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Research Paper

# Social Media Use and Executive Control: An Auditory Go/No-Go Study

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## ABSTRACT

Increased social media usage among young adults has raised concerns about its potential impact on cognitive functioning, particularly executive control processes. This study investigated the effects of social media usage on inhibitory control, set-shifting, and cognitive flexibility among Indian young adults (N = 30, $M_{age}$ = 23.32, SD = 2.20) using a novel modified auditory Go/No-Go paradigm alongside established neuropsychological measures. The modified paradigm incorporated social-network-related auditory cues (Instagram and WhatsApp notification sounds) and neutral cues to assess context-specific inhibitory control. Participants were classified into high and low social media usage groups based on the Social Media Addiction Questionnaire (SMAQ). Although statistically significant group differences were largely absent, small-to-moderate effect sizes consistently favored the low social media usage group. The modified Go/No-Go paradigm demonstrated significant correlations with established executive function measures, providing preliminary evidence of convergent validity. Within-task analyses revealed that the mixed-condition block significantly increased task difficulty ($F(30) = 16.79$, $p < .001$, $\eta^2p = .375$), demonstrating the paradigm's sensitivity to context-specific inhibitory demands. These findings offer preliminary evidence supporting the utility of culturally adapted and ecologically relevant paradigms for investigating executive control in the context of social media use.

***Keywords:*** *Social Media Use, Executive Functions, Inhibitory Control, Cognitive Flexibility*

The digital revolution has fundamentally transformed human social interaction, with social networking sites (SNS) becoming integral to daily communication, entertainment, and information seeking. In India, social media penetration has reached unprecedented levels, with over 600 million users representing 42.6% of the total population (Basuroy, 2023). This rapid adoption, particularly among young adults aged 18-30 years, coincides with increasing accessibility of affordable internet and smartphone technology. However, alongside the undeniable benefits of enhanced social connectivity and information access, concerns have emerged regarding the potential cognitive consequences of excessive social media engagement.

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Recent neuroimaging and behavioural studies illuminated the complex relationship between digital media consumption and cognitive functioning where Aitken et al. (2024) demonstrated immediate impairments in executive function tasks following social media exposure, with functional near-infrared spectroscopy revealing increased medial prefrontal cortex activity alongside decreased dorsolateral and ventrolateral prefrontal cortex activation—patterns suggestive of compensatory cognitive effort and diminished working memory capacity. Similarly, large-scale studies have documented associations between problematic social media use and deficits in inhibitory control, with effect sizes ranging from small to medium ($d$ = .25-.50) across various paradigms (Zhang et al., 2024).

Studies have shown that the use of smartphones and social media before bedtime can disrupt sleep patterns, leading to shorter sleep duration and poorer sleep quality (Levenson et al., 2017). The constant exposure to stimulating content by responding to late-night notifications can reduce sleep quality; blue light emitted by screens leads to increased sleep latency, and the addictive nature of social media can interfere with sleep patterns, potentially impacting individuals' overall well-being and cognitive functioning (Keles et al., 2020).

***Executive Functions and Social-Media: Theoretical Framework***

Executive functions encompass a constellation of higher-order cognitive processes essential for goal-directed behaviour, including working memory, inhibitory control, and cognitive flexibility (Diamond, 2013; Miyake et al., 2000, Aydin et al., 2020). These processes are primarily mediated by prefrontal cortical networks, which undergo continued maturation through early adulthood—a period coinciding with peak social media adoption. The theoretical framework for understanding social media's impact on executive functions draws heavily from the Interaction of Person-Affect-Cognition-Execution (I-PACE) model proposed by Brand et al. (2019), which conceptualizes addictive behaviour as arising from an imbalance between emotion-based impulsive systems and cognitive-control-based reflective systems.

According to this model, executive functions, particularly inhibitory control, serve as protective factors against addictive behaviour. Conversely, reductions in these abilities may facilitate the development and maintenance of problematic usage patterns. The hyperactivation of reward-seeking mechanisms in response to social media stimuli can undermine top-down cognitive control, creating a cycle of diminished self-regulation and increased engagement with potentially addictive content.

