

Swearing Enhances Explosive Performance and Psychological Responses during Resistance Exercise

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Abstract

Introduction: Anecdotally, the use of swearing during training is practiced by athletes and recreational exercisers alike, but it is currently unknown if swearing imparts performance benefits during explosive resistance exercise. The purpose of this study was to determine if swearing improves performance and psychological responses to explosive resistance exercise.

Methods: In a counterbalanced crossover manner, resistance-trained males (n=11) completed two bench press exercise trials each with a different language condition: 1) Neutral word (NEU), 2) Swear word (SWR). Participants vocalized the corresponding language condition as loud as possible immediately before each exercise attempt. For the bench press exercise, participants completed 1 set × 2 repetitions at 75% of 1-Repetition Maximum (1-RM) as explosively as possible followed by 3 sets × Repetitions to failure (RTF) at 75% 1-RM separated by 2-minutes of rest. Motivation and psychological arousal were subjectively measured post-exercise.

Results: Findings show that RTF ($p=0.105$; $d=0.48$) did not differ between conditions, but barbell velocity was significantly higher with SWR versus NEU ($p=0.004$; $d=1.11$). Motivation ($p=0.007$; $d=1.05$) and psychological arousal ($p=0.002$; $d=1.32$) were higher with SWR versus NEU.

Conclusions: Current findings suggest that vocalizing a SWR prior to attempting maximal effort may improve motivational responses and explosive exercise performance but does not influence strength-endurance.

Key Words: Profanity, Bench Press, Motivation

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Introduction

The act of swearing, or use of taboo language, has been suggested to influence physical performance by altering physiological and psychological responses to exercise¹. While underpinning mechanisms are still being elucidated, swearing has been suggested to modulate various psychological factors including mood, psychological arousal, and psychological flow state²⁻⁵. In the context of performance, Jiannine et al.⁶ showed that repeating swear words during body weight and isometric exercise improved performance. Further supporting this, Stephens et al.⁷ reported increased power output during Wingate anaerobic sprint testing with swearing. While intriguing, the effects of swearing on explosive resistance exercise are relatively unknown. Since resistance exercise modes of training are highly utilized by athletes and recreational exercisers, identifying the impact of swearing on resistance exercise performance has important implications for optimizing training outcomes. Therefore, the purpose

of this study was to determine if swearing improves performance and psychological responses to explosive resistance exercise. We hypothesized that verbalizing a swear word prior to explosive bench press exercise would increase explosive ability and muscular strength-endurance. Furthermore, we hypothesized that swearing would improve psychological responses to exercise compared to verbalizing a neutral word.

Methods

Participants

To determine adequate sample size, an a priori power analysis was completed in G*power (v 3.1) ⁸. The effects of explicit language in the context of strength-endurance and during dynamic resistance exercise are relatively unknown. Thus, we utilized a previous investigation from our lab that included 1) explicit language/swearing, 2) dynamic muscular strength-endurance, and 3) bench press exercise. Findings showed that SWR language in music resulted in increased repetition volume during free-weight bench press with an estimated effect size of $d = 0.93$ ⁹. Thus, the following parameters were used: test= two-sided t-test, $d = 0.93$, $\alpha = 0.05$, $\beta = 0.8$. Analysis revealed a sample size of $n = 12$. Accordingly, 12 resistance trained males (age= 23 years \pm 6, height= 174 cm \pm 12, body mass=78 kg \pm 10, 1-RM= 104 kg \pm 20, training experience= 6 years \pm 6) were recruited to participate. One participant failed to complete all visits due to a non-study related injury, and a total of 11 participants were included for the final analysis. Being resistance trained was defined as accruing at least two days of resistance exercise a week, and participants were only included if they performed bench press at least one day a week. Safety of exercise was determined using a physical activity readiness questionnaire (PAR-Q) ¹⁰. Other exclusion criteria included sustaining an upper body injury in the past 6 months, history of cardiovascular or metabolic disease, or inexperience with bench press. Participants were required to refrain from stimulants, nicotine, and alcohol at least 12 hours prior to participation ¹⁰. Furthermore, participants were asked to replicate nutrition and sleep habits to the best of their ability prior to each visit. All visits occurred roughly at the same time of day (± 1 hour) to avoid circadian effects on performance. Prior to any data collection, verbal and written informed consent were obtained from each participant, and the protocol was approved by the UAB institutional review board (UAB IRB-300015140).

Language Conditions

Swearing and neutral language were selected as previously described by Washmuth et al. ¹¹. For the SWR condition, participants were asked to self-select a single swear word based on the following prompt: what explicit word would you use if you stubbed your toe or hit your thumb with a hammer? Intensity or emotional valence of selected words were not standardized or recorded. For the NEU condition, participants were given a list of 5 neutral words to self-select a single word including: chair, white, table, cold, hard. Participants were instructed to verbalize the corresponding word as loud as possible immediately prior to giving effort for each bench press exercise bout.

