



# Who uses chatgpt? The role of moral identity in predicting the use of chatgpt

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## Abstract

The popularity of Artificial Intelligence-based tools is rapidly growing. The broad availability of such technology offers immediate assistance in various tasks, from students' graded assignments to employees' written work. We aimed to examine whether the Big Five personality traits and the self-importance of moral identity predicted the use of ChatGPT for writing tasks at the time of ChatGPT's growing popularity (i.e., January 2023). At the time, ChatGPT was a novelty that sparked controversy over its impact on education. Its release to public called into question the point of giving written assignments, both in schools and universities, and caused uncertainty about the authorship of written reports in other sectors. In this study, a sample of 420 American students (59% female) and 492 Americans from a community sample (56.5% female) completed the Ten-Item Personality Inventory, the Self-Importance of Moral Identity Scale, and answered questions about ChatGPT usage. Unfortunately, personality could not be included in the final analyses due to TIPI's poor reliability. Both dimensions of self-importance of moral identity appeared to be significant. We found that internalization was negatively related to ChatGPT usage, while symbolization was positively (but only in the community sample) related to ChatGPT usage. We discuss these results in the context of further AI development and its impact on work and education.

**Keywords** ChatGPT · Personality · Self-importance of moral identity · Artificial intelligence

## Introduction

In the last few years, probably no other technology has been as widely used and discussed by the public as ChatGPT (Gorichanaz, 2023). This machine learning model, an algorithm based on a massive dataset of text from the Internet, is a generative mechanism able to produce text

near-instantaneously and regenerate brand-new responses on request (Elkins & Chun, 2020). In the industry, it has been called “the best artificial intelligence chatbot ever released to the general public” (Roose, 2022, p. 1). This fame is well-earned: ChatGPT can engage in “human-like” conversations, write essays, poems, and code, translate languages, summarize text, generate countless ideas, and even pass prestigious exams, such as Wharton's MBA exam (Pavlik, 2023; Terwiesch, 2023; Xiang, 2023).

The variety of possibilities for using ChatGPT is promising but also alarming: Teachers worry about its negative impact on students (Herman, 2022). It was only a matter of time before concerns were raised about the independence of students' work, including homework essays (for an overview of ChatGPT assessment in education, see Kasneci et al., 2023; Rudolph et al., 2023; Tlili et al., 2023). This research aimed to establish how extensive this problem is, what proportion of students know and use ChatGPT, and who decides to use ChatGPT for school assignments.

However, ChatGPT's use extends beyond the academic field. It is a broadly available tool and is used for various

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purposes by different groups. Thus, comparing the results across two samples—students and community—could reveal commonalities and group-specific differences in the use of ChatGPT. For this reason, we also examined a community sample to investigate whether the use of ChatGPT for ready-made text for one's assignments is a problem specific to the group of students or if it extends to work-related contexts in general.

January 2023 was a time when the novelty of ChatGPT was inspiring to some and alarming to others. Discussed were concerns in the sector of education (e.g., Susnjak, 2024; Westfall, 2023) - some schools even forbade the use of ChatGPT due to fear of students' reliance on its output and impairment of their abilities of critical thinking and problem solving (Dans, 2023; Wingard, 2023). At the same time more and more guides appeared explaining the mechanics and use of ChatGPT (e.g., Garg, 2022; Dev, 2023). It was yet unclear what newer versions could bring and how would we use them in our everyday work and education. One thing was certain - ChatGPT, as a representative of AI tools at the time, will somehow reform the use of the Internet, including the contexts of education and work.

Our study tested what personality traits (Costa & McCrae, 1992) may be connected with using ChatGPT for generating ready-made text for school, academic, or work assignments. Personality is the most commonly tested parameter influencing human behavior (for an overview, see Schultz & Schultz, 2016), including school behavior (Resing et al., 1999) and the use of new technologies (Barnett et al., 2015; Sorokowski et al., 2015).

*Personality.* This complex composition of psychological traits is an individually differentiating variable that is relatively stable over time (Cobb-Clark & Schurer, 2012; Schultz & Schultz, 2016). Across years of personality research, many theories have addressed the structure of personality (e.g., Catell, 1950; Eysenck & Eysenck, 1987; Golberg, 1993; Skinner, 1965). Currently, the most commonly used in psychological studies is the Five-Factor Model (FFM; Costa & McCrae, 1992), also known as the Big Five Personality Theory (McCrae & Costa, 2008). This model presents five potentially underlying personality traits: extraversion, emotional stability, agreeableness, conscientiousness, and openness to experience. We had specific predictions regarding two of these personality traits.

First, as openness to experience is characterized by intellectual openness to ideas and mental flexibility (McCrae & Costa, 1997a, b) and predicts the acceptance of technology (Seibert et al., 2021; Sindermann et al., 2022), individuals scoring high on this dimension could be more likely to experiment with the use of ChatGPT and try to find a

helpful, sensible application for it in everyday life. Furthermore, openness to experience is known to be one of the factors that predict the acceptance of technology (Seibert et al., 2021; Sinderman et al., 2022). Using AI to complete tasks may help achieve better results quicker, but this can also be interpreted as taking unjust shortcuts to assignment realization because others who have more specific abilities or devote more time to the task may achieve similar results. Thus, a second prediction was that conscientiousness could be correlated with ChatGPT usage, as it has been found to predict personal technology use. For instance, lower conscientiousness is related to excessive technology use (Buckner et al., 2012) and more frequent use of social networking sites (Wilson et al., 2010). Higher conscientiousness is negatively related to all kinds of Internet activity except for searching for information (Lu et al., 2022). Therefore, we hypothesized that lower conscientiousness would be related to using ChatGPT for written tasks and assignments.

