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An Experimental Laboratory Examination of the Psychological and Physiological Effects of Civic Empowerment: A Novel Methodological Approach

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Abstract

Civic engagement can be empowering and might promote well-being, especially for individuals from marginalized backgrounds. This study uses a novel experimental approach to simulate civic engagement in a laboratory study and to test whether this approach engenders civic empowerment and buffers psychological and physiological reactivity to stress and social rejection. Young adults, primarily experiencing low socioeconomic status ($N = 128$), were randomly assigned to deliver a speech about a civic or a neutral issue. Giving a civic speech leads to higher feelings of empowerment compared with giving a neutral speech. Delivering the civic speech buffers sympathetic nervous system reactivity to stress (measured through the pre-ejection period) and leads to higher identification with social class background. This is one of the first studies to use an experimental approach and psychophysiological methods to examine the effects of civic empowerment on civic, psychosocial, and physiological reactivity outcomes.

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civic engagement, empowerment, experiment, emerging adults, socioeconomic status, social rejection

It is clear from examples of young adults voicing their opinions about important civic issues, from the civil rights movement to climate justice issues (Blakemore, 2018; Witt, 2019), that civic engagement can be simultaneously empowering and challenging and can have broad effects on development. Robust evidence links various behavioral forms of civic engagement—from volunteering, to voting, to activism—to changes in social attitudes and well-being among young adults. Some forms of civic engagement, such as community organizing and participatory action research—which empower young people and foster a critical understanding of society—have been found to promote subjective well-being and occupational aspirations, particularly for young people who are traditionally left out of civic society (Berg et al., 2009; Christens et al., 2011; Zimmerman et al., 1999).

However, major questions remain about the causal relationship between behavioral civic engagement and civic and psychosocial outcomes, the mechanisms through which various forms of civic engagement affect individual development, and for whom civic experiences might be especially formative. In particular, the problem of self-selection plagues this type of research for good reason: It is difficult to randomize people to civic experiences. Therefore, assessing causal links between civic engagement and outcomes is challenging. This study draws on experimental methodology to address these challenges by manipulating civic empowerment in the laboratory, examining the psychological and physiological effects, and exploring subsequent civic and psychosocial outcomes.

Effects of Civic Engagement on Civic and Psychosocial Outcomes

Civic engagement, defined by the American Psychological Association (2018) as the individual and collective actions designed to identify and address issues of public concern, is important for both communities and individuals (Ballard & Syme, 2015; Christens & Peterson, 2012). Civic engagement is a multidimensional construct that often includes behaviors, attitudes, and skills (Wray-Lake et al., 2017). In this article, we focus on the behavioral dimension of civic engagement. Evidence suggests that civic engagement is associated with many aspects of development, including social attitudes, identity, health, and well-being among adolescents and young adults. Adolescents and young adults who participate in activities like volunteering and activism are more likely to pay attention to political issues, think critically about society, and feel efficacy to participate in civic life in adulthood (e.g., Ballard, 2015; Christens & Peterson, 2012; Hart et al., 2007). In addition, civic engagement plays a role in identity development by helping young people define and enact their identity and values (Crocetti et al., 2012; Hardy et al., 2010). This study seeks to extend existing

correlational links between civic behavior, civic attitudes (e.g., beliefs about society, civic efficacy), and psychosocial experiences (e.g., mood, identity) by experimentally testing possible causal links between simulated civic behavior and outcomes.

The literature linking civic engagement to health and well-being is emergent, but provides initial evidence that civic engagement may affect physical and psychological health. For example, in an experimental study, one form of civic engagement, volunteering, boosted physical health indicators for adolescents in the short term (Schreier & Chen, 2013). Rigorous longitudinal investigations show that volunteering and voting during young adulthood are associated with better mental health and fewer health risk behaviors across time (e.g., Ballard et al., 2019). However, activism (e.g., participating in a protest) during young adulthood is associated with increased health risk-taking behaviors and is not associated with mental health over time (Ballard et al., 2019). One study examining the correlates of political experiences found that more weekly and daily standard political engagement was associated with feeling as if one is a burden on society (Oosterhoff et al., 2020). Another study found high negative affect and increased stress (measured through changes in cortisol) among some participants around the 2016 presidential election (Hoyt et al., 2018). Thus, although civic behaviors may sow the seeds for positive development across the lifespan, activism, which often increases critical attitudes about society (Watts et al., 2011) and involves making one's opinions on controversial issues public, may also have costs to well-being due to social rejection or discrimination. This study seeks to extend previous work by simulating a civic experience that involves making one's opinion public (i.e., delivering a speech on a civic topic) and taps into civic empowerment as one potential mechanism linking civic engagement to civic and psychosocial outcomes.

Civic Empowerment as a Mechanism Linking Civic Engagement With Civic and Psychosocial Outcomes

Civic engagement might affect young adult development via many mechanisms, including increasing social connections, providing instrumental social opportunities, causing stress, and increasing one's sense of purpose and meaning in life. One promising psychological mechanism underlying civic engagement is empowerment (Ballard & Ozer, 2016). Psychological empowerment—the psychological processes through which people gain greater control over their lives, take a proactive approach in their communities, and develop critical understandings of their sociopolitical environments (Zimmerman, 1995)—is proposed to promote health and well-being (Wallerstein, 1992). For example, psychological empowerment is linked with self-esteem and social connectedness (Ozer & Schotland, 2011) and mediates links between family cohesion, self-esteem, and mental health (Christens & Peterson, 2012). High-quality civic engagement should empower young people to see themselves as important contributing members of society and increase their self-efficacy (Watts et al., 2003); this is developmentally relevant for young adults as they take on expanded roles within society (Flanagan & Levine, 2010). *Civic* empowerment is defined as feeling that one's active participation and involvement can influence societal and civic decision-making,

based on the emotional component of psychological empowerment (Christens et al., 2016). Such empowerment may be a critically important psychological benefit of civic engagement that promotes positive outcomes.

