

Careless Responding in Mental Health Screening: The Moderating Role of Questionnaire Type on Individual Responses

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Abstract

Background: Online questionnaires are widely used for large-scale mental health screening. However, careless responses from participants can compromise data validity, ultimately undermining the reliability of screening outcomes. While prior studies have primarily focused on the effects of individual and environmental factors on careless responding, the role of questionnaire type remains underexplored. Furthermore, few studies have examined careless responding within mental health screening contexts.

Objective: This study aims to investigate the individual factors influencing careless responses in online mental health screening questionnaires and assess how these factors vary across different types of psychological screening instruments.

Methods: Data were collected from 24,367 participants at Xinxiang Medical University, encompassing four widely used psychological screening questionnaires designed to assess depression, anxiety, stress, and insomnia. Logistic regression models were applied to analyze the impact of individual factors on careless responding and to evaluate the moderating role of questionnaire type. Additionally, average response times were analyzed to identify characteristic patterns associated with careless responding.

Results: Gender: Female participants demonstrated greater conscientiousness than males when completing psychological screening questionnaires ($p < 0.01$). Educational level: Contrary to expectations, participants with higher education levels exhibited more careless responses ($p < 0.01$), potentially due to heightened self-esteem and reluctance to disclose mental health concerns. Age: Older participants were more meticulous when completing surveys on depression and stress ($p < 0.01$) but displayed increased careless responding in the insomnia questionnaires ($p < 0.01$). Smoking habit: Smokers showed greater care when responding to the depression survey but were more prone to careless responses in other questionnaires ($p < 0.05$). Drinking habit: Drinkers, compared to non-drinkers, were more likely to respond carefully ($p < 0.05$). Analysis of response times revealed that participants tended to spend less time on surveys on depression and anxiety, often skimming through questions. In contrast, careless responding in surveys on stress and insomnia was characterized by skipped questions and rapid answer selection.

Conclusions: Careless responding in online psychological screening deviates from previous findings. The influence of individual factors varies across questionnaire types, likely due to differences in participants' attentiveness to specific instruments. These findings offer valuable insights for questionnaire designers and administrators, highlighting the need for targeted interventions tailored to user group characteristics and the unique features of different questionnaire types to mitigate careless responding.

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Original Paper

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Abstract

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Keywords: careless response; digital health; online health screening; mental illness

Introduction

Background

Mental illnesses, such as depression and anxiety, are associated with symptoms including low mood, difficulty concentrating, and a diminished interest in life, profoundly affecting both individuals' well-being and societal stability [1,2]. With the rapid evolution of modern society, psychological issues have become increasingly prevalent worldwide. The COVID-19 pandemic has exacerbated

this trend, leading to a sharp rise in mental health cases [3]. According to the World Health Organization, nearly 1 billion people globally suffer from mental disorders, with cases of anxiety and depression increasing by 25% following the pandemic [4]. However, due to the mental illnesses under the stigmatized context, particularly depression and anxiety, individuals often hesitate to disclose their conditions to healthcare providers [5]. This reluctance results in a significant number of unreported and untreated cases, ultimately exacerbating the overall disease burden [6,7]. Consequently, implementing effective mental health screening is essential for early detection, prevention, and treatment of mental illnesses [8,9].

Psychological screening questionnaires are standardized tools designed to assess an individual's mental health status through a series of structured questions. Traditionally, these questionnaires are distributed by administrators to participants for completion, after which they are collected and analyzed. However, this method is often hindered by inefficiencies in distribution, data collection, and analysis. The emergence of internet technology has revolutionized this process by introducing online psychological screening questionnaires, which offer a more efficient and scalable alternative. Online questionnaires can improve the recognition of mental illness and increase patients' opportunities to receive digital mental health interventions [10]. Compared to paper questionnaires, they are more easily accepted by respondents in current psychological health screening [11]. Despite their advantages, a significant limitation of online questionnaires is the increased risk of careless responding, where participants may fail to read or fully engage with the items [12,13,14]. This can lead to data that inaccurately reflects their true mental health status [15]. Such inaccuracies undermine the validity of the results and subsequent psychological interventions. Consequently, identifying the factors that influence careless responding and improving response accuracy has become a critical priority.

Related Works

Existing research has explored both external and internal factors influencing careless responses in online surveys. External factors include extrinsic motivation, social contact, and environmental distractions. For instance, Gadiraju et al. [16] found that participants recruited through crowdsourcing platforms frequently employ strategies to minimize time and effort in exchange for compensation. As survey duration increases, participants' motivation and attention tend to decline, significantly elevating the risk of careless responding. Additionally, Johnson [17] argued that the lack of direct interaction between respondents and administrators, and physical distance in online surveys may reduce participants' sense of responsibility, leading to more careless responses. Environmental distractions can further exacerbate careless responding [18].

