Cheat Codes as External Support for Players Navigating Fear of Failure and Self-Regulation Challenges In Digital Games

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ABSTRACT

Failure is an integral element of most games, and while some players may benefit from external support, such as cheat codes, to prompt self-soothing, most games lack supportive elements. We asked participants (N=88) to play Anno 1404 in single-player mode, and presented a money-generating cheat code in a challenging situation, also measuring the personality trait of *action-state orientation*, which explains differences in self-regulation ability (i.e., self-soothing) in response to threats of failure. Individuals higher in state orientation were more likely to take the offer, and used the cheat code more frequently. The cheat code also acted as an external support, as differences in experienced pressure between action- and state-oriented participants vanished when it was used. We found no negative consequences of using external support in intrinsic motivation, needs satisfaction, flow, or performance. We argue that external support mechanisms can help state-oriented players to self-regulate in gaming, when faced with failure.

CCS CONCEPTS

• **Applied computing** → **Computer games**; • **Human-centered computing** → *Empirical studies in HCI*; **HCI theory, concepts and models**.

KEYWORDS

action-state orientation, PSI theory, digital games, cheating, cheat codes, player experience, pressure, self-regulation, fear of failure

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1 INTRODUCTION

People play games for a variety of motivations, including for stress relief [82], alleviating boredom [60], repairing noxious moods [12], escaping through fantasy [88], and recovering from life's demands [18]. These motivations relate to a growing body of evidence that support the idea that people play games as a way of self-regulating their emotions (e.g., [80, 82])—in particular, to reduce unwanted affect (e.g., [11, 76]), which includes high-arousal-low-valence emotional states, such as frustration and stress, and low-arousal-low-valence states, such as boredom and depression. Although game designers often intend players to work within the game's system of rules and procedures to eventually beat a game [34], research suggests that a majority of players have taken agency over their emotional experience within *single-player games* by using *in-game cheats* [70]. In-game cheats originated from developer codes used to facilitate the development process, that were accidentally (or intentionally) left in shipped games and discovered by players; however, in addition to cheat codes, games often include loopholes (e.g., skipping parts of a dungeon in World of Warcraft [90]), exploits (e.g., by purposely gaining an advantage by utilizing a broken mechanic in-game [16]), mods (e.g., gaining vision through walls using additional modifications [2]), or even game settings (e.g., "Free Building Mode" in city management games [64]) that may be frowned upon by other players as 'cheating', rather than achieving the objective through skill and dedication. Cheating in games carries a negative connotation, primarily as a result of the consistent view that cheating within multi-player games is unfair [20, 27, 94] or even toxic [15, 75]. However, researchers suggest that in *single-player scenarios*, players use in-game cheats to help expedite progress toward achieving a game's objectives, and tailor their game experience to best match their emotional needs and optimize recovery through play [20, 27, 70]. Passmore et al. [70] suggest that because of these potential recovery benefits, researchers and designers should consider avoiding imposing the morality of cheating in multiplayer games onto single-player games, and rather reframe cheating as a "micro-intervention" for players to autonomously improve their play experiences and facilitate restorative play.

Supporting in-game cheats for restorative play is important because for some people, it is more difficult to self-regulate unwanted affect and repair noxious moods. Self-regulation theory describes this difference in the ability to self-regulate affect as *action orientation* and *state orientation* [53, 54, 58]. Action-oriented

individuals tend to have stronger self-regulatory abilities, whereas state-oriented individuals tend to have more difficulties with self-regulation. These differences in self-regulatory ability only appear when people are under stress (e.g. [50, 52]), when up-regulation of positive affect (i.e., self-motivation) or down-regulation of negative affect (i.e., self-soothing) is necessary. Therefore, two dimensions of action-state orientation are generally distinguished: *demand-related action-state orientation* (i.e., the ability to self-motivate under stress) and *threat-related action-state orientation* (i.e., the ability to self-soothe under stress; hereafter referred to as tASO). The affect-regulation advantage of action- over state-oriented individuals under pressure has been demonstrated in many contexts, including in health (e.g., [69]), sports (e.g., [36]), and academia (e.g., [86]). In the context of gaming, the threat of failure is considered by many as fundamental to the play experience [3, 32, 46], and most game scholars include an uncertain and quantifiable game outcome in their definitions of what a game is (e.g., [85]). Beyond just the threat of failure, many single-player games use time pressure, resource management, complex rule sets, and conflict [34] to create a play experience that can feel overwhelming, stressful, full of pressure, and often results in multiple failures prior to success [32]. This repeated failure has been described as essential to the enjoyment of many play experiences, when it leads to eventual success [32, 46]; however, it can also be described as stressful, with physiological evidence supporting this view [63].

Self-regulation theory [53, 54, 58] suggests that threat-related action-oriented players (i.e., those with greater ability to self-soothe) should be better able to down-regulate negative affect during gaming, essentially being better equipped to cope with in-game pressure and the threat of failure. However, it further suggests that there are strategies that can help mitigate differences related to action-state orientation, as the disadvantages for state-oriented individuals *disappear when external support is given* [1]. If—like Passmore et al. [70]—we frame 'cheating' as an in-game mechanism that players use to tailor their emotional experience, then an in-game cheat prompt can be viewed as an *external stimulus that could benefit state-oriented players in initiating self-soothing*. Self-regulation theory would thus predict that state-oriented players may be more likely to accept the support (i.e., use the cheat code), and benefit from it (i.e., prompt self-soothing), when faced with the pressure of playing a new and complex game. The problem is we have no evidence that tASO predicts behaviour in gaming—a context (unlike health [69] or academia [86]) in which the threat of failure is seen as integral to the experience, and is even enjoyed by many players (e.g., [32, 46]). However, there are myriad examples outside of self-regulation theory that demonstrate how our identities, personalities, and traits outside of gaming contexts predicts our behaviours within games (e.g., [23, 73, 74]), even when we as players know that the risks are fabricated and the outcomes inevitable.

