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Involuntary classroom transition moderates the effect of Present Hedonistic perspective on the belief in free will

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ABSTRACT

Mitigation plans during the early stages of COVID-19 provided a unique, antagonistic environment in which drastic changes occurred quickly and did so with minimal freedom of choice (e.g., involuntary transition from in-person to online classroom). As such, individuals of different beliefs and perspectives would respond differently to these mitigations. We examined the interaction between the Present-Hedonistic (PH) perspective and involuntary classroom transition on the belief in free will ($N = 131$). PH-oriented individuals exhibit a strong desire for choice while also welcome new opportunities and change. Importantly, the perceived freedom of choice and capacity for change also serve as foundational constructs to the belief in free will. Our results revealed that involuntary transition weakened the free will belief in those with lower PH but did not affect those of higher PH orientation. These findings suggest that the interplay between the perception of choice and capacity for change account for how individuals responded to the COVID-19 pandemic mitigation plans.

1. Introduction

Beginning in the spring of 2020, the world was responding to the COVID-19 pandemic with fear and uncertainty. The rates of infections and deaths were rapidly increasing and clinical trials for vaccines had not yet begun. A majority of businesses, schools, and other public locations temporarily suspended in-person interactions. Many people entered “lockdown” or “quarantine” and were mostly confined within their own homes. These sudden changes, mandates, and restrictions related to the pandemic resulted in different degrees of physical and mental responses. In many individuals, psychological disturbances such as the level of stress, depression and anxiety were elevated (e.g., Qui et al., 2020).

The effect of the pandemic-related restrictions also spanned beyond physical and mental health and may have affected personal values, attitudes, beliefs, and behaviors that could in turn affect well-being. In particular, the circumstances surrounding the pandemic might have affected individuals' sense of agency and the belief in free will. Past research has shown that the belief in free will is a predictor of several behavioral and psychological variables. For instance, those with a strong belief in free will perform better in various situations including in a work environment (Stillman et al., 2010) and in school (Feldman et al., 2016).

On the other hand, when the belief in free will is weakened, this may encourage undesirable behaviors (e.g., see also Zhao et al., 2014 on racial biases; Baumeister et al., 2009 on anti-social behaviors). For instance, Vohs and Schooler (2008) demonstrated that when participants' belief in free will declined, a decline in moral responsibilities was observed and there was a greater tendency to cheat. Given the influential impact of free will belief on behaviors, it is important to examine how pandemic-related circumstances may limit or minimize the belief in free will. This examination may lead to a better understanding of, and possible mitigations for, immoral or undesirable behaviors during this unprecedented time.

In general, those who have a strong belief in free will exhibit a greater desire to engage in choice (Feldman, 2017). The mandated safety guidelines, however, could have created an environment that hindered such engagement, and instead appeared to be uncontrollable and constrained. Subsequently, some individuals could have felt that the freedom of choice had been abruptly taken away, rendering a reduction in a sense of agency and internal control (e.g., Barlas & Obhi, 2013), which are key foundations for the lay belief in free will (Bergner & Ramon, 2013; Feldman, 2017). In addition, capacity for change is a critical construct that influences agency and the belief in free will (Feldman, 2017). While the pandemic exerted external havoc,

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individuals processing of greater internal capacity for change might have been able to maintain a sense of agency and adhere to their belief in free will by embracing change and working with or around the pandemic restrictions.

In the current study, we examined how the belief in free will could be affected by the interaction between the internal capacity for change (as indexed by the Present Hedonistic orientation within the Time Perspective Theory as described below) and the external imposition of pandemic mitigation plans that minimized choice (i.e., when involuntarily transitioned from an in-person classroom to an online learning platform). Time Perspective Theory (Zimbardo & Boyd, 1999) posits that time perspective is an unconscious process in which personal and social experiences are assigned to a temporal category involving the past, present, or future. These personal time perspectives are hypothesized to affect our daily decisions, feelings, and mood. Zimbardo and Boyd distinguished five types of time perspectives: Past-Positive, Past-Negative, Present-Hedonistic, Present-Fatalistic, and Future. Individuals who tend to be of higher Past-Positive orientation focus on positive memories of the past and appear to have fewer depressive symptoms, exhibiting increased well-being and life satisfaction (Stolarski et al., 2011). Past-Negative individuals, on the other hand, often reflect on the negative past, ruminating about errors and mistakes, and consider themselves as realists. They also experience a higher level of depressive symptoms (Anagnostopoulous & Griva, 2012). Individuals with a greater orientation toward Present-Fatalistic exhibit greater depressive symptoms, feel their fate has been pre-determined, and that they have minimal control of their lives. Conversely, future-oriented individuals plan ahead and are confident in their decisions.

