The Effect of Verbal Encouragement with Swearing on High Intensity Exercise Performance

Original Research

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Abstract

Introduction: Verbal encouragement has not been shown to reliably enhance performance on the Wingate Anaerobic Test (WAnT); however, research has found that when individuals swear during the WAnT, average power increases. This study examined whether incorporating swearing into verbal encouragement during a WAnT enhances performance, self-confidence, and psychological flow compared to standard verbal encouragement without swearing.

Methods: Forty-one physically active participants (25 females, 16 males; age 20.8 ± 0.78 years) completed two counterbalanced laboratory visits involving verbal encouragement with swearing (VES) and without swearing (VE) by one female researcher while performing the WanT on a Wattbike Air ergometer. Average power, fatigue index, self-confidence, and psychological flow were measured.

Results: No main effect of condition was found for average power (p = 0.071), self-confidence (p = 0.376) or flow (p = 0.414). However, a significant condition by sex interaction emerged for average power (p = 0.01, η^2_p = 0.16). Males exhibited lower average power under the VES condition compared to VE, whereas females showed no difference. Males also reported higher self-confidence than females overall (p = 0.049).

Conclusions: Verbal encouragement that included swearing did not enhance WAnT performance, self-confidence, or flow. Instead, male participants' performance declined when a female researcher provided VES. Guided by the Social Identity Theory, these results suggest that the motivational impact of verbal encouragement may depend on the social identity alignment between the encourager and the receiver. When swearing violates gender norms or expectations, it may heighten self-consciousness and inhibit performance rather than enhance it.

Key Words: Wingate Anaerobic Test, self-confidence, psychological flow

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Introduction

Maximal exercise testing is widely used in both clinical and non-clinical settings to assess physical and physiological capabilities, inform individualized exercise prescriptions, and evaluate the effectiveness of training programs. A central requirement of these tests is that individuals exert maximal effort, as insufficient effort can produce misleading or invalid results.[1] To support maximal effort, verbal encouragement is commonly used and is recommended in numerous

exercise testing protocols.[2] Consistent with these recommendations, studies have shown that verbal encouragement can meaningfully increase performance in tests involving sustained exertion, such as VO_{2max} testing[3] and multistage shuttle run tests[4], as well as in functional assessments like the 6-minute walk test.[5] However, verbal encouragement has not demonstrated comparable effects in shorter, high-intensity tests that require immediate maximal output. For example, during the Wingate Anaerobic Test (WAnT), a 30 second "all out" cycling test, verbal encouragement has not reliably enhanced performance.[2] One explanation is that tests requiring instantaneous, explosive effort, there is limited opportunity for verbal encouragement to influence motivation or arousal during the task. Thus, for the WAnT, performance enhancement may depend on motivational strategies that exert an immediate psychological effect.

Swearing, defined as using potentially offensive taboo words[6], may represent such a strategy.[7-10] Recent research demonstrates that swearing vocalized by individuals engaged in a physical task can increase performance, in part by increasing state disinhibition, elevating self-confidence, and fostering attentional engagement or "flow".[11] Notably, when participants repeated a swear word during the WAnT, average power output increased by 4.5%.[9] These findings support that swearing has the capacity to produce rapid psychological effects that translate into immediate increases in physical effort.

Given this evidence, it is plausible that verbal encouragement containing swear words may enhance the motivational impact of standard verbal encouragement during short-duration maximal effort. Therefore, the purpose of this study was to examine the effects of verbal encouragement that includes swearing on WAnT performance, self-confidence, and psychological flow (i.e., engagement). It was hypothesized that verbal encouragement containing swearing would lead to greater 1) WAnT performance, 2) self-confidence, and 3) psychological flow, compared to verbal encouragement without swearing. Additionally, sex-specific effects will be explored. Given the exploratory nature of this study and the lack of prior research, all findings should be viewed as preliminary evidence on the influence of verbal encouragement containing swearing on physical performance.