Furthermore, as using ChatGPT for writing assignments could be understood as a behavior bordering on plagiarism (see Anders, 2023; Westfall 2023), we attempted to establish whether a particular differentiator might be the self-importance of moral identity (Aquino & Reeds, 2002). Past research has already connected this trait with unethical behaviors (Hertz & Krettenauer, 2016; Reynolds & Ceranic, 2007). For example, moral identity was shown to mediate the relationship between religiosity and aggression (Hardy et al., 2012), spirituality and “doing good” (Rodriguez-Rad & Ramos-Hildago, 2018), self-regulation and rule-breaking (Hardy et al., 2014) or ethical leadership and relationship conflicts at workplace (Mayer et al., 2012). People with low (vs. high) moral identity are more likely to cheat at high-competition tasks (Vadera & Pathki, 2020) and are less likely to compensate after acting unethically (Mulder & Aquino, 2013).

*Self-Importance of Moral Identity.* Another predictor of using ChatGPT for academic assignments could be an individual's perception of morality and, specifically, how important it is to be moral (Aquino & Reeds, 2002). The self-importance of moral identity can shape people's behavior. Hertz and Krettenauer's metaanalyses (2016) support the idea that moral identity predicts moral behavior in both prosocial behavior and avoidance of antisocial behavior. Using ChatGPT to generate ready-made text for one's work or assignments could, especially at the beginning of its popularity, be considered unethical. Therefore, the self-importance of moral identity might influence people's decisions to use ChatGPT to write their work (Aquino & Reeds, 2002; Hertz & Krettenauer, 2016).

In the theory of self-importance of moral identity (as specified by Aquino & Reeds, 2002), there can be two dimensions distinguished: what kind of person one wants to be (internalization) and how one wants to be perceived (symbolization). Internalization is related to the self-importance of moral characteristics. High internalization is related to being more willing to donate money anonymously or extend love and status to strangers. Symbolization refers to the social demonstration of these characteristics: high symbolization is related to being more willing to become a social group member, volunteer, or be a good student or employee who fulfills duties well. Both of these dimensions influence how situational cues regulate moral behavior (Boegershausen, et al., 2015). As some may consider the use of ready AI-created text as unethical, unfair behavior (e.g., Anders, 2023; Oravec, 2023), it is less likely to be used by people who perceive it important to be a fair and moral person. Thus, we hypothesized that higher internalization would negatively predict ChatGPT usage for completing assignments (as cheating would probably break internal moral norms). Individuals who value being a moral person would probably be less likely to use ChatGPT to complete their tasks or assignments, as it would be inconsistent with their moral standards. In this context, shifting responsibility to an AI-generated text can be perceived as unethical and unfair behavior (Anders, 2023; Oravec, 2023) that is less likely to be committed by individuals with a strong sense of self-importance of one's moral identity (Hertz & Krettenauer, 2016).

Breaking moral rules usually elicits negative emotions such as guilt or shame in the wrongdoer (Cohen et al., 2012; Giner-Sorolla, 2012; Prinz & Nichols, 2010; Tangney et al., 2007), so individuals with higher moral internalization and symbolization should be less likely to expose themselves to the consequences of their moral violations. On the one hand, higher symbolization might positively predict ChatGPT use, as someone who wants to be perceived as moral may use immoral ways to achieve this aim (Atran & Gómez, 2018; Mulder & Aquino, 2013). On the other hand, higher symbolization could be negatively related to its use, as internalization usually correlates positively with symbolization (e.g., Aquino & Reed, 2002; Paruzel-Czachura & Blukacz, 2021), and people who care about morality should (theoretically) care about their internal and external moral self-image (Aquino & Kay, 2018; Hardy & Carlo, 2011).

*Other variables.* In addition to the Big Five personality and Self-Importance of Moral Identity measures, we controlled for participants' age, gender, and internet usage, as each of these might be related to ChatGPT usage (Sakirin & Said, 2023). We also checked participants' familiarity and attitudes toward this brand-new and unexplored tool (at the time of data collection).

## Method

The study was approved by the ethics committee at the Institute of Psychology, University of Wrocław. The study complies with the 1964 Declaration of Helsinki and its later addenda. All participants provided informed consent to participate in the study.

## Participants

The study was conducted between January 22–24, 2023 (i.e., within two months of the first release of ChatGPT-3.5 on November 30, 2022). We only asked participants about ChatGPT usage in general, without specifying the version, to avoid confusion as version 3.5 was the first version released to public in a form of an interactive Chat. That also means that whoever used ChatGPT at a time, had used this version.

We used a market research company to collect the data from two samples: American students ( $N=505$ ) and Americans from the community sample ( $N=505$ ) through an online survey. In the first step, we removed data from respondents unfamiliar with ChatGPT, leaving 202 students and 114 individuals from the community sample. Next, we removed data from participants who declined to provide an answer regarding student status (only in students' sample) and provided inconsistent or impossible data (answering "no" to being familiar with ChatGPT but "yes" to using it to generate ready-made text for own work or academic assignment, using the Internet more than 24 h a day, and being 200 of age). After excluding invalid data, the final sample of students consisted of 191 participants (51.3% females) aged 18–53 ( $M=22.4$ ,  $SD=4.11$ ), and the final sample from the community sample consisted of 109 participants (39.4% females) aged 18–74 ( $M=38.5$ ,  $SD=14.8$ ). The data are available and can be accessed at: [https://osf.io/4btkc/?view\\_only=34c76b9026a64d1590ae912b478d8fff](https://osf.io/4btkc/?view_only=34c76b9026a64d1590ae912b478d8fff).

## Procedure

The online survey included items regarding demographic data, The Ten Item Personality Inventory (TIPI; Gosling et al., 2003), The Self-Importance of Moral Identity Scale (SIMIS; Aquino & Reeds, 2002), and questions concerning ChatGPT usage.