To determine whether cheating in single-player games can be viewed as an external support that helps state-oriented players self-soothe, in this study, we investigate tASO in a gaming context. We exposed novice players to a complex city-management game (Anno 1404), in which they quickly lost in-game money and faced failure. Participants were given the opportunity to use a money-generating cheat code (external support) to help with a challenging situation. We posed research questions related to how tASO influenced the use of the external support. Furthermore, we examined whether accepting the external support to initiate self-soothing had any positive or negative consequences in terms of player experience and performance. Our results show that individuals higher in state orientation were more likely to take the offer and use the cheat code, and were likely to use it more frequently. Furthermore, the cheat code did act as external support to state-oriented players, as those who used it benefited: For participants who did not use the cheat code, greater state orientation was associated with higher experienced pressure; however, for those who used the external support (i.e., the cheat code), the effect of action-state orientation on experienced pressure was completely mitigated, in line with what the theory would predict (e.g., [1]). Further, our results suggest no negative consequences of using the external support on player experience, in terms of intrinsic motivation, needs satisfaction during play, flow, or performance. Our work reinforces the perspective of Passmore et al. [70] of in-game cheats as a mechanism for tailoring play experiences, and adds to the mounting evidence that it is important to consider individual differences of players—including their action-state orientation—when designing games that support players with a diversity of motivations for gaming and styles of play.

2 BACKGROUND

2.1 Challenge and Failure in Games Research

Experiencing failure is often considered to be a central aspect of gaming (e.g., [3, 32, 46]). Some players intentionally seek out stressful game experiences because success in a game is not "simply winning or avoiding death, but is about setting goals, experiencing challenges, and beating the odds to triumph over adversity and repeated struggle" [32]. Therefore, some types of failures are seen as desirable in game design [3], and the satisfaction of eventual success can be heightened by multiple failures along the way [32, 72]. Further, for players higher in challenge orientation, failure can be just as enjoyable as success, because temporary failure is perceived as part of the journey to eventual success—as integral as the eventual triumph [32]. From this research on failure in games, we might assume that providing external support to make a game easier might be seen as undesirable, which is likely why 'cheat codes' are becoming less common, even in single-player games. However, self-regulation theory [53, 54, 58] suggests that such assumptions might not be equally true for all players, because some players are less likely to be able to cope with unpleasant play experiences. Therefore, they might be left behind by 'sink or swim' approaches and would instead benefit from external help—such as in-game cheats—to grow and learn to the same extent as action-oriented players.

2.2 Cheating and Cheat Codes in Gaming

Generally, cheating is defined as a violation of regulations whether they are official or inferred guidelines of a system [47]. Like any sports in the physical world, digital games also face violations of rules [68], ranging from simple creative tools to expand a game and modify its ruleset to dedicated applications and assistive systems that aid players to gain a permanent performance advantage over other players [20, 31, 47], such as wall-hacks or aim-bots [2]. In

the dawn of video games, developers used secret codes to add a temporary advantage or mechanic as a means of facilitating game testing, and these codes were sometimes left in shipped games both unintentionally and intentionally [20]. The taxonomy of Yan et al. [94] shows multiple ways in which players may manipulate and overbend the rules of a game, e.g., collusion, abusing game mechanics, or exploiting other players [94]. In multiplayer gaming, there is a general agreement that cheating is negatively regarded when it results in one player receiving an unearned and unfair advantage over others [20, 27]. To keep the game entertaining for everyone, Duh et al. [28] emphasize that all players should stick to the rules and avoid the (over)-usage of cheats; however, players have different ideas of what counts as cheating and what is a "smart tactic based on the rules of the game".

Although some players denounce any form of cheating, others still value single-player game cheat codes for various reasons, such as overcoming technical problems, advancing the game towards completion, or just for pleasure [27]. In a large qualitative study, Consalvo [20] provides four primary motivations for cheating within games: feeling "stuck," "wanting to play God," feeling "bored with the game," and being "a jerk". As Passmore et al. [70] observe, three of these four motivations are relevant in single-player games. Together, this work implies that cheating may not only be used to gain an advantage, but to enhance the player experience. Passmore et al., [70] further suggested that cheating within single-player games may be better characterized as cheating for purposes of player agency over gameplay—wherein players can have control over their experiences to *reduce negative affect* , enable *creative solutions to reduce frustrating or boring* gameplay, and tailor the game to best match their emotional needs and optimize recovery through play [70]. The reasons for cheating are highly personal and affected by individual motives and goals around what players wish to achieve in the game. However, the role of action-state orientation in this context is still not explored and may help designers gain a theory-based understanding of how, why, and when cheat codes can be used to support certain players.

2.3 Self-Regulation Theory

We draw our theoretical background from self-regulation theory—also referred to as action control theory or the theory of Personality Systems Interaction (PSI theory) [53, 54, 58]. The theory explains two fundamental aspects of a fully functioning personality: implementing difficult intentions (*intention enactment*) and learning from failures (*self-growth*). Both of these aspects are particularly important in the context of gaming. Overcoming an unpleasant affective state is essential for both intention enactment—which necessitates self-motivation, and self-growth—which requires the ability to self-soothe. According to self-regulation theory, self-growth requires integrating and overcoming uncomfortable thoughts and experiences. When being confronted with failure, individuals typically experience negative affect, i.e., pain. They tend to focus on the failure, leading to a narrowed mindset, often described as 'tunnel vision'. In order to learn from failure, individuals need to down-regulate this negative affect, essentially practicing self-soothing. Therefore, shifting between opposing affective states (high and low negative affect) is crucial for self-growth.

Individual differences in the ability to self-soothe is described through the construct of action-state orientation and is measured using the Action Control Scale [52, 55, 58]. This questionnaire distinguishes between two dimensions of action-state orientation: the *demand-related action-state orientation* , which describes the high versus low ability to up-regulate positive affect (self-motivation), and the *threat-related action-state orientation (tASO), which* describes the high versus low ability to down-regulate negative affect (self-soothing). These two different types of self-regulatory abilities develop independently of each other in childhood due to socializing experiences [54, 56, 61].

Although an established personality theory, action versus state orientation has been underutilized in HCI and gaming research. Demand-related action-state orientation (i.e., the ability to self-motivate) was recently considered in a study by Birk et al. [10] that investigated unwanted interruptions during game play, showing that state-oriented individuals were less able to dismiss an interrupting notification during a round of a match-3 game, and among players who did dismiss the dialog, state-oriented players took longer to do so. In this study, the authors considered demand-related action-state orientation, focusing on the ability to up-regulate positive affect under demand (i.e., self-motivate). However, when it comes to understanding how players respond to failure, tASO—the ability to down-regulate negative affect (i.e., self-soothe)—is the more relevant concept to consider. However, within gaming research, tASO has not received any attention, despite the potential it holds to contribute to understanding how players respond to the fear of failure within gaming.

2.3.1 Threat-related Action Orientation: Self-soothing Promotes Self-growth. People with high self-soothing ability are called threat-related action-oriented individuals, people with low self-soothing ability are called threat-related state-oriented individuals [53, 54, 58]. Consider a person who, after facing a setback, doesn't dwell on what went wrong but instead keeps pushing forward, perhaps even resorting to taking action without processing their negative emotions or adjusting their approach to a problem. This describes someone who tends to be highly threat-related action-oriented. In contrast, you might be familiar with someone who, when confronted with a negative experience, tends to shut down and becomes engrossed in ruminating about what went wrong or excessively analyzing the situation. This behavior is indicative of a highly threat-related state-oriented individual. Research on differences of tASO has shown that action-oriented compared to state-oriented individuals are better at down-regulating negative affect when exams come closer [13]. This self-soothing ability helps action-oriented people to better cope with adverse life circumstances such as chronic pain [14], and bullying [93]. Action-oriented individuals experience a universal trust that takes the edges off day-to-day experiences [57]. After inducing negative affect in an experiment, action-oriented individuals are better able to maintain access to their intuition and holistic knowledge [7], generate goals that are congruent with their own motives [4], and buffer themselves against social expectations that do not match intrinsic preferences [48]. Furthermore, a high sensitivity for negative affect does not impede but even boosts action-oriented individuals in their creativity [9]. Finally, action

orientation promotes people's ability to learn from negative experiences and grow as a person [61] rather than to persist in a negative state.

Taken together, self-regulation theory explains that people can have similar negative experiences (e.g., failing in a task), but different abilities to cope with them. Some individuals find it harder than others to maintain access to their own needs, preferences and goals, when they are confronted with threats. A uniform approach to game design that focuses solely on main effects while neglecting interaction effects (e.g., 'most players find learning through threats of failure enjoyable') fails to accommodate individual differences. Instead, a tailored approach is essential to address diverse needs.

2.4 The Present Study

Under stressful situations (e.g., frustration, failure), action-oriented individuals find themselves at an advantage [50]. Because state-oriented individuals have difficulties regulating their emotions on their own, they benefit from external support when dealing with frustration or failure. This benefit of external support is shown in studies within non-gaming contexts, demonstrating that differences between action-state orientation disappear when external support is provided (e.g., [1, 4, 8]). In games, stressful situations are common, which leads to a different playing field for action- and state-orientated players. Action-oriented individuals can handle feelings of frustration or failure by themselves, which means they know how to overcome these situations and therefore can continue playing quickly. State-oriented individuals may stay stuck in the feeling of frustration or failure, which could cause them to pause or even quit the game. Cheat codes—as an offer of external support—should theoretically level the playing field by providing state-oriented players with a means to overcome stressful situations during play.

The present study investigates how individual differences in the ability to down-regulate negative affect influence cheat code usage and how this, in turn, affects player performance and experience. During the experiment novice players play the city management game Anno 1404 [77] and face a stressful situation (i.e., threat of bankruptcy). At one point participants are presented with the option to either work under this threatening situation or to remove the threat of bankruptcy with a cheat code. While all participants are placed in a situation where they continuously lost money, they are randomly assigned to one of two conditions: in the poor condition, participants have little gold left and are close to financial ruin; in the rich condition, there is still sufficient capital left to survive for the duration of the lab study even if finances would not be improved by the player. We included the rich and poor conditions to investigate whether the extent of the threat of failure is a relevant factor.

Self-regulation theory [53, 54, 58] describes that state-oriented individuals benefit from external support, and previous research has demonstrated this outside of game contexts (e.g., [1, 4, 8]). What is not known so far is whether state-oriented individuals accept external support instead of, for example, being overwhelmed and shutting down. Furthermore, to our knowledge there is no empirical evidence on tASO in gaming—a context, in which failure is seen as integral to the experience. We also do not know whether accepting external support to initiate self-soothing in a game context will influence player experience or performance. With these considerations in mind, we posed the following research questions:

- **RQ1: Are players higher in threat-related state orientation *more likely to use* an external support when playing a game in which they are facing the threat of failure?**
  - RQ1a. Are players higher in state orientation more likely to use the cheat code under threat of failure?
  - RQ1b. Do players who use the cheat generate more money through it when they are higher in state orientation?
  - RQ1c. Do such differences depend on the extent of the threat (rich vs. poor)?
- **RQ2. Does using the cheat code affect *player experience*?**
  - RQ2a. Does using an external support such as a cheat code affect player experience (i.e., intrinsic motivation, needs satisfaction, or flow)?
  - RQ2b. Does using the external support affect state oriented players differently than action-oriented players?
- **RQ3. Did using the external support (i.e., cheat code) affect *player performance?***

3 METHODS

To answer these research questions, we conducted a lab study.

3.1 Participants

The sample consisted of 123 students at the University of *{removed for anonymous review}*, of which 15 were excluded due to missing data or technical problems during the experiment. We also excluded participants who had prior experience with playing Anno 1404 (N = 20), to support a consistent sample in terms of exposure to the game and to ensure the difficulty of the play situation (as experienced players should have little trouble to navigate it). The remaining sample consisted of 88 participants (M_{age} = 21.89, SD = 4.58; 16 men, 72 women, 0 non-binary). Using established scale cut-off thresholds [52], 41 of them were classified as threat-related action-oriented (scale values = 5–12), of which 21 were in the poor condition and 20 in the rich condition; 47 people were classified as threat-related state-oriented (scale values = 0–4), of which 23 were randomly assigned to the poor condition and 24 to the rich condition. While this classification follows a dichotomous distinction depending on a scale cut-off value, this is only used to describe the sample. All analyses were conducted with the continuous variable for action-state orientation, looking at action-state orientation on a spectrum rather than treating it as a categorical variable [19, 67]. We did not include a control group (who were not given the option to cheat) as this would have doubled our needed sample size without contributing to answering our research questions; we return to the impacts of this decision in the discussion.

3.2 Procedure

Participants arrived at the lab and after providing informed consent, first completed the trait questionnaires. They were then introduced to Anno 1404 through a 5-minute video tutorial and received a summary sheet with a detailed explanation on how to improve their balance sheet, which was printed and available throughout

the game. They then began to play; after 5 minutes, participants received a pop-up: "*During the next minute you can use a cheat to generate money by clicking the F8 key. You can click it as often as you like!*". The game then continued for another 10 minutes (resulting in a total of 15 minutes play time) after which participants received a pop-up: "*The game time is now over. If you want to continue playing, you can extend the game for up to 10 minutes*" to avoid frustration caused by an abrupt end to the gameplay. At this point, participants completed questionnaires on the play experience, their gaming experience, their experience with cheating in games, and demographic variables. At the end of the study, participants were rewarded with course credit. The experiment took participants around one hour to complete.

3.2.1 The Game: Anno 1404 (Dawn of Discovery). We chose Anno 1404 [77]—a complex city management game, in which players construct a settlement mimicking the age of discovery—for our game stimulus in our study. In Anno 1404, players need to gather and manage resources for building houses, farms, and industries, without losing sight of the satisfaction of the needs of the growing population. The financial condition of the settlement is crucial for player success, and new players are likely to lose sight of balancing everything. Because we wanted to induce threat of failure, the savegame was started in a suboptimal condition. To manipulate the extent of threat, participants were randomly assigned to one of two conditions: in the rich condition (starting capital of 41961 gold), there was enough money left to play through the experiment even if the balance sheet of the settlement was not improved. In the poor condition (starting capital of 1961 gold), the player was threatened by bankruptcy during the study if they did not improve the situation quickly. A financial collapse (bankruptcy) would leave players unable to obtain goods and production buildings. Aside from the differences in starting capital, the two conditions were held constant. The players' initial balance sheet was negative in both versions, and players lost 583 gold units per minute in both conditions, until they improved the state of their settlement. An AutoIt[44] script steered the experiment and informed participants about the cheat code usage and optional prolonging of the game when the play time was over. Another AutoIt script increased the amount of gold a player had upon using the cheat by altering the memory of the game, because Anno 1404 does not have any built-in publicly-known cheat codes. We chose Anno 1404 as it is a complex game that is challenging to master but for which the rules could be learned in a single play session, because the starting conditions could be manipulated to induce likely failure, and because a single cheat moment could be contrived that would clearly benefit the players.

3.3 Measures

The study was carried out in Germany, and accordingly, German versions of all questionnaires were utilized. The questionnaires were sourced either in their already-published German forms (e.g., Flow, Action-State Orientation) or as translated versions of questionnaires used in previous peer-reviewed studies.

3.3.1 Action-State Orientation. Action-state orientation was assessed using the action-control scale (ACS; [52]). The questionnaire consists of 24 items that describe different situations; participants choose one of two possible answers for each situation. The questionnaire can be divided in two scales, each measured with 12 items: demand-related (Cronbach's α = .80) and tASO (Cronbach's α = .81). An example item for threat-related is *"When I am in a competition and have lost every time:* (a) *I can soon put losing out of my mind*; (b) *The thought that I lost keeps running through my mind"* with (a) being the action-oriented and (b) the state-oriented response. Action-oriented answers are summed up, resulting in a scale ranging from 0-12, so that individuals fall on a continuum. The ACS is an established scale and reliability and construct validity have been demonstrated by previous work [6, 26, 55]; for an overview of the validity in 18 languages, including German and English, see [51].

3.3.2 Intrinsic Motivation. Using the Intrinsic Motivation Inventory (IMI; [66, 83]; for the German translation see [17]), we measured the dimensions interest-enjoyment (7 items; e.g. *"Playing the game was fun"*; Cronbach's α = .87), and perceived competence (6 items; e.g. *"I think I am pretty good at this game"*; Cronbach's α = .70), pressure-tension (5 items; e.g. *"I was anxious while playing the game"*; Cronbach's α = .71). Responses were rated on a 5-point Likert scale ranging from "1 = *strongly disagree*" to "5 = *strongly agree*". The effort-importance scale was measured but is not included in subsequent analyses because of reliability issues: Cronbach's α was .14, which seems to have been caused by participants not paying attention to two reverse-coded items.

3.3.3 Needs Satisfaction during Play. The satisfaction of player needs was assessed using the Player Experience of Needs Satisfaction questionnaire (PENS; [43, 84]). PENS surveys competence satisfaction (3 items; e.g. *"I feel very capable and effective when playing"*; autonomy satisfaction (3 items; e.g. *"I experienced a lot of freedom in the game"*; Cronbach's α = .82); Cronbach's α = .84), intuitive control (3 items; e.g. *"Learning the game controls was easy"*; Cronbach's α = .80), and presence (9 items; e.g. *"When playing the game I feel as if I was part of the story"*; Cronbach's α = .88). Responses were rated on a 5-point Likert scale ranging from "1 = *strongly disagree*" to "5 = *strongly agree*".

3.3.4 Flow Experience. The Flow Short Scale (FKS; [78, 79]) was used to measure flow experience. The scale consists of 10 items that were rated on a 7-point Likert scale ranging from 1 = *"not at all"* to 7 = *"very much"*. The items can be summarized as a general factor (Cronbach's α = .84) or divided into two factors: fluency of performance (6 items; e.g. *"The right thoughts/movements occur of their own accord"*; Cronbach's α = .87) and absorption by activity (4 items; e.g. *"I feel just the right amount of challenge"*; Cronbach's α = .84).

3.3.5 Player performance. Player performance was measured by logging how much players improved their balance sheet throughout the game. The balance sheet represents gold income per minute and describes the economic state of the settlement. Regardless of condition, all players started the game losing 583 gold per minute (a balance of -583). The less gold they lost per minute in the end of the play time, the better their performance. Some participants ended the game in a worsened situation; however, during the first five minutes until the cheat was offered, players improved their balance by 104 gold per minute from an average balance of -583 to

Table 1: Descriptive statistics split by whether or not participants used the cheat codes. Range of possible values: intrinsic motivation inventory (IMI) and player experience needs satisfaction (PENS): 1–5, flow: 1–7, action-state orientation: 0–12.Higher values indicate more of the construct (e.g., more absorption) and higher values for action-state orientation indicate greater action orientation.

