

# ACHIEVEMENT GOAL MOTIVATION AND RELIANCE ON CHATGPT FOR LEARNING

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## Abstract

With the advancement of artificial intelligence and its integration into education, understanding individual differences in interaction with this technology becomes a pressing issue. This study examined the association between achievement goal orientations and reliance on an artificial intelligence tool, ChatGPT, among higher education students. Crowdsourced participants (N= 413) filled in a questionnaire measuring attitudes towards ChatGPT, reliance on ChatGPT for completing 13 tasks, and achievement goal orientations. Mastery approach orientation was, in general, associated with lower reliance on ChatGPT, while mastery avoidance and performance approach with higher, albeit these associations did not hold for all of the examined tasks. The findings underscore the need for further longitudinal and individual-difference-based research on use of and reliance on educational technology.

**Keywords:** *ChatGPT, learning, achievement goal motivation, university students.*

## 1. Introduction

In November 2022, OpenAI released their large language model ChatGPT to the public, which generated immediate interest among the community. This interest was driven by the advanced capabilities of ChatGPT. Unlike previous chatbots, ChatGPT was trained on exceptionally large data, is versatile and, given the same prompt, can generate different versions of a text, which are difficult to distinguish from the writings by humans (Lund et al., 2023). Additionally, when presented with exam questions, the expansive dataset that it was trained on, along with the algorithms it employs, enables ChatGPT to answer to a standard that would pass exams (Mbakwe et al., 2023). Thus, in the context of university education, the discourse revolves around potential uses and misuses, such as engaging in academic dishonesty (Cotton et al., 2023; King, 2023; Stutz et al., 2023), but few studies have examined if students do engage with the bot or whether ChatGPT could be used as a learning aid (Stojanov, 2023). In a previous study in our lab, my colleagues and I examined how students use the bot for university learning, and identified four themes: content acquisition, self-regulation, technical problem solving and writing support) and 12 subthemes. Building on that study, in the current study I examine if achievement goal orientations are related to reliance on ChatGPT for learning tasks.

An achievement goal embodies an individual's quest for competence. It represents a mental image of a potential outcome rooted in competence that one is driven to achieve (Elliot & Thrash, 2001). Achievement goals can be differentiated based on how competence is defined and valenced (Elliot, 1999). If one defines competence by whether they have achieved understanding or mastered the task or improved one's performance, they have mastery orientation, whereas if competence is defined as the attainment of more knowledge or skills than others, then one has performance-oriented goals. In terms of valence, if the achievement goal is focused on obtaining a positive outcome, then the goal in question is an approach goal; if the goal is focused on avoiding a negative outcome, then it is said that the goal is an avoidance goal. When these achievement goals are combined in a 2x2 conceptualization (Elliot & McGregor, 2001), there are four possibilities to consider: mastery-approach, which stresses attaining task mastery or improvement; mastery avoidance, which is focused on aiming not to lose one's skills or fail to master the task; performance approach, where the focus is on striving to outperform others, and performance avoidance, where the focus is on aiming to avoid performing worse than others.

Studies indicate that approach goals are positively, and avoidance goals negatively related to academic achievement (Alhadabi & Karpinski, 2020; Wirthwein et al., 2013). Given that AI tools such as ChatGPT could serve as a knowledge resource for students and influence how students approach learning

tasks, it is worth examining how the different achievement goals may predict reliance on such tools for learning, especially as technology usage may be related to personality traits (Ryan & Xenos, 2011).

Empirical studies examining how achievement goal orientations are related to the use of educational technology tools are lacking. This is important question because technology is becoming an important aspect of education (Bond et al., 2020), thus this study will shed light on individual differences, in particular achievement goal orientations, in the use of educational technology when pursuing academic competence. This is a pressing issue given that artificial intelligence is developing at a staggering pace and studies on the intersection of personality and educational technology, and in particular artificial intelligence are lacking.

## 2. Method

### 2.1. Participants

Participants were 413 higher education students (Age:  $M = 24.31$ ,  $SD = 8.12$ , 160 males, 248 females, 5 non-binary) recruited via CloudResearch (Chandler et al., 2019).