Protocol

During the first visit, participants completed a light warm-up of bench press exercise before performing a one-repetition maximum (1-RM) test ⁹. For subsequent visits, a battery of bench press exercises was completed for each condition as previously described by Ballmann et al. ¹². To determine explosive ability, participants completed 1 set \times 2 repetitions of bench press at 75% of 1-RM as explosively as possible. A linear position transducer (Gymaware, Kinetic Performance, ACT, Australia) was attached to the barbell to determine mean velocity. To determine muscular strength-endurance, participants completed 3 sets \times repetitions to failure (RTF) at 75% 1-RM separated by 2-minutes of rest. No verbal encouragement was provided to participants during exercise. Following the cessation of exercise, feelings of motivation and psychological arousal were measured using a visual analog scale as previously described by Rogers et al. ¹³.

Statistical Analysis

All data were analyzed using open-access Jamovi software (v 2.3.28.0) and are shown as mean \pm standard deviation (SD) ^{14,15}. Data normality was confirmed using the Shapiro-Wilk method. For repetitions to failure, a 2×3 [condition \times set] repeated measures ANOVA was used for analysis with a Tukey post-hoc to correct for multiple comparisons. Sphericity was tested using Mauchly's test and no assumptions were violated. For all other variables, a paired-samples t-test was utilized to detect differences between conditions. Estimates of effect size were determined using Cohen's D analysis and interpreted as <0.5 - small, 0.5 - 0.8 moderate, and >0.8 large ^{16,17}. Statistical significance was set at $p \leq 0.05$.

Results

Performance Outcomes

Repetitions to failure and mean barbell velocity are shown in Figure 1. For repetitions to failure (repetitions; Figure 1a), there was a main effect for set ($p < 0.001$; $\eta^2 = 0.707$) but not for condition ($p = 0.105$; $\eta^2 = 0.003$). Furthermore, no interaction for set \times condition ($p = 0.956$; $\eta^2 < 0.001$). Post-hoc analysis of the set showed that participants completed significantly more repetitions during set 1 versus set 2 (Set 1 = 10.9 reps \pm 2.3, Set 2 = 6.5 reps \pm 1.95; $p < 0.001$; $d = 1.52$) and set 3 (Set 3 = 4.1 reps \pm 1.3; $p < 0.001$; $d = 2.58$). Also, participants completed more repetitions during set 2 versus set 3 ($p < 0.001$; $d = 1.74$). For mean barbell velocity (m/s; Figure 1b), SWR resulted in higher velocity values versus the NEU condition (NEU = 0.49 m/s \pm 0.09, SWR = 0.54 m/s \pm 0.09; $p = 0.004$; $d = 1.11$).

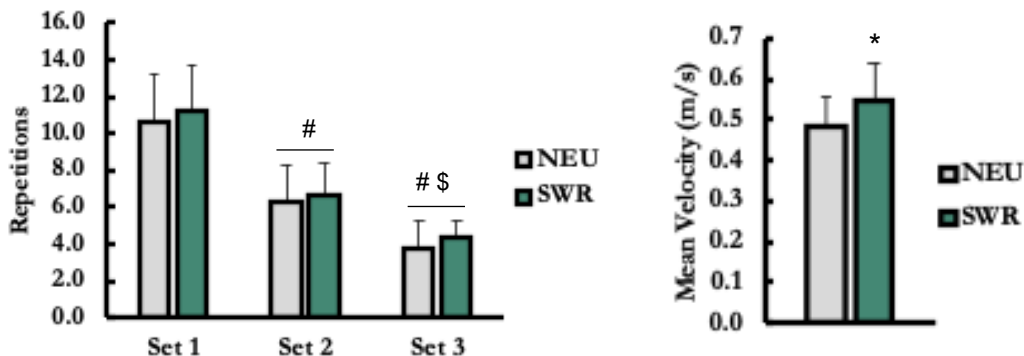


Figure 1. Comparisons of (a) repetitions to failure by set and total completed (repetitions)(b) mean barbell velocity (m/s) between neutral language (NEU; grey bars) and swearing language (SWR; green bars) conditions. Data are presented as mean \pm SD. # indicates significantly different from Set 1 ($p \leq 0.05$). \$ indicates significantly different from Set 2 ($p \leq 0.05$). * indicates significantly different from NEU ($p \leq 0.05$).

Metrics of motivation and psychological arousal are shown in Figure 2. For motivation (arbitrary units; Figure 2a), SWR resulted in significantly higher motivation levels compared to NEU (NEU = 45.5 a.u. \pm 19.0, SWR = 65.0 a.u. \pm 22.5; $p = 0.007$; $d = 1.05$). For psychological arousal (arbitrary units; Figure 2b), SWR resulted in higher arousal levels versus the NEU condition (NEU = 42.3 a.u. \pm 18.0, SWR = 64.5 a.u. \pm 20.0; $p = 0.002$; $d = 1.32$).