***Empirical Evidence: Mixed Findings and Methodological Considerations***

The empirical literature examining social media's impact on executive functions has yielded mixed findings, largely attributed to methodological heterogeneity and measurement limitations. Early studies predominantly employed traditional neuropsychological measures designed for clinical populations, which may lack sensitivity to subtle changes in healthy young adults. For instance, Müller et al. (2021) found that problematic social media use was associated with attentional deficits rather than general decision-making impairments, suggesting that conventional executive function measures may not capture the specific cognitive processes affected by social media engagement and it is also not clear as to which Executive functioning abilities are associated with social media addiction (Reed, 2023).

Recent meta-analytic evidence has begun to clarify these relationships. A comprehensive systematic review by Li et al. (2023) examining 1,051 Chinese young adults found significant negative associations between social media addiction and executive functioning,

with emotional disturbance and sleep quality serving as mediating pathways ($\beta$ = -.38, $p$ < .001). However, the effect sizes were generally small to moderate, raising questions about the clinical significance of observed differences and the sensitivity of traditional assessment approaches.

***The Need for Modified Paradigms: Enhancing Ecological Validity***

A growing consensus in experimental psychology emphasizes the importance of ecological validity—the degree to which research findings can be generalized to real-world settings. Traditional cognitive tasks, while psychometrically robust, often employ abstract stimuli that bear little resemblance to the complex, multimodal environments in which executive functions operate daily. This limitation is particularly relevant when studying social media's effects, as the cognitive demands of digital environments differ substantially from those assessed by conventional neuropsychological measures.

Recent advances in paradigm development have begun to address these concerns through the incorporation of addiction-relevant cues and ecologically valid stimuli. Wegmann et al. (2020) pioneered the use of social-network-specific auditory cues in Go/No-Go paradigms, demonstrating enhanced sensitivity to inhibitory control deficits among individuals with social-networks-use disorder symptoms. Their findings revealed that general inhibitory control measures failed to capture the specific cognitive processes involved in problematic social media use, highlighting the need for context-specific assessment approaches.

The theoretical rationale for using addiction-related cues draws from dual-process models of addiction, which posit that addiction-specific stimuli can trigger automatic approach responses that require greater inhibitory control to override (Wiers et al., 2013). In the context of social media, notification sounds, visual interfaces, and other platform-specific cues may activate conditioned responses that differ from those elicited by neutral stimuli. This specificity suggests that modified paradigms incorporating such cues may provide more sensitive indices of the cognitive processes underlying problematic social media use.

The frequent exposure to multiple sources of information on social media platforms, often presented in a fragmented and rapid manner, can also contribute to decreased cognitive focus and task-switching difficulties (Rosen et al., 2013). Increasing research evidence supports the notion of uncontrolled social media use leading to the emergence of addiction-like symptoms in the population (Van Deursen et al., 2015). Although the international classification systems for disorders: *International Classification of Diseases (ICD-11)* and *Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition (DSM-5)* do not recognise the social-networking-sites (SNS) addiction or social media addiction under behavioural addictions as of now (Basu et al., 2021; Kurniasanti et al., 2019) amongst others with diagnostic criteria like internet gaming disorder, and gambling; growing research suggests that it shares similarities with other behavioural addictions and substance-use disorders.

***Rationale***

The present study aimed to address three primary objectives: First, we sought to investigate the relationship between social media usage and executive control processes using both traditional and modified assessment approaches. Second, we aimed to validate a culturally adapted version of the auditory Go/No-Go paradigm incorporating locally relevant social media cues (Instagram and WhatsApp notification sounds) within an Indian young adult

population. Third, we examined the paradigm's construct validity through correlational analyses with established executive function measures.

Beyond the inclusion of platform-specific auditory cues, we introduced a novel mixed-condition block requiring participants to respond to both social media and neutral stimuli within the same trial sequence. By examining the convergent validity of our modified paradigm with established measures, we aimed to provide evidence for its utility as a research tool while advancing theoretical understanding of the specific cognitive processes affected by social media engagement.