	Used Cheat					Did Not Use Cheat				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
IMI: Pressure	55	1.20	3.80	2.52	0.68	32	1.20	4.40	2.59	0.91
IMI: Enjoyment	55	1.00	4.43	2.29	0.82	32	1.29	4.43	2.93	0.98
IMI: Competence	55	1.00	3.50	2.32	0.62	32	1.00	3.83	2.35	0.71
PENS: Competence	55	1.00	3.67	2.01	0.85	32	1.00	3.67	2.00	0.83
PENS: Autonomy	55	1.00	4.67	2.81	1.03	32	1.00	4.33	2.88	1.08
PENS: Intuitive Control	55	1.00	4.67	2.63	0.97	32	1.00	5.00	2.90	1.10
PENS: Presence	55	1.00	3.67	2.17	0.79	32	1.00	3.56	2.17	0.81
Flow: Fluency	55	1.00	5.33	2.86	1.22	32	1.00	6.17	3.13	1.44
Flow: Absorption	55	1.00	6.75	3.74	1.58	32	1.00	6.75	3.58	1.75
Action-State Orientation	55	0	12	3.85	3.00	32	0	12	5.28	3.22
Performance before cheat	55	-643	-158	-482	111	32	-584	14	-475	139
Performance at game end	55	-1230	246	-393	275	32	-1027	742	-276	331

-479 (Mean= -479, SD= 122, Min= -643, Max= +14). In the end of the 15 minutes play time, players had improved their steady income by 233 gold per minute on average (Mean= -350, SD= 300, Min= -1230, Max= +742).

3.4 Data Analyses

Data analyses were performed using IBM SPSS Statistics 26. Throughout, we use the Bonferroni-Holm [40] method of alpha correction—which controls familywise error rate and reduces the probability of a Type I error through an alpha adjustment—to interpret significant differences.

RQ1: To test whether state-oriented players are more likely to use the cheat code, we conducted a multiple regression using continuous action-state orientation and experimental condition (poor/rich; RQ1c) as independent variables and cheat code usage (no cheat versus cheat) as the dependent variable (RQ1a). In the second multiple regression, we investigate differences in the amount of cheat code usage (RQ1b). We collected this as an absolute number (ranging from 0-639) and because the standard deviation was very high, we divided the variable into three categories of relatively equal size 1: no cheat (0; n=32), 2: low cheat (<31 button presses; n=29), and 3: high cheat (>30 button presses; n=26). The low cheat group reflects cheating up to once every two seconds, while the high cheat group represents players who either kept pressing the button or held it pressed for the entire minute.

RQ2: Next, we analyse *the influence of cheat code use on player experience* (intrinsic motivation, needs satisfaction, and flow experience). We conducted 9 multiple regressions using continuous action-state orientation and cheat code usage (no/yes) as the independent variables and the sub-scales of the three categories of player experience as dependent variables (RQ2a), testing for interactions as well in a moderation analysis (RQ2b).

RQ3: For the final research question, which investigates *effects of cheating on player performance*, we report repeated measurement analysis of variance (ANOVA) with cheat code usage (no/yes) as the independent variable and balance sheet at different measurement time points (1: before cheat; 2: end of game) as the dependent variable. The balance sheet serves as a reflection of the in-game settlement's gold income (or loss) per minute, providing insight into its current state.

4 RESULTS

Descriptive statistics for all variables are displayed in Table 1. Prior to conducting each analysis, we performed assumption tests, despite most analyses being robust against violations of assumptions. In every instance, these tests did not indicate any reason to discontinue the analysis.

4.1 RQ1: Are players higher in threat-related state orientation *more likely to use* an external support when playing a game in which they are facing the threat of failure?

Both operationalizations of the threat of failure in RQ1 (1: the game situation itself; 2: the increased pressure depending on experimental condition (RQ1c)) were tested concurrently in the same analyses to prevent alpha error inflation.

4.1.1 RQ1a & 1c. Are players higher in state orientation more likely to use the cheat code under threat of failure? Participants higher in state orientation were more likely to use cheat codes ($\beta = -.240, T = -2.27, p = .03$). There was no main effect of experimental condition (rich versus poor; $\beta = -.164, T = -1.55, p = .13$), and no interaction effect of action-state orientation and experimental condition (moderation; $\beta = .024, T = .07, p = .95$).

4.1.2 RQ1b & 1c. Do players who use the cheat generate more money through it when they are higher in state orientation? This analysis revealed a significant main effect of action-state orientation ($\beta = -.243, T = -2.29, p = .03$), no significant main effect of condition (rich versus poor; $\beta = -.114, T = -1.07, p = .29$), and no significant interaction term between action-state orientation and condition ($\beta = -.038, T = -.10, p = .92$). Therefore, regardless of the condition, participants higher in state orientation used cheat codes more than participants higher in action orientation.

Table 2: Multiple regression results with explained variance at each level, unstandardized regression coefficients (B), standardized regression coefficients (β), and *p*-values for regressions predicting intrinsic motivation inventory (IMI) measures, using action-state orientation (Step 1), dichotomous cheat (Step 1), and the interaction term (i.e., moderation) (Step 2). Goodness of fit indices (R^2) for each block are provided.

	IMI: Enjoyment				IMI: Competence				IMI: Pressure/Tension			
	R^2	B	β	p	R^2	B	β	p	R^2	B	β	p
Step 1	.032				.026				.076*			
Action-State Orientation		.051	.183	.100		.034	.164	.141		-.069	-.279	.011*
Dichotomous Cheat		.072	.040	.720		.010	.007	.949		-.165	-.104	.336
Step 2	.063				.028				.154**			
Interaction (ASO x Cheat)		-.103	-.355	.102		-.018	-.086	.696		.143	.564	.007**

Table 3: Multiple regression results with explained variance at each level, unstandardized regression coefficients (B), standardized regression coefficients (β), and *p*-values for regressions predicting player experience of needs satisfaction (PENS) measures, action-state orientation (Step 1), dichotomous cheat (Step 1), and the interaction term (i.e., moderation) (Step 2). Goodness of fit indices (R^2) for each block are provided.