The TIPI is widely used to determine personality traits. It is answered on a 7-point scale from 1 (*disagree strongly*) to 7 (*agree strongly*), with two items for each personality trait: extraversion (e.g., "I see myself as extraverted, enthusiastic"), emotional stability (e.g., "I see myself as calm, emotionally stable"), conscientiousness (e.g., "I see myself

as dependable, self-disciplined”), agreeableness (e.g., “I see myself as sympathetic, warm”), and openness to experience (e.g., “I see myself as open to new experiences”). The reliability of the TIPI measures tested with Cronbach’s  $\alpha$  and McDonald’s  $\omega$  were extremely low for all subscales in the student’s sample: extraversion ( $\alpha=0.329$ ,  $\omega=0.329$ ), agreeableness ( $\alpha=0.007$ ,  $\omega=0.006$ ), conscientiousness ( $\alpha=0.255$ ,  $\omega=0.261$ ), emotional stability ( $\alpha=0.373$ ,  $\omega=0.375$ ) and openness to experience ( $\alpha=0.257$ ,  $\omega=0.263$ ) and in community sample: extraversion ( $\alpha=0.556$ ,  $\omega=0.557$ ), agreeableness ( $\alpha=0.348$ ,  $\omega=0.364$ ), conscientiousness ( $\alpha=0.318$ ,  $\omega=0.330$ ), emotional stability ( $\alpha=0.511$ ,  $\omega=0.524$ ) and openness to experience ( $\alpha=0.397$ ,  $\omega=0.413$ ) Due to the unsatisfactory reliability of TIPI, we decided not to include personality traits in subsequent analyses.

The Self-Importance of Moral Identity Scale (SIMIS) measures two components of moral identity: internalization and symbolization. First, participants were asked to imagine a person with particular moral characteristics (e.g., fair, kind, compassionate, caring). Next, they rated ten statements, five for internalization (e.g., “It would make me feel good to be a person who has these characteristics”) and five for symbolization (e.g., “The types of things I do in my spare time (e.g., hobbies) clearly identify me as having these characteristics”). Items were answered on a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The reliability of both subscales was satisfactory in both samples (in students’ sample: internalization  $\alpha=0.613$ ,  $\omega=0.630$ , symbolization  $\alpha=0.762$ ,  $\omega=0.763$ ; in general sample: internalization  $\alpha=0.710$ ,  $\omega=0.730$ , symbolization  $\alpha=0.789$ ,  $\omega=0.791$ ).

Participants were also asked whether they were familiar with ChatGPT and had ever used it to generate text. Students were asked if they had ever submitted an academic assignment (e.g., an essay) using ChatGPT. Participants from a

community sample were asked if they had ever generated ready-made text to complete own work. These questions were answered on a *yes/no* scale. Participants in both samples also assessed—on a 5-point scale from 1 (*definitely no*) to 5 (*definitely yes*)—the extent to which they agreed with the following statements: “Do you think it is a good thing that ChatGPT was created?”, “Do you like having ChatGPT broadly available?”, “Do you think that ChatGPT is more of an opportunity than a threat to society?”, and “Do you consider using ChatGPT for school and/or academic assignments or essays if it was never detected?”. Participants were also asked to assess how ethical—on a scale from 1 (*very unethical*) to 5 (*very ethical*)—they thought it was to submit work written with ChatGPT. Finally, participants reported how many hours per day they spent on the Internet.

## Results

### Student sample

At the time of the study, 191 participants (45.5%) were familiar with ChatGPT (version 3.5). Of those, 131 (68.8%) had already used it to write school or academic assignments. Students who were familiar with ChatGPT tended to have positive feelings about it ( $M=3.85$ ,  $SD=0.97$ ), liked having it broadly available ( $M=3.92$ ,  $SD=0.88$ ), and were more likely to perceive it as an opportunity than a threat to society ( $M=3.64$ ,  $SD=1.12$ ). On average, they would also be more likely to use it to complete an assignment if this was never detected ( $M=3.58$ ,  $SD=1.11$ ). The ethicality of submission of work written with ChatGPT was, on average, assessed neutrally ( $M=3.46$ ,  $SD=1.12$ ).

Binomial logistic regression was used to determine whether the self-importance of moral identity can predict whether participants have already written an assignment with ChatGPT. The dependent variable was participants’ answers about having already written an assignment using ChatGPT; independent variables included the internalization and symbolization scores, as well as Internet daily use, age, and gender.

The model fitted the data well (McFadden’s  $R^2=0.13$ ;  $\chi^2=30.1$ ;  $p<.001$ ). Internalization was a significant, negative predictor ( $b = -0.84$ ;  $p=.001$ ), such that those with higher internalization were less likely to use ChatGPT for written work. Age was a significant positive predictor of writing an assignment using ChatGPT ( $b=0.23$ ;  $p<.01$ ), such that older participants were more likely to use it. The full model is presented in Table 1.

**Table 1** The binary logistic regression model predicting whether US students familiar with ChatGPT had already written an assignment with ChatGPT ( $N=191$ )

Model fit measures					
Overall Model Test					
Deviance	AIC	$R^2$ McF	$\chi^2$	$df$	$p$
208	220	0.126	30.1	5	<.001
Model coefficients – already written an assignment with ChatGPT					
Predictor	Estimate	SE	Z	$p$	Odds ratio
Intercept	-1.63	1.83	-0.89	.374	0.20
Internalization	-0.84	0.26	-3.27	.001	0.43
Symbolization	0.28	0.25	1.13	.260	1.32
Internet daily usage	-0.04	0.04	-1.06	.290	0.96
Age	0.23	0.07	3.17	.002	1.26
Gender (1: male, 0: female)	-0.52	0.35	-1.5	.134	0.59

## Community sample

At the time of the study, 109 participants (22.2%) were familiar with ChatGPT. Of those, 61 (56%) have already used it to generate ready-made text to complete a written task. In general, participants familiar with ChatGPT tended to have positive feelings about its creation ( $M=3.79$ ,  $SD=0.74$ ), liked having this tool broadly available ( $M=3.8$ ,  $SD=1.14$ ), and were likely to perceive it as an opportunity than a threat to society ( $M=3.73$ ,  $SD=1.13$ ). The ethicality of submission of work written with ChatGPT was assessed rather positively ( $M=3.59$ ,  $SD=1.2$ ).

A binomial logistic regression model was conducted to determine whether the self-importance of moral identity predicts the use of ChatGPT for generating ready-made text for written tasks. The participants' answers to whether they had already used ChatGPT in this regard were included as the dependent variable; independent variables included internalization and symbolization scores, Internet daily use, age, and gender.

The data fitted the model well (McFadden's  $R^2=0.27$ ,  $\chi^2 = 40.3$ ,  $p<.001$ ). Symbolization was a significant, positive predictor ( $b=1.5$ ,  $p<.001$ ), such that those with higher symbolization were more likely to use ChatGPT for written work. Internalization was a significant negative predictor ( $b = -0.95$ ,  $p<.01$ ), such that those with higher internalization were less likely to use ChatGPT for written work. The full model is presented in Table 2.

## Discussion

In this study, we aimed to examine the role of Big Five personality traits and the self-importance of moral identity in using ChatGPT for completing written work. Unfortunately, the low reliability of TIPI did not allow us to include personality traits in the analyses. Furthermore, we tested how widely ChatGPT was used by US students and community samples during the earliest days of its public availability (version 3.5, in January 2023) and what proportion of students and community samples had already generated ready-made text to complete their own work.

The concerns over ChatGPT use in education have been emphasized since its release (Lo, 2023), with some schools deciding to ban it (Johnson, 2023; Yu, 2023). Educators focused on rapid changes and new challenges in grading essays and other forms of written homework (Roose, 2023; Townsend, 2023). Some suggested that verifying students' knowledge must take new forms because existing ones are no longer reliable (Leffer, 2023). Differences in text written by humans or generated by ChatGPT are hard to recognize, making it difficult to hold students who overuse

**Table 2** The binary logistic regression model predicting whether participants from the community sample familiar with ChatGPT had generated ready-made text for written tasks ( $N=109$ )

Model fit measures					
Overall Model Test					
Deviance	AIC	$R^2$ McF	$\chi^2$	$df$	$p$
109	121	0.27	40.3	5	<.001
Model coefficients – generated ready-made text for the written tasks					
Predictor	Estimate	SE	Z	$p$	Odds ratio
Intercept	-0.58	1.84	-0.32	.751	0.56
Internalization	-0.95	0.34	-2.76	.006	0.39
Symbolization	1.5	0.39	3.88	<.001	4.48
Internet daily usage	-0.01	0.05	-0.23	.822	0.99
Age	-0.03	0.02	-1.83	.068	0.97
Gender (1: male, 0: female)	0.47	0.52	0.90	.369	1.59

it accountable. ChatGPT can generate school essays that match or even exceed the quality of student-written work, potentially leading to unfair grading (Waltzer et al., 2023).

Controversies surrounding ChatGPT were not only related to the field of education but also work-related contexts. For instance, some concerns were raised over the negative impact of using ChatGPT on employee's creativity and critical thinking (e.g., Dans, 2023). Also, the broad availability of Artificial Intelligence tools, such as (but not limited to) ChatGPT, awakened the fear of dehumanization in the workplace (Fritts & Cabrera, 2021; Woodruff, et al., 2024). Some were worried that the prevalent use of ChatGPT would reduce human interaction or personal relations at work by, for example, creating workplace trust issues (Haggart, 2023).

In the student sample, almost half of our participants were familiar with ChatGPT, and most of these (68%) had already used it to write an academic assignment. In the community sample, only about one-fifth of the participants (22.2%) were familiar with ChatGPT. Of those, over half (56%) had already used it to generate ready-made text for a written task. As this study was conducted at the beginning of ChatGPT's growing popularity, these numbers grew over the following months. For instance, other studies found that the monthly number of visits to ChatGPT's website increased from 600 million in January 2023 to 1.8 billion in May 2023 (Duarte, 2024).

In both samples, we ascertained whether an individual's self-importance of their moral identity could predict their previous experiences with using ChatGPT to submit academic assignments or any written work. We found support for the hypothesis about internalization. In both samples, participants who cared more about being moral were less likely to complete assignments with the help of ChatGPT. We only found support for the hypothesis regarding symbolization in the community sample. In general, the results

are partially consistent with meta-analyses, showing that moral identity predicts moral outcomes overall (Hertz & Krettenauer, 2016; Lefebvre & Krettenauer, 2019). However, the two dimensions of self-importance of moral identity are typically unequal predictors of moral behavior (Hertz & Krettenauer, 2016); internalization tends to be a stronger predictor than symbolization (Jennings et al., 2014). Therefore, it seems unsurprising that symbolization did not significantly predict using ChatGPT for written assignments in both samples. Bearing in mind the specific character of the students' sample, there is a possibility that some other factors moderated the effect; we also might not have had sufficient power to detect small effects. Overall, our results suggest that internalization is more strongly related to ethically controversial behavior than symbolization, but more studies are needed to verify this possibility.

We found that in the students' sample, older individuals were more likely to have used ChatGPT for written assignments, although this result should be interpreted cautiously as the age in this sample was relatively homogenous: Age variation was limited, as all participants were students. In both samples we also tested the effect of gender, but this was not a significant predictor of using ChatGPT for written assignments. This outcome is consistent with previous studies on the self-importance of moral identity, which also tend not to find evidence for the effects of gender on unethical behavior (only moral emotions; Lefebvre & Krettenauer, 2019).

## Limitations

We encountered a challenge of unsatisfying reliability in TIPI, which resulted in the exclusion of TIPI from analyses. In both studies, even the highest reliability index in TIPI was lower than desired, such as Cronbach's alpha of at least 0.75 (Tavakol & Dennick, 2011). These low values may partially be due to short measures' limitations: with fewer items, a scale's psychometric properties tend to be lower than in longer measures (Kruyen et al., 2013; Rammstedt & Beierlein, 2014). Obtaining such results brings into question whether shortening psychological measures does not come at the expense of their informative function. It is also important to bear in mind that the TIPI was developed to be a brief measure of the Big-Five personality dimensions (Gosling et al., 2003). This entails that any misreading of a single item by a participant may distort their profile, and bias overall research findings. While short scales are popular due to their ease of use, they may not provide the same level of valuable information as their longer counterparts (Credé et al., 2012; Thørrisen & Sadeghi, 2023). Although the TIPI authors (Gosling et al., 2003) acknowledged that it achieves

lower reliability values measured by Cronbach's alpha than the original tool for measuring the Big Five traits, authors refer to favorable results for the test-retest method. Since our research did not involve the test-retest design, and the results obtained in the alpha analysis were very low, we concluded that using TIPI would involve too high a risk of drawing incorrect inferences about the studied relationships.