## METHODOLOGY

### *Sample*

Thirty participants aged 20-30 years ($M$ = 23.32, $SD$ = 2.20) were recruited from Christ University, Bengaluru, India, through convenience sampling via social media recruitment and institutional mailing lists over a two-month period. Participants were active social media users, reporting 2-8 hours of daily usage across various platforms. Inclusion criteria specified active social media use (minimum one SNS account), age between 20-30 years, and ability to complete cognitive tasks and questionnaires. Exclusion criteria included hearing or vision impairments that might interfere with task performance. Written informed consent was obtained from all participants, who were informed of their right to withdraw and assured of data confidentiality and anonymity.

### *Instruments*

Four measures were used in this study,

**1. Social Media Addiction Questionnaire (SMAQ) (Basu et al., 2021)**

The SMAQ assessed social media addiction severity across six dimensions: intense desire, impaired control, withdrawal, tolerance, decreased alternate pleasure, and harmful use. The 20-item scale uses a 6-point Likert format (1 = *strongly disagree* to 6 = *strongly agree*) with items such as *"Cannot imagine living without social media"* and *"Feel that I am increasingly spending more and more time on social media."* Higher scores indicate greater addiction risk. The scale demonstrated high internal consistency (Cronbach's α = .879) and good split-half reliability ($r$ = .765).

**2. Berg Card Sorting Task (BCST) (Berg, 1948)**

The computerized BCST, administered via Psychology Experimental Building Language (PEBL) version 2.2, assessed cognitive flexibility and set-shifting abilities. Participants sorted 128 cards according to implicit rules (colour, shape, or number) that changed without warning. Feedback ("Correct!" or "Incorrect!") was displayed for 500ms following each response. Primary dependent variables included perseverative errors (defined according to Heaton criteria, 1993) and percentage error rates. The PEBL BCST has demonstrated good reliability (ICC = 0.61 - 0.83) in young adult populations (Piper et al., 2015).

**3. Stroop Colour-Word Interference Task (Troyer et al., 2006)**

The PEBL Stroop task assessed inhibitory control and attentional filtering across 80 trials. Participants identified ink colors of colour words that were either congruent or incongruent with the word meaning. Dependent variables included accuracy and reaction time. Although specific reliability data for the PEBL version are limited, computerized attention tasks generally demonstrate adequate internal consistency and test-retest reliability (Langner et al., 2023).

## 4. Modified Auditory Go/No-Go Task

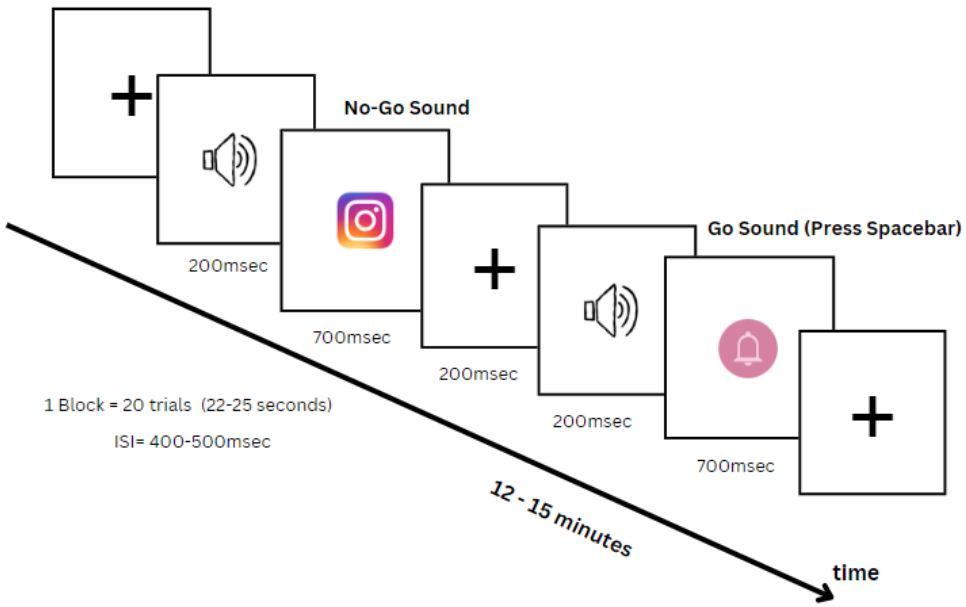
A novel auditory Go/No-Go paradigm was developed based on Wegmann et al. (2020) and Verdejo-García and Pérez-García (2007), implemented using OpenSesame (Mathot et al., 2012) software (version 3.3.14). Four auditory tones of comparable length (700ms) included two social-network-related tones (Instagram and WhatsApp notification sounds) and two neutral analog tones (table bell and microwave bell). All audio files were standardized to 48,000 Hz sampling rate using Audacity software (version 3.0). The task comprised six blocks with 20 trials each: Go blocks (respond to social media sounds), No-Go blocks (respond to analog sounds), and novel Mixed blocks (respond to both social media and analog sounds). This design created varying levels of cognitive demand while maintaining the core inhibitory control requirements. The Mixed condition aimed to increase ecological validity by approximating the complex, rapidly changing stimuli characteristic of real-world digital environments.