Internal factors, such as participants' intrinsic motivation, interest, and personality traits, also play a significant role in careless responding. For example, participants with low survey interest are more likely to exhibit careless responses in lengthy surveys compared to shorter ones [19]. As survey duration increases, participants' motivation diminishes, further elevating the probability of careless responses [15]. Additionally, Maniaci and Rogge [20] found that self-reported agreeableness, conscientiousness, and openness to experience were negatively correlated with careless responding. Bowling et al. [21] reported that acquaintance-reported agreeableness, conscientiousness, emotional stability, and extraversion were all negatively correlated with careless responding. Similarly, Meade et al. [13] found that self-reported agreeableness, friendliness, and emotional stability were negatively correlated with careless responding in a sample of undergraduate students. McKay [22] further revealed that benevolent personality traits (e.g., self-esteem) were negatively correlated with careless responding, while malevolent traits (e.g., interpersonal coldness, sensation-seeking) were positively correlated.

Research Gaps

While existing research has extensively explored external and internal factors influencing careless responding in online surveys, these studies have primarily focused on non-psychological screening contexts. Unlike general questionnaires, psychological screening instruments often include intrusive or sensitive items (e.g., “Have you had suicidal thoughts in the past two weeks?”), which may trigger defensive avoidance or emotional arousal in respondents. This can lead to deliberate concealment or emotionally driven randomized responses. As a result, the factors contributing to careless responding in psychological screening questionnaires may differ significantly from those in general online surveys, highlighting the need for further investigation into this unique context.

Moreover, existing research has produced inconsistent findings regarding the same factors influencing careless responding, potentially due to the moderating effect of questionnaire type. Most studies analyze data from a single questionnaire type, whereas psychological screening questionnaires encompass diverse forms, such as the Patient Health Questionnaire-9 (PHQ-9) [23], Generalized Anxiety Disorder-7 (GAD-7) [24], Insomnia Severity Index (ISI)[25], and Perceived Stress Scale (PSS) [26]. Thus, the same factors may yield different conclusions across different psychological screening instruments. However, fewer studies have examined response behaviors across multiple psychological screening questionnaires within the same participant group.

This study aims to explore the factors influencing careless responding in online psychological screening questionnaires, with the goal of enhancing participants’ conscientiousness and accuracy in completing these instruments. By addressing these factors, we can improve the reliability and validity of psychological screening outcomes, ultimately advancing mental health services.

Methods

Data source

This study utilized data from an internet-based mental health screening conducted among college students at Xinxiang Medical University in 2021 [27]. The screening employed four widely recognized psychological assessment scales: (PHQ-9 [23], GAD-7 [24], ISI [25], and PSS [26]. The response time for each question was meticulously recorded to ensure accurate data collection. Participants were required to provide complete demographic information and respond to all items across the four scales. From the initial pool of 24,367 collected samples, 75 participants were excluded due to missing values, and an additional 56 samples were excluded for providing unrealistic age entries. After these exclusions, the final dataset comprised 24,236 valid samples. Descriptive statistics of the participants in the online psychological screening questionnaires are presented in Table 1.

Table 1. Descriptive Statistics of Online Psychological Screening Questionnaire Samples

Number of respondents	n (%)
All	24236 (100)
Gender	
Male	8718 (36)
Female	15518 (64)
Age	
16-22	20516 (84.7)
23-29	3643 (15)
30-35	77 (0.3)

Educational Level	
Associate degree	1278 (5.3)
Bachelor's degree	22259 (91.8)
Master's degree	666 (2.8)
Doctoral degree	33 (0.1)
Smoking situation	
Never smokes	22468 (92.7)
Former smoker (cumulative smoking >10 packs), but not in the past year	189 (0.8)
Occasional smoker (cumulative smoking <10 packs)	1039 (4.3)
Current smoker (cumulative smoking >10 packs)	540 (2.2)
Drinking situation	
Never drinks	16372 (67.5)
Drank in the past (more than once a week), but not in the past year	282 (1.2)
Drinks occasionally (less than once a week)	7344 (30.3)
Current regular drinker (more than once a week)	238 (1)

Variables definition

The dependent variable in this study was whether participants exhibited careless responding in the psychological screening questionnaires. Careless responding was operationalized based on participants' response times. Response time refers to the duration required for participants to complete a specific task. Previous research has established that each psychological scale has a reasonable response time threshold [28]. Consequently, this study classified responses with times below this threshold as careless.

Specifically, response time thresholds were established based on prior research and empirical observations. David et al. indicated that patients typically take 15 to 30 seconds to complete the nine-item PHQ-9 paper form [29]. Therefore, the response time threshold for the PHQ-9 scale was set at 15 seconds, with responses below this threshold classified as careless. Similarly, the response time thresholds for the PSS, ISI, and GAD-7 scales were set at 20 seconds, 10 seconds, and 10 seconds [30], respectively. The number of careless responses for each questionnaire is summarized in Table 2.