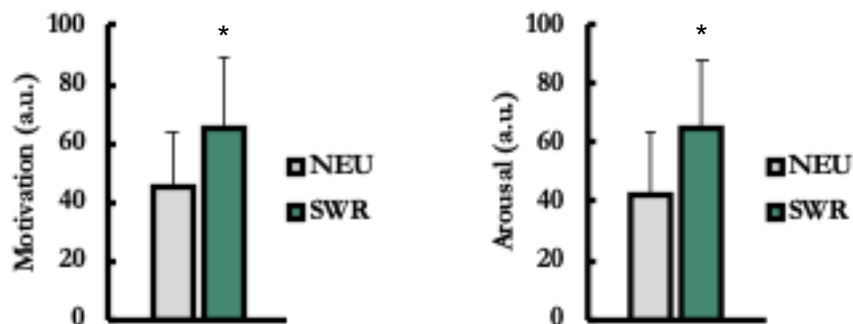


Figure 2. Comparisons of (a) motivation (arbitrary units, a.u.) and (b) psychological arousal (arbitrary units, a.u.) between neutral language (NEU; grey bars) and swearing language (SWR; green bars) conditions. Data are presented as mean \pm SD. * indicates significantly different from NEU ($p \leq 0.05$).

Discussion

The act of swearing has been previously suggested to enhance physical performance during isometric, body weight, and sprint-based exercise^{1,6,7}. However, the effects of swearing on dynamic and explosive resistance exercise remain unclear. Current findings show that while swearing did not result in changes to muscular strength-endurance, as evidenced by similar repetition volume between conditions, swearing resulted in improved mean barbell velocity during

bench press exercise, suggesting improved explosive ability. Furthermore, swearing resulted in more favorable psychological responses with increased feelings of motivation and psychological arousal. These findings show improved explosive ability with concomitant psychological benefits during resistance exercise, which has tremendous practical application in using swearing as a training aid.

Current findings of increases in explosive bench press performance with swearing, as evidenced by higher barbell velocity, are supportive of previous findings⁷. For example, Stephens et al.⁷ revealed that repeating a swear word resulted in enhanced grip strength and power development during sprinting. Although mechanisms for these effects are largely speculative at this time, swearing has been suggested to result in greater sympathetic responses, which may result in a heightened “fight or flight” response, thereby increasing physical effort. Indeed, markers of sympathetic activation have been described previously when individuals use taboo/explicit versus neutral language¹⁸. This is further supported by the fact that psychological arousal and motivation levels were enhanced with swearing currently, which suggests a “psyching up” effect¹³.

Interestingly, swearing did not result in changes to muscular strength-endurance, which was counter to the current hypothesis. This contrasts with previous investigations, which have shown improvements in muscular endurance. Multiple investigations have reported that swearing improves muscular endurance during isometric and body weight exercise^{6,19}. While reasons for disparities are not fully clear, differences in findings may be due to methodological differences in the swearing stimulus. Indeed, previous investigations had participants repeat the swear word (i.e. repeat every 3 seconds) throughout the exercise whereas currently, participants said the swear word once prior to effort. It is plausible that the beneficial effects of swearing may be highly transient and a single swearing stimulus may not result in sustained elevations in performance that is required for repeated fatiguing exercise. However, this is largely speculative and further study investigating timing and dosage of swearing will be necessary to identify optimal strategies for the application of swearing to elicit peak performance.

Importantly, swearing resulted in potent changes to psychological responses to resistance exercise in the form of increased motivation and psychological arousal. This aligns with previous work showing that swearing may be used to enhance motivation and mental strength in athletes⁵. Furthermore, use of swearing and taboo language have been previously linked to enhanced emotional arousal^{1,20}. It is plausible that swearing-induced motivation and arousal led to increased effort, thereby enhancing explosive ability. Overall, these findings highlight swearing as a psychological tool that may be used to optimize performance during explosive resistance exercise.

While the current study presents novel findings that vocalizing a swear word enhances barbell velocity during the bench press and psychological factors related to performance, several limitations should be acknowledged. This study was not pre-registered and should therefore be considered exploratory, although the conceptual replication in the present study of previous findings in combination with the large effect sizes in the present study provides some assurance that the findings of this study are meaningful^{4,6,7}. Although this study utilized a counterbalanced crossover design, consistent with prior research, the small homogeneous sample of university students limits the generalizability of these findings to broader populations^{4,6,7}. Furthermore, this study was conducted in a controlled laboratory setting, thus limiting the generalizability of these findings to real-world settings (e.g., fitness center, athletic field). There was also a lack of masking to experimental conditions. Therefore, we cannot rule out the possibility of an undue influence of placebo effects or changes in behavior due to potential expectations. Lastly, while the instructions to verbalize their word as loud as possible were consistent across participants and conditions, this study did not monitor decibel level between NEU and SWR conditions. It may be possible that the psychophysiological arousal from the SWR led to louder vocalization in the SWR condition, confounding the findings.

Conclusions

In conclusion, swearing prior to explosive resistance exercise results in enhanced barbell velocity but does not result in alterations to muscular strength-endurance. Furthermore, swearing results in enhanced psychological mediators of performance, namely motivation and psychological arousal. These findings may support the use of swearing as an effective, inexpensive, and widely available ergogenic aid that may be useful at enhancing explosive performance.

Conflict of Interest. The authors declare no conflicts of interest.

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