### *Procedure*

Following informed consent, participants completed cognitive tasks in a controlled laboratory setting. The modified Go/No-Go task began with a familiarization phase presenting visual representations of each auditory stimulus alongside their respective sounds. Participants then completed practice trials before beginning the main experiment. Task instructions specified response contingencies for each block, with associations reversed across conditions to control for stimulus-specific learning effects.

The BCST followed immediately after the Go/No-Go task, followed by the Stroop task. The complete cognitive battery required approximately 25-30 minutes. Participants completed the SMAQ and demographic questionnaire at session conclusion. All procedures adhered to institutional ethical guidelines and the Declaration of Helsinki. Any limitations encountered during the study, such as sample size or potential confounding variables, were acknowledged and discussed to provide a comprehensive understanding of the study's scope and implications.

***Figure 1. Schematic for the modified auditory go/no-go task***



### *Statistical Analysis*

Statistical analyses were conducted using Jamovi (version 2.2), with supplementary D-prime analysis performed in Microsoft Excel. For the Go/No-Go task, signal detection theory (Macmillan & Creelman,1991) parameters were calculated:

$d' = Z(\text{Hit Rate}) - Z(\text{False Alarm Rate})$

Higher $d'$ values indicate higher discrimination between target and non-target stimuli. Response bias (β) was calculated as the criterion bias independent of sensitivity.

Groups were classified using median split (SMAQ score = 63.5) into high SNS use ($n$ = 15) and low SNS use ($n$ = 15) categories. Normality assumptions were assessed via Shapiro-Wilk tests. Independent samples $t$-tests compared group differences across executive function measures. Repeated measures ANOVA examined within-block and between-block differences in Go/No-Go performance. Effect sizes were interpreted according to Cohen's (1988) guidelines: small ($d \geq .20$), medium ($d \geq .50$), and large ($d \geq .80$).

## RESULTS

### *Sample Characteristics and Group Classification*

Participant social media usage ranged from 2-5 hours daily for the majority of the sample. The median split classification yielded equal groups: 15 participants in the high SNS use group and 15 in the low SNS use group, enabling balanced comparisons across cognitive measures.