Table 2. Number of Careless Responses for PHQ-9, PSS, ISI, and GAD-7 Questionnaires

	PHQ-9	PSS	ISI	GAD-7
Number of careless answers	n (%)	n (%)	n (%)	n (%)
All	2257 (100)	3295 (100)	2981 (100)	3598 (100)
Gender				
Female	1396 (61.9)	1480 (44.9)	1305 (43.8)	1807 (50.2)
Male	861 (38.1)	1815 (55.1)	1676 (56.2)	1791 (49.8)
Age				
16-22	2111 (93.5)	2702 (82)	2470 (82.9)	3036 (84.4)
23-29	144 (6.4)	583 (17.7)	501 (16.8)	554 (15.4)
30-35	2 (0.1)	10 (0.3)	10 (0.3)	8 (0.2)
Educational Level				

Associate degree	6 (0.3)	164 (5.0)	120 (4.0)	119 (3.3)
Bachelor's degree	2161 (95.7)	2989 (90.7)	2723 (91.4)	3316 (92.1)
Master's degree	86 (3.8)	131 (4)	128 (4.3)	153 (4.3)
Doctoral degree	4 (0.2)	11 (0.3)	10 (0.3)	10 (0.3)
Smoking situation				
Never smokes	2149 (95.2)	2929 (88.9)	2664 (89.4)	3303 (91.8)
Former smoker, but not in the past year	11 (0.5)	50 (1.5)	39 (1.3)	40 (1.1)
Occasional smoker	75 (3.3)	212 (6.4)	184 (6.2)	171 (4.8)
Current smoker	22 (1)	104 (3.2)	94 (3.1)	84 (2.3)
Drinking situation				
Never drinks	1553 (68.8)	2218 (67.3)	1994 (66.9)	2606 (72.4)
Drank in the past, but not in the past year	9 (0.4)	43 (1.3)	35 (1.2)	30 (0.8)
Drinks occasionally	678 (30.0)	991 (30.1)	912 (30.6)	928 (25.8)
Current regular drinker	17 (0.8)	43 (1.3)	40 (1.3)	34 (1)

As shown in Table 2, careless responses were observed in 9.4%, 13.6%, 12.3%, and 14.9% of participants when completing the PHQ-9, PSS, ISI, and GAD-7 questionnaires. To manage extreme outliers, samples with response times exceeding three standard deviations above the average value were removed. This adjustment resulted in final sample sizes of 23,984 for the PHQ-9, 24,133 for the PSS, 24,152 for the ISI, and 24,165 for the GAD-7.

Model selection

To investigate the factors influencing careless responding in online psychological screening questionnaires, binary logistic regression models were applied to the processed samples for the PHQ-9, PSS, ISI, and GAD-7 surveys. This analytical approach allowed for a comprehensive assessment of the key demographic and behavioral predictors contributing to response tendencies.

Results

Empirical Analysis

The results of the binary logistic regression models are presented in Table 3.

Table 3. Regression Results of Careless Responses across Different Questionnaires

Variable	PHQ-9 coefficient	PSS coefficient	ISI coefficient	GAD-7 coefficient
Gender (reference=male)				
Female	-0.160***	-1.111***	-1.110***	-0.920***
Age	-0.331***	0.039***	0.034***	-0.012
Educational Level (reference=associate degree)				
Bachelor's degree	3.184***	0.024	0.209**	0.466***
Master's degree	4.884***	0.372***	0.685***	1.117***
Doctoral degree	3.365***	1.232***	1.195***	1.244***
Smoking situation				

(reference=Never smokes)

Former smoker, but not in the past year	-0.348	0.533***	0.370**	0.412**
Occasional smoker	-0.222*	0.283***	0.208**	0.116
Current smoker	-0.751***	0.108	0.109	0.020

Drinking situation

(reference=Never drinks)

Drank in the past, but not in the past year	-1.056***	-0.356**	-0.455**	-0.859***
Drinks occasionally	-0.050	-0.507**	-0.485***	-0.682***
Current regular drinker	-0.081	-0.398**	-0.365*	-0.695***

Note: * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$

As shown in Table 3, the coefficients for the female gender variable in all four scale models are negative and statistically significant at the 1% level. This indicates that female participants are more conscientious than male participants when completing psychological screening questionnaires, which is consistent with previous studies.

The relationship between age and careless responding varies depending on the type of psychological scale. In the PHQ-9 scale, age exhibits a significant negative correlation with careless responding, indicating that older college students are more likely to complete the questionnaire conscientiously. However, in the PSS and ISI scales, age shows a significant positive correlation with careless responding. This finding diverges from previous research. For instance, Kroenke et al. [31] noted that older individuals generally approach mental health-related questionnaires with greater seriousness. A potential explanation is that older individuals may complete the PHQ-9 more conscientiously because it assesses depressive symptoms, a topic to which older individuals may pay greater attention due to their heightened awareness of emotional health. Additionally, older individuals may be more inclined to attribute stress and insomnia to external factors (e.g., physical aging) rather than internal psychological states [32]. This external attribution bias could further explain their tendency to respond carelessly to the PSS and ISI.

Compared to individuals with an associate degree, those with bachelor's, master's, and doctoral degrees are more likely to exhibit careless responding when completing psychological screening questionnaires. This finding contradicts conventional wisdom, as higher education is typically associated with greater conscientiousness in task completion. The tendency may stem from several factors. First, their deeper awareness of the stigma surrounding mental illness [33,34] could lead them to avoid negative labels by responding carelessly. Second, perfectionistic tendencies among this group [35,36] may make them overly sensitive to questionnaire items, prompting careless responses.

Table 3 reveals that, in the PHQ-9 scale, occasional smokers and current smokers among college students complete the PHQ-9 more conscientiously. However, in the PSS and ISI scales, occasional smokers are more careless when completing these questionnaires. Additionally, former smokers show a significant positive correlation with careless responding in the PSS, ISI, and GAD-7 scales. This phenomenon may be linked to the characteristics of the scales and the psychological motivations associated with smoking behavior. In the PHQ-9, occasional smokers may respond more seriously because smoking behavior is closely tied to depressive symptoms, prompting them to pay greater attention to their emotional state [37]. In contrast, in the PSS and ISI, occasional smokers may respond more carelessly, as they often view smoking as a means to alleviate stress and improve sleep, making them less sensitive to these issues [38]. Former smokers may respond carelessly because they believe they have already addressed smoking-related health concerns, leading them to pay less attention to stress, insomnia, and anxiety [39].

Table 3 reveals that, in the PSS, ISI, and GAD-7 scales, college students with a history of drinking (including past drinkers, occasional drinkers, and current regular drinkers) are more likely to complete the questionnaires conscientiously compared to those who have never consumed alcohol. This finding contradicts common assumptions, as drinking is often thought to impair cognitive function and task focus. A potential explanation is that individuals with a history of drinking may be more attuned to their mental state, leading them to complete the questionnaires more seriously to better understand them.

Pattern Identification

While the study has identified factors influencing careless responding in online psychological screening questionnaires, the specific behavior patterns underlying careless responses remain unclear. Careless responding may manifest in two ways: (1) providing answers without thoroughly reading or processing the questions and (2) randomly selecting response options without meaningful engagement. Understanding these behavior patterns is crucial for improving questionnaire design and ultimately enhancing the validity and reliability of psychological assessments. To explore this, the average response times for each question were calculated separately for careless and careful responders across the PHQ-9, PSS, ISI, and GAD-7 scales. The findings are presented in Figures 1 through 4.