Social Marginalization and Social Rejection

Civic empowerment may be especially relevant for the positive development of young adults from marginalized backgrounds (e.g., low SES, ethnic minority, immigrant origin) and those experiencing discrimination or structural oppression (e.g., Hope & Spencer, 2017; Watts et al., 2011). Critical consciousness theory suggests that participating in civic activities that raise critical awareness of social conditions and underlying inequalities can empower people within their communities (Ginwright & James, 2002; Hope & Spencer, 2017; Watts et al., 2003, 2011). In this context, civic empowerment might operate either as a psychological resource or as a coping mechanism. Therefore, it is particularly fruitful to investigate the potential role of civic empowerment for well-being in the context of social marginalization. This study addresses this by recruiting a community sample of individuals primarily experiencing low SES based on their current income relative to their household size.

In addition, we simulate a stressful experience by experimentally manipulating social rejection in the lab, which is found to increase a physiological response associated with acute stress (Slavich et al., 2010). Because civic empowerment may be especially impactful when the civic activity aligns with a personally relevant social issue (Ballard, 2014), we employ two randomly assigned tasks in this study. The first is rejection based (ostensibly) on one's socioeconomic background (a stressful experience of social rejection that is aligned with the civic empowerment task) and the second is rejection based on one's social network (a more general stressful experience of social rejection).

Civic Empowerment and Stress Regulation in the Context of Social Rejection

Civic empowerment might affect health among marginalized young adults by influencing stress regulatory systems. A large body of research has shown that the two branches of the autonomic nervous system (ANS)—the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS)—play important roles in linking social experiences and health. Psychologists regularly assess SNS and PNS reactivity during various tasks to understand the biological processes at play in social situations and to overcome the challenges of self-report (Mendes, 2009). In particular, the SNS is known to activate during threatening, intense, or stressful experiences, and, over time, prolonged SNS activation may lead to negative health outcomes (Miller et al., 2009). Pre-ejection period (PEP) is a physiological measure of the time from the left ventricle contracting to the aortic valve opening. Decreases in PEP represent SNS activation and have been linked to high arousal affective states that are intense and engaging, but not necessarily valenced (Mendes, 2016).

The PNS controls the body at rest, and specific markers of PNS functioning such as heart rate variability (HRV) or respiratory sinus arrhythmia (RSA) can help gauge efficient biological functioning and positive physical health in laboratory tasks. For instance, higher HRV may reflect cardiac flexibility or self-regulatory capacity (Bower et al., 2008; Kubzansky et al., 2015). Decreases in RSA during a task primarily reflect PNS withdrawal and have been linked to cognitive effort, attentional focus, conscious control, and negative affect (Mendes, 2016). Because SNS and PNS branches can be reciprocal, coactivated, or uncoupled, measuring indicators of both is recommended (Berntson et al., 1991; Obradović & Boyce, 2012).

How might civic activities influence responsivity of these physiological systems? Civic activities that empower young people may provide a psychological resource that could buffer ANS reactivity (i.e., lower SNS activity, greater PNS activity) in subsequent socially stressful situations. Alternatively, civic empowerment can also raise awareness of social injustice and lead to critical reflection (Watts et al., 2011), thus potentially sensitizing people to social stress. In this case, civic empowerment might lead to greater ANS reactivity (i.e., greater SNS activity, lower PNS activity) to social stress. To date, no research has examined the extent to which the SNS and PNS are engaged during and after civically empowering experiences.

Overview

This study applies a novel, laboratory-based experimental design, to answer four questions about civic engagement among young adults primarily experiencing low SES. First, we test whether a lab-simulated civic engagement task invokes feelings of civic empowerment, using a speech paradigm. Second, we examine whether there are distinct patterns of physiological activation associated with civic speech preparation and presentation. Third, we examine the acute psychological effects of civic engagement on subsequent civic and psychosocial outcomes (i.e., attitudes about society and civic institutions, social class identity, and affect). Finally, we examine these effects within the context of two different forms of social rejection.

Method

Participants

Participants were recruited through online advertisement in the San Francisco community targeting a low-income catchment area (e.g., hourly service workers, community college students, etc.). Participants completed an online questionnaire to determine their eligibility for the study (i.e., based on SES [see below] and the absence of psychological or cardiovascular conditions known to affect physiological functioning). Our power calculation, assuming a medium effect size (e.g., $\eta_p^2 = .08$; four groups, $\alpha = .05$) suggested that we would need a sample size of $N = 130$ to achieve 80% power. The final sample consisted of 128 young adults between the ages of 18 and 30 ($M_{age} = 23$, $SD = 3.30$), who were diverse with regard to gender (60% female) and race and ethnicity (Table 1).

Table 1. Sample Demographics.

Demographics	*N*	Percentage
Gender		
Male	51	39.8
Female	77	60.2
Race/ethnicity		
European American	30	23.4
Black	14	10.9
Hispanic/Latino(a)	23	18
East Asian	19	14.8
South East Asian	10	7.8
Native American	3	2.3
Biracial/mixed/multiracial	23	18
Other	6	4.8
Socioeconomic status		
Annual household income		
<10k	18	14.1
10k–20k	19	14.8
20k–30k	22	17.2
30k–40k	25	19.5
40k–50k	25	19.5
50k–60k	10	7.8
60k–70k	6	4.7
70k–80k	2	1.6
90k–100k	1	0.8
Highest education		
Less than high school	4	3.1
High school diploma	10	7.8
Some college	75	58.6
College degree	30	23.4
Graduate degree	9	7.0
Mothers' highest education		
Less than high school	30	23.4
High school diploma	30	23.4
Some college	41	32.0
College degree	18	14.1
Graduate degree	6	4.7
Missing	3	2.3

We focused recruitment for this study among participants currently experiencing low SES, as measured by having a current annual household income at 200% below the U.S. poverty line adjusted for the number of people currently in the household. Fifteen participants in the sample did not meet this standard but were retained due to concerns about power. To develop a full picture of the socioeconomic background of

participants, we describe our sample in terms of three traditional dimensions of SES: resource-based (participants' income), education-based (participants' education level), and status-based (subjective social status) indicators (Diemer et al., 2013). The mean household income for our sample ranged from US$20,000 to US$30,000, the majority of the participants had some college education, and 18.7% reported that their mother had a bachelor's degree or greater (see Table 1 for further details). In terms of subjective social status, the participants indicated where they would place themselves on a ladder, using the subjective social status ladder measure, relative to others in the United States (Adler et al., 2000). Their answers ranged from two to eight ($M = 6.16$, $SD = 1.66$) where 1 indicates the highest social status (with regard to money, education, and job respect) and 10 indicates the lowest social status.

The participants were compensated US$60 for participating. Appropriate consent and debriefing procedures were followed; the study was approved by the institutional review board (IRB) at the University of California, San Francisco.

Procedure

Eligible participants were scheduled for a laboratory session and instructed to avoid caffeine consumption and vigorous exercise for at least 2 hr before the session. Specific laboratory tasks are described below and Figure 1 provides an overview of the study procedure (more details are available from the first author upon request). Upon arrival, the participants were introduced to the study and participated in the informed consent process. The participants completed baseline affect questionnaires and then physiological sensors were applied to the surface of the skin (described below) before completing a 5-min resting physiological baseline period followed by the laboratory tasks.

Speech task. The participants were randomly assigned to one of two speech conditions, created for this study. In the *civic* condition, participants were asked to give a speech about homelessness and affordable housing in San Francisco that they were told would be video recorded for review by a local community organizing board. The participants were told that their opinion was very important, their voice mattered, and that their speech would have an impact on the decisions the board made about affordable housing. They were given five minutes to prepare a short, two to three minute speech, with the option of using personal stories and/or a fact sheet and testimonials about affordable housing in the Bay Area.

In the *control* condition, the participants were asked to give a speech about a certain brand of snack food, which they were told would be recorded for review by a snack company board. We emphasized the same features of giving the speeches (i.e., express what you think is important from your own perspective, your speech does not need to be perfect) as we did for the civic empowerment speech; however, we did not emphasize how important their opinions were, how much their voice mattered, or that their speech would have an impact. The participants were given five minutes to prepare their two to three minute, with the option of using personal stories and/or a fact sheet with statistical information about the snack food company.

Rejection manipulation. After giving their speech, the participants completed a brief questionnaire, either about their SES or about their social network size, to prepare for the rejection manipulation (available from the first author upon request). There were two rejection conditions to explore whether civic empowerment was effective in buffering against different types of rejection. The experimenter, who was preparing a "fun game" (West et al., 2017), paused after reviewing the results of the participant's questionnaire, said that "the fun game was for people from a higher socioeconomic class" (for those in the *SES rejection* condition) or "the fun game was for people with higher-quality social networks" (for those in the *social rejection* condition), and removed the game from the room. Thus, the rejection manipulation was identical across the conditions, except that the basis for rejection was (presumably) SES or social network quality.

Mental math task. Following the rejection manipulation, the participants completed a difficult mental math task (~4 min), a standard lab stressor commonly used to activate SNS responses. The participants were asked to count backward quickly in steps of 7 from 23,485 in front of the experimenter who was timing them. The participants who were able to successfully count backwards by 7 in the first minute were asked to count backwards from 13, to maintain a steady level of difficulty.

Post-study questionnaire. Finally, the participants completed a battery of self-report questionnaires (described below). They were then debriefed and compensated.

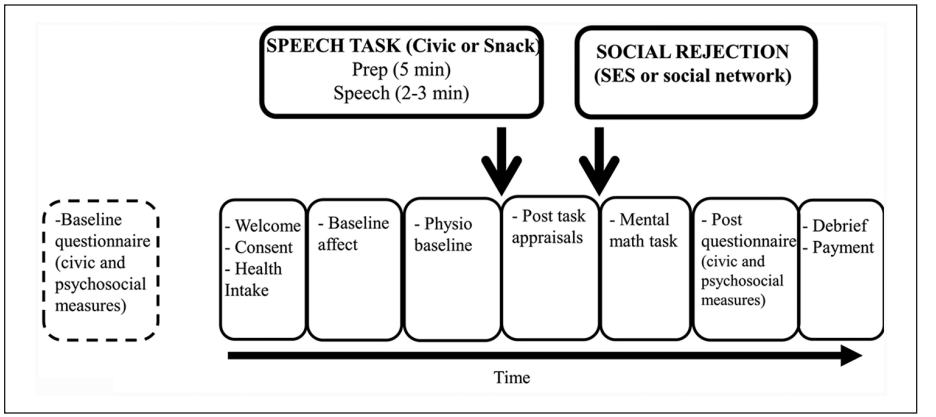

Figure 1. Overview of the procedure.
Note. The solid outline indicates the portion of the procedure done in the lab; the dashed outline indicates the portion of the procedure conducted outside the lab; the bolded outline indicates randomizations. SES = socioeconomic status.

Measures

Self-reports. Civic and psychosocial outcomes of interest in this study were sociopolitical skills, fair society beliefs, external political efficacy, social class identity, and affect. Demographic information and baseline civic and psychosocial constructs were

measured through online questionnaires before the study and affect was measured at the beginning of the lab visit. Outcomes were measured at the end of the lab visit. See Table 2 for citations, items, and measure reliabilities. The speech task manipulation check was assessed through seven post-task appraisal questions right after the participants completed the speech task (see Figure 2).

Physiology. ANS data were collected noninvasively following established guidelines (Sherwood et al., 1990). Impedance cardiography (ICG) was sampled at 1000 Hz using an HIC-2000 and a Mylar band system that completely encircled participants' neck and torso. Elecrocardiography (ECG) was performed using a modified Lead II sensor configuration and an ECG100C (Biopac) amplifier and all signals were integrated into Biopac's MP150 System (Goleta, CA). Data were visually inspected offline for noise and artifacts by trained research assistants and binned in 1-min intervals using MindWare's Analysis Software (IMP 2.6; HRV 2.6; Gahanna, OH). We focus on two physiologic ANS measures. PEP, a measure of SNS, is a chronotropic measure that represents the time from the left ventricle contracting to the aortic valve opening. RSA, a measure of PNS, is a measure of HRV using spectral analysis and focusing on variability within typical respiration ranges (.15–.40).