Both studies were conducted at the very beginning of the broad availability of AI tools. Over time, ChatGPT users have discovered new potential uses of this tool. Also, the first version released to the public (ChatGPT-3.5) was programmed differently than the newer versions (e.g., ChatGPT-4, released on March 2023 is claimed to be more accurate, has better reasoning ability and contextual understanding than ChatGPT-3.5; General AI, 2023). This development probably as well changes the possibilities offered to users nowadays. For instance, ChatGPT can be used both to cheat and to enhance personal potential (Bahrini et al., 2023). Today, many people realize that the potential functions and applications of AI are countless (for examples, see Nah et al., 2023). Many students employ it to generate ideas or create initial drafts that are subsequently refined, illustrating the potential synergy between technology and human creativity (Currie, 2023; Grassini, 2023). At the time of the study, we did not differentiate between the forms of interactions with ChatGPT (Bang & Park, 2023; Cotton et al., 2023). Further research is essential to elucidate how people students perceive these. Education will almost certainly face changes in homework forms, as less self-disciplined individuals can easily earn good grades for AI-generated work. Nevertheless, the same tool can also be used to help people work better and allow them to learn from it.

## Future directions

There are several other further directions for studies on the characteristics of people using ChatGPT based on previous work on engagement with technology. For example, in the academic setting, it would be worth testing whether an individual's academic motivation (e.g., intrinsic or extrinsic motivation; Fagan et al., 2008; Murdock & Anderman, 2006) is a significant predictor of ChatGPT use. Potentially, this could reveal if individuals driven by a genuine passion for learning are less likely to rely on AI when working on assignments. The same question can be considered in any other field where human creation can easily be replaced. Passion and internal drive should prevent people from relying on AI entirely, but they could still use it to ease some of the workload.

Another direction to explore is whether an individual's comfort level and proficiency with technology might

influence ChatGPT use (Erdem et al., 2018; Song et al., 2013). It could be hypothesized that more tech-savvy individuals are more inclined to use ChatGPT for their work, while those less comfortable with technology use it as a support tool or not at all.

Furthermore, future studies could test the role of task complexity (Sultana & Nemati, 2021; Xu et al., 2020). The complexity of assignments—requiring different levels of knowledge or very specific and unusual information—could play a role in decision-making about gaining external help from AI. It could be hypothesized that people use ChatGPT more frequently for written work, which is perceived as more straightforward than complex or nuanced tasks, both at work and in academia. AI (including ChatGPT) is only newly available for most internet users, so many other factors might be tested to understand such matters.

Overall, the assessment of individual traits and their relationship with technology can be influenced by various factors, including the context in which the technology is used, the specific tasks involved, and the individual's motives for utilizing it.

## Conclusions

In conclusion, our study aimed to verify what proportion of people used ChatGPT for academic and work assignments and how prevalent the use of ChatGPT for written tasks was across two student and community samples. At a time, it was a controversial tool, seen by some as a threat for critical thinking, and by some as time saving tool. As every novelty, it sparked a debate on whether it would enhance or impair our work, abilities and our performance. The study revealed that, in January 2023, nearly half of students knew about ChatGPT, and most had already used it to complete their own written work. In the community sample, one-fifth of the sample was familiar with ChatGPT, and over half had already used it to generate ready-made text for their written work.

We found that those with lower moral internalization were more likely to use ChatGPT for writing assignments. In the community sample, we also found that those with higher moral symbolization were more likely to use ChatGPT to generate ready-made text for their work, but this result was not replicated in the student sample, so it needs further examination.

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**Data availability** The data are available and can be accessed at: [https://osf.io/4btkc/?view\\_only=34c76b9026a64d1590ae912b478d8ff](https://osf.io/4btkc/?view_only=34c76b9026a64d1590ae912b478d8ff).

## Declarations

**Ethical approval** Ethical approval of the study protocol was provided by the ethics committee at the Institute of Psychology, University of Wrocław.

**Competing interest** The authors declare they have no financial interests.

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## References

- Anders, B. A. (2023). Is using ChatGPT cheating, plagiarism, both, neither, or forward thinking? *Patterns*, 4(3), 100694. <https://doi.org/10.1016/j.patter.2023.100694>
- Aquino, K., & Reed, A., II. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology*, 83(6), 1423–1440. <https://doi.org/10.1037/0022-3514.83.6.1423>
- Aquino, K., & Kay, A. (2018). A social cognitive model of moral identity. In K. Gray & J. Graham (Eds.), *Atlas of Moral Psychology* (pp. 133–140). The Guilford Press.
- Atran, S., & Gómez, Á. (2018). What motivates devoted actors to extreme sacrifice, identity fusion, or sacred values? *Behavioural and Brain Sciences*, 41, e193. <https://doi.org/10.1017/S0140525X18001565>
- Bahrini, A., Khamoshifar, M., Abbasimehr, H., Riggs, R. J., Esmaili, M., Mastali, M., & Pasehvar, M. (2023). ChatGPT: Applications, opportunities, and threats. Preprint in: *IEEE Systems and Information Engineering Design Symposium*.
- Bang, J., & Park, G. (2023). Uprising of ChatGPT and ethical problems. *Robotics & AI Ethics*, 8, 1–11. <https://doi.org/10.22471/ai.2023.8.01>
- Barnett, T., Pearson, A. W., Pearson, R., & Kellermanns, F. W. (2015). Five-Factor Model personality traits as predictors of perceived and actual usage of technology. *European Journal of Information Systems*, 24, 374–390. <https://doi.org/10.1057/ejis.2014.10>
- Boegershausen, J., Aquino, K., & Reed, A. (2015). Moral identity. *Current Opinion in Psychology*, 6, 162–166. <https://doi.org/10.1016/j.copsy.2015.07.017>
- Buckner, J. E., Castille, C. M., & Sheets, T. L. (2012). The Five Factor Model of personality and employees' excessive use of technology. *Computers in Human Behavior*, 28(5), 1947–1953. <https://doi.org/10.1016/j.chb.2012.05.014>
- Cattell, R. B. (1950). *Personality: A systematic theoretical and factual study*. McGraw-Hill. 10.1037/10773-000.
- Cobb-Clark, D. A., & Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters*, 155(1), 11–15. <https://doi.org/10.1016/j.econlet.2011.11.015>

- Cohen, T. R., Panter, A. T., & Turan, N. (2012). Guilt proneness and moral character. *Current Directions in Psychological Science*, 21(5), 355–359. <https://doi.org/10.1177/0963721412454874>
- Costa, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and Individual Differences*, 13(6), 653–665. <https://doi.org/10.1016/0191-8869/92/90236-1>
- Cotton, D. R. E., Cotton, P. A., & Shipway, R. J. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 61(2), 228–239. <https://doi.org/10.1080/14703297.2023.2190148>
- Credé, M., Harms, P., Niehooster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five Personality Traits. *Journal of Personality and Social Psychology*, 102(4), 874–888. <https://doi.org/10.1037/a0027403>
- Currie, G. M. (2023). Academic integrity and artificial intelligence: Is ChatGPT hype, hero or heresy? *Seminars in Nuclear Medicine*, 53(5), 719–730. <https://doi.org/10.1053/j.semnuclmed.2023.04.008>
- Dans, E. (2023). ChatGPT and the decline of critical thinking. *Insights*. Published: January 27, 2023. Available at: <https://www.ie.edu/insights/articles/chatgpt-and-the-decline-of-critical-thinking/>
- Dev, J. (2023). Using ChatGPT in Education: Guide for Teachers. Edtech Empire. Published: February 19, 2023. Available at: <https://edtechempire.com/using-chatgpt-in-education-guide-for-teachers/>
- Duarte, F. (2024). Number of ChatGPT users (Aug 2024). *Exploding Topics*. Published: July 27, 2024. Available at: <https://explodingtopics.com/blog/chatgpt-users>
- Elkins, K., & Chun, J. (2020). Can GPT-3 pass a writer's Turing test? *Journal of Cultural Analytics*, 5(2). <https://doi.org/10.22148/001c.17212>
- Erdem, A., Gürçan, U., & Mehpare, S. (2018). High school students' proficiency perceptions to the usage of technology products at physics lessons. *Turkish Online Journal of Educational Technology*, 17(2), 55–67.
- Eysenck, H. J., & Eysenck, M. W. (1987). *Personality and individual differences*. New York, Plenum.
- Fagan, M. H., Neill, S., & Wooldridge, B. R. (2008). Exploring the intention to use computers: An empirical investigation of the role of intrinsic motivation, extrinsic motivation, and perceived ease of use. *Journal of Computer Information Systems*, 48(3), 31–37. <https://doi.org/10.1002/bjs.11326>
- Fritts, M., & Cabrera, F. (2021). AI recruitment algorithms and the dehumanization problem. *Ethics and Information Technology*, 23(15), 791–801. <https://doi.org/10.1007/s10676-021-09615-w>
- Garg, H. (2022). chatGPT: The Complete Guide. Harishgarg. Published: December 1, 2022. Available at: [https://harishgarg.com/writing/chatgpt-the-complete-guide/?utm\\_source=chatgpt.com](https://harishgarg.com/writing/chatgpt-the-complete-guide/?utm_source=chatgpt.com)
- General AI. (2023). GPT-4 vs GPT-3.5: Understanding the Differences. AI Mode. Published: November 25, 2023. Available at: <https://aimode.co/gpt-4-vs-gpt-3-5/>
- Ginger, Sorolla, R. (2012). *Judging passions: Moral emotions in persons and groups* (p. 214). Psychology Press.
- Golberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, 48(1), 26–34. <https://doi.org/10.1037/0003-066X.48.1.26>
- Gorichanaz, T. (2023). ChatGPT turns 1: AI chatbot's success says as much about humans as tech. *United Press International*. Published: December 1, 2023. Available at: <https://www.upi.com/Voices/2023/12/01/ChatGPT-turns-1-technology-human-behavior/3581701436876/>
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37(6), 504–528. [https://doi.org/10.1016/S0092-6566\(03\)00046-1](https://doi.org/10.1016/S0092-6566(03)00046-1)
- Grassini, S. (2023). Shaping the future of education: Exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences*, 13(7), 692. <https://doi.org/10.3390/educsci13070692>
- Haggart, B. (2023). Here's why ChatGPT raises issues of trust. *World Economic Forum*. Published: February 6, 2023. Available at: <https://www.weforum.org/agenda/2023/02/why-chatgpt-raises-issues-of-trust-ai-science/>
- Hardy, S. A., Walker, L. J., Rackham, D. D., & Olsen, J. A. (2012). Religiosity and adolescent empathy and aggression: The mediating role of moral identity. *Psychology of Religion and Spirituality*, 4(3), 237–248. <https://doi.org/10.1037/a0027566>
- Hardy, S. A., Bean, D. S., & Olsen, J. A. (2014). Moral identity and adolescent prosocial and antisocial behaviors: Interactions with moral disengagement and self-regulation. *Journal of Youth and Adolescence*, 44, 1542–1554. <https://doi.org/10.1007/s10964-014-0172-1>
- Hardy, S. A., Spsampsp Carlo, G. (2011). Moral Identity. In S. J. Schwartz, K. Luyckx, Spsampsp V. L. Vignoles (Eds.), *Handbook of Identity Theory and Research* (pp. 495–513). Springer. [https://doi.org/10.1007/978-1-4419-7988-9\\_19](https://doi.org/10.1007/978-1-4419-7988-9_19)
- Herman, D. (2022). The end of high-school English. *The Atlantic*. Published: December 12, 2022. Available at: <https://www.theatlantic.com/technology/archive/2022/12/openai-chatgpt-writing-high-school-english-essay/672412/>
- Hertz, S. G., & Krettenauer, T. (2016). Does moral identity effectively predict moral behavior?: A Meta-Analysis. *Review of General Psychology*, 20(2), 129–140. <https://doi.org/10.1037/gpr0000062>
- Jennings, P. L., Mitchell, M. S., & Hannah, S. T. (2014). The moral self: A review and integration of the literature. *Journal of Organizational Behavior*, 36(S1), S104–S168. <https://doi.org/10.1002/job.1919>
- Johnson, A. (2023). ChatGPT in schools: Here's where it's banned – and how it could potentially help students. *Forbes*. Published: January 18, 2023. Available at: <https://www.forbes.com/sites/arianajohnson/2023/01/18/chatgpt-in-schools-heres-where-its-banned-and-how-it-could-potentially-help-students/>
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., Stadler, M., ... & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kruyen, P. M., Emons, W. H. M., & Sijtsma, K. (2013). On the shortcomings of shortened test: A literature review. *International Journal of Testing*, 13(3), 223–248. <https://doi.org/10.1080/15305058.2012.703734>
- Lefebvre, J. P., & Krettenauer, T. (2019). Linking moral identity with moral emotions: A meta-analysis. *Review of General Psychology*, 23(4), 444–457. <https://doi.org/10.1177/1089268019880887>
- Leffer, L. (2023). ChatGPT can get good grades. What should educators do about it? *Scientific American*. Published: August 25, 2023. Available at: <https://www.scientificamerican.com/article/chatgpt-can-get-good-grades-what-should-educators-do-about-it/>
- Lo, C. K. (2023). What is the Impact of ChatGPT usage on Education? A Rapid Review of the Literature. *Education Sciences*, 13(4), 410. <https://doi.org/10.3390/educsci13040410>
- Lu, H., Na, W., & Wenfa, Z. (2022). Personality and Internet use: A meta-analysis. *Proceedings of the 2021 4th International Conference on E-Business, Information Management and Computer Science*, 279–286. <https://doi.org/10.1145/3511716.3511759>
- Mayer, D. M., Aquino, K., Greenbaum, R. I., & Kuenzi, M. (2012). Who displays ethical leadership, and why does it matter? An examination of antecedents and consequences of ethical

