	**2.04**	**<.001**	**-21.56**	**-13.56**
Drug x Recovery	**-5.87**	**2.05**	**.005**	**-9.90**	**-1.84**
Sex	**-5.27**	**2.01**	**.010**	**-9.21**	**-1.32**
BMI	0.18	0.72	.807	-1.24	1.60
SES	0.50	0.53	.346	-0.54	1.54

Note: Significant effects ($p<.05$) are bolded. Drug was coded 0=Placebo, 1=Propranolol. "TSST Tasks" are the Speech and Math tasks aggregated. Sex was coded 0=Female, 1=Male.

Table S7. Unadjusted fixed effects for all outcomes, provided for future meta-analyses.

Predictors	*b*	*S.E.*	*p*	*Lower 95% CI*	*Upper 95% CI*
Mean negative, high arousal emotions relative to BL2					
Intercept	**1.08**	**0.06**	**<.001**	**0.96**	**1.19**
Drug	-0.02	0.08	.778	-0.19	0.14
TSST Prep	**0.38**	**0.07**	**<.001**	**0.24**	**0.51**
Post-TSST	**0.75**	**0.07**	**<.001**	**0.61**	**0.88**
Drug x TSST Prep	-0.18	0.10	.067	-0.38	0.01
Drug x Post-TSST	**-0.22**	**0.10**	**.027**	**-0.42**	**-0.03**
Mean negative, low arousal emotions relative to BL2					
Intercept	**1.16**	**0.04**	**<.001**	**1.09**	**1.24**
Drug	0.08	0.05	.144	-0.03	0.18
TSST Prep	-0.06	0.04	.167	-0.14	0.02
Post-TSST	0.01	0.04	.775	-0.07	0.09
Drug x TSST Prep	-0.02	0.06	.731	-0.13	0.09
Drug x Post-TSST	-0.03	0.06	.651	-0.14	0.09
Mean positive, high arousal emotions relative to BL2					
Intercept	**1.74**	**0.11**	**<.001**	**1.53**	**1.94**
Drug	0.06	0.15	.684	-0.24	0.36
TSST Prep	-0.03	0.09	.717	-0.21	0.15
Post-TSST	0.07	0.09	.459	-0.11	0.25
Drug x TSST Prep	-0.02	0.13	.886	-0.28	0.24
Drug x Post-TSST	-0.13	0.13	.328	-0.39	0.13
Mean positive, low arousal emotions relative to BL2					
Intercept	**2.69**	**0.11**	**<.001**	**2.48**	**2.9**
Drug	-0.19	0.16	.225	-0.49	0.12
TSST Prep	**-0.56**	**0.10**	**<.001**	**-0.76**	**-0.36**
Post-TSST	**-0.61**	**0.10**	**<.001**	**-0.81**	**-0.41**
Drug x TSST Prep	0.25	0.15	.096	-0.04	0.54
Drug x Post-TSST	0.09	0.15	.549	-0.20	0.38
Mean challenge appraisals relative to TSST Prep					
Intercept	**4.66**	**0.14**	**<.001**	**4.39**	**4.93**
Drug	0.06	0.20	.773	-0.34	0.45
Post-TSST	**-0.55**	**0.12**	**<.001**	**-0.79**	**-0.32**
Drug x Post-TSST	-0.10	0.18	.574	-0.45	0.25
Mean threat appraisals relative to TSST Prep					
Intercept	**4.10**	**0.15**	**<.001**	**3.81**	**4.39**
Drug	-0.27	0.22	.206	-0.70	0.15
Post-TSST	0.04	0.12	.754	-0.20	0.27
Drug x Post-TSST	0.11	0.17	.510	-0.23	0.45
Mean negative appraisals relative to TSST Prep					
Intercept	**1.46**	**0.08**	**<.001**	**1.31**	**1.62**
Drug	-0.05	0.11	.658	-0.27	0.17
Post-TSST	**0.38**	**0.07**	**<.001**	**0.24**	**0.52**
Drug x Post-TSST	-0.17	0.10	.112	-0.37	0.04
Mean pre-ejection period relative to BL2					
Intercept	**117.55**	**2.40**	**<.001**	**112.84**	**122.26**
Drug	**9.93**	**3.52**	**.005**	**3.01**	**16.85**
TSST Prep	**-10.84**	**2.53**	**<.001**	**-15.82**	**-5.86**
TSST Tasks	**-10.75**	**2.52**	**<.001**	**-15.69**	**-5.80**
TSST Recovery	-1.69	2.55	.509	-6.70	3.33
Drug x Prep	4.84	3.72	.194	-2.47	12.15
Drug x TSST	**9.58**	**3.68**	**<.001**	**2.35**	**16.81**
Drug x Recovery	2.10	3.72	.572	-5.20	9.41
Mean respiratory sinus arrhythmia relative to BL2					
Intercept	**7.31**	**0.16**	**<.001**	**6.99**	**7.63**
Drug	-0.22	0.23	.336	-0.68	0.23
TSST Prep	**-0.44**	**0.19**	**.019**	**-0.80**	**-0.07**