Table 2. Scale Information for Self-Reported Outcome Measures.

Outcome; no. of items, (reliability)	Citation	Response scale	Example items
Sociopolitical skills; 17 items (two subscales: Leadership Competence and Policy Control) (α_{pre} = .83, α_{post} = .84)	Zimmerman & Zahniser (1991)	1 (*strongly disagree*) to 5 (*strongly agree*)	"I am often a leader in groups." "I can usually organize people to get things done." "There are plenty of ways for people like me to have a say in what our government does."
Fair society beliefs; three items (α_{pre} = .79, α_{post} = .85)	Flanagan et al. (2007)	1 (*strongly disagree*) to 5 (*strongly agree*)	"Basically, people get fair treatment in America, no matter who they are." "In America, you have an equal chance no matter where you come from or what race you are."
External political efficacy; four items (α_{pre} = .85, α_{post} = .84)	Flanagan et al. (2009)	1 (*strongly disagree*) to 5 (*strongly agree*)	"The government doesn't care what people like me or my family think." *(reversed)* "The U.S. government is pretty much run for the rich, not the average person." *(reversed)*
Social class identity; eight items (two subscales: Private and Identity) (α_{pre} = .69, α_{post} = .69)	Adapted from Luhtanen and Crocker (1992)	1 (*none at all*) to 5 (*extremely*)	"In general, I'm glad to be a member of the social class I belong to." "The social class I belong to is an important reflection of who I am."
Positive affect; eight items (α_{pre} = .70, α_{post} = .77)	Harmon-Jones et al. (2016) (earlier version than published)	1 (*not at all*) to 5 (*a great deal*)	"desire," "relaxed"
Negative affect; 20 items (α_{pre} = .86, α_{post} = .87)	Harmon-Jones et al. (2016) (earlier version than published)	1 (*not at all*) to 5 (*a great deal*)	"scared," "panic," "lonely"

Analysis

First, we tested for preexisting differences between conditions to ensure success of random assignment. Group comparison tests revealed no differences in demographics (gender, age, race, language spoken, household income, parental education) or civic, social, and affective variables before the study. The only exception was in the case of pre-screen *Fair Society Beliefs* (Table 3). To account for this, we controlled for baseline *Fair Society Beliefs* scores in these analyses. Descriptive statistics are presented in Table 3. We tested for differences in outcomes across gender, age, and SES (operationalized as income-to-needs ratio). Income-to-needs ratio is a widely used metric to examine the variation in the experience of poverty or near poverty (Roosa et al., 2005), calculated by dividing the total household income by the poverty threshold (determined annually by the U.S. Census Bureau, based on household size and updated each year for inflation). Where differences or correlations were detected between outcomes and covariates, the covariate was included in the relevant model (noted below). Given that SES was a theoretically relevant covariate, we conducted a set of exploratory analyses examining interactions between SES (using income-to-needs ratio) and experimental conditions on the outcomes of interest. These analyses are described in the "Results" section.

For all analyses, missing data were handled through listwise deletion and varied depending on the specific analysis from $n = 1$–13 cases deleted. Three participants were missing data on pre-task affect and 13 participants were missing data on post-task measures due to needing to terminate the session prior to completion. The final sample included in the analyses of the pre/post-self-report measures was 115 participants.

For the physiological measures, we used published guidelines to omit physiologic responses that were implausible (Blascovich et al., 2011) or in some cases physiologic data were lost due to unscorable signals due to interference or lost signal (e.g., a lead falls out). Importantly, these data decisions were made prior to any analyses and follow standard conventions in psychophysiology. The omitted physiologic data include one entire subject dropped, and PEP and RSA data dropped for a range of two to eight participants on particular tasks. Thus, analyses on the physiological data included a range of 120 to 126 participants across measures/periods. To address outliers, extreme values for each physiologic end point of interest were winsorized (i.e., recoded to the calculated value ± 3 SDs from the mean) before analyses to preserve the relative ranking of the outliers but reduce their influence.

Our overall analysis approach included 2×2 analyses of variance (ANOVAs) with speech condition (civic vs. snack) and rejection condition (SES vs. social network) as between-subject factors. For self-reported outcomes, post-task scores were dependent variables. This design allowed us to test for the main effects of speech and rejection conditions and interactions between the two conditions. For physiological outcomes, we examine ANS reactivity (calculated as changes from baseline to task for RSA and PEP) during speech preparation and speech delivery. Finally, we examine ANS reactivity during the mental math task that followed the rejection manipulation.

Results

Speech Task Manipulation Check

First, we conducted independent-samples t tests comparing the civic speech and snack speech groups on seven post-task appraisal questions. The groups differed significantly on three of seven questions: The civic speech group reported that the task was more demanding, $t(126) = 2.06$, $p = .042$, the issue they made a speech about was more important, $t(126) = 10.71$, $p < .001$, and they felt more empowered, $t(126) = 3.117$, $p = .002$, compared with the snack speech group. The groups did not differ in their reports of task engagement, task performance, task enjoyment, or task efficacy (ps $> .10$). Thus, as expected, the two tasks were matched in valence and engagement, but the civic speech created greater feelings of task demand, importance, and empowerment (Figure 2).