Methods

Participants

To inform an adequate sample size, an a priori power analysis was conducted using G-power 3.1.9.6 open access software.[12] A previous investigation by Stephens et al.[9] showed participant swearing out loud during the WAnT increased average power with a $d = 0.610$. Thus, the following parameters were used: *t*-test (matched pairs); $d = 0.610$; alpha = 0.05; power = 0.80; two-tailed test (non-directional). This yielded an appropriate sample size of $n = 42$. Accordingly, a total of 42 physically active student participants were recruited using a convenience sampling method from the Nova Southeastern University community and received course credit for their participation. One participant was removed due to incomplete data acquisition which resulted in a total sample size of n=41 (25 females, 16 males; age 20.8 ± 0.78 years). Physically active was defined as accruing at least 150 minutes/week of moderate-intensity exercise.[13] Participants also completed the physical activity readiness questionnaire[14] (PAR-Q) to ensure that exercise was safe and appropriate prior to participation. Participants were excluded if they had diabetes, cancer, heart disease, or any other injury or illness limiting exercise capacity. Participants were instructed to refrain from performing strenuous activity 24 hours prior to testing and to avoid consuming caffeine or pre-workout supplements for 12 hours before testing. Written informed consent was obtained from all participants prior to their engagement in the study, and all procedures and experimentation were approved by Nova Southeastern University's Institutional Review Board, approval number 2024-351.

Materials

Wingate Anaerobic Test

The Wattbike Air (Wattbike Ltd, Nottingham, UK) is a stationary exercise ergometer designed to measure cycling performance across a range of workouts. The bike features an air-brake resistance system, supplemented by a magnetic braking mechanism that allows for precise load adjustments and consistent resistance across trials. The integrated performance software continuously measures and records output variables including average power and fatigue index. The Wattbike has been shown to be a reliable method for assessing cycling performance.[15-17]

Verbal Encouragement

To enhance the internal validity of this study, one female researcher, provided verbal encouragement throughout all of the 30-second WAnTs. Stephens et al.[9] found that when participants swore out loud every three seconds during the WAnT, a total of 10 times, their performance improved. Therefore, the verbal encouragement with swearing (VES) condition included 10 instances of swearing, at roughly 3-second intervals (Table 1). The swear words "fuck" and

"shit" were chosen to be included in the VES condition, as these words are considered examples of strong swearing.[6] The verbal encouragement without swearing (VE) condition provided the same verbal encouragement, with all swear words removed.

Table 1. Verbal encouragement that was provided to participants for the a) verbal encouragement with swearing and the b) verbal encouragement without swearing conditions.

a) Verbal encouragement with swearing	b) Verbal encouragement without swearing conditions.
Alright, let's go! Push that s**t hard from the start!	Alright, let's go! Push it hard from the start!
You're strong as f**k, keep driving those legs!	You're strong, keep driving those legs!
That's it, don't slow down, give it all your s**t!	That's it, don't slow down, give it all you have!
Halfway there, f***ing crush it!	Halfway there, you're crush it!
Keep grinding, you've got more in the tank, don't take any s**t from the pain!	Keep grinding, you've got more in the tank, don't worry about the pain!
That's f***ing awesome, don't stop now!	That's awesome, don't stop now!
Legs are burning? Good! Ride that s**t out!	Legs are burning? Good! Ride it out!
Come on, f**k fatigue, this is your sprint!	Come on, don't fatigue, this is your sprint!
Almost done, one last f***ing push!	Almost done, one last push!
Finish strong, empty the tank, leave that shit on the bike!	Finish strong, empty the tank, leave it all on the bike!

Self-Confidence

The 5-item self-confidence subscale of the Revised Competitive State Anxiety-2[18] (CSAI-2R) was used to assess self-confidence. The five items describe feelings of confidence and participants were asked how well each statement matches how they felt during the WAnT on a 4-point Likert scale (1 = not at all, 4 = very much so). Scores range from 10 to 40, where a high score indicates higher levels of self-confidence. The self-confidence subscale was found to be reliable at alpha = 0.80.[18]

Psychological Flow

Flow during the WAnT was assessed using the 3-item flow index described by Ulrich et al.[19] This flow index was amended to reflect the WAnT used in the study ("I would love to test my cycling like that again", "I was thrilled", and "Task demands were well matched to my ability") and collected responses through a 7-point Likert scale anchored at 1 ("I do not agree at all") and 7 ("I completely agree"). The final score was the sum across the three items, with a range of 3-21, where a high score indicates higher levels of flow. This scale has been shown to have acceptable reliability of alpha = 0.80.[19] Participants were instructed to rate these items based on how they experienced the WAnT.

Protocol

This study utilized a randomized counterbalanced design, in which all participants (n = 42) completed two laboratory visits, each involving a different condition: 1) verbal encouragement with swearing (VES) and 2) verbal encouragement without swearing (VE). A one-week washout period separated the two visits to minimize carryover effects. During the initial visit, after written informed consent was obtained, the WAnT seat height and handlebars were adjusted to fit the participant. Participants completed a 5-minute warm-up consisting of pedaling at 50 revolutions per minute (rpm) against light resistance. After this warm-up, participants were instructed to pedal as fast as possible against zero resistance and when they reached what the researcher perceived to be peak rpm, the researcher said "Go!". At this command, resistance was applied to the WAnT based on the participants' weight (7.5% of body weight), and participants cycled as fast as possible for 30 seconds from a seated position during the entire test.[20,21] Depending on randomization, the researcher provided either VES or VE throughout the 30-second trial (Figure 1). Participants were blinded to the results of the Wingate to eliminate motivational bias. After completing the WAnT, participants performed a 5-10-minute cool-down consisting of light pedaling, then completed the self-confidence and psychological flow measures. This same procedure was repeated for the second condition, occurring one week after the first condition.