	PENS: Competence				PENS: Autonomy			
	R^2	B	β	p	R^2	B	β	p
Step 1	.029				.011			
Action-State Orientation		.045	.167	.133		.034	.102	.364
Dichotomous Cheat		.155	.089	.419		-.021	-.010	.931
Step 2	.029				.024			
Interaction (ASO x Cheat)		-.002	-.007	.976		-.081	-.235	.286
	PENS: Int. Control				PENS: Presence			
	R^2	B	β	p	R^2	B	β	p
Step 1	.030				.002			
Action-State Orientation		.039	.120	.278		-.013	-.050	.654
Dichotomous Cheat		-.216	-.102	.355		-.020	-.012	.913
Step 2	.034				.004			
Interaction (ASO x Cheat)		-.040	-.118	.588		-.020	-.076	.733

Table 4: Multiple regression results with explained variance at each level, unstandardized regression coefficients (B), standardized regression coefficients (β), and *p*-values for regressions predicting flow short scale measures, using action-state orientation (Step 1), dichotomous Cheat (Step 1), and the interaction term (i.e., moderation) (Step 2). Goodness of fit indices (R^2) for each block are provided. *p<.05

	Flow: Fluency				Flow: Absorption			
	R^2	B	β	p	R^2	B	β	p
Step 1	.054				.027			
Action-State Orientation		.090	.217	.049*		.085	.163	.144
Dichotomous Cheat		-.133	-.049	.651		.279	.083	.455
Step 2	.061				.038			
Interaction (ASO x Cheat)		-.071	-.166	.441		-.113	-.209	.338

4.2 RQ2. Does using the cheat code affect *player experience*?

This second research question comprises two sub questions—because the two sub questions are answered by the same model for each dependent measure (a single multiple regression), we report the results for these two questions together, organised by dependent measure. RQ2a represents the main effects of cheat code use on player experience and RQ2b represents the interaction effects between action-state orientation and cheat code use on player experience. The main effects of action-state orientation on player experience are reported because they are automatically tested in the same model, but are not directly relevant to our research questions.

4.2.1 Intrinsic Motivation. See Table 2 for all results.

Interest-Enjoyment. There were no significant main effects for *tASO* or cheat code usage (dichotomous variable) on interest-enjoyment. There was no significant interaction effect of tASO and cheat code usage on interest-enjoyment.

Perceived Competence. There were no significant main effects for tASO or cheat code usage on perceived competence. There was no

significant interaction effect between tASO and cheat code usage on perceived competence.

Pressure-Tension. We observed a significant main effect of tASO on pressure/tension ($\beta = -.279, T = -2.6, p = .01$). State-oriented participants self-reported that they experienced more pressure on average while playing Anno 1404 than action-oriented participants did. This effect was moderated by cheat code usage ($\beta = .564, T = 2.7, p < .01$): only those state-oriented players who did not use the cheat code experienced more pressure, while state-oriented participants who used the cheat code did not experience higher pressure than action-oriented participants. There was no significant main effect of cheat code usage ($\beta = -.104, T = -.97, p = .37$). This indicates that action-oriented players did not benefit from the cheat code in the same way that state-oriented individuals did. See Table 2 for the results, and Figure 1 for a visualization of the interaction effect.

4.2.2 Needs Satisfaction During Play. There were no significant main effects of tASO on the player experience of needs satisfaction scales (competence, autonomy, presence/immersion, and intuitive controls). There were no interaction effects between tASO and cheat code usage. Player experience of needs satisfaction on these four subscales was neither positively nor negatively affected by using the cheat code. See Table 3 for all results.

4.2.3 Flow Experience. There was a main effect of tASO on flow—fluency of performance ($\beta = .217, T = 2.0, p = .049$); however, this result was not significant after the Bonferroni-Holm correction. There were no other main effects or interaction effects of action-state orientation (tASO) and cheat code usage on flow—fluency of performance or flow—absorption by activity. Flow experience was neither positively nor negatively affected by using the cheat code. See Table 4 for all results.

4.3 RQ3. Did using the external support (i.e., cheat code) affect *player performance?*

To estimate performance, the dependent variables we considered were the amount on the participant's balance sheet (settlement gold income per minute) before they had the option to cheat, and their balance sheet at the end of the game (before optional prolonging). In the repeated-measurement ANOVA (rANOVA) we observe no statistically significant difference in player performance between participants who used cheat codes and those who did not ($F_{1,85}$= 2.85, η^2 =.032, p=.095), indicating that using the cheat code usage had no significant effect on player motivation to improve the state of their in-game settlement (performance).

5 DISCUSSION

In this paper, we introduce action-state orientation, a personality disposition which describes individual differences in the way people cope with threatening situations [50, 55]. In essence, action-oriented individuals exhibit good self-regulatory abilities under stress [30]; state-oriented individuals, on the other hand, have difficulties motivating or soothing themselves on their own [5, 89] and therefore they benefit from external support [1, 4, 49]. This led us to the assumption that in threatening situations, state-orientation should be related to using an external support, such as cheat codes in single-player games. Beyond just introducing and explaining the theory, we illustrate its utility for games research through an exemplary study.

5.1 Summary of Findings

We summarize our main findings by research question.

RQ1: Are players higher in threat-related state orientation *more likely to use* an external support when playing a game in which they are facing the threat of failure?

- Individuals who have difficulties with self-regulation (state orientation) are both more likely to use cheat codes and to use them with higher frequency when confronted with a complex new game.
- We observed no statistical differences in likelihood of cheating based on the starting resources of the players (i.e., rich or poor starting condition).

RQ2. Does using the cheat code affect *player experience*?

- Individuals who have difficulties with self-regulation reported more experience of pressure and tension during gameplay than action-oriented individuals; however, when the external support (cheat code) was utilized, this relationship between action-state orientation and pressure disappeared, allowing state-oriented individuals to alleviate the experienced pressure.
- Cheat code usage did not significantly affect player experience (flow experience, needs satisfaction, and the other measured aspects of intrinsic motivation), thus we cannot conclude that cheating made the experience better or worse for these measures.