Of the five time perspectives, we have focused our study on the Present-Hedonistic (PH) orientation because this orientation consists of both the desire for choice and the capacity for change. Specifically, individuals of greater PH orientation exhibit higher level of openness, are actively seeking unique and pleasurable experiences, have a strong desire to live in the moment, and act by the rules of their own choosing. Present Hedonistic orientation is described also as welcoming of and adaptive to change (Veenhoven, 2003), and individuals of greater PH orientation exhibit greater happiness and lower depressive scores (Disabato et al., 2017). Based on these PH attributes, we asked how the belief in free will varies with PH perspective under circumstances in which sudden changes were imposed by pandemic mitigation plans.

We had the opportunity to examine the relationship between Present-Hedonistic perspective and the belief in free will among college students at the beginning of the pandemic lockdown. One group of the participants enrolled in Psychology classes in which lessons were delivered in person prior to the pandemic but shifted to an online platform in accordance with COVID-19 mitigation plans. The other group of participants also enrolled in similar Psychology classes, but lessons were delivered through an online platform prior to and during lockdown; thus their learning environment did not change.

It is unclear how the interaction between PH and the classroom transition would affect the belief in free will. On the one hand, the sudden and unexpected change in class format in the first group of participants might facilitate a feeling of lack of agency especially for those who were highly PH oriented and presumably desired options, rendering a possible reduction in the belief in free will. This prediction is built on the basis of the agency and intention attribution hypothesis, which posits that the belief in free will is associated with an increased sense of agency. Thus the belief in free will is enhanced when one's actions or behaviors are self-generated (e.g., having a choice for a classroom format) rather than when imposed upon by external factors (Alquist et al., 2013; Barlas & Obhi, 2013; Genschow et al., 2017; Lynn et al., 2014; Rigoni et al., 2012; Rigoni et al., 2013; Rigoni et al., 2015) such as in the context of the involuntary classroom transition in response to the pandemic.

The intention attribution hypothesis can also serve as a basis for a different direction of the interaction between PH and classroom

transition. For instance, those with high PH orientation generally have a high capacity for new experiences and new changes, and thus the transitioning of classroom environment might not affect the belief in free will. Instead, high PH's tendency to welcome change may manifest into a perception of having a choice that encourages one to embrace the classroom transition as a unique opportunity to explore and experience something new (Veenhoven, 2003), reinforcing the belief in free will. As a result, the belief in free will of these high PH individuals would be heightened or at least would not be affected by the classroom transition. By the same token, those with a low PH orientation, who have less capacity for change, might experience a higher level of stress and therefore would be affected by the classroom transition because these individuals would not perceive the change as a welcoming opportunity.

2. Materials and methods

2.1. Participants

A total of 131 students at the University of Arizona took part in an online survey during the early stage of the COVID-19 pandemic in the United States between April 13 and May 6, 2020. The participants were recruited from psychology classes taught by different instructors, but these classes nevertheless shared similar course materials (i.e., introductory concepts in psychology) and learning objectives. A power analysis performed with G*Power 3.1 (Faul et al., 2009) indicated that 77 participants would allow for the detection of a medium effect (0.15) of a partial R^2 increase of 0.05 ($\alpha = 0.05$) with a power of .8. Of the 131 participants surveyed, 68 participants transitioned from an in-person classroom format to a remote online learning format due to the pandemic (Transition group: 23 males and 45 females; average age of 21.21). The remaining 63 participants were learning remotely prior to and during the pandemic (Online, Non-transition group: 27 males and 36 females; average age of 20.54). All participants had the option of receiving course credit or monetary compensation (between \$10 and \$25). All participants consented to the study protocol approved by the Institutional Review Board of the University of Arizona. All data were collected via Qualtrics data collection software hosted by the University of Arizona.

2.2. Materials and procedure

2.2.1. Time Perspective Inventory

The Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) was used to measure the Present Hedonistic and the other four time perspectives. The ZTPI consists of five scales assessed via 56 questionnaire items: Past-Negative (e.g., *I often think of what I should have done differently in my life*), Past-Positive (e.g., *Familiar childhood sights, sounds, and smells often bring back a flood of wonderful memories*), Present-Fatalistic (e.g., *Fate determines much in my life*), Present-Hedonistic (e.g., *I believe that getting together with one's friends to party is one of life's important pleasures*), and Future (e.g., *When I want to achieve something, I set goals and consider specific means for reaching those goals*). The participants rated on a Likert scale the degree to which each of the ZTPI referred to them (1 = *very untrue*, 5 = *very true*).

2.2.2. Free Will and Determinism Scale

The FWD scale (Rakos et al., 2008) consists of 22 items rated on a Likert scale of 1 to 5 (1 = Strongly Disagree, 5 = Strongly Agree). The resulting scores range from 22 (most deterministic) to 110 (most libertarian; i.e., a stronger belief in free will).

2.2.3. Mental health measures

Participants completed the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) and the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983). The DASS measures depression through several constructs reflecting DSM-5 depression symptomology, as well

as characteristic signs of arousal and stress. The STAI has two forