

Regulatory Focus and Serious Games: A Quasi-Experimental Study

This research is partially supported by grant #0943064 from the National Science Foundation.

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<http://gel.msu.edu/playertypes>

Poster presented by Carrie Cole at the Society for the Study of Motivation (<http://www.thessm.org>) in affiliation with the Annual Convention of the Association for Psychological Science (APS) 5/24/2012, Chicago.

Premise

Digital Game-Based Learning (DGBL) experiences are often required as part of classroom learning or workplace training. Learners cannot choose to stop playing, even if they experience gameplay as uninteresting or aversive. In this quasi-experimental study, we examine the impact of regulatory focus on gameplay behaviors and attempt to manipulate regulatory focus.

The overarching questions were:

- 1.) Does regulatory focus affect gameplay behavior?
- 2.) Can we manipulate regulatory focus to better support DGBL gameplay goals, particularly when success in the game draws upon a regulatory focus opposite to a player's preferred focus?

Regulatory focus and regulatory fit theory

Regulatory focus theory (Higgins, 1997, 1998) posits that two motivational systems regulate all goal-directed behaviors. The two systems are *promotion focus* and *prevention focus*. Promotion focus individuals enjoy gains and dislike non-gains. They tend to emphasize achievements, advancements, and possibilities (Higgins et al., 2001). In contrast, prevention focus enjoys non-loss and dislike losses. They tend to emphasize safety and obligations (Cesario, Grant, & Higgins, 2004).

When an individual uses an approach that matches his or her regulatory focus, the individual experiences a regulatory fit state. When an individual experiences a regulatory fit state, the individual feels "right" about what they are doing, and will engage in the goal-attaining action with stronger strength. Persuasion studies have found that when a persuasive message matches the recipient's regulatory focus the receiver is more likely to believe the message and have higher intentions of complying (Cesario, Grant, & Higgins, 2004).

In the context of goal-directed DGBL, regulatory fit theory implies that players are more likely to be motivated by learning game design whose goals match their regulatory focus. For example, a game that emphasizes exploring might appeal to promotion focus players, whereas a game that emphasizes resource preservation may appeal to prevention focus players. This study has two goals, first to examine if regulatory focus affects how players approach a common game goal. And second to examine whether teachers and game designers may be able to improve regulatory fit by overriding players' natural regulatory focus by prescribing and reinforcing external instructions.

Hypothesis

- H1a. Promotion focus players will adopt an eager approach by taking more shots than prevention focus players.
- H1b. Promotion focus players will make more mistakes (missed shots) than prevention focus players.
- H2. Prevention focus players will spend more time than promotion focus players reading the feedback screen.
- H3. Promotion focus players will be more likely to play beyond the required minimum 10 minutes than prevention focus players
- H4. Prevention focus players will conform to whichever set of external instructions they receive (the manipulation) more so than will promotion focus players.

Player Data Collection Steps

1. Pre-Survey Regulatory Focus

Regulatory focus was measured using Higgins' 11 item Event Reaction Questionnaire. The questions ask about how frequently specific events occur or have occurred in the respondent's life. Participants were classified as having a Prevention or Promotion focus based on a median split.

<http://www.columbia.edu/cu/psychology/higgins/papers/rfq.pdf>

2. Random Assignment (Eager or Vigilant Manipulation)



EAGER: Try to achieve the highest level you possibly can in 10 minutes of play. The research computer will keep track of time and how many levels you complete.



VIGILANT: For the next 10 minutes, try to make as few mistakes as possible while you play Starshine. The research computer will keep track of time and how many mistakes you make.

3. In-Game Data Collection



8:53 remaining
5 rounds won
with EAGER dashboard

8:53 remaining
15 shots missed
or VIGILANT dashboard

Starshine: A trajectory shooting, puzzle game where players attempt to hit all of the stars located on the screen with a single shot that causes a chain reaction as stars explode from getting hit. (by Hero Interactive)

Sample Size by Study Condition and Regulatory Focus

		Post-test Regulatory Focus		TOTAL
		Promotion	Prevention	
Randomly assigned Study Condition	Eager	47	46	93
	Vigilant	38	47	85
	TOTAL	85	93	178

(The 47 promotion-oriented players in the Eager condition and the 47 prevention-oriented players in the Vigilant condition should have experienced regulatory fit.)

Findings

The data was consistent with H1a & H1b. Promotion focus players ($M=123$, $SD=70$) took significantly more shots than did prevention focus players ($M=107$, $SD=42$), $t[176]=-1.81$, $p<.05$. Promotion focus players were less careful in taking shots, and therefore made more mistakes ($M=110$, $SD=67$) than prevention focus players ($M=94$, $SD=42$), $t(176)=-1.84$, $p<.05$.

The data was not consistent with H2. There was no significant difference in the average time spent viewing between-round feedback for promotion and prevention focus players.

	Promotion focus		Prevention focus	
	mean	s.d.	mean	s.d.
Shots fired*	123	70	107	42
Shots missed*	110	67	94	42
Time on feedback (seconds)	2.72	2.25	2.94	2.64

The data was consistent with H3. Promotion focus players played longer beyond the required time of 10 minutes ($M=12:35$, $SD=8:34$) than prevention focus players ($M=10:34$, $SD=2:48$), $t(176)=-2.14$, $p<.05$.

We hypothesized (H4) that because prevention focus players are more concerned with safety and avoiding mistakes, prevention focus players are more likely to be affected by external instruction than promotion focus players. The data was consistent with this hypothesis.

	Promotion Focus				Prevention Focus					
	Eager Condition		Vigilant Condition		Eager Condition		Vigilant Condition			
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.		
Time (seconds) before 1 st shot	0.92	0.73	1.24	1.48	*.84	0.65	<	1.63	1.87	
AVG time (seconds) between shots	*10.4	5.5	<	12.7	7.5	*8.8	3.6	<	14	9.2
AVG checks per shot	5.4	3		5.9	2.7	*4.7	1.9	<	6.2	3.7
Total shots	130	78		115	60	*121	44	>	89	31
Failed shot ratio	88%	7%		88%	5%	*88%	5%	>	83%	17%
AVG time (seconds) viewing score	2.8	2.8		3.1	2.5	*2.3	1.4	<	3.2	2.9
Total game time	12:20	6:23		12:49	10:21	*11:03	3:05	>	9:58	2:17
n	46		47		47		38			

Discussion

- The results from this study indicate that regulatory focus affects how players approach a game's goals. Promotion focus players took an eager approach by taking more shots regardless of the fact that this approach also increased number of mistakes. In comparison, prevention focus players played the game in a vigilant manner, carefully reducing shots to prevent mistakes.
- This study also found that prevention focus players were more likely to comply with external instructions whereas the promotion focus participants' behaviors were not affected by the external instructions. This maybe because prevention focus players are more concerned with obligations and dislike making mistakes. Therefore they complied with external instructions even if the eager instructions went against their favorable vigilant means.
- These finding are important because they suggests that instructors need to pay attention to different regulatory focus among learners when using digital games as educational tools. Promotion focus learners may react differently to prevention focus learners based on the way a game's goals and rewards are designed. The prevention focus learners are more likely to follow additional instructions given by instructors, but the promotion focus learners are unaffected. Different response to external instructions may create a disparity in the effectiveness of digital game based learning.

References

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