Supplemental Material

Study 1

Initial Task

As we report in the manuscript, all participants completed an initial task before the anagram task. The purpose of the initial task was twofold. First, the data were used to test hypotheses reported in Townsend, Truong, and Smallets (in preparation). Second, we used the initial task as a basis to administer feedback to all participants, which indicated that achieving their goal (i.e., entry into the drawing) was unlikely. The initial task asked participants to come up with as many novel uses for a cardboard box as possible in 5 minutes while their physiological responses were recorded. After participants finished the task, they completed measures of positive and negative affect, evaluation of the task, effort put into the task, and their generalized perceptions of control (for more information, see Townsend, Truong, & Smallets, in preparation).

Psychophysiological Measurement

Before the study, we asked participants the following questions to ensure that they did not have these qualities that would seriously affect their physiological responses: "Do you have a pacemaker?" Do you believe you might be pregnant?" and "In the past 6 months, have you taken medicine that would affect your cardiovascular system (e.g., beta-blockers?" Experimenters attached participants to an ECG100C electrocardiogram (ECG) amplifier manufactured and sold by Biopac Systems, Inc. (Goleta, California). We used a Modified Lead II electrode configuration and ECG signals were recorded and stored on a computer with Biopac Acqknowledge 3.9.2. We edited and ensembled the ECG data with Mindware Systems (Layfeyette, OH) using techniques from previously published cardiovascular research (Berntson et al., 1997). Participants were also connected to a NICO100C impedance cardiogram and a

Vasotrac (Model APM205A) blood pressure monitor as part of the research project reported in Townsend, Truong, and Smallets (in preparation).

Anagram Task

We have included the anagram task from Studies 1 and 2 (see Appendix). Before participants completed the anagram task, participants in the goal-enabling condition were also given a choice among three folders (all containing the same task) and between a blue or black pen, whereas participants' folder and pen were chosen for them by the experimenter in the control condition.

Additional Measures in Study 1

In addition to the measures reported in the manuscript, we assessed other exploratory variables. In particular, we included measures to investigate differences in participants' experience of the study based on condition: positive and negative affect, ratings of the anagram task and the experimenter, and perceived control of the general study situation. We thought it might be possible that the control condition is a more aversive experience than the goal-enabling condition, because it could potentially create lower feelings of control or agency, regardless of perseverance or consistency, creating unwanted systematic differences among participants. We did not have a priori hypotheses for these measures.

We also included measures to investigate associations between participants' self-esteem and personal mastery and control with their perseverance and consistency. Previous work shows that grit is positively associated with self-control (Duckworth & Gross, 2014) and self-efficacy (Credé, Tynan, & Harms, 2016), which led us to theorize that, despite engaging in an externally-controlled laboratory study (i.e., a situation in which they had little ability to influence their environment), perseverance and consistency would continue to be positively associated with

general perceptions of personal mastery and control and self-esteem, regardless of condition. Specifically, we hypothesized that, across conditions, participants higher in perseverance and consistency would report greater personal mastery and control and self-esteem than participants lower in perseverance and consistency. The facets of grit's persistent relationship with personal mastery and control and self-esteem, despite a temporary loss of control, would be consistent with the literature showing grit's benefits.

See Table 1 for a complete list of items from these measures as well as those reported in the manuscript. See Table 2 for the correlations among variables in Study 1.

Table 1

Complete List of Items Included in Study 1

Dependent Variable	Items
Perseverance	1. I finish whatever I begin. 2. I have overcome setbacks to conquer an important challenge. 3. Setbacks don't discourage me. 4. I am diligent. 5. I am a hard worker. 6. I have achieved a goal that took years of work.
Consistency	1. I often set a goal but later choose to pursue a different one. (reverse-coded) 2. I have difficulty maintaining my focus on projects that take more than a few months to complete. (reverse-coded) 3. New ideas and new projects sometimes distract me from previous ones. (reverse-coded) 4. I become interested in new pursuits every few months. (reverse-coded) 5. My interests change from year to year. (reverse-coded) 6. I have been obsessed with a certain idea or project for a short time but later lost interest. (reverse-coded)
Positive Affect	Excited, Alert, Attentive, Inspired, Enthusiastic
Negative Affect	Nervous, Ashamed, Irritable, Self-conscious, Distressed
Self-reported Engagement	I tried my hardest on the second task.
Task Evaluation	The second task was… 1. Difficult 2. Fair 3. A meaningful predictor of my skills and abilities
Perceived Situational Control	1. I believe I had control over my own performance. 2. I had control over the situation I was in.
Self-esteem	1. I feel confident about my abilities. 2. I am worried about whether I am regarded as a success or failure. (reverse-coded) 3. I feel frustrated or rattled about my performance. (reverse-coded) 4. I feel that I am having trouble understanding things that I read. (reverse-coded)

	5. I feel self-conscious. (reverse-coded)
	6. I feel as smart as others.
	7. I feel displeased with myself. (reverse-coded)
	8. I am worried about what other people think of me. (reverse-coded)
	9. I feel confident that I understand things.
	10. I feel inferior to others at this moment. (reverse-coded)
	11. I feel concerned about the impression I am making. (reverse-coded)
	12. I feel that I have less scholastic ability right now than others. (reverse-coded)
	13. I feel like I am not doing well. (reverse-coded)
	14. I am worried about looking foolish. (reverse-coded)
Personal Mastery and Control	1. I can do just about anything I set my mind to.
	2. When I really want something, I usually find a way to succeed at it.
	3. Whether or not I am able to get what I want is in my own hands.
	4. What happens to me in the future mostly depends on me.
	5. There is little I can do to change the important things in my life. (reverse-coded)
	6. I often feel helpless in dealing with the problems of life. (reverse-coded)
	7. Other people determine most of what I can and cannot do. (reverse-coded)
	8. What happens in my life is often beyond my control. (reverse-coded)
	9. There are many things that interfere with what I want to do. (reverse-coded)
	10. I have little control over the things that happen to me. (reverse-coded)
	11. There is really no way I can solve the problems I have. (reverse-coded)
	12. I sometimes feel I am being pushed around in my life. (reverse-coded)
Experimenter Evaluation	I believe the experimenter is…
	1. Competent
	2. Prejudiced (reverse-coded)
	3. Friendly
	4. Incoherent (reverse-coded)
	5. Mean (reverse-coded)
	6. Arrogant (reverse-coded)
	7. Cold (reverse-coded)
	8. Stuck-up (reverse-coded)
	9. Kind
	10. Intelligent
	11. Biased (reverse-coded)
	12. Ignorant (reverse-coded)