RQ3. Did using the external support (i.e., cheat code) affect *player performance?*

- Performance did not differ between players who used cheat codes and those who did not.

5.2 Action-State Orientation Influences Cheat Code Usage and Experienced Pressure

In this study, action-state orientation influenced whether or not participants embraced the opportunity to use cheat codes to generate in-game currency. In line with self-regulation theory [53, 54, 58] action-oriented individuals find it easier to soothe themselves while facing a threatening situation (e.g., failure, threat of losing the game) and therefore do not need cheat codes to cope. State-oriented individuals, on the other hand, have trouble navigating stressful situations on their own due to their limited ability to down-regulate negative affect. Previous research in non-gaming contexts (e.g., [1]) shows that state-oriented individuals are likely to benefit from external help. We replicate this in a game context by demonstrating that players who are new to a complex game and higher in state orientation actively make use of external support.

We show that in a difficult situation, players who struggle with self-regulation self-report higher pressure and tension (compared to action-oriented players), but that this difference disappeared for players who used the cheat code as external support. Thus, the external support removed pressure for players who may find it difficult to self-regulate under stress. Self-regulation theory can

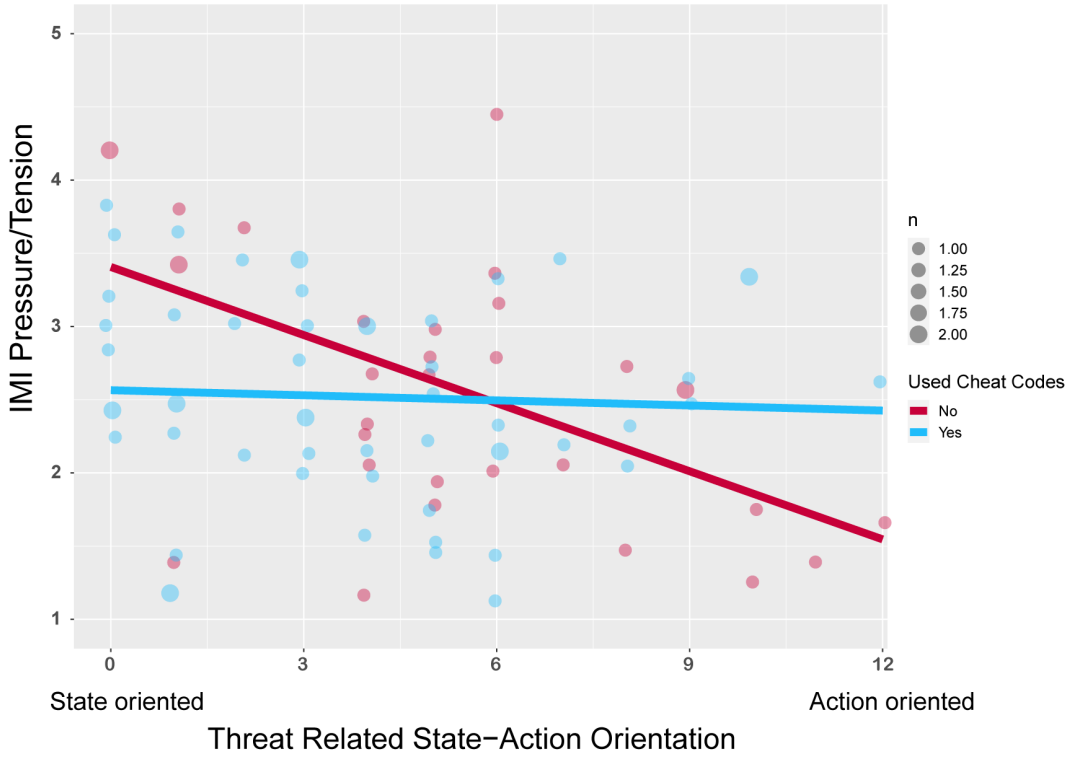

Figure 1: Effects of action-state orientation on IMI Pressure/Tension with colour indicating those who used the cheat code (blue) and those who did not (red). The size of the circle in the scatter plot indicates the frequency of the answer and coloured based on whether they used cheat codes. Using the external prompt (cheat code) mitigated the effect of threat-related state-action orientation on experienced pressure. The orientation is expressed on the X-axis ranging from 0 (= mainly state-oriented) up to 12 (=mainly action-oriented). The colored lines in the scatter plot visualize the overall trend for both conditions (Did not use cheat = red; Used cheat = blue).

be utilized to explain this finding: people who are high in (threat-related) state orientation have a harder time with down-regulating negative affect in a threatening situation. The new game paired with the difficult in-game situation created a situation of threat. Our results suggest that the cheat code allowed state-oriented players to relax more. Furthermore, because we are considering the regulation of negative affect under stress, it is not surprising that there were effects on pressure-tension and not on other measures of player experience, such as enjoyment or flow.

5.3 We Observed No Downside to Using Cheat Codes

One might argue that while cheat codes can help people overcome stressful or threatening situations, they may come at a cost in terms of fun (which can be generated by overcoming challenges) and competence (improving at the game). However, we did not observe this in our study. Individuals who used cheat codes did *not* report lower game enjoyment, perceived competence, competence satisfaction, autonomy satisfaction, intuitive controls, immersion/presence or flow experience. In addition, player performance was not harmed in this study. Through the use of psychological theories, we can add context to these findings: for state-oriented individuals, being the ones more likely to need external support to regulate emotions, using the cheat code merely takes the pressure from a threatening situation, allowing them to focus on the task. They accept external help, which might level the playing-field between state-oriented and action-oriented players. These results are in line with Passmore et al. [70], who show that cheating in single-player games can be beneficial for those who wish to enact agency over their emotional experience during play. They are also in line with Doherty et al. [27], who provide 13 motivations for cheating, which include "to advance toward completion in a game", and to "have fun". We do not know *why* our participants chose to use the cheat; however, we do know that players chose to use it and there were no observable differences in experience for those who did. It is possible that in other contexts, these results might differ, because we looked at a sample that had limited gaming experience. Still, we find no indication that providing beginner players with help through the cheat opportunity hindered their experience or performance when learning a new game. This is in line with previous work demonstrating that assisting players did not impede learning once the assistance was removed, and did not harm experience (see [24, 37, 42]).