### *Between-Group Comparisons of Executive Function Performance*

Independent samples $t$-tests revealed no statistically significant differences between high and low SNS usage groups across most executive function measures (Table 1). However, small-to-moderate effect sizes consistently favored the low SNS usage group despite the absence of statistically significant differences across most measures. For the modified Go/No-Go task, overall target sensitivity ($d'$) was higher for low SNS users ($M$ = 2.57, $SD$ = 0.94) compared to high SNS users ($M$ = 2.05, $SD$ = 1.34), representing a small-to-medium effect size ($d$ = 0.43). Response bias (β) similarly favoured the low SNS group ($M$ = 1.075, $SD$ = 0.603) over the high SNS group ($M$ = 0.919, $SD$ = 0.345), indicating better stimulus discrimination. The largest between-group difference was observed for Go Block target sensitivity ($t$ = 1.87, $p < .05$), with low SNS users demonstrating superior performance ($M$ = 3.64, $SD$ = 1.26) compared to high SNS users ($M$ = 2.01, $SD$ = 1.26). BCST performance showed minimal group differences, with slightly higher error rates in the high SNS group (perseverative errors: $M$ = 14.67, $SD$ = 7.12) versus low SNS group ($M$ = 14.00, $SD$ = 7.12). Stroop task performance revealed interesting patterns, with comparable accuracy across groups (low SNS: $M$ = 25.13, $SD$ = 1.77; high SNS: $M$ = 25.47, $SD$ = 0.74) but notably slower reaction times for high SNS users ($M$ = 1835.69ms, $SD$ = 781.36) compared to low SNS users ($M$ = 1589.83ms, $SD$ = 575.75), representing a medium effect size ($d$ = 0.35).

***Table 1. Independent samples t-test for High SNS users and Low SNS users for Go/No-Go task, BCST, and Stroop task***

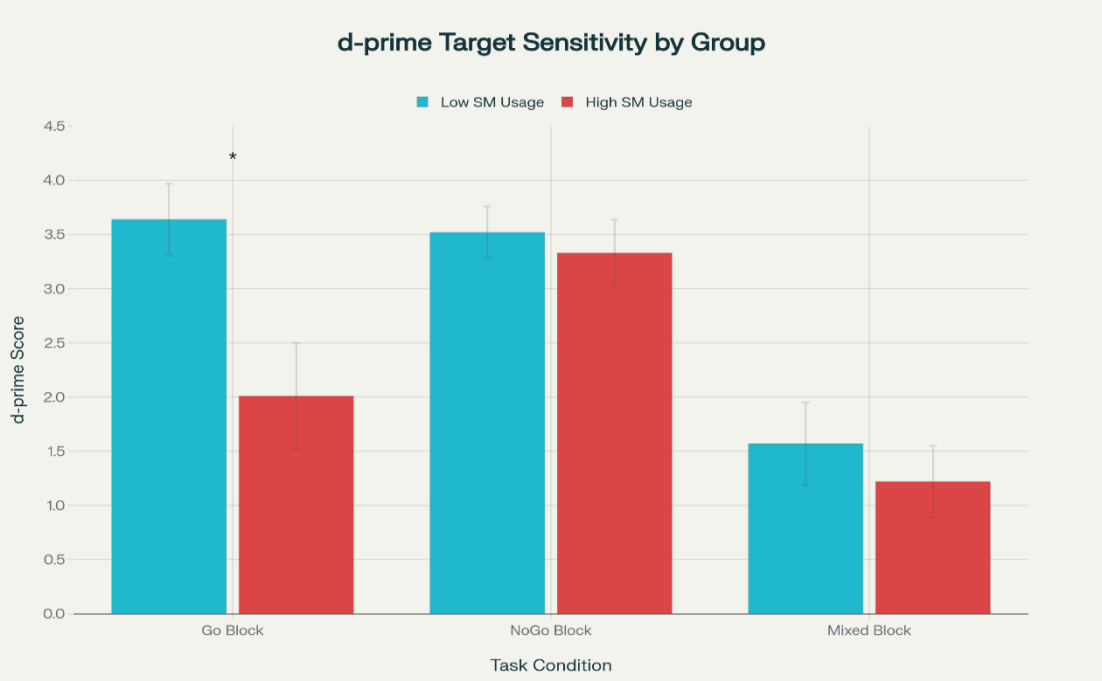
| Parameters | | Low SNS | | High SNS | | t | Cohen's d |
|---|---|---|---|---|---|---|---|
| | | M | SD | M | SD | | |
| **Target sensitivity (d')** | Overall d' | 2.57 | 0.94 | 2.05 | 1.34 | 1.23 | 0.45 |
| | Go Block d' | 3.64 | 1.26 | 2.01 | 3.12 | 1.87* | 0.68 |
| | No-Go Block d' | 3.52 | 0.91 | 3.33 | 1.07 | 0.53 | 0.19 |
| | Mix Block d' | 1.57 | 1.46 | 1.22 | 1.55 | 0.63 | 0.23 |
| **BCST Errors** | Perseverative | 14.00 | 7.12 | 14.67 | 6.21 | -0.27 | -0.10 |
| | % errors | 11.09 | 5.42 | 11.53 | 4.78 | -0.23 | -0.08 |
| **Stroop Effect** | Accuracy | 25.13 | 1.77 | 25.47 | 0.74 | -0.67 | -0.25 |
| | Reaction Time | 1589.83 | 575.75 | 1835.69 | 781.36 | -0.98 | -0.36 |