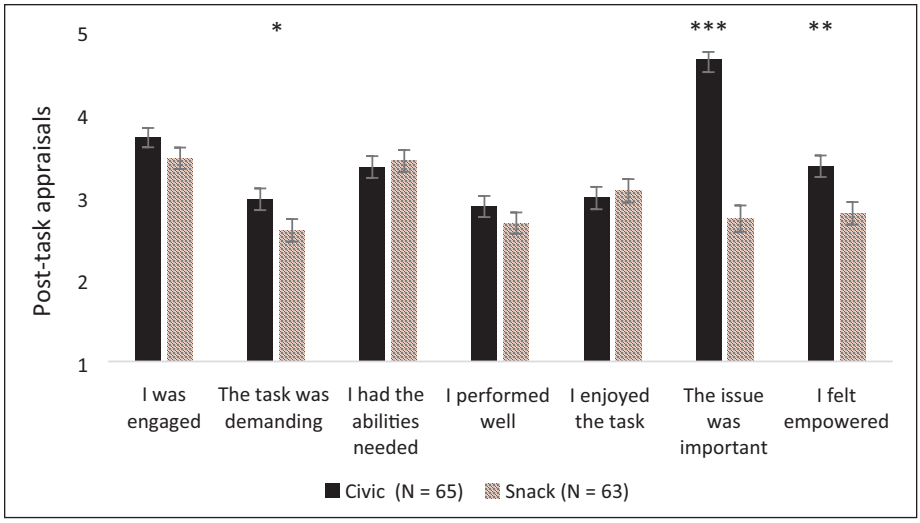

Figure 2. Post-speech task appraisals by group (civic vs. snack speech).
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Self-Reported Civic and Psychosocial Outcomes

Self-reported civic outcomes were analyzed with a 2 (speech condition: civic vs. snack) × 2 (rejection condition: SES vs. social network) between-subject ANOVA (Table 3). Covariates (age, gender, and income-to-needs ratio) were not associated with self-reported outcomes with the following exception: Age was negatively associated with fair society beliefs. The model with fair society beliefs thus controls for baseline fair society beliefs and age. Effect sizes are given in terms of partial eta squared (η_p^2) and all effect sizes can be interpreted as "small" effects when using

established guidelines (Lakens, 2013). The novel paradigm used in the present research questions makes it difficult to directly compare to similar effect sizes found in the literature (Lakens, 2013). When comparing to a study with a similar design that examines the effect of a values affirmation task on buffering stress, effect sizes for this study are larger than the documented effects of values affirmation on cardiovascular stress regulation measures and similar to the effects of values affirmation on neuroendocrine stress regulation (Creswell et al., 2005).

Sociopolitical skills. There were no main effects of speech ($p = .307$) or rejection ($p = .874$) on sociopolitical skills. The interaction between speech and rejection was also not significant ($p = .147$).

Fair society beliefs. There was no main effect of speech ($p = .548$) on fair society beliefs. A main effect of rejection condition emerged, $F(1, 108) = 7.07$, $p = .009$, $\eta_p^2 = .061$, with those in the social network rejection condition showing higher belief that society is generally fair compared with those in the SES rejection condition. No interaction between speech and rejection conditions emerged ($p = .339$).

External political efficacy. There were no main effects of speech ($p = .667$) or rejection condition ($p = .731$) on external political efficacy. However, a marginally significant interaction emerged between speech and rejection condition, $F(1, 111) = 3.91$, $p = .051$, $\eta_p^2 = .03$, which was driven by participants in the SES rejection condition showing marginally higher external political efficacy in the civic speech condition, $t(54) = 1.83$, $p = .074$, compared with those in the snack speech condition. In the social network rejection condition, the participants in the civic and snack speech groups did not differ on external political efficacy ($p = .305$).

Social class identity. There was a main effect of speech condition, $F(1, 111) = 6.934$, $p = .010$, $\eta_p^2 = .059$, on social class identity whereby those in the civic speech condition reported higher identification with their social class compared with those in the snack speech condition. There was a main effect of rejection condition, $F(1, 111) = 13.219$, $p < .001$, $\eta_p^2 = .106$, whereby those in the social network rejection condition reported higher social class identity compared with those in the SES rejection condition. No interaction between conditions emerged ($p = .843$).

Affect. We observed a marginally significant main effect for speech condition on positive affect, $F(1, 111) = 3.762$, $p = .055$, $\eta_p^2 = .033$, whereby participants in the civic speech condition reported marginally lower positive affect compared with those in the snack speech condition. There was no main effect of rejection ($p = .134$), and no interaction between conditions emerged ($p = .337$). For negative affect, there were no main effects for speech condition ($p = .703$), or rejection condition ($p = .252$), and no interaction ($p = .752$).

Table 3. Descriptive Statistics for Self-Reported Civic and Psychosocial Outcome Variables.

			Speech condition									Rejection condition					
			Full sample			Civic speech group			Snack speech group			SN rejection			SES rejection		
Variable	Items	Reliability	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Pre-measures																	
Sociopolitical skills	17	.83	128	3.383	0.526	65	3.433	0.462	63	3.331	0.584	63	3.402	0.548	65	3.364	0.507
Fair society beliefs	3	.79	128	2.078	0.842	65	1.918	0.780	63	2.243	0.878*	63	2.053	0.795	65	2.103	0.892
External political efficacy	4	.85	128	2.637	0.839	65	2.735	0.851	63	2.536	0.822	63	2.734	0.854	65	2.542	0.820
Social class identity	8	.69	128	3.576	0.846	65	3.673	0.847	62	3.474	0.840	62	3.706	0.807	65	3.452	0.870
Positive affect	8	.7	124	2.524	0.599	64	2.459	0.601	60	2.594	0.593	61	2.543	0.570	63	2.506	0.630
Negative affect	20	.86	124	1.242	0.307	64	1.225	0.271	60	1.259	0.342	61	1.189	0.247	63	1.292	0.350
Post-measures																	
Sociopolitical skills	17	.84	115	3.438	0.530	57	3.487	0.468	58	3.389	0.585	59	3.446	0.484	56	3.430	0.579
Fair society beliefs	3	.85	115	2.188	0.895	57	2.012	0.847	58	2.362	0.914	59	2.045	0.801	56	2.339	0.969*
External political efficacy	4	.84	115	2.791	0.819	57	2.820	0.817	58	2.763	0.828	59	2.818	0.872	56	2.763	0.766
Social class identity	8	.69	115	3.640	0.775	57	3.818	0.776	58	3.466	0.740*	59	3.877	0.675	56	3.391	0.801*
Positive affect	8	.77	115	2.665	0.624	57	2.553	0.562	58	2.776	0.665†	59	2.583	0.554	56	2.752	0.684
Negative affect	20	.87	115	1.141	0.231	57	1.133	0.203	58	1.149	0.258	59	1.117	0.184	56	1.167	0.272

Note. SN = social network; SES = socioeconomic status.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 4. Correlations Between Self-Report and Physiological Outcomes.