### 2.2. Procedure

Participants filled in a survey programmed in Qualtrics. The survey was part of a larger study looking at ChatGPT uses and in addition to the variables reported here also collected data on artificial intelligence literacy, intellectual humility and critical usage of ChatGPT.

### 2.3. Instruments

**2.3.1. Reliance on ChatGPT.** Participants were asked to indicate the degree (1= not at all; 5 = completely reliant) to which they rely on ChatGPT for completing 13 tasks (derived from a previous study exploring students use of ChatGPT; See Table 1).

**2.3.2. Achievement goals.** To measure achievement goals, we used the achievement goal scale, which consists of 12 items, divided into four subscales. Participants rated the degree to which each item was true of them on a 7-point scale, anchored at 1 = not at all true of me and 7 = very true of me.

Sample items are: It is important for me to do better than other students (Performance approach, Cronbach alpha = 0.90); My goal in this class is to avoid performing poorly (Performance avoidance, Cronbach alpha = 0.74); It is important for me to understand the content of this course as thoroughly as possible (Mastery approach, Cronbach alpha = 0.86); and I'm often concerned that I may not learn all that there is to learn in this class (Mastery avoidance, Cronbach alpha = 0.85)

**2.3.3. Attitudes towards ChatGPT.** To measure attitudes towards ChatGPT, we adapted the general attitudes towards artificial intelligence scale (Schepman & Rodway, 2020), which consists of two subscales, positive attitudes (12 items, e.g., There are many beneficial applications of ChatGPT; Cronbach  $\alpha = 0.88$ ) and negative attitudes (8 items, e.g., I find ChatGPT sinister; Cronbach  $\alpha = 0.81$ ).

## 3. Results

Table 1 presents the means and standard deviation for reliance on ChatGPT for each of the 13 tasks. To examine the association between reliance on ChatGPT and the four achievement goal orientations, we ran a series of multiple regression, with the four orientations as predictor variables, controlling for positive and negative attitudes towards ChatGPT, and each of the task students indicated their reliance on, as an outcome variable. Unsurprisingly, positive but not negative attitudes predicted higher reliance on ChatGPT for each task. Mastery approach predicted lower reliance for tasks such as information retrieval, drafting, homework help, summarizing, math problems, coding and using ChatGPT for writing assignments, while performance approach higher reliance on ChatGPT for homework help, quizzing, solving math problems and writing assignments. Mastery avoidance predicted higher reliance on ChatGPT for homework help, summarizing texts and creating study plans (See Table 1).

Table 1. Results of hierarchical regression analysis with reliance on ChatGPT as an outcome variable.