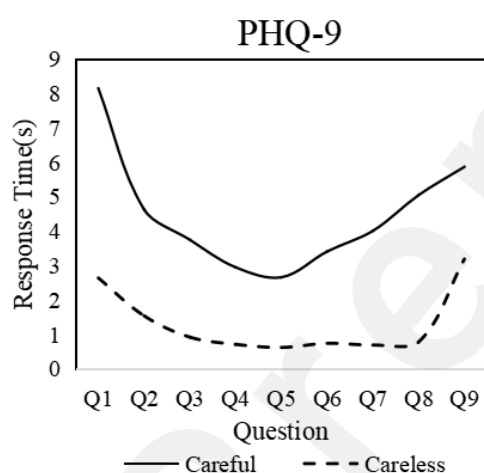


Figure 1 Response Time for Single Questions of PHQ-9

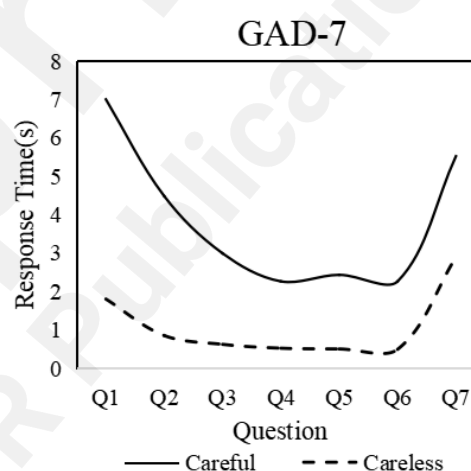


Figure 2 Response Time for Single Questions of GAD-7

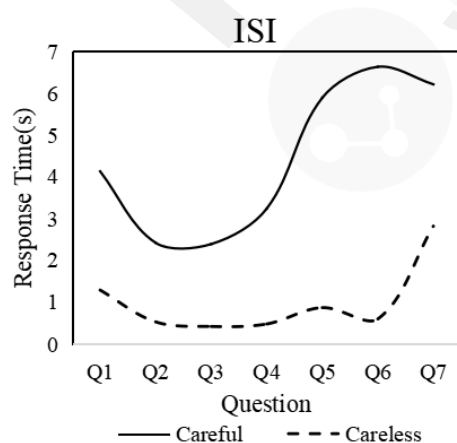


Figure 3 Response Time for Single Questions of ISI

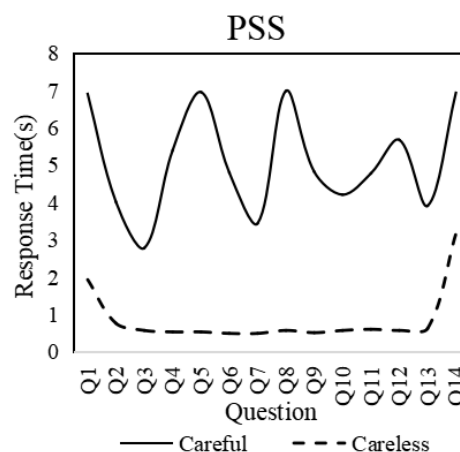


Figure 4 Response Time for Single Questions of PSS

As illustrated in Figures 1 and 2, both careless and careful responders exhibit similar trends in response time per question across the PHQ-9 and GAD-7 scales. However, careless responders demonstrate significantly shorter response times compared to careful responders. This pattern suggests that careless responders tend to skim through questions rapidly, without engaging in thorough reading or thoughtful consideration. In contrast, Figures 3 and 4 reveal distinct behaviors for the ISI and PSS scales: careful responders display variability in response times per question, while careless responders maintain nearly constant response times. This result indicates that they may skip reading the questions altogether, opting instead to select answers automatically.

This behavior can be attributed to the varying levels of importance participants place on different psychological conditions. For the PHQ-9 and GAD-7 scales, which assess depression and anxiety symptoms, even careless responders may still skim through the questions due to the perceived significance of these conditions. While their responses are faster, they may still minimally engage with the content to provide answers. In contrast, for the ISI and PSS scales, which measure insomnia severity and perceived stress. Given that stress and insomnia are often perceived as less critical or less stigmatized than depression and anxiety, participants may disregard the questions entirely, selecting answers automatically to complete the task with minimal effort. This suggests that the perceived importance of the topic influences the depth of engagement, with less salient conditions like stress and insomnia receiving significantly less attention.

Discussion

Principal Findings

This study analyzed data from 24,367 college students who completed four widely used psychological screening questionnaires: PHQ-9, GAD-7, PSS, and ISI, revealing individual factors influencing careless responding in online psychological screening and explored how these factors manifest differently across questionnaire types.

The study found that female participants were more serious than male participants when filling out psychological screening questionnaires. Elder college students were more serious when filling out the PHQ-9 questionnaire but were more likely to be careless when filling out the PSS and ISI questionnaires. Contrary to common sense, individuals with higher education levels showed more careless response behaviors when filling out psychological screening questionnaires. This may be related to the stigmatized perception of mental illness among the highly educated group, their tendency towards perfectionism. In addition, smokers were more serious when filling out the PHQ-9 but showed more careless behaviors when filling out other questionnaires; drinkers were more likely to fill out psychological screening questionnaires seriously than non-drinkers, which may be related to the higher attention paid by drinkers to their own mental health.

When filling out the PHQ-9 and GAD-7 questionnaires, careless responders were characterized by quickly skimming through the questions; while when filling out the PSS and ISI questionnaires, careless responders skipped some questions and directly selected answers. These findings provide important references for questionnaire designers and distributors, suggesting that targeted intervention measures should be taken according to the characteristics of user groups and questionnaire types during the questionnaire design and distribution process to reduce careless response behaviors and improve the effectiveness of psychological screening questionnaires.

Comparison With Previous Work

The findings of this study differ from prior research on careless response behaviors in online questionnaires. Previous studies primarily examined the influence of external factors (e.g., external motivation, social contact, and environmental distractions) and internal factors (e.g., participants'

intrinsic motivation, interest, and personality traits) on careless responses. In contrast, this study delves deeper into how individual factors manifest differently across various types of psychological screening questionnaires. For instance, while prior research generally suggested that individuals with higher education levels are more likely to complete tasks conscientiously, this study found that highly educated individuals exhibited greater careless response behaviors when filling out psychological screening questionnaires. This discrepancy may be attributed to the intrusive nature of certain questionnaire items—highly educated individuals, driven by strong self-esteem, may be reluctant to disclose mental health concerns. Additionally, this study identified variations in how age, smoking, and drinking behaviors influence careless responses across different questionnaire types. These findings diverge from previous conclusions, highlighting the need to account for the interaction between questionnaire type and individual characteristics when analyzing careless response behaviors.