Table 2

Correlations Among Variables in Study 1

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Perseverance	--	.17*	.12	.16+	.17*	.11	-.03	-.07	.11	-.07	.01	.12	.30***	.06
2. Consistency	.17*	--	-.10	.06	-.04	-.06	-.19*	-.02	-.01	-.20*	< .00	.12	.18*	.02
3. RSA Reactivity	-.10	.02	--	-.04	-.08	-.12	.13	.11	-.09	-.14+	-.03	-.11	-.16+	-.11
4. SR Engagement	.06	.16+	-.05	--	.12	.50***	.04	.07	.34***	.34***	.40***	-.13	.07	.22**
5. Performance	-.04	.17*	-.08	.12	--	.11	-.25**	-.35***	.27**	.13	.21*	.18+	.06	.06
6. Positive Affect	-.06	.11	-.12	.50***	.11	--	.13	-.02	.22**	.32***	.31***	.04	.03	.30***
7. Negative Affect	-.19	-.03	.13	.04	-.25**	.13	--	.28**	-.19*	.09	-.10	-.08*	-.25*	-.15+
8. Task was Difficult	-.02	-.07	.11	.07	-.35***	-.02	.28**	--	-.02	.03	-.16+	-.55***	-.26**	.001
9. Task was Fair	-.01	.11	-.09	.34***	.27**	.22**	-.19*	-.02	--	.31***	.44***	.06	.11	.14+
10. Task was Meaningful	-.20*	-.07	-.14+	.34***	.13	.32***	.09	.31***	.03	--	.39***	-.23**	-.10	.16+
11. Situational Control	< .000	.01	-.03	.40***	.21*	.31***	-.10	-.16+	.44***	.39***	--	.06	.16+	.30***
12. Self-esteem	.12	.12	-.11	-.13	.18+	.04	-.08	-.55***	.06	-.23**	.06	--	.52***	.01
13. Mastery and Control	.18*	.30***	-.16+	.07	.06	.03	-.25**	-.26**	.11	-.10	.16+	.52***	--	.05
14. Experimenter Rating	.02	.06	-.11	.22**	.06	.30***	-.15+	.001	.14+	.16+	.30***	.01	.05	--

Note. RSA = respiratory sinus arrhythmia, SR = self-reported.

+p < .10, *p < .05. **p < .01. ***p < .001.

Positive and negative affect. Participants reported their positive and negative affect using Watson and colleagues' (1988) Positive and Negative Affect Scale by indicating how much they felt each of 10 emotions after the anagram task on a scale from 1 (*not at all*) to 7 (*very much*). We separately examined positive affect (e.g., excited), $M = 3.86$, $SD = 1.17$, $\alpha = .77$, and negative affect (e.g., nervous), $M = 2.91$, $SD = 1.33$, $\alpha = .79$.

Task evaluation. Participants reported their perceptions of the anagram task on three author-generated items by indicating their agreement with each statement on a scale from 1 (*not at all*) to 7 (*extremely*). Because the reliability for the three items was low ($\alpha = .43$) and no correlations between items were strong (rs $< .32$), each item is analyzed separately. The items include evaluating the anagram task as difficult, $M = 4.80$, $SD = 1.21$, as fair, $M = 4.69$, $SD = 1.41$, and as a meaningful predictor of one's skills and abilities, $M = 3.25$, $SD = 1.70$.

Perceived situational control. Participants reported their perceptions of situational control using two author-generated items by indicating how true each statement was on a scale from 1 (*not at all*) to 7 (*very much*), $M = 4.91$, $SD = 1.45$, $r = .67$. An example item is, "I had control over their situation I was in."

Self-esteem. Participants reported their self-esteem on 14 items adopted from Heatherton and Polivy (1991)'s State Self-esteem Scale by indicating their agreement with each statement on a scale from 1 (strongly disagree) to 7 (strongly agree), M = 5.00, SD = 1.18, $\alpha = .93$. An example item is, "I feel confident about my abilities."

Personal mastery and control. Participants reported their perceived personal mastery and control using Lachman and Weaver's (1998) two subscales of generalized control: perceived constraints (eight items; $M = 2.52$, $SD = .95$, $\alpha = .88$) and personal mastery (four items; $M = 5.72$, $SD = .89$, $\alpha = .76$). Participants reported how much they believed each of the 12 statements

were true of them using a scale from 1 (*not at all true*) to 7 (*extremely true*). We combined the two scales together to create one composite for perceived personal mastery and control (see Röcke & Lachman, 2008; $M = 5.56$, $SD = .81$, $\alpha = .87$). Example item include, "I can do just about anything I really set my mind to" and, "There are many things that interfere with what I want to do" (reverse-coded).

Experimenter evaluation. Participants reported their perception of the experimenter on 12 author-generated items by indicating their agreement with each statement on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), $M = 5.98$, $SD = .98$, $\alpha = .92$. An example item is, "I believe the experimenter was competent."

Demographics. We asked participants their gender, age, race/ethnicity, subjective socioeconomic status, mother's highest level of education, father's highest level of education, family's average yearly household income, whether they were born in the U.S., and if English was their first language.

Results and Discussion of Additional Measures in Study 1

We ran the same moderated regression analyses for the additional Study 1 measures as we did for the non-physiological measures reported in the manuscript. Specifically, we included being U.S. born (0 = not U.S. born, 1 = U.S. born) as a covariate on Step 1, the independent effects of perseverance (mean-centered) or consistency (mean-centered) and condition (0 = control, 1 = goal-enabling) on Step 2, and an interaction term of the grit facets by condition on Step 3. For the interaction effects, we report ΔR^2 as the effect size and for all main effects and simple slopes, we report *b* as the effect size. See Tables 3 and 4 for full results.