Outcome variable	M(SD)	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)	R <sup>2</sup>
		Attitude (positive)	Attitude (negative)	Performance Approach	Performance Avoidance	Mastery Avoidance	Mastery Approach	Constant	
Find answers to specific questions related to my studies.	2.42 (1.28)	0.823 (0.081)	-0.032 (0.075)	0.070 (0.038)	0.018 (0.048)	0.020 (0.044)	-0.11* (0.05)	-0.110 (0.460)	0.23
Drafting my written assignments.	2.07 (1.21)	0.601** (0.079)	-0.14 (0.074)	0.102** (0.037)	-0.023 (0.047)	0.055 (0.043)	-0.174** (0.051)	0.481 (0.453)	0.16
Editing my written assignments.	2.18 (1.32)	0.658** (0.088)	0.094 (0.082)	0.069 (0.041)	0.004 (0.053)	-0.014 (0.048)	-0.103 (0.057)	0.050 (0.504)	0.13
Help with writing homework assignments.	2.21 (1.27)	0.659** (0.082)	-0.043 (0.077)	0.088* (0.039)	0.065 (0.049)	0.093* (0.045)	-0.231** (0.052)	0.200 (0.047)	0.19
Understanding complex concepts.	2.54 (1.35)	0.850** (0.085)	-0.085 (0.079)	0.009 (0.040)	0.062 (0.051)	0.082 (0.046)	-0.069 (0.055)	-0.430 (0.485)	0.24
Summarizing complex texts.	2.54 (1.33)	0.717** (0.085)	-0.128 (0.079)	0.068 (0.040)	0.069 (0.051)	0.139** (0.046)	-0.257** (0.055)	0.568 (0.485)	0.21
Obtaining feedback on my written assignments.	2.16 (1.33)	0.655** (0.089)	0.102 (0.082)	0.065 (0.042)	0.048 (0.053)	0.015 (0.048)	-0.068 (0.057)	-0.544 (0.506)	0.14
Generating practice questions or quizzes for self-assessment in my studies.	2.12 (1.35)	0.459** (0.093)	-0.037 (0.086)	0.113* (0.043)	-0.012 (0.055)	0.034 (0.050)	-0.092 (0.060)	0.586** (0.529)	0.08
Creating study schedules or plans.	2.02 (1.28)	0.472** (0.088)	0.075 (0.081)	0.057 (0.041)	-0.002 (0.052)	0.097* (0.048)	-0.096 (0.056)	0.070 (0.501)	0.09
Solving math problems.	2.29 (1.39)	0.548** (0.094)	0.133 (0.087)	0.124** (0.044)	0.020 (0.056)	0.035 (0.051)	-0.239** (0.061)	0.569 (0.538)	0.12
Coding or programming tasks.	2.01 (1.27)	0.650** (0.084)	0.093 (0.078)	0.074 (0.040)	-0.063 (0.050)	0.078 (0.046)	-0.126* (0.054)	-0.044 (0.482)	0.15
Generating ideas for creative projects.	2.35 (1.28)	0.685** (0.084)	0.039 (0.078)	0.072 (0.039)	0.003 (0.050)	0.058 (0.046)	-0.176 (0.054)	0.326 (0.479)	0.16
Writing my assignments for me.	1.86 (1.227)	0.567** (0.081)	0.061 (0.075)	0.90* (0.038)	-0.005 (0.048)	0.019 (0.044)	-0.272** (0.052)	0.862** (0.461)	0.16

#### 4. Discussion

This study examined the associations between reliance on ChatGPT for 13 learning tasks and achievement goal orientations. The results indicated that mastery approach was negative predictor for seven tasks, especially those that required demonstration of student's learning, such as drafting and writing papers, completing their homework or that offered shortcuts to learning, such as summarizing texts. These results are somewhat counter to our intuition and may have to do with how useful students perceive ChatGPT for their learning goals, or how students understand the use of ChatGPT as a learning aid. For example, if students perceive summarized text as depriving them of opportunities to learn, then it is not surprising that mastery approach, where the goal is authentic learning, would predict lower reliance for this task. On the other hand, performance approach was positively related with reliance on ChatGPT

for tasks that may directly lead to higher grades such as writing assignments, obtaining homework help, solving math problems, and quizzing oneself. Performance avoidance did not predict reliance on any of the tasks, while mastery avoidance positively predicted summarizing, creating study plans and homework help, suggesting that this orientation may be driving self-regulation such as planning one's study time as a way to manage the fear that one may not learn all there is to learn. Similarly, the fear of not fully comprehending all available information might incentivize those students driven by mastery avoidance to take shortcuts to learning such as using summaries in an attempt to 'digest' as much information as possible. The non-significant relationship between either of the orientations and reliance on ChatGPT for idea generation as well as conceptual understanding, may suggest that all students, regardless of their goal orientation are likely to rely on ChatGPT for these purposes, as the mean reliance score was relatively high, compared to the other means.

While the study shed light on the different patterns of engagement with technology for the different achievement goal orientations, the limitations include crowdsourced participants and their self-reported reliance. These participants may be more inclined to use technology than the average student, and their self-reports might not reflect their actual reliance. Further, we only measured reliance for 13 tasks and these may not have captured all the ways that students use and rely on ChatGPT, albeit these tasks were derived from open ended pilot questionnaire where students reported how they have engaged with ChatGPT. Despite these shortcomings, this study is the first to examine how individual differences may lead to different engagement with educational technology. Future research could focus on other individual difference variables and include longitudinal studies to understand how such reliance evolves over the course of academic studies.

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