5.4 Not Wrong, Not Right, Just Different

Our research could easily leave the impression that state-oriented individuals are "inferior" while action-oriented individuals are "superior"; however, this is incorrect. First, differences between action-state orientation only emerge under stress (threat or demands)—under low-stress conditions, the differences between action-state orientation disappear and, in fact, state-oriented individuals sometimes have an advantage [45]. Action-oriented individuals shine under pressure, while state-oriented individuals do well without *needing* pressure; the flip side of this is that action-oriented individuals may *need* some kind of stress to get going (e.g., [30, 50, 91]). Second, previous research has shown that state-oriented individuals benefit from external help (e.g., [1, 4, 49]). Our results add to this by showing that state-oriented individuals are also more likely to *actively* accept this help when given. A willingness to accept help can be an advantage and a readiness to use given resources should not be seen as a weakness. Third, it can be an advantage to not to act hastily. For example, having a diverse group of people can improve teamwork and a combination of action and state orientation works best: state-oriented individuals may better contribute a sensitivity for potential risks, a thorough analysis of potential problems, and to counteract excessive optimism, whereas action-oriented individual may find it easier to overcome rumination and encourage trying out possible solutions [39, 92]. Taken together, both action- and state orientation have advantages and disadvantages; however, prior work has identified ways to 'train' action orientation or help to cope with being exposed to stressful situations, because a relaxed atmosphere or external support is not always provided (see [1, 8, 29, 30]).

5.5 Implications for Design: The Role of External Support in Digital Games

Our findings show that there is no need to insist on a sink-or-swim approach to provide interesting gameplay or for players to improve their skills. Game communities are often concerned with achievement, and considering gaming as a meritocracy (e.g.,[71, 87]) might be one of the reasons why conditions such as social anxiety have been found to translate into gameplay (e.g., [21, 22]). Kuss et al. [59] describe how gamers feel that they are not "real" gamers, for reasons such as not playing every day, not being heavily invested in their games, or not playing the "right" type of game. Such tropes of distinguishing between 'casual' and 'hardcore' gamers challenge the legitimacy, credibility, and authenticity of many gamers [38]. However, there are many reasons for playing games beyond seeking challenge, such as stress relief, immersion, or social connection [65]. Playing digital games can improve symptoms in players with social anxiety and depression [35, 62] and both competitive and cooperative gameplay can reduce stress levels in players [81]. Just as there are many motivations for gaming [41], there are many ways to support players with different needs. Our work shows that when given external support, the pressure for state-oriented plays who accept it is reduced, which is in line with previous work showing that aiding players does not harm their learning, even when the support is later removed [37, 42]. Additionally, game designers may consider the role of *other players* as a support mechanic: In some games, like Dark Souls 3 [33], players can ask friends to assist with challenging parts of the game. Through enabling players to help each other, game designers enable state-oriented players not only to overcome a challenge in a less stressful way but also help them to satisfy social needs by playing cooperatively with friends [25]. Our game explored the injection of a cheat opportunity in a moment when failure was clearly apparent; in games, the opportunity to cheat and the conditions in which the opportunity presents itself are more subtle and varied. Our findings empirically demonstrate the benefits of a cheat in our specific game scenario, but may not generalize to other genres or game contexts.

Our work showed that accepting help did not harm experience, which is in line with work showing that adapting challenges to the skill of the player benefits experience [24]. There are already ways to adjust difficulty levels in many games, including Anno 1404; however, action- and state-oriented individuals are unlikely to differ in their preference for game difficulty levels because they do not differ in their motivation for achievement and challenge [5], but rather *differ in their ability to overcome failure-related rumination.*

By introducing a well-established theory of self-regulation and intertwining it with questions concerning game design and user experience, we aim to provide an additional toolkit for comprehending players. This approach provides precise terminology for describing and classifying players, facilitating the differentiation between traits that are commonly observed together but might not be causal relationships. For instance, while it may seem that players who avoid challenging or stressful games do not seek achievement and mastery, it is plausible that these players are instead just deterred by specific design aspects of these games and not by the achievement aspect itself.

5.6 Limitations and Future Directions

There are some limitations that should be considered. First, we did not include a control group that did not have the option to use cheat codes, which would have doubled our needed sample size without contributing to answering our research questions; however, would have allowed us to investigate whether having the option to use a cheat code when things get difficult leads to an improvement in the player experience of state-oriented individuals. We did, however, observe that the amount of pressure that state-oriented players experienced was only lower for those who accepted the cheat code as an external support. Future work could investigate the effects of using the cheat code on player experience, including a control group for comparison. Second, future studies should examine the generalization of these results by investigating a more heterogeneous sample (i.e., more men, non-students), different gaming contexts (e.g., multiplayer games, other game genres) as well as other forms of threat/failure (e.g., not being able to solve a puzzle) and external support. Third, we introduced two dimensions of action-state orientation in the theoretical background, because we are introducing the theory to HCI and we wanted to highlight the distinction between different types of self-regulation. However, we did not investigate *demand-related* action-state orientation as there was no theoretical reason to assume that demand-related action-state orientation would be a relevant factor in our experimental setting. Future work could investigate how game designers can help state-oriented individuals overcome difficulties in self-motivation.

6 CONCLUSION

The main contribution of this work is theoretical: we introduce and explain an underutilized theory to HCI researchers. To illustrate self-regulation theory and give an example of how it can be applied, we conducted an exemplifying user study with the goal of demonstrating its utility and value to games research. We demonstrated how individual differences in self-regulation (specifically in down-regulating negative affect) are related to cheat code usage and how that, in turn, might affect player performance and experience. Overall, two important conclusions can be drawn from our study. First, individuals higher in state orientation, who have difficulties with self-regulation when they experience fear of failure, are more likely to use cheat codes (an external support) to overcome threatening in-game situations. Individuals higher in (threat-related) action orientation used cheat codes less often and less frequently and also did not observably benefit from them. Second, using cheat codes does not have negative consequences in terms of player performance and experience. Rather, the opposite might be true: cheat codes allowed state-oriented individuals to have a more relaxed gaming experience by offering them a way to regulate externally.

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