Table 3

Perseverance Moderated Regression Results for Additional Measures in Study 1

	Positive Affect	Negative Affect	The Task was Difficult	The Task was Fair	The Task was Meaningful	Perceived Situational Control	Self-Esteem	Mastery and Control	Experimenter Rating
	b [CI]	*b* [CI]	*b* [CI]	*b* [CI]	*b* [CI]	*b* [CI]		*b* [CI]	*b* [CI]
Covariates									
Step ΔR^2	.003	.003	.002	.042	.014	.017	.008	.041	.027
U.S. Born	-0.14	-0.16	-0.12	0.61*	-0.42	0.40	0.22	0.35*	0.34*
	[-0.55, 0.27]	[-0.63, 0.30]	[-0.54, 0.30]	[0.13, 1.09]	[-1.00, 0.17]	[-0.10, 0.90]	[-0.19, 0.63]	[-0.07, 0.62]	[0.05, 0.68]
Main Effects									
Step ΔR^2	.005	.040	.003	.008	.003	.020	.015	.076	.012
Perseverance	0.06	-0.26+	-0.08	0.12	-0.09	.02	0.13	0.23**	0.04
	[-0.19, 0.31]	[-0.54, 0.02]	[-0.35, 0.18]	[-0.12, 0.35]	[-0.38, 0.20]	[-0.23, 0.26]	[-0.07, 0.33]	[0.10, 0.36]	[-0.12, 0.21]
Condition	0.15	-0.38+	0.02	0.13	-0.06	0.40+	-0.11	-0.01	0.21
	[-.24, 0.54]	[-0.81, 0.06]	[-0.38, 0.42]	[-0.32, 0.59]	[-0.62, 0.50]	[-0.06, 0.87]	[-0.50, 0.28]	[-0.27, 0.24]	[-0.11, 0.52]
Interaction Effect									
Step ΔR^2	.004	.002	.001	.002	.001	.004	.001	.000	.005
Perseverance x Condition	0.19	0.16	0.12	-0.14	0.09	0.20	0.09	-0.02	0.15
	[-0.31, 0.70]	[-0.41, 0.73]	[-0.41, 0.65]	[-0.61, 0.34]	[-0.50, 0.67]	[-0.29, 0.69]	[-0.49, 0.32]	[-0.29, 0.24]	[-0.18, 0.48]

Note. The table presents unstandardized regression coefficients with the corresponding 95% confidence intervals (CI) for each effect, as well as the ΔR^2 for each step. Being U.S. born (0 = not U.S. born, 1 = U.S. born) and condition (0 = control, 1 = goal-enabling) are dichotomous variables. Perseverance is a continuous variable (mean-centered).

+$p < 1.00$. *$p < .05$. **$p < .01$.

Table 4

Consistency Moderated Regression Results for Additional Measures in Study 1

	Positive Affect	Negative Affect	The Task was Difficult	The Task was Fair	The Task was Meaningful	Perceived Situational Control	Self-Esteem	Mastery and Control	Experimenter Rating
	b [CI]	*b* [CI]	*b* [CI]	*b* [CI]	*b* [CI]	*b* [CI]		*b* [CI]	*b* [CI]
Covariates									
Step ΔR^2	.004	.003	.003	.042	.014	.017	.008	.041	.027
U.S. Born	-0.16 [-0.56, 0.25]	-0.15 [-0.61, 0.31]	-0.14 [-0.56, 0.28]	0.61* [0.13, 1.09]	-0.42 [-1.00, 0.17]	0.40 [-0.10, 0.90]	0.22 [-0.19, 0.63]	0.35 [0.07, 0.62]	0.34* [0.005, 0.68]
Main Effects									
Step ΔR^2	.007	.051	< .001	.002	.039	.020	.018	.035	.010
Consistency	-0.07 [-0.25, 0.12]	-0.24* [-0.44, -0.03]	-0.02 [-0.21, 0.17]	-0.02 [-0.24, 0.20]	-0.32* [-0.58, 0.06]	-.004 [-0.23, 0.22]	0.14 [-0.05, 0.32]	0.14 [0.02, 0.26]	0.02 [-0.13, 0.17]
Condition	0.14 [-0.24, 0.52]	-0.32 [-0.75, 0.10]	0.01 [-0.39, 0.41]	0.10 [-0.35, 0.56]	-0.02 [-0.57, 0.52]	0.40+ [-0.06, 0.87]	-0.15 [-0.53, 0.23]	-0.08 [-0.34, 0.18]	0.19 [-0.12, 0.51]
Interaction Effect									
Step ΔR^2	.008	.002	.001	.019	.003	.022	< .001	< .001	.028
Consistency x Condition	0.20 [-0.16, 0.57]	0.12 [-0.29, 0.53]	-0.06 [-0.44, 0.33]	0.38+ [-0.06, 0.81]	0.19 [-0.34, 0.72]	0.41+ [-0.04, 0.86]	0.04 [-0.33, 0.40]	0.02 [-0.23, 0.26]	0.31* [0.01, 0.61]

Note. The table presents unstandardized regression coefficients with the corresponding 95% confidence intervals (CI) for each effect, as well as the ΔR^2 for each step. Being U.S. born (0 = not U.S. born, 1 = U.S. born) and condition (0 = control, 1 = goal-enabling) are dichotomous variables. Consistency is a continuous variable (mean-centered).

+p < 1.00. *p < .05.

Positive and negative affect. There were no main or interactive effects on participants' positive affect, ps > .104. Further, there we no main or interactive effects of perseverance on negative affect, ps > .115. However, there was a significant main effect of consistency on participants' negative affect, $t(146) = -2.31$, $b = -0.24$, $p = .023$, such that higher consistency scores were associated with lower negative affect. The negative effect of consistency, but not perseverance, on negative affect strengthens the support that perseverance and consistency should be analyzed separately as they yield different outcomes. Importantly, there were no main effects of condition on positive or negative affect.

Task evaluation. There was a significant main effect of consistency on participants' evaluation that the task was a meaningful predictor of their skills and abilities, $t(146) = -2.42$, $b = -0.32$, $p = .017$, such that greater consistency was associated with lower ratings that the task was a meaningful predictor of their skills and abilities. Although this effect was not predicted and could be spurious, we speculate that higher (vs. lower) consistency may be related to seeing tasks as less diagnostic and to a malleable, rather than fixed, mindset (Dweck, 2000). There was also a marginal consistency by condition interaction on participants' evaluation that the task was fair, $F(4, 142) = 2.39$, $b = 0.38$, $\Delta R^2 = 0.02$, $p = .090$. Although marginal, the interaction effect on participants' evaluation that the task was fair was in the same direction as our predicted consistency by condition interactions on engagement and performance, which means participants could be exhibiting more physiological engagement just because they see the task as more fair than other participants. To rule out this explanation, we ran additional consistency moderated regression analyses controlling for the evaluation that the task was fair. Importantly, controlling for the evaluation that the task was fair did not change the significance or direction of our results. All other main and interactive effects on evaluations that the task was difficult, fair, or

meaningful were nonsignificant, ps > .228. Importantly, there were no main effects of condition on task evaluations.