Statistical Analysis

All data are presented as mean ± standard deviation (SD) and were analyzed using Jamovi statistical software (v2.3.28.0). Normality of data was first confirmed using the Shapiro-Wilk method. For all outcomes, a 2 × 2 [condition

× sex] repeated measures ANOVA was utilized to detect main effects and interactions. In cases of significant main effects or interactions, differences in means were analyzed via pairwise comparisons and adjusted via Tukey post-hoc. Estimates of effect size for main effects are shown as partial eta squared (η^2_p) while Cohen's *d* effect sizes were used for mean comparisons. Significance was set at $p \leq 0.05$.

Results

For WAnT average power (watts; Figure 1a), there was no main effect for condition ($F(1,39) = 3.45$, $p = 0.071$, $\eta^2_p = 0.081$) but a main effect for sex was observed ($F(1,39) = 77.8$, $p < 0.001$, $\eta^2_p = 0.666$). Furthermore, there was a significant interaction for condition × sex ($F(1,39) = 7.42$, $p = 0.010$, $\eta^2_p = 0.160$). Power was higher in males versus females regardless of condition ($t(39) = -8.21$, $p < 0.001$, $d = 2.4$). Post hoc comparisons of the condition × sex interaction showed that males had significantly lower power output during the VES condition versus VE ($t(39) = 2.93$, $p = 0.027$, $d = 0.3$) but this was not apparent in females ($t(39) = -0.693$, $p = 0.899$, $d = 0.1$). Analysis of fatigue index (arbitrary units; Figure 1b) showed no main effects for condition ($F(1,39) = 0.034$, $p = 0.854$, $\eta^2_p = 0.001$) or sex ($F(1,39) = 0.279$, $p = 0.600$, $\eta^2_p = 0.007$). Furthermore, there was no interaction for condition × sex ($F(1,39) = 0.024$, $p = 0.876$, $\eta^2_p = 0.001$).

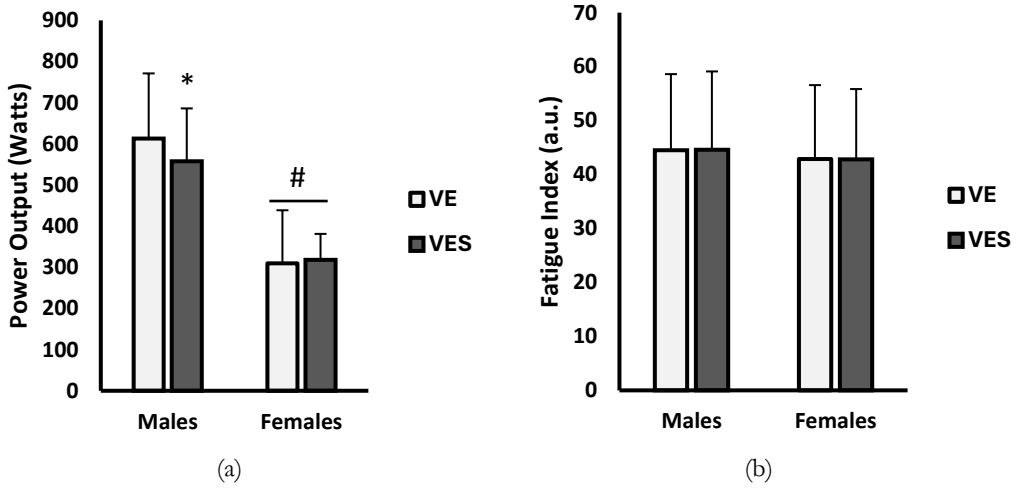

Figure 1. a) Average power output (watts) and b) fatigue index (a.u.) of males and females during a 30-second Wingate Anaerobic test (WAnT) as compared between verbal encouragement (VE; light bars) and verbal encouragement with swearing (VES; dark bars) conditions. Data is presented as mean ± SD. * indicates significantly different from VE ($p \leq 0.05$). # indicates significantly different from males ($p \leq 0.05$).