Limitations and Future Work

While this study provides new insights into careless response behaviors in online psychological screening questionnaires, several limitations should be noted. First, the data for this study were collected from college students at Xinxiang Medical University, resulting in a relatively homogeneous sample in terms of age, education level, and cultural background. This may limit the generalizability of the findings. Future research should expand the sample to include individuals of different ages, occupations, and cultural backgrounds to enhance the external validity of the results. Second, this study focused on four commonly used psychological screening tools. Future research should examine a broader range of psychological screening questionnaires to gain a more comprehensive understanding of how careless responding manifests across different contexts. Expanding the scope of research in these directions will provide deeper insights into mitigating response biases and improving the reliability of psychological assessments.

Conclusion

This study analyzed data from college students who completed four common psychological screening questionnaires online, identifying the individual factors that influence careless response behaviors and their heterogeneous manifestations across different questionnaire types. The findings indicate that gender, age, education level, smoking, and drinking habits significantly impact careless response tendencies, with these effects differing across screening tools. Moreover, the study revealed distinct patterns of careless responses depending on the questionnaire type. When completing the PHQ-9 and GAD-7, careless responders tended to skim through questions quickly, whereas in the PSS and ISI, they were more likely to skip questions and select answers without careful consideration. These insights have critical implications for the design and administration of psychological screening tools. They underscore the necessity of developing targeted interventions to reduce careless responding, which may include user-specific engagement strategies, adaptive survey designs, or built-in attention checks tailored to different populations and questionnaire formats. By addressing these challenges, researchers and clinicians can improve the reliability and validity of screening results, leading to more accurate assessments and better-informed mental health interventions.

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Conflicts of Interest

None declared.