Perceived situational control. There was a marginal main effect of condition on perceived situational control, $t(146) = 1.71$, $b = 0.40$, $\Delta R^2 = .020$, $p = .090$, such that those in the goal-enabling condition felt marginally more perceived situational control than those in the control condition. This effect is not particularly surprising, as those in the goal-enabling condition theoretically had more control over their outcomes than those in the control condition because their performance mattered for their goal achievement. There was also a marginal consistency by condition interaction on perceived situational control, $F(4, 142) = 2.21$, $b = 0.41$, $\Delta R^2 = 0.02$, $p = .070$. Although the aforementioned effects are marginal, we ran additional moderated regression analyses controlling for perceived situational control to ensure it was not affecting our results. Importantly, controlling for perceived situational control did not change the significance or direction of our results. All other main and interaction effects were nonsignificant, ps > .903.

Self-esteem. Contrary to our predictions, there were no main effects of perseverance or consistency on self-esteem, ps > .147. Although previous research has found that grit is positively related to self-efficacy (Credé et al., 2016), we do not find that the separate facets of grit are predictive of more generalized perceptions of confidence or positive ratings of the self. None of the other main or interactive effects on participants' self-esteem were significant, ps > .435.

Personal mastery and control. As predicted, there were significant main effects of perseverance, $t(146) = 3.47$, $b = 0.23$, $p = .001$, and consistency, $t(146) = 2.26$, $b = 0.14$, $p = .025$, on personal mastery and control. Specifically, participants higher in perseverance or

consistency reported significantly greater personal mastery and control than those lower in perseverance or consistency, irrespective of condition. These results indicate that people higher (vs. lower) in each facet of grit continue reporting greater feelings of context-nonspecific mastery and control, regardless of factors constraining their control over their outcomes in a particular context. We believe this finding is supportive of previous work relating grit, more generally, to self-control (Duckworth & Gross, 2014) and self-efficacy (Credé et al., 2016). There were no other main or interactive effects, ps > .545.

Experimenter evaluation. There was a significant consistency by condition interaction on participants' experimenter evaluation, $F (4, 142) = 2.48$, $b = 0.31$, $\Delta R^2 = 0.03$, $p = .041$. Although marginal, the interaction effect on experimenter evaluation is in the same direction as our predicted patterns for engagement and performance, which means participants could be exhibiting more physiological engagement just because they like the experimenter more. To rule out this explanation, we ran additional consistency moderated regression analyses controlling for experimenter evaluation. Importantly, controlling for experimenter evaluation did not change the significance or direction of our results. All other main and interactive effects were nonsignificant, ps > .204.

Analyses Excluding Manipulation Check Failures

As we mention in the manuscript, chi-square analyses indicated that, overall, the manipulation in Study 1 was successful, but at least 10% of participants in each condition failed the manipulation check. Therefore, we ran the moderated regression analyses reported in the manuscript while excluding people who failed the manipulation check and report the results here. Importantly, the main effect of perseverance on self-reported engagement remains marginal, $t (124) = 1.03$, $b = 0.20$, $p = .099$, and the main effect of perseverance on performance becomes

significant, t (125) = 3.53, b = 0.52, p = .032. However, the main effect of perseverance on RSA reactivity remains nonsignificant, t (114) = 1.42, b = 0.04, p = .572. In addition, the consistency by condition interaction on RSA reactivity remains significant, F (6, 108) = 2.12, b = -0.32, ΔR^2 = 0.04, p = .025. However, the consistency by condition interactions on self-reported engagement and performance remain nonsignificant, ps > .711.

Analyses Without Covariates

Readers may be curious about the results of Study 1 without the covariates. For perseverance, when we remove all covariates, the main effect on self-reported engagement remains marginal, t (146) = 2.24, b = 0.20, p = .070, the main effect on performance becomes significant, t (147) = 2.71, b = 0.49, p = .030, and the main effect of perseverance on RSA reactivity remains nonsignificant, t (136) = 0.22, b = 0.02, p = .828. For consistency, when we remove all covariates, the consistency by condition interactions on self-reported engagement, F (3, 143) = 0.73, b = 0.14, ΔR^2 < 0.01, p = .511, and on performance, F (3, 147) = 0.30, b = 0.09, ΔR^2 < 0.001, p = .832, remain nonsignificant, and the consistency by condition interaction on RSA reactivity remains significant, F (3, 133) = 3.77, b = -0.34, ΔR^2 = 0.05, p = .006.

Analyses Controlling for Other Grit Facet

Readers may also be curious about the results of Study 1 when controlling for the other grit facet (e.g., controlling for consistency in the perseverance analyses). For perseverance, when we control for consistency in addition to our other covariates, the main effect on self-reported engagement remains marginal, t (146) = 1.69, b = 0.19, p = .092, the main effect on performance remains marginal, t (147) = 1.93, b = 0.44, p = .055, and main effect of perseverance on RSA reactivity remains nonsignificant, t (134) = 0.47, b = 0.04, p = .636. For consistency, when we control for perseverance in addition to our other covariates, the consistency by condition

interactions on self-reported engagement, $F (5, 141) = 1.09$, $b = 0.18$, $\Delta R^2 = 0.01$, $p = .386$, and

on performance, $F (5, 142) = 2.26$, $b = 0.19$, $\Delta R^2 < 0.01$, $p = .647$, remain nonsignificant, and the

consistency by condition interaction on RSA reactivity remains significant, $F (5, 131) = 2.45$, $b =$

-0.34, $\Delta R^2 = 0.05$, $p = .007$.

Study 2

Exclusion of Non-U.S. Born Participants

As we report in the manuscript, we collected an initial sample of participants ($N = 198$)

for Study 2 and investigated whether 3-way interactions of consistency, condition, and being

born in the U.S. were present. We investigated the presence of these 3-way interactions for two

reasons. First, previous research indicates that people from the U.S., which is a notably

independent (vs. interdependent) cultural context, desire personal control over their outcomes

(e.g., Kim & Markus, 1999; Markus & Conner, 2013) which may systematically influence the

way U.S. born versus non-U.S. born participants experience our manipulation. Second, our

analyses from Study 1 indicated a strong main effect of being born in the U.S. on task

performance ($p = .011$), which is one of our central dependent variables of interest.