For self-confidence (arbitrary units; Figure 2a), there was no main effect of condition, ($F(1,39) = 0.801$, $p = 0.376$, $\eta^2_p = 0.020$) but a significant main effect for sex was observed ($F(1,39) = 4.14$, $p = 0.049$, $\eta^2_p = 0.096$). No interaction for condition × sex was observed ($F(1,39) = 1.10$, $p = 0.300$, $\eta^2_p = 0.028$). Post hoc analysis showed that males were significantly more confident than females regardless of condition ($t(39) = -2.03$, $p = 0.049$, $d = 0.4$). For psychological flow (arbitrary units; Figure 2b), there were no main effects for condition ($F(1,39) = 0.680$, $p = 0.414$, $\eta^2_p = 0.017$) or sex ($F(1,39) = 0.682$, $p = 0.414$, $\eta^2_p = 0.017$). Furthermore, there was no interaction for condition × sex ($F(1,39) = 0.057$, $p = 0.811$, $\eta^2_p = 0.001$).

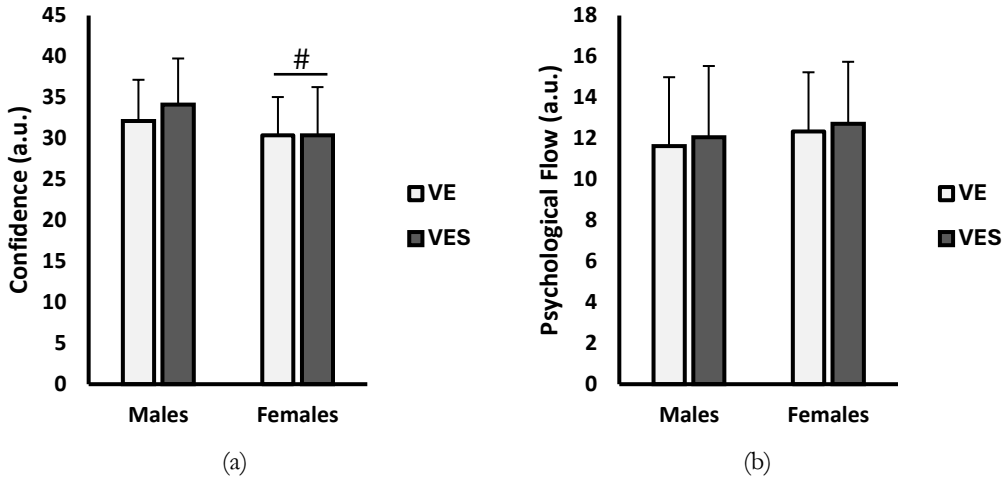

Figure 2. a) Self-confidence (a.u.) and b) Psychological flow (a.u.) of males and females during a 30-second Wingate Anaerobic test (WAnT) as compared between verbal encouragement (VE; light bars) and verbal encouragement+ swearing (VES; dark bars) conditions. # indicates significantly different from males ($p \leq 0.05$).

Discussion

The purpose of this study was to examine whether incorporating swearing into verbal encouragement during a WAnT would enhance performance, self-confidence, and psychological flow compared to standard verbal encouragement without swearing. Previous research has shown that participants swearing out loud improves physical performance[22], including during the WAnT[9]; however, contrary to the stated hypotheses, VES did not improve performance in the present study. In fact, participants who were male produced lower average power in the VES condition compared to standard VE. Neither self-confidence nor psychological flow differed between conditions, although participants who were male reported higher self-confidence than participants who were female, regardless of condition. These unexpected findings raise important questions about the social and psychological mechanisms of swearing's ergogenic effects.

One critical difference between the present study and prior research linking swearing with increased physical performance is the source of the swearing. Earlier studies demonstrating performance benefits had the participants swear themselves (e.g., repeating profanities during maximal effort tasks). Self-generated swearing may enhance performance because it represents voluntary emotional expression, promoting self-efficacy. In contrast, the present study involved researcher-generated swearing. Hearing another person swear may not evoke the same disinhibitory state as swearing yourself[11], and could instead heighten social awareness.[23] For some participants, particularly those who were male, this social salience may have increased self-consciousness, hesitation, or inward focus, all of which can interfere with maximal physical output.[24,25]