Abbreviations

RCT: Randomized Controlled Trial

COVID-19: Corona Virus Disease 2019

PHQ-9: Patient Health Questionnaire-9

GAD-7: Generalized Anxiety Disorder 7

ISI: Insomnia Severity Index

PSS: Perceived Stress Scale

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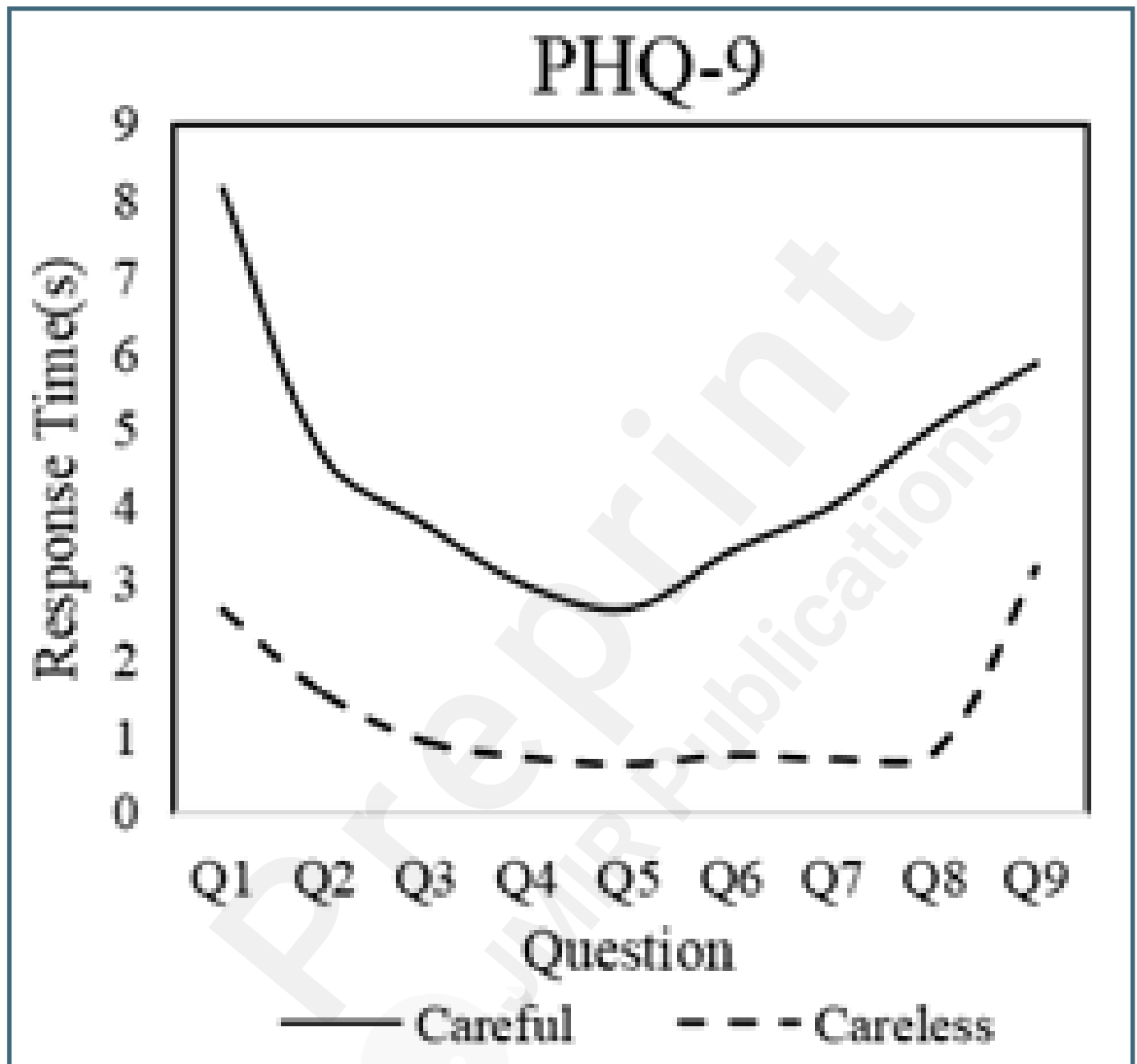
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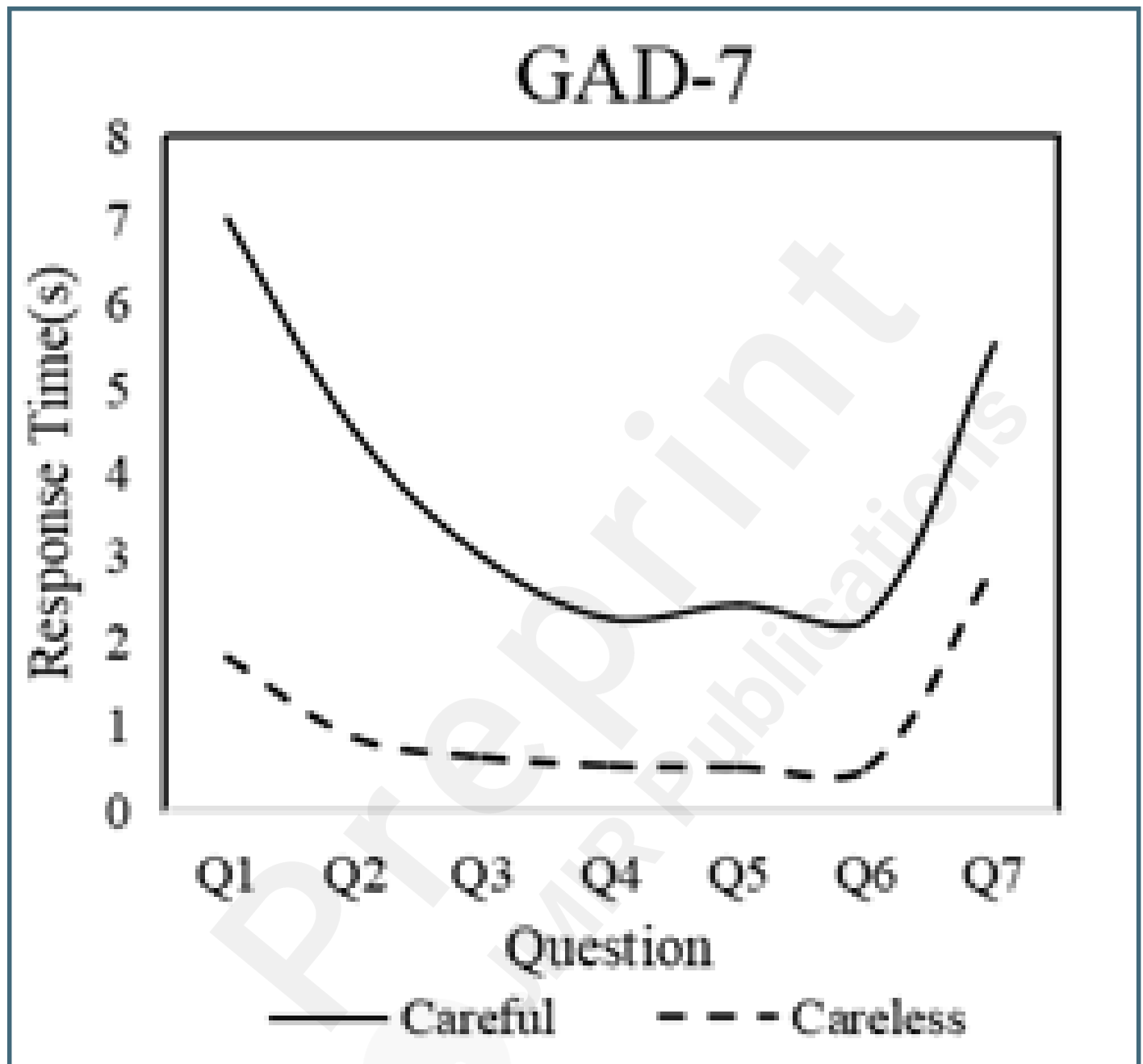
Supplementary Files