	Speech preparation PEP	Speech preparation RSA	Speech delivery PEP	Speech delivery RSA	Mental math PEP	Mental math RSA
Sociopolitical skills	.116	−.125	.057	.097	.048	.079
Fair society beliefs	.041	−.020	.049	.039	.013	.122
External political efficacy	−.112	−.009	−.095	−.101	−.189*	−.077
Social class identity	−.166	.029	−.156	.009	−.147	−.057
Positive affect	.053	.118	.081	.197*	.043	.145
Negative affect	.072	.007	.085	−.153	.030	.040

Note. PEP = pre-ejection period; RSA = respiratory sinus arrhythmia.
$^{\dagger}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

Physiological Outcomes

See Table 4 for correlations between self-report and physiological outcomes. For each ANS system, we describe reactivity during speech preparation and speech delivery, and then examine ANS reactivity during the mental math task that followed the rejection manipulation (Table 5). Age, gender, and income-to-needs ratio were not associated with physiological arousal with the following exceptions: Females showed greater RSA reactivity compared with males during speech delivery, $t(122) = 2.93$, $p = .004$. Thus, we controlled for gender in this RSA model.

PEP. Results indicated that the participants in the civic speech condition showed significantly less PEP decreases (less SNS activation) during both speech preparation, $F(1, 121) = 4.03$, $p = .047$, $\eta_p^2 = .032$, and speech delivery, $F(1, 118) = 7.29$, $p = .008$, $\eta_p^2 = .058$, compared with the snack speech condition. Thus, preparing for and delivering a speech about an important civic issue was associated with less SNS activation compared with giving a speech about snacks. Similarly, results from the mental math task showed that those in the civic speech condition showed marginally less PEP decreases, $F(1, 118) = 3.745$, $p = .055$, $\eta_p^2 = .031$, compared with the snack speech condition (Figure 3). There was no main effect of rejection condition and no interaction between speech and rejection. Thus, individuals who had given the civic speech showed less SNS activation during mental math than those in the snack speech condition regardless of the type of social rejection experienced.

RSA. Results indicated that participants in the civic speech and snack speech conditions did not differ significantly on RSA during either speech preparation ($p = .220$), or speech delivery ($p = .869$); this model also controlled for gender. Thus, it appears that the type of speech given did not influence PNS activation. There was no main effect of speech condition on RSA during the stressful mental math task ($p = .593$). There was a main effect for the type of rejection on PNS withdrawal. We observed

Table 5. Descriptive Statistics for Physiological Outcome Variables.

				Speech condition						Rejection condition					
	Full sample			Civic speech group			Snack speech group			Social network rejection			SES rejection		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Speech preparation															
PEP	123	−6.297	9.010	60	−4.698	7.743	59	−7.992	9.938*						
RSA	126	−0.400	0.998	62	−0.504	0.988	60	−0.286	1.000						
Speech delivery															
PEP	120	−18.283	17.010	61	−14.397	14.122	55	−22.579	18.927**						
RSA	124	−0.956	1.423	62	−0.973	1.393	58	−0.937	1.464						
Mental math															
PEP	122	−9.92	11.781	62	−7.903	11.395	60	−11.996	11.906†	61	−8.820	12.336	61	−11.012	11.193
RSA	125	−0.377	1.150	63	−0.436	1.248	62	−0.317	1.037	62	−0.132	1.142	63	−0.619	1.109*

Note. SES = socioeconomic status; PEP = pre-ejection period; RSA = respiratory sinus arrhythmia.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

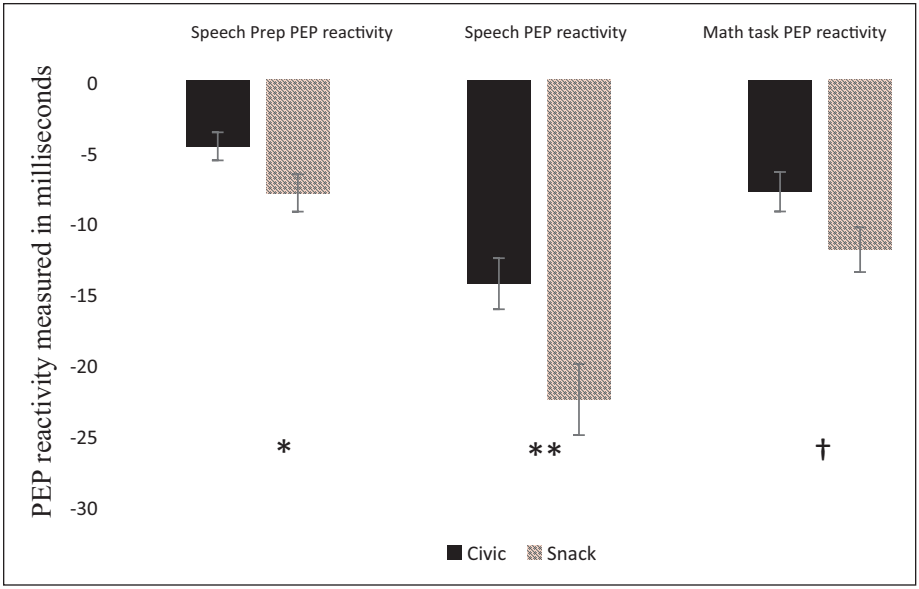

Figure 3. PEP reactivity by speech type (civic vs. snack) during speech preparation, speech task, and mental math.
Note. PEP = pre-ejection period.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

greater parasympathetic withdrawal in the SES rejection condition compared with the social network rejection condition, $F(1, 121) = 5.831, p = .017, \eta_p^2 = .046$. There was no interaction between speech and social rejection on RSA changes.