TSST Tasks	**-0.89**	**0.18**	**<.001**	**-1.25**	**-0.53**
TSST Recovery	-0.30	0.19	.106	-0.67	0.06
Drug x Prep	**0.58**	**0.26**	**.028**	**0.06**	**1.10**
Drug x TSST	**0.58**	**0.26**	**.028**	**0.06**	**1.10**
Drug x Recovery	0.45	0.26	.091	-0.07	0.97
Log-transformed salivary alpha-amylase relative to BL2					
Intercept	**44.76**	**5.26**	**<.001**	**34.38**	**55.15**
Drug	-7.48	7.54	.322	-22.37	7.40
Post-TSST T15	7.27	4.93	.143	-2.48	17.01
Drug x T15	**-15.63**	**7.01**	**.027**	**-29.46**	**-1.80**
Log-transformed salivary cortisol relative to BL2					
Intercept	**3.06**	**0.88**	**.001**	**1.32**	**4.80**
Drug	2.16	1.28	.093	-0.36	4.68
Post-TSST T15	**3.92**	**0.10**	**<.001**	**1.96**	**5.89**
Post-TSST T30	1.92	1.00	.057	-0.05	3.90
Drug x T15	1.57	1.44	.277	-1.27	4.40
Drug x T30	0.59	1.44	.684	-2.25	3.43

Note: Please reach out to the first author (JKM) or senior author (KAM) if you need more details or other effect information for meta-analyses.

Table S8. Bivariate correlations between emotions and appraisals within the TSST Prep and TSST Task timepoints.

	During TSST Prep							Immediately after TSST Speech and Math						
	Self-Reported Emotions				Self-Reported Appraisals			Self-Reported Emotions				Self-Reported Appraisals		
	NegHi	**NegLo**	**PosHi**	**PosLo**	**Challenge**	**Threat**	**Negative**	**NegHi**	**NegLo**	**PosHi**	**PosLo**	**Challenge**	**Threat**	**Negative**
Emotions														
NegHi	-	.49***	.02	-.23*	-.39***	.68***	.69***	-	.54***	-.10	-.28**	-.50***	.59***	.79***
NegLo		-	.03	-.09	-.35***	.28**	.50***		-	-.22*	-.26*	-.42***	.15	.47***
PosHi			-	.66*	.32**	-.31**	-.08			-	.70***	.37***	-.27**	-.12
PosLo				-	.40***	-.48***	-.21				-	.50***	-.36***	-.26*
Appraisals														
Challenge					-	-.43***	-.36***					-	-.32***	-.40***
Threat						-	.57***						-	.58***

Note: NegHi= negative, high arousal emotions; NegLo= negative, low arousal emotions; PosHi= positive, high arousal emotions; PosLo= positive, low arousal emotions; Challenge= challenge appraisals; Threat= threat appraisals; Negative= negative internal and external evaluative appraisals.
***p<.001, **p<.01, *p<.05

Table S9. Bivariate correlations between physiological markers in response to the TSST.

	RSA	**sAA**	**Cortisol**
PEP	.26*	-.27*	.02
RSA	-	-.24*	-.11
sAA		-	-.13

Note: These measures reflect the raw timepoint inter-correlations between markers' peak response to the stressor. For autonomic physiology measures of pre-ejection period (PEP) and respiratory sinus arrhythmia (RSA), this was during the TSST speech and math tasks. For salivary markers, this was 15-min post-TSST for salivary alpha amylase (sAA) and 30-min post-TSST for salivary cortisol. Both PEP and RSA decreased under stress (indicative of greater effort or "stress") whereas sAA and cortisol tended to increase. As might be expected, we found a small correlation between PEP and RSA. Similarly, greater sAA peak was associated with greater PEP and RSA decreases in response to the TSST. Cortisol was unrelated to any other markers. *p<.05