The Social Identity Theory[26] (SIT) provides a useful framework for interpreting the sex-specific results observed in this study. According to the SIT, individuals define themselves partly through membership in social groups (e.g., gender groups, occupational groups), and behavior is guided by norms associated with those group identities. When social expectations are violated, one's sense of identity can become salient, triggering behavioral restraint. In this present study, the female researcher's use of swear words, a behavior that is often less socially acceptable for women[6,27,28], may have been perceived by male participants as a violation of gender norms. It is possible that hearing a female researcher use profanity increased behavior restraint in male participants, due to the violation of a perceived gender norm, producing inhibition rather than disinhibition. In contrast, female participants may have experienced a greater sense of alignment with the female researcher's in-group identity. This shared gender identity may have fostered a "we're in this together" sense of solidarity, supporting their in-group identity. This aligns with SIT's assertion that messages from in-group members are more influential than those from out-group members.[29] Additionally, while both males and females swear more comfortably in same-sex interactions and hesitate to swear in mixed-sex groups, female swearing in mixed-sex interactions tends to be judged more harshly as compared to males.[6] Importantly, there are some limitations when interpreting these SIT-based explanations. While the SIT describes social groups and norms

(e.g., gender groups, gender norms), only biological sex was measured in this study, not gender identity, limiting the degree to which the SIT can help explain the current findings.

While speculative, it is plausible that the effects of VES depend on the interaction between the sex of the encourager and that of the receiver. The present study highlights the importance of the interplay between characteristics of the encourager and the receiver, and the content of the encouragement, on the outcome of the verbal encouragement. Coaches, clinicians, and researchers should practice caution when providing verbal encouragement, recognizing that motivational language carries social meaning that may be shaped by social identity expectations. Standardizing verbal encouragement protocols may help minimize unintended bias introduced by linguistic and interpersonal factors, ensuring that performance assessments reflect physiological rather than psychosocial differences.

Limitations and Future Directions

This study was the first to directly examine the effects of verbal encouragement with swearing on maximal exercise testing, but several limitations should be acknowledged. This study was not pre-registered and should therefore be considered exploratory. For ethical reasons, participants were informed in advance that swearing would occur. Specifically, the participants were informed that they would be receiving verbal encouragement with swearing while completing the WAnT, and the informed consent included that exact verbal encouragement scripts (see Figure 1) for both the VES and VE conditions, potentially diminishing any "shock factor" and altering natural responses. Informing participants before the experiment about the swearing conditions and specific scripts may have led to demand characteristics and expectancy effects, potentially altering participants' responses to the VES and VE conditions. Additionally, because the same female researcher provided all verbal encouragement, results can't be generalized beyond the characteristics of the encourager used in this study.

Verbal encouragement that includes swearing is unlikely to diminish performance for every person in every situation, thus the need to identify boundary conditions that determine when including swearing may harm, enhance, or produce null effects on performance. Given that cultural, generational, and racial identities shape attitudes towards swearing[6], future studies should examine these interactions systematically. For example, different generational backgrounds of the researcher and participants may help shape their social expectations of swearing. Consequently, swearing by a young adult researcher in the presence of young adult participants may influence performance outcomes differently than swearing by or in the presence of older generations. While race is a less studied social variable within swearing research, Caucasians do tend to swear in a wider range of social situations than other racial groups, and they typically face less severe judgement for their language.[6] This suggests that the racial identity of the individual providing VES may also influence performance outcomes. An additional limitation is the assumption that swearing carries a uniform social meaning. This study did not collect data on participants' familiarity, attitudes, or comfort with swearing, which may have further moderated the influence of VES on physical performance. Therefore, future studies investigating the effects of VES on performance should examine interactions between the characteristics of the researcher and participants. A better understanding of when, how, and with whom swearing impacts the outcomes of verbal encouragement would provide coaches, clinicians, and scholars with research supported strategies on how to optimize verbal encouragement practices. More broadly, it is important that the findings of this present study guide continued research examining swearing's psychosocial effects and the contextual factors that moderate those effects. The external validity of this study should be examined in other applied contexts where verbal encouragement may influence task outcomes. Future research might investigate how VES affects performance in tasks that rely on different domains of functioning, such as strategy-based activities (e.g., chess), coordination-dependent tasks (e.g., darts), strength-based efforts (e.g., bench press one-repetition maximum), or cognitively demanding assessments (e.g., academic examinations).

Conclusions

Contrary to expectations, verbal encouragement that included swearing did not enhance Wingate Anaerobic Test performance, self-confidence, or psychological flow. Instead, male participants exhibited lower average power during the Wingate Anaerobic Test under the verbal encouragement with swearing condition, whereas female participants' performance remained unchanged. These results suggest that the ergogenic benefits of self-swearing do not necessarily extend to situations in which swearing is heard from someone else.

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Conflict of Interest
The authors declare no conflicts of interest.

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Data Availability
Data is available upon reasonable request to corresponding author.

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