Exploratory Analyses

To test whether the speech or rejection type may have had different effects among people across socioeconomic background, we conducted exploratory analyses interacting the income-to-needs ratio variable with both the speech and the rejection condition variables. There was a significant interaction between SES and speech condition on fair society beliefs, $F(1, 104), p = .009, \eta_p^2 = .065$. To further probe this interaction, we examined mean differences in fair society beliefs across speech conditions at 1 SD above and below the mean of the income-to-needs ratio variable (with income-to-needs ratio centered at 200% of the federal poverty line). In the higher SES group (+1 SD above the mean), those in the civic speech condition reported lower fair society beliefs compared with those in the snack speech condition, $t(10) = -3.89, p = .007$. However, in the lower SES group (1 SD below the mean), there were no differences in fair society beliefs across the speech conditions. No other significant two- or three-way interactions emerged with the speech[1] or rejection condition on the civic and psychosocial outcomes or physiological reactivity.

Discussion

Using an experimental laboratory simulation study of civic empowerment and measuring physiologic responses, we add to an existing body of experimental studies of volunteering and helping behaviors (e.g., Schreier et al., 2013). Randomly assigning people to a civic engagement experience augments and extends methods used in existing research by allowing tests of casual relationships. Results revealed that individuals randomly assigned to deliver a civic speech on affordable housing felt more empowered and found the speech more demanding and more important than those who delivered a speech about a neutral topic. The groups did not differ in their other appraisals of the speeches, suggesting that the tasks were otherwise experienced similarly. Empirical evidence from research outside the laboratory suggests that participating in community and civic engagement programs can be empowering and increase efficacy (Ballard et al., 2016; Christens et al., 2011). An important contribution of this study is developing a protocol that simulates a realistic, civically empowering experience (i.e., making one's voice heard on an important civic issue). Making one's voice heard is an ecologically valid and developmentally appropriate civic activity among adolescents and young adults. The protocol developed in this study can be used and adapted for future studies of civic engagement in the laboratory.

Second, we tested whether the speech condition (i.e., delivering a speech about affordable housing vs. snack foods) affected self-reported civic and psychosocial outcomes. From the perspective of critical consciousness theory, some forms of civic participation promote critical reflection on one's community, which can be especially difficult if it leads individuals to recognize and grapple with complex issues related to fairness and justice and one's own position in society (Watts et al., 2011). Civic engagement might also shape identity processes, such as feelings of belonging or identification with a group. Indeed, participants who gave a civic speech on affordable housing reported higher identification with their social class compared with those who made a speech about snacks. The civic speech perhaps highlighted social class issues and thus primed or supported a short-term boost in feelings of social class membership. Overall, engaging in civic behaviors, such as speaking up about civic and political issues, might shape identification with certain in-groups.

This study also examined how civic empowerment may interact with social rejection to influence civic and psychosocial outcomes. The one interaction that emerged between civic speech and type of rejection (SES based or social network based) was related to external political efficacy, or the sense that civic institutions are responsive to "people like me." Follow-up simple-effects analysis to determine what was driving the interaction did not reach traditional significance levels. Future research is needed to determine if this pattern will replicate and if it extends across other types of marginalization and rejection (e.g., racial discrimination).

Finally, this is the first study to look inside the body to describe physiological processes involved in civic empowerment. In line with recommendations for investigating physiological reactivity to discrete tasks, we used measures of both branches (sympathetic, measured through PEP reactivity, and parasympathetic, measured through RSA reactivity) of the ANS (Obradović & Boyce, 2012). Our findings were

consistent regarding sympathetic reactivity; we found that participants who gave a civic speech showed lower levels of SNS activation both while preparing for and giving their speech, as well as during a subsequent stressful math task, compared with those in the snack speech condition. This pattern of physiological findings suggests a potential mechanism by which civic empowerment may be beneficial for healthy development. SNS activation is linked with high arousal affective states (Mendes, 2016) and prior research has shown that heightened SNS activation is linked with long-term alterations in hormonal and immune processes that are detrimental to mental and physical health outcomes (Grebe et al., 2010; Irwin & Cole, 2011; Levick et al., 2010). Although speculative, we interpret the fact that civic empowerment leads to lower sympathetic activation (both during the speech and during a subsequent stress task) as suggesting that the empowering nature of the civic speech may buffer the arousal of giving a speech and subsequent arousal associated with social rejection. This is important because such a "stress buffer" may accumulate over time to support better physical health. However, there are alternative explanations. For example, the civic speech might have been too mentally demanding (Richter et al., 2008), which may have decreased motivation or effort in the civic speech group compared with the snack speech group. More research is needed to replicate these findings and to bolster our interpretations and rule out alternative explanations; however, it is exciting to consider civic engagement as a potential intervention to mitigate the deleterious effects of social rejection.

Although there was a consistent set of findings regarding the effects of civic empowerment on SNS activation, we found no significant effects of the speech task on PNS activation. In light of previous research linking RSA decreases to cognitive effort, attentional focus, conscious control, and negative affect (Mendes, 2016), perhaps civic empowerment does not produce differential changes in the amount of focus, effort, or negative affect compared with other speech topics (Mendes, 2016). One PNS finding that did emerge was in the context of the type of social rejection, whereby the SES-based rejection group showed more PNS reactivity during the subsequent mental math task compared with the social network rejection condition. The SES-based rejection might have been perceived as more threatening, more believable, or perhaps less changeable, which might have led the participants to be especially engaged in the subsequent math task to try and "prove themselves," as indicated by more PNS engagement. However, more research is necessary to replicate this effect and examine how additional types of rejection (e.g., racial discrimination) may impact parasympathetic activation and to clarify the role (or lack thereof) of the PNS in civic empowerment. It will be important for future work to continue to measure multiple physiological systems to further understand the integration of biological systems in response to civic empowerment.