*Note.* * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

***Construct Validity of the Modified Go/No-Go Paradigm***

Correlation analyses provided preliminary support for the convergent validity of the modified paradigm. (Table 2). Target sensitivity (d') from the Go/No-Go task correlated significantly with Stroop reaction time ($r = -.51$, $p < .01$), indicating that participants with better inhibitory control on the modified task also demonstrated faster conflict resolution on the established Stroop measure. Additionally, BCST perseverative errors correlated negatively with Mixed block d' ($r = -.37$, $p < .05$), suggesting that cognitive flexibility and context-specific inhibitory control share underlying mechanisms. These correlational patterns support the convergent validity of the modified paradigm while demonstrating its sensitivity to executive function variations across individuals. The observed correlations suggest that the paradigm engages cognitive processes overlapping with those measured by established executive function tasks.

***Figure 2. Target sensitivity (d') for low SNS and High SNS use groups across conditions (Go, No-Go, Mixed Blocks)***



### *Within-Task Analysis: Block Difficulty and Cognitive Load*

Repeated measures ANOVA examining performance across the three Go/No-Go blocks revealed significant within-subject effects ($F = 16.79$, $p < .001$, $\eta^2_p = .375$), confirming the manipulations' effectiveness in creating varying levels of cognitive demand. Post-hoc analyses indicated no significant difference between Go and No-Go block performance ($M_{diff} = 0.60$, $SE = 0.37$, $p > .05$), suggesting comparable difficulty levels for these single-stimulus conditions. However, the Mixed block proved significantly more challenging than both Go ($M_{diff} = 1.43$, $SE = 0.42$, $p < .05$) and No-Go blocks ($M_{diff} = 2.03$, $SE = 0.27$, $p < .001$). This pattern demonstrates that requiring participants to maintain and switch between multiple stimulus-response mappings within the same block substantially increased cognitive load, validating the Mixed condition as a more demanding test of executive control. No significant Group × Block interaction emerged ($F(30) = 2.38$, $p = .102$, $\eta^2_p = .078$), indicating that while the task successfully manipulated cognitive difficulty, the limited sample size may have precluded detection of group-specific differences in task sensitivity.

### *Associations Between Social Media Usage and Executive Function Measures*

Pearson correlations revealed that social media usage time positively correlated with SMAQ scores ($r = .38$, $p < .05$), supporting the questionnaire's validity for assessing problematic usage patterns. However, no significant correlations emerged between SMAQ scores and cognitive task performance, suggesting that executive function differences may be more subtle than captured by the current sample size and measurement approach. The absence of direct correlations between social media measures and cognitive performance contrasts with some previous findings but aligns with recent large-scale studies reporting weak associations between social media use and cognitive abilities (Stieger & Wunderl, 2022). These inconsistencies may reflect the complexity of social media's cognitive effects, which may be moderated by factors such as usage patterns, content type, and individual differences in susceptibility.