We used moderated regression analyses to test the 3-way interaction between

consistency, condition, and being born in the U.S. predicting task performance and self-reported

engagement with our initial sample. Specifically, we included the independent effects of

consistency (continuous, mean-centered), condition (0 = control, 1 = goal-enabling), and being

born in the U.S. (0 = not born in the U.S., 1 = born in the U.S.) on Step 1, the three 2-way

interaction terms (consistency, condition by being born in the U.S., and consistency by being

born in the U.S.) on Step 2, and a 3-way interaction term of consistency, condition, and being

born in the U.S. on Step 3. Seven people did not complete the consistency scale and two people

did not complete the measures of self-report engagement, yielding 189 participants (103 U.S.-born, 95 non-U.S.-born).

Similar to Study 1, there was a significant main effect of being born in the U.S. on task performance, $t(189) = 2.28$, $b = 1.14$, $p = .023$, and a marginal main effect of being born in the U.S. on engagement, $t(189) = 1.70$, $b = 0.20$, $p = .092$. There was also a significant 2-way interaction between consistency and being born in the U.S. on performance, $F(6, 184) = 2.08$, $b = 1.58$, $p = .038$. There were no other significant independent effects or 2-way interactions, ps > .171. Importantly, the 3-way interaction of consistency, condition, and being born in the U.S. was significant for engagement, $F(7, 182) = 1.47$, $b = 0.76$, $\Delta R^2 = .02$, $p = .037$, and trending toward significance for performance, $F(7, 183) = 2.15$, $b = 2.36$, $\Delta R^2 = .01$, $p = .119$.