The use of both self-report and physiological measures in this study suggests that civic empowerment might provide some short-term benefits (e.g., buffered sympathetic activation). We found that giving the civic speech led to more feelings of empowerment and buffered SNS activity in the subsequent socially stressful situation. At the same time, it is very important to consider the "costs" to civic activities as suggested by critical consciousness theory and research on activism burnout (e.g., Gorski & Chen, 2015).

Facing civic issues is often difficult. For example, over time, taking part in activism through protests can lead to higher perceptions of discrimination (Ballard, 2015). Taking action, such as sharing opinions online or calling a political representative about an important issue, can feel both empowering and frustrating. Actions such as attending a protest can also have important implications for personal safety and development. Future work should further elucidate the time course of civic engagement and its effects over a longer period of time. In particular, although this study conceptualized civic empowerment as building a potential psychological resource that might buffer against future social stress (see Creswell et al., 2005, for a similar study design), civic engagement might provide a productive coping mechanism for social stress and marginalization (Ballard & Ozer, 2016; Hope & Spencer, 2017) or might consistute an upsetting and stressful activity, depending on the identities of the civic actors and the form and context of civic engagment. Future studies can attend to the contexts of civic engagement and test the coping hypothesis by having study participants engage in an empowering task *after* a social stressor.

Framed by critical consciousness theory, this study aimed to examine potential impacts of civic empowerment among a community sample currently experiencing low SES. Future research should explicitly address the possibility that civic empowerment operates differently among young adults experiencing low, compared with high, SES by sampling participants across a broad range of SES. In addition, more research is needed to examine whether findings extend to individuals who are marginalized based on other demographic characteristics and cultural backgrounds, such as being from an ethnic or racial minority group or immigrant background, as research documents a gap in civic opportunities, and civic and political power, based on these characteristics (Kahne & Middaugh, 2008; Levinson, 2010) and it is difficult to divorce civic engagement from the broader social historical context. One recent study suggests differential effects of political activism on mental health for Latinx and Black young adults. Political activism buffered the negative effects of social rejection, measured through racial and ethnic discrimination, on stress and depressive symptoms for Latinx college students. However, political activism exacerbated the negative effects of such discrimination on stress and anxiety for Black college students (Hope et al., 2018). Future work can explore how civic engagement can best be scaffolded and supported to provide empowerment and meaning while guarding against potentially stressful aspects.

Some study limitations should be noted. First, although our civic speech paradigm produced feelings of empowerment, it is also possible that another aspect of civic empowerment drives the present findings. For example, the civic speech blends the experience of having a voice with the action of articulating views on an important issue. Future studies can separate these two important aspects of civic empowerment, as well as test other mechanisms. In addition, giving the speech might have been stressful in and of itself. Although this is an ecologically valid reaction, given that civic engagement outside the laboratory can be stressful, future studies can design alternative approaches for simulating civic empowerment in the laboratory that involve higher social stress (e.g., calling a local congressperson) versus lower social stress (e.g., emailing a congressperson).

Second, it is not possible to invariantly map physiological processes onto psychological states (Mendes, 2016; Porges, 2007). Although we interpret the PEP findings in terms of buffering arousal, there are alternative possible explanations for the reduced PEP in the civic speech condition; future research should replicate these findings and test alternative hypotheses. Third, the overall findings regarding self-report measures were sparse. Perhaps, the social attitudes measured are unlikely to be affected by one-time experiences. Future research should examine which social attitudes and beliefs might be affected by civic empowerment (e.g., opinions about specific civic issues, intentions for civic engagement) and how beliefs and attitudes change over the longer term in response to accumulated civic empowerment experiences. Fourth, although we intended to sample young adults experiencing low SES, 15 participants were above this income range. Some participants who met the SES criteria by current income (200% of the federal poverty line, adjusted for household size) were current students, who may not truly represent a low-SES demographic profile. Finally, the study might have been underpowered. Our initial power calculation suggested that a sample size of $N = 130$ would be needed. We were able to recruit 128 participants and the analytic sample sizes were lower. In addition, effect sizes were weaker than we had anticipated, based on limited similar previous studies on which to estimate expected effect sizes. Future studies should replicate the findings using larger samples. Post hoc exploratory analyses by SES were particularly underpowered; future studies with larger samples and a wider range of SES can test whether the effects of civic empowerment differ across participant SES.

Conclusion

This study used a novel approach to simulate an empowering civic engagement experience in a laboratory-based experiment and tested the causal effects of civic empowerment on civic and social attitudes, mood, and physiology among young adults experiencing low SES. This study used psychophysiological methods to examine the biological consequences of civic empowerment, a mechanism proposed to be at work in political and activist forms of civic engagement (Ballard & Ozer, 2016). This study provides preliminary evidence that giving a civic speech causes increased feelings of empowerment and buffers SNS arousal in the short term, while simultaneously leading to higher social class identification. Although findings should be interpreted cautiously in light of limitations, this study provides a proof of concept for simulating civic engagement in a laboratory setting and using novel methodologies to explore the psychological and biological costs and benefits of civic engagement.

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Data Availability

The data and syntax for analyses from this study are made available online through the Open Science Framework. Additional materials and questions can be obtained by emailing the first author.

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Note

1. We also examined SES as a moderator using the categories of household income (<US$20,000; US$20,000–US$50,000; >US$50,000) and observed one small and unreliable interaction ($p = .055$) that differed from the pattern when using income-to-needs ratio as the SES indicator. An interaction emerged between the speech condition and income on social class identity, $F(2, 103) = 2.982$, $p = .055$, $\eta_p^2 = .055$, whereby those in the middle income category (i.e., an annual income of US$20,000–US$50,000) reported higher social class identification in the civic speech group compared with the snack speech group.

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