Figures

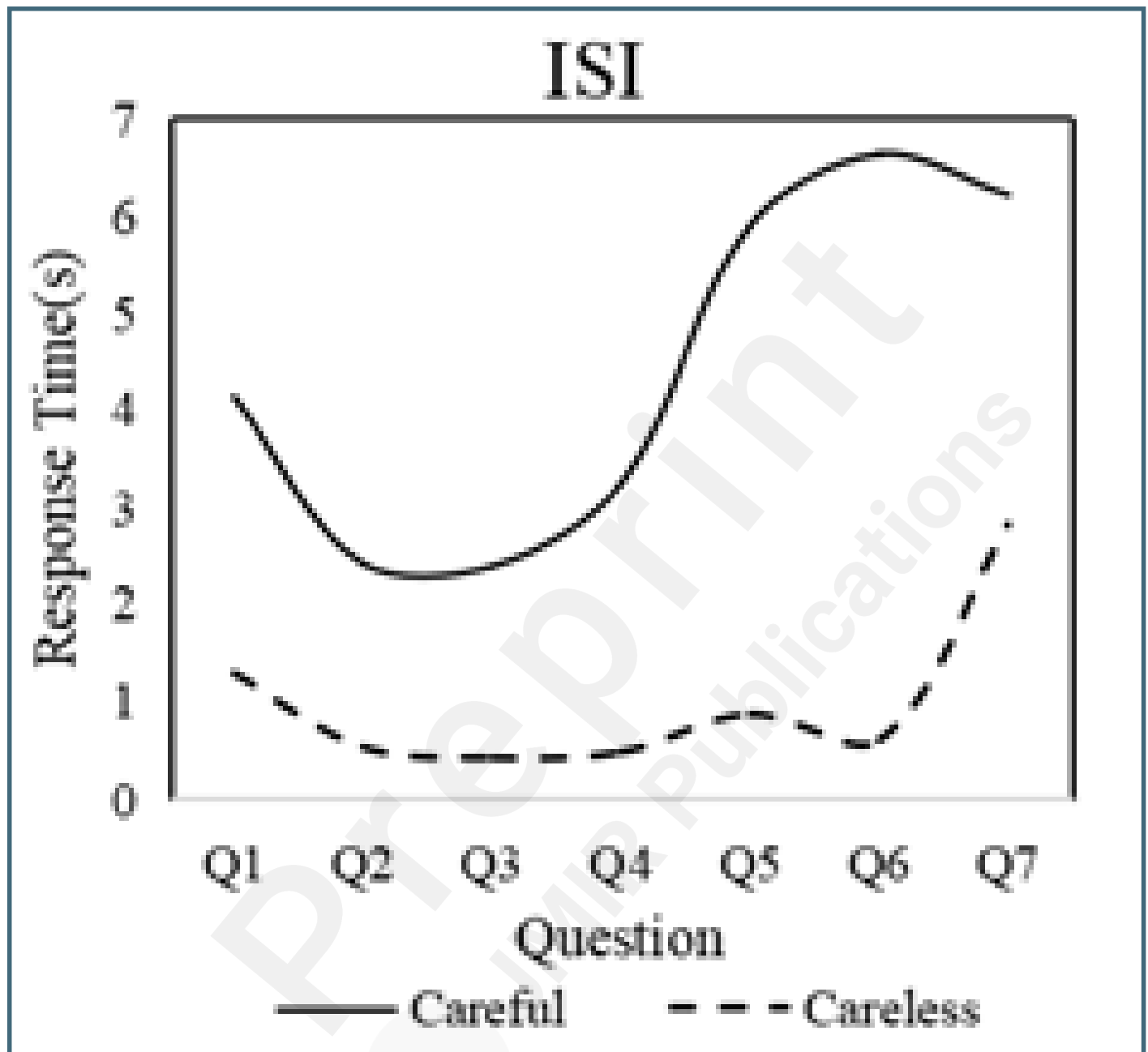
Response time for single questions of PHQ-9.



Response time for single questions of GAD-7.



Response time for single questions of ISI.



Response time for single questions of PSS.