Based on the 3-way interaction results, we decomposed the 3-way interaction into two 2-way interactions of consistency by condition (i.e., among only U.S.-born participants, then among only non-U.S.-born participants). Specifically, we included the independent effects of consistency and condition on Step 1 and the interaction term of consistency by condition on Step 2. Among U.S.-born participants, there was a significant consistency by condition interaction on performance, $F(3, 97) = 3.49$, $b = 2.30$, $\Delta R^2 = .04$, $p = .036$, and on self-reported engagement, $F(3, 96) = 2.22$, $b = 0.61$, $\Delta R^2 = .05$, $p = .025$ (see Figures 1a and 2a). The pattern of these results is consistent with our hypotheses, but because the analyses are underpowered, we do not report the simple slopes. Conversely, among non-U.S.-born participants, the consistency by condition interaction was nonsignificant for performance, $F(3, 86) = 0.04$, $b = -0.06$, $\Delta R^2 < .001$, $p = .956$, or self-reported engagement, $F(3, 86) = 0.36$, $b = -0.15$, $\Delta R^2 = .004$, $p = .541$ (See Figures 1b and 2b).
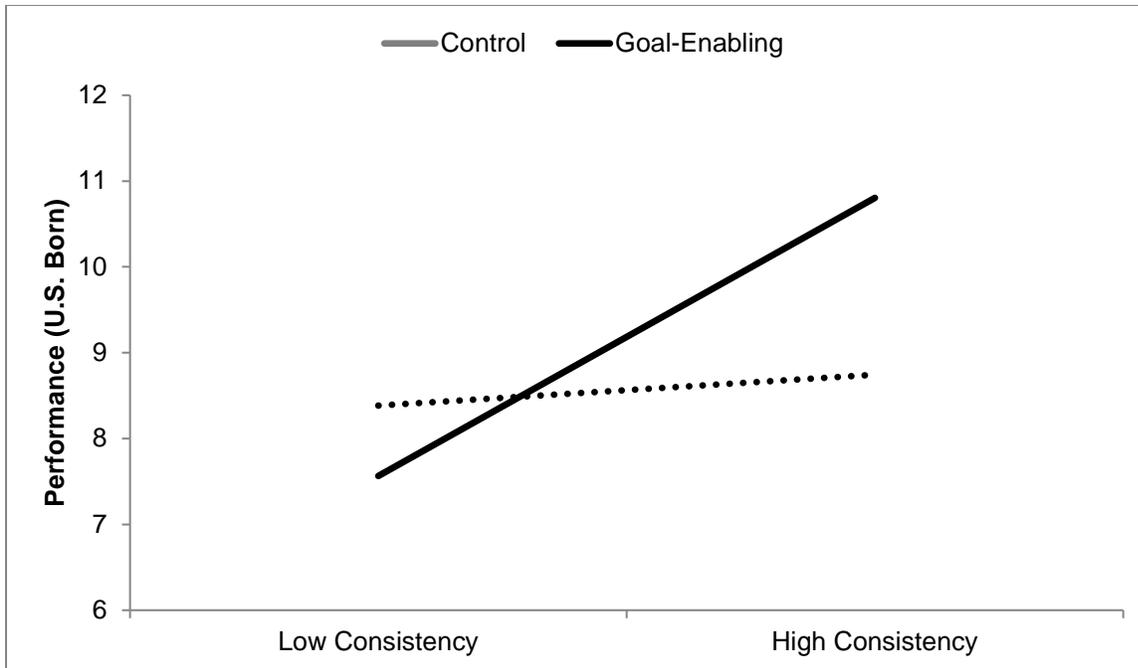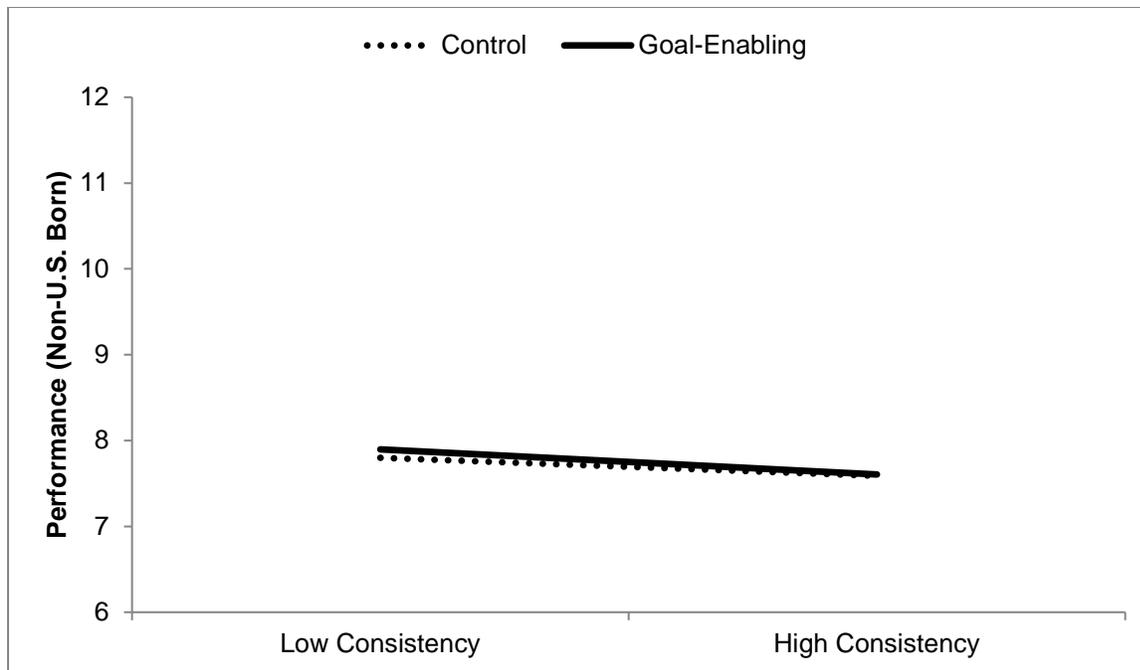
Figure 1a. Performance as a function of consistency and condition among only U.S.-born participants from the initial sample collected for Study 2. Higher values reflect more correctly solved anagrams and therefore better performance. "High" and "low" consistency represented as ± 1 *SD* from the mean.
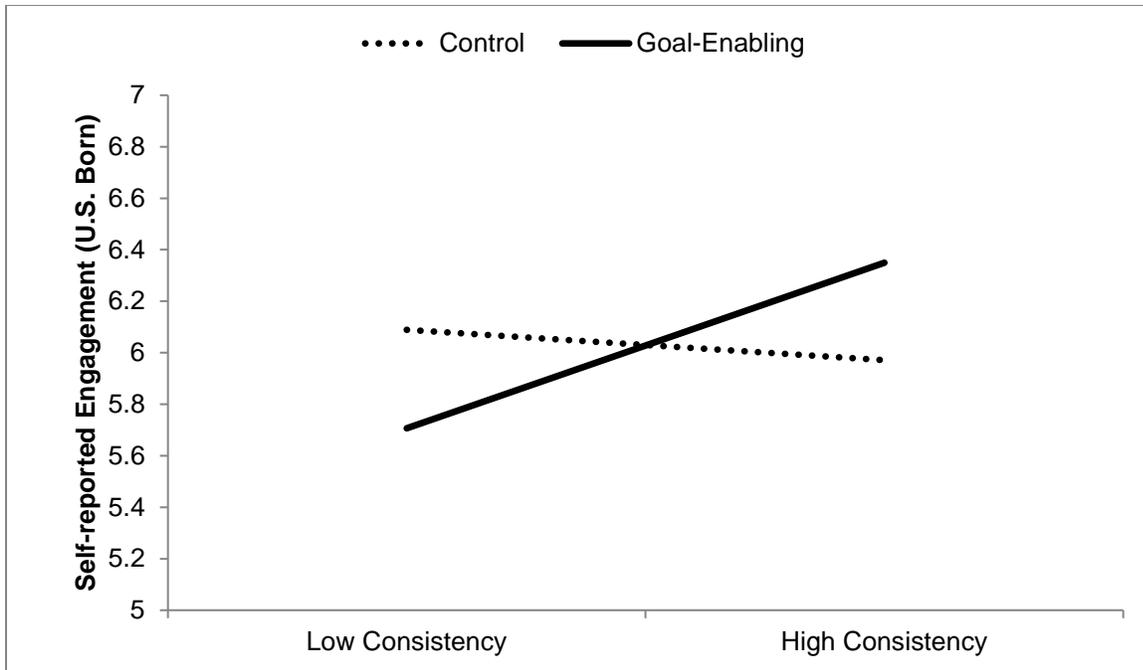
Figure 1b. Performance as a function of consistency and condition among only non-U.S.-born participants from the initial sample collected for Study 2. Higher values reflect more correctly solved anagrams and therefore better performance. "High" and "low" consistency represented as ± 1 *SD* from the mean.
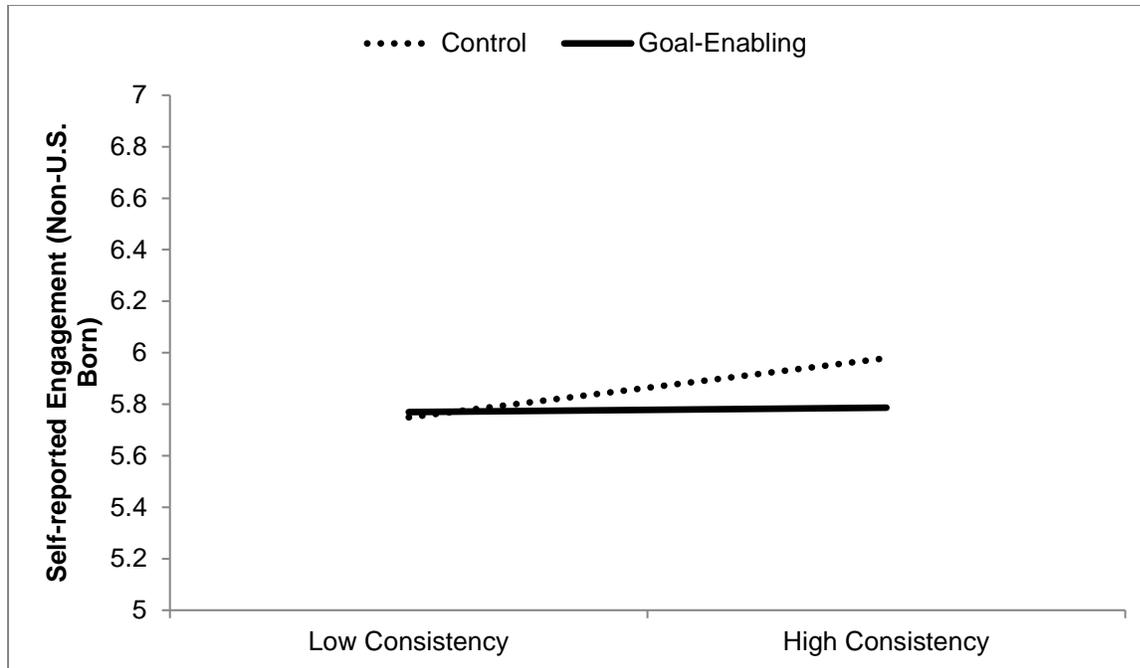
Figure 2a. Self-reported engagement as a function of consistency and condition among only U.S.-born participants from the initial sample collected for Study 2. Higher values reflect greater engagement in the anagram task. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Figure 2b. Self-reported engagement as a function of consistency and condition among only non-U.S.-born participants from the initial sample collected for Study 2. Higher values reflect greater engagement in the anagram task. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Based on these results, which are consistent with previous research indicating that degree of control is especially important for Americans (e.g., Kim & Markus, 1999; Markus & Conner, 2013), we focused the remainder of our data collection on people who were born in the U.S. Specifically, we initiated a second round of data collection using the student subject pool targeting only those who were native English speakers. We used this as a proxy for being U.S. born because it was included in the department-wide prescreening survey (i.e., birthplace was not included). We recruited new participants, until we reached our target total sample size (i.e., between 160 and 170 participants). All analyses reported in the manuscript and in the rest of the