***Table 2. Pearson's Correlation Coefficients for SNS users***

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **d' (All)** | — | | | | | | | | | |
| **d'(Go)** | 0.64*** | — | | | | | | | | |
| **d' (No-Go)** | 0.58*** | 0.52** | — | | | | | | | |
| **d' (Mix)** | 0.89*** | 0.39* | 0.35 | — | | | | | | |
| **PE (BCST)** | -0.23 | -0.08 | -0.06 | -0.37* | — | | | | | |
| **% E (BCST)** | -0.23 | -0.07 | -0.07 | -0.37* | 0.99*** | — | | | | |
| **S (A)** | 0.15 | 0.16 | -0.1 | 0.22 | 0.17 | 0.18 | — | | | |
| **S (RT)** | -0.51** | -0.26 | -0.54** | -0.44* | 0.03 | 0.03 | -0.35 | — | | |
| **AH** | -0.06 | -0.19 | -0.09 | 0.1 | -0.28 | -0.29 | 0.18 | -0.06 | — | |
| **SMAQ** | -0.16 | -0.24 | -0.12 | -0.11 | -0.11 | -0.11 | 0.02 | 0.26 | 0.38* | — |

*Note.* * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## DISCUSSION

The present study examined the relationship between social media usage and executive control processes using both established neuropsychological measures and a modified

auditory Go/No-Go paradigm. Three key findings emerged: (1) the modified paradigm showed significant convergent validity with established executive function measures; (2) group differences were most apparent in social media-specific target sensitivity, whereas traditional measures showed comparatively smaller effects; and (3) the mixed block condition provided enhanced sensitivity to individual differences in executive control. The absence of robust statistical differences between high and low social media usage groups aligns with recent findings suggesting that social media's cognitive effects may be more nuanced than initially hypothesized. Aitken et al. (2024) similarly found that while social media exposure affected neural activity patterns, behavioural differences were often subtle and required sensitive measurement approaches to detect. This pattern underscores the importance of developing refined paradigms capable of capturing the specific cognitive processes affected by digital media engagement.

Our findings are broadly consistent with predictions derived from the I-PACE model. The observation that group differences emerged specifically for social media cues (Go block) but not for neutral conditions aligns with Brand et al.'s (2019) emphasis on cue-specific processing mechanisms in behavioural addictions. Recent updates to the I-PACE model (Brand et al., 2025) emphasize the dynamic interplay between gratification and compensation processes across different stages of addictive behaviour development. Our finding that individuals with higher social media usage tended to demonstrate lower target sensitivity to social media cues suggests that these stimuli may indeed capture attentional resources in a manner consistent with compensation-based coping mechanisms. The significant correlation between our modified paradigm and the Stroop task ($r = -0.51$) supports the theoretical proposition that domain-specific and general inhibitory control processes share common underlying mechanisms while exhibiting distinct functional characteristics. This aligns with recent neuroscience evidence demonstrating both overlapping and distinct neural networks for different types of inhibitory control (Xu et al., 2023).

A central contribution of this study lies in increasing the contextual relevance of inhibitory-control assessment through the incorporation of social-media-related auditory cues. Traditional laboratory measures, while psychometrically sound, may lack the environmental relevance necessary to capture subtle cognitive changes associated with problematic technology use. The mixed block condition represents a novel extension of traditional auditory Go/No-Go paradigms. By requiring participants to maintain and update multiple stimulus-response mappings simultaneously, this condition approximated the complex attentional demands characteristic of real-world social media environments. The finding that this condition showed the strongest correlations with established executive function measures ($r = -0.37$ with BCST perseverative errors) supports its validity as an ecologically relevant cognitive challenge. Recent meta-analytic work on ecological validity in neuropsychological assessment (Parsons et al., 2022) emphasizes the importance of both verisimilitude (surface similarity) and veridicality (functional similarity) in test development. The paradigm (Wegmann et al., 2020) incorporated familiar social-media notification sounds, thereby increasing stimulus relevance for the target population and veridicality was supported by significant correlations with established measures and theoretically meaningful group differences.