- leadership. *Academy of Management Journal*, 55(1), 151–171. <https://doi.org/10.5465/amj.2008.0276>
- McCrae, R. R., & Costa, P. T., Jr. (1997a). Personality trait structure as a human universal. *American Psychologist*, 52(5), 509. <https://doi.org/10.1037/0003-066X.52.5.509>
- McCrae, R. R., & Costa, P. T. (2008). The five-factor theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 159–181). The Guilford Press.
- McCrae, R. R., & Costa, P. T. (1997b). Conceptions and correlates of openness to experience. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of Personality Psychology* (pp. 825–847). Academic Press. <https://doi.org/10.1016/B978-012134645-4/50032-9>.
- Murdock, T. B., & Anderman, E. M. (2006). Motivational perspectives on student cheating: Toward an integrated model of academic dishonesty. *Educational Psychologist*, 41(3), 129–145. [https://doi.org/10.1207/s15326985ep4103\\_1](https://doi.org/10.1207/s15326985ep4103_1)
- Mulder, L. B., & Aquino, K. (2013). The role of moral identity in the aftermath of dishonesty. *Organisational Behavior and Human Decision Processes*, 121(2), 219–230. <https://doi.org/10.1016/j.obhdp.2013.03.005>
- Nah, F. F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023). Generative AI and ChatGPT: Applications, challenges, and AI-human collaboration. *Journal of Information Technology Case Application Research*, 25(3), 277–304. <https://doi.org/10.1080/15228053.2023.2233814>
- Oravec, J. A. (2023). Artificial Intelligence implications for academic cheating: Expanding the dimensions of responsible human-AI collaboration with ChatGPT. *Journal of Interactive Learning Research*, 34(2), 213–237.
- Paruzel-Czachura, M., & Blukacz, M. (2021). How relevant for you is to be a moral person? Polish validation of the Self-Importance of Moral Identity Scale. *PloS One*, 16(8), e0255386. <https://doi.org/10.1371/journal.pone.0255386>
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the implications of generative Artificial Intelligence for journalism and media education. *Journalism & Mass Communication Educator*, 10776958221149577. <https://doi.org/10.1177/10776958221149577>.
- Prinz, J. J., & Nichols, S. (2010). Moral emotions. In J. M. Doris (Ed.), *The Moral Psychology Handbook* (p. 111). Oxford University Press.
- Rammstedt, B., & Beierlein, C. (2014). Can't we make it any shorter? The limits of personality assessment and ways to overcome them. *Journal of Individual Differences*, 35(4), 212–220. <https://doi.org/10.1027/1614-0001/a000141>
- Resing, W. C., Bleichrodt, N., & Dekker, P. H. (1999). Measuring personality traits in the classroom. *European Journal of Personality*, 13, 493–509. [https://doi.org/10.1002/\(SICI\)1099-0984\(199911/12\)13:6%3C493::AID-PER355%3E3.0.CO;2-V](https://doi.org/10.1002/(SICI)1099-0984(199911/12)13:6%3C493::AID-PER355%3E3.0.CO;2-V)
- Reynolds, S. J., & Ceranic, T. L. (2007). The effects of moral judgement and moral identity on moral behavior: An empirical examination of the moral individual. *Journal of Applied Psychology*, 92(6), 1610–1624. <https://doi.org/10.1037/0021-9010.92.6.1610>
- Rodriguez-Rad, C. J., & Eamos-Hidalgo, E. (2018). Spirituality, consumer ethics, and sustainability: The mediating role of moral identity. *Journal of Consumer Marketing*, 35(1), 51–63. <https://doi.org/10.1108/JCM-12-2016-2035>
- Roose, K. (2022). The brilliance and weirdness of ChatGPT. *The New York Times*. Published: December 5, 2022. Available at: <https://www.nytimes.com/2022/12/05/technology/chatgpt-ai-twitter.html>.
- Roose, K. (2023). Don't ban ChatGPT in schools. Teach with it. *The New York Times*. Published: January 12, 2023. Available at: <https://www.nytimes.com/2023/01/12/technology/chatgpt-schools-teachers.html>.
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching*, 6(1). <https://doi.org/10.37074/jalt.2023.6.1.9>.
- Sakirin, T., & Sad, R. B. (2023). User preferences for ChatGPT-powered conversational interfaces versus traditional methods. *Mesopotamian Journal of Computer Science*, 2023, 22–28. <https://doi.org/10.58496/MJCSC/2023/004>
- Schultz, D. P., & Schultz, S. E. (2016). *Theories of personality*. Cengage Learning.
- Seibert, D., Godulla, A., & Wolf, C. (2021). Understanding how personality affects the acceptance of technology: A literature review. Leipzig.
- Sindermann, C., Uang, H., Elhai, J. D., Yang, S., Quan, L., Li, M., & Montag, C. (2022). Acceptance and fear of Artificial Intelligence: Associations with personality in a German and Chinese sample. *Discover Psychology*, 2, 8. <https://doi.org/10.1007/s44202-022-0020-y>
- Skinner, B. F. (1965). *Science and human behavior*. Simon and Schuster.
- Song, L., Watulak, S. L., Kritskaya, O., & Elmendorf, D. (2013). Exploring undergraduate students' skills, level of comfort, and perceived benefit of using technology for learning. *International Journal of Technology in Teaching and Learning*, 9(1), 18–36.
- Sorokowski, P., Sorokowska, A., Oleszkiewicz, A., Frackowiak, T., Huk, A., & Pisanski, K. (2015). Selfie posting behaviors are associated with narcissism among men. *Personality and Individual Differences*, 85, 123–127. <https://doi.org/10.1016/j.paid.2015.05.004>
- Sultana, T., & Nemati, H. R. (2021). Impact of explainable AI and task complexity on human-machine symbiosis. *Americas Conference on Information Systems 2021 Proceedings*, 20.
- Susnjak, T. (2024). ChatGPT: The End of Online Exam Integrity? *Educational Sciences*, 14(6), 656. <https://doi.org/10.3390/educsci14060656>
- Tangney, J. P., Stuewig, J., & Mashek, D. J. (2007). Moral emotions and moral behavior. *Annual Review of Psychology*, 58, 345–372. <https://doi.org/10.1146/annurev.psych.56.091103.070145>
- Tavakol, M., & Dennik, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- Terwiesch, C. (2023). *Would ChatGPT get a Wharton MBA? A prediction based on its performance in the operations management course*. Mack Institute for Innovation Management at the Wharton School, University of Pennsylvania.
- Thørrisen, M. M., & Sadeghi, T. (2023). The Ten-Item Personality Inventory (TIPI): A scoping review of versions, translations and psychometric properties. *Frontiers in Psychology*, 14, 1202953. <https://doi.org/10.3389/fpsyg.2023.1202953>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huand, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10, 15. <https://doi.org/10.1186/s40561-023-00237-x>
- Townsend, C. (2023). ChatGPT essays and more: How teachers and schools are dealing with AI writing. *Mashable*. Published: January 7, 2023. Available at: <https://mashable.com/article/chatgpt-ai-essays-classroom-materials-teachers-react>.
- Vadera, A. K., & Pathki, C. S. (2020). Competition and cheating: Investigating the role of moral awareness, moral identity, and moral elevation. *Journal of Organizational Behavior*, 42, 1060–1081. <https://doi.org/10.1002/job.2545>
- Waltzer, T., Cox, R. L., & Heyman, G. D. (2023). Testing the ability of teachers and students to differentiate between essays generated by