supplemental material exclude participants not born in the U.S. ($n = 109$). Of the 109 participants

excluded, 51 were in the goal-enabling condition and 58 were in the control condition.

Additional Measures in Study 2

As we mention in the manuscript, we included two additional measures in Study 2. First,

because people who are high in grit are able to maintain engagement in their pursuits over time

(Duckworth, 2016), we included a measure of investment (i.e., sustained engagement) as another

benefit of grit. Reflecting our overall theorizing, we predicted that perseverance would be

positively associated with investment in anagram tasks regardless of whether performance matter

for goal achievement, whereas consistency would only be positively associated with investment

when performance on an anagram task enabled goal achievement. Second, because completing

more anagram tasks in the past might enhance anagram-solving ability and, therefore,

performance, we assessed participants' experience with anagram tasks as a potential covariate.

See Table 4 for a complete list of items from these measures as well as those reported in

the manuscript. See Table 5 for the correlations among variables in Study 2.

Table 4

Complete List of Items Included in Study 2

Dependent Variable	Items
Perseverance	1. I finish whatever I begin. 2. Setbacks don't discourage me. 3. I am diligent. 4. I am a hard worker.
Consistency	1. I often set a goal but later choose to pursue a different one. (reverse-coded) 2. I have difficulty maintaining my focus on projects that take more than a few months to complete. (reverse-coded) 3. New ideas and new projects sometimes distract me from previous ones. (reverse-coded) 4. I have been obsessed with a certain idea or project for a short time but later lost interest. (reverse-coded)
Self-reported Engagement	1. I tried my hardest on the task 2. I was fully engaged in the task. 3. I was not focused on the task. (reverse-coded) 4. I was interested in the task. 5. The task was thought-provoking. 6. I found the task boring. (reverse-coded)
Investment	1. I am experienced at completing word puzzles. 2. I work on word puzzles often. 3. I am interested in word puzzles.
Number of Anagram Tasks Previously Completed	The word puzzle you completed today is called an anagram task. How many anagram tasks have you completed before today?

Table 5

Correlations Among Variables in Study 2

Measure	1.	2.	3.	4.	5.	6.
1. Perseverance	--	.34***	.22**	.16*	.30***	.20*
2. Consistency	.34***	--	.08	.001	.08	.13
3. Performance	.22**	.08	--	.28***	.50***	.23**
4. Self-reported Engagement	.16*	.001	.28***	--	.44***	.13
5. Investment	.30***	.08	.50***	.44***	--	.20*
6. Previous Experience with Anagrams	.20*	.13	.23**	.13	.20*	--

$^{*}p < .05. \ ^{**}p < .01. \ ^{***}p < .001.$

Investment. Participants reported their investment in anagram tasks using three author-generated items on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), $M = 3.05$, $SD = 1.29$, $\alpha = .79$. An example item is, "I am interested in word puzzles."

Previous experience with anagrams. Participants responded to a single item, "How many anagram tasks have you completed before today?" on a scale with four options: 1 = *none – I have never done an anagram task before*, 2 = *less than 5*, 3 = *more than 4 but less than 20*, 4 = *more than 20*. Given our primary interest was in whether participants had *any* previous experience with anagrams, we then created a binary measure of whether or not participants had completed an anagram task before (0 = *no anagram tasks completed before*, 1 = *at least 1 anagram task completed before*), $M = .82$, $SD = .38$.

Demographics. In Study 2, we asked participants their gender, year in college, age, race/ethnicity, subjective socioeconomic status, mother's highest level of education, father's highest level of education, guardian's (if it was someone other than their mother or father)

highest level of education, family's average yearly household income, high school grade point average (GPA), college GPA, SAT scores, ACT scores, whether they were born in the U.S., and if English was their first language.

Results and Discussion of Additional Measures in Study 2

      Investment. Consistent with our predictions, there was a significant main effect of perseverance on investment, $t(159) = 4.07$, $b = 0.67$, $p < .001$, but not a significant main effect of condition nor a perseverance by condition interaction on investment, ps $> .336$. Further consistent with our predictions, the consistency by condition interaction on investment was significant, $F(3, 156) = 2.60$, $b = 0.81$, $\Delta R^2 = 0.04$, $p = .012$ (See Figure 3). Specifically, mirroring the results for performance and engagement, among participants in the goal-enabling condition, those with higher consistency reported significantly more investment in anagram tasks than those with lower consistency, $b = 0.66$, $p = .008$. However, among participants in the control condition, consistency was not associated with investment, $b = -0.16$, $p = .439$. Thus, participants higher in consistency reported more investment in anagrams than those lower in consistency, but only when their performance on an anagram task enabled goal achievement. In addition, among participants high in consistency, those in the goal-enabling condition reported significantly more investment than those in the control condition, $b = 0.60$, $p = .012$. Among participants low in consistency, there was no difference in investment between conditions, $b = -0.45$, $p = .119$. The main effects of consistency and condition on investment were nonsignificant, ps $> .288$.
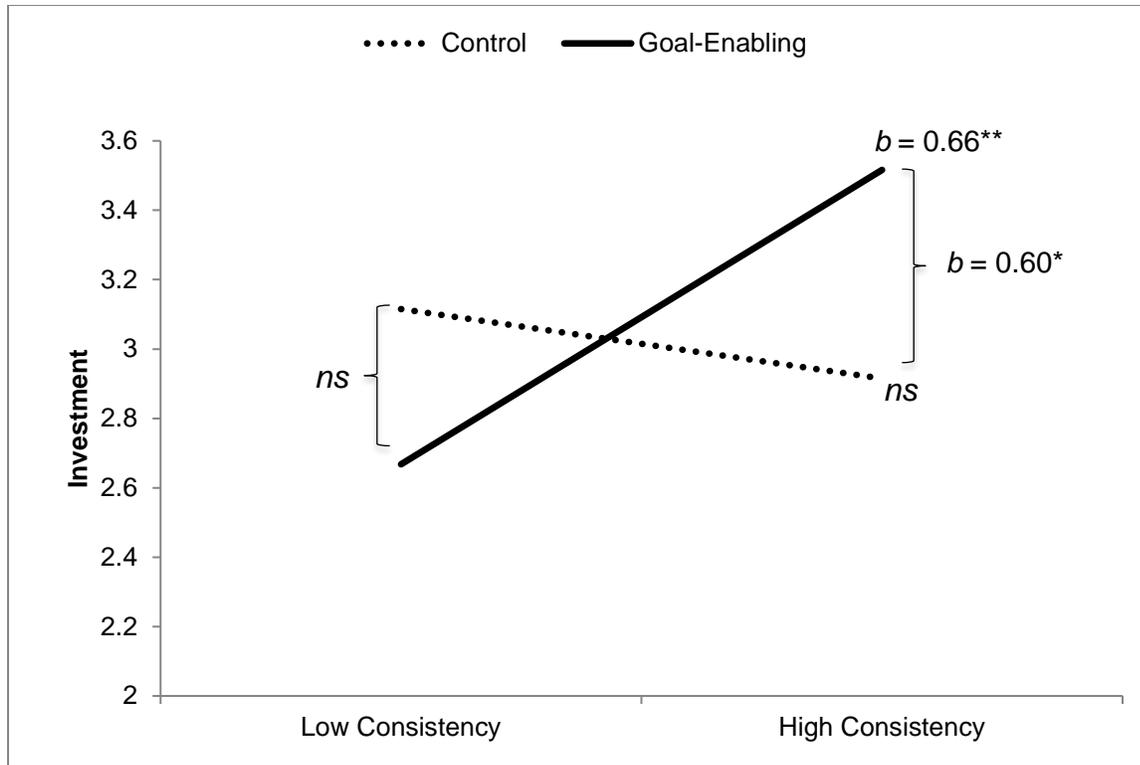
Figure 3. Investment in anagrams as a function of consistency and condition in Study 2. Higher values reflect greater investment in anagram tasks. "High" and "low" consistency represented as ± 1 *SD* from the mean.

Previous experience with anagrams. We reran our moderated regression analyses predicting our primary dependent variables (i.e., performance and self-reported engagement) while including the dichotomous variable of completing an anagram task before as a covariate on Step 1. Importantly, the inclusion of this covariate did not change the direction of our results, but two effects did become marginal. First, the main effect of perseverance on engagement became marginal, $t(159) = 1.77$, $b = 0.22$, $p = .079$, and the interaction of consistency by condition on performance became marginal, $F(4, 157) = 3.46$, $b = 1.60$, $\Delta R^2 = 0.02$, $p = .056$.

Analyses Excluding Manipulation Check Failures

As we mention in the manuscript, chi-square analyses indicated that, overall, the manipulation in Study 2 was successful, but at least 10% of participants in the goal-enabling condition failed the manipulation check. Therefore, we ran the moderated analyses reported in the manuscript while excluding people who failed the manipulation check and report the results here. Importantly, the main effect of perseverance on performance, t (134) = 2.81, b = 1.30, p = .006, and self-reported engagement, t (132) = 2.27, b = 0.27, p = .025, remained significant. In addition, the consistency by condition interactions on performance, F (3, 131) = 2.12, b = 2.28, ΔR^2 = .04, p = .017, and self-reported engagement, F (3, 132) = 1.58, b = 0.52, ΔR^2 = .03, p = .036, remained significant. All other main and interactive remained nonsignificant, ps > .229.

Analyses Controlling for Other Grit Facet

Again, readers may be curious about the results of Study 2 when controlling for the other grit facet (e.g., controlling for consistency in the perseverance analyses). For perseverance, when we control for consistency, the main effects on performance, t (161) = 2.70, b = 1.26, p = .008, and self-reported engagement, t (159) = 2.14, b = 0.28, p = .033, remain significant. For consistency, when we control for perseverance, the consistency by condition interactions on performance, F (4, 157) = 3.22, b = 1.66, ΔR^2 = .02, p = .047, and self-reported engagement, F (4, 155) = 2.85, b = 0.59, ΔR^2 = .04, p = .011, remain significant.

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Appendix

Instructions: Below are words that can be re-arranged to make other words. For instance, the letters in the word 'cone' can be rearranged to spell 'once.' For each word that appears below, try to re-arrange *all of the letters* to create a different word.

When you have an answer, please write it in the space provided next to each word. **If you attempt to solve a word puzzle and do not solve it, <u>please mark the box labeled 'attempted' to indicate that you tried to solve the puzzle</u>.**

<u>Word</u>	<u>Answer</u>	<u>Attempted</u>
chin	_____	☐
coin	_____	☐
earth	_____	☐
canoe	_____	☐
ample	_____	☐
caper	_____	☐
cause	_____	☐
selves	_____	☐
attic	_____	☐
alumna	_____	☐
ignore	_____	☐
disease	_____	☐
being	_____	☐
alloy	_____	☐
rescued	_____	☐
markers	_____	☐
chase	_____	☐
wigs	_____	☐
listen	_____	☐
charm	_____	☐

When you are finished, please bring your questionnaire out to the experimenter