The findings of this study suggest that the core cognitive mechanisms underlying executive control and their relationship to social media usage may be universal, while the specific manifestations may vary across cultural contexts. The incorporation of Instagram and

WhatsApp cues reflects the global penetration of these platforms while acknowledging their particular salience in Indian youth culture. However, recent research has highlighted the critical importance of cultural validation in cognitive assessment (Nielsen et al., 2023), particularly in diverse populations with varying educational, linguistic, and technological backgrounds. Group differences on traditional measures (BCST, Stroop) and the modified paradigm suggests that culturally adapted measures may indeed provide enhanced sensitivity to subtle cognitive processes. This aligns with recent validation work demonstrating that cross-cultural cognitive batteries can achieve diagnostic accuracy without losing cultural relevance (Delgado-Álvarez et al., 2023).

### *Methodological Incorporations*

Several methodological incorporations in this study warrant discussion. First, the application of signal detection theory (d-prime analysis) provided enhanced statistical power and theoretical clarity compared to simple accuracy measures. The distinction between sensitivity (d') and response bias (β) allowed for more nuanced interpretation of group differences and their underlying mechanisms. Second, the incorporation of mixed blocks represents enhancement to traditional Go/No-Go paradigms. This manipulation successfully increased cognitive demand and improved discriminatory power, suggesting that paradigm modifications should consider the complexity and multitasking demands of modern digital environments. Third, the counterbalancing of response mappings across blocks helped control for potential learning effects and response preferences that might confound interpretation. Future research should continue to incorporate such design considerations to enhance internal validity. The significant correlations between our modified paradigm and established measures provide preliminary evidence for convergent validity. The negative correlation with Stroop reaction time ($r = -0.51$) suggests that both tasks tap into shared inhibitory control processes, while the correlation with BCST perseverative errors ($r = -0.37$) supports the cognitive flexibility component of the modified paradigm.

These findings suggest that cue-specific assessments may provide valuable insights into the cognitive mechanisms underlying problematic social media use that are not captured by traditional measures. This has potential implications for both assessment and intervention development. Recent intervention research has shown that cognitive training targeting inhibitory control can reduce problematic internet use (Brand et al., 2020). Our findings suggest that such interventions might benefit from incorporating social media-specific elements to enhance their ecological validity and clinical effectiveness.

### *Limitations and Future Directions*

This Study provides valuable insights into the relationship between social media usage and executive control, supported by consistent directional patterns observed across measures. Within this context, several considerations help guide the interpretation and future extension of these findings. First, the sample size ($N = 30$) was relatively small, which may have limited statistical power to detect small-to-medium effects. The observed effect sizes suggest that future studies with larger samples may be better positioned to determine whether these patterns represent reliable group differences. Second, the cross-sectional design allows for the identification of associations but does not permit conclusions regarding causality. Future longitudinal research would be valuable in clarifying the directionality of the relationship between social media usage and executive control, including the possibility of bidirectional influences. Third, the sample consisted of university students from a single institution. Although this homogeneity may have reduced variability associated with extraneous factors, it may also limit the generalizability of the findings. Future studies should aim to include

more diverse populations to enhance external validity. Fourth, social media usage was assessed through self-report (SMAQ), which may be subject to biases such as social desirability and recall inaccuracies. Incorporating objective measures of usage, such as smartphone-based data, would strengthen the accuracy of future assessments.

Despite these considerations, the consistent directional patterns observed across measures suggest that social media usage may be associated with subtle variations in executive control. The use of a sensitive and validated experimental paradigm represents a key strength of the study and may be particularly useful for detecting nuanced cognitive effects. Future research could build on these findings by examining the effectiveness of cognitive training interventions targeting inhibitory control, as well as evaluating digital wellness interventions using both context-specific and traditional assessment approaches.

## CONCLUSION

This study demonstrated the feasibility and validity of a modified auditory Go/No-Go paradigm for assessing social media-specific executive control processes in young adults. The paradigm demonstrated preliminary convergent validity with established measures and appeared sensitive to individual differences that may not be fully captured by traditional assessments. Thus, supporting the potential value of incorporating context-relevant cues into executive-function assessment. The findings are consistent with theoretical models emphasizing cue-specific cognitive processes in problematic technology use.

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***Conflict of Interest***

The author declared no conflict of interest.

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