- ChatGPT and high school students. *Human Behavior and Emerging Technologies*, 2023, 1923981. <https://doi.org/10.1155/2023/1923981>
- Westfall, C. (2023). Educators Battle Plagiarism As 89% Of Students Admit To Using OpenAI's ChatGPT For Homework. *Forbes*. Published: January 28, 2023. Available at: <https://www.forbes.com/sites/chriswestfall/2023/01/28/educators-battle-plagiarism-as-89-of-students-admit-to-using-open-ais-chatgpt-for-homework/>.
- Wilson, K., Fornasier, S., & White, K. M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, and Social Networking*, 13(2), 173–177. <https://doi.org/10.1089/cyber.2009.0094>
- Wingard, J. (2023). ChatGPT: A threat to higher education? *Forbes*. Published: January 10, 2023. Available at: <https://www.forbes.com/sites/jasonwingard/2023/01/10/chatgpt-a-threat-to-higher-education/>.
- Woodruff, A., Shelby, R., Kelley, P. G., Rousso-Schindler, S., Smith-Loud, J., & Wilcox, L. (2024). How Knowledge Workers Think Generative AI Will (Not) Transform Their Industries. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24), May 11–16, 2024, Honolulu. <https://doi.org/10.1145/3613904.3642700>.
- Xiang, C. (2023). ChatGPT is passing the tests required for medical licenses and business degrees. *Vice*. Published: January 23, 2023. Available at: <https://www.vice.com/en/article/akebwe/chatgpt-is-passing-the-tests-required-for-medical-licenses-and-business-degrees>.
- Xu, Y., Shieh, C., van Esch, P., & Ling, I. (2020). AI customer service: Task complexity, problem-solving ability, and usage intention. *Australasian Marketing Journal*, 28(4), 189–199. <https://doi.org/10.1016/j.ausmj.2020.03.005>
- Yu, H. (2023). Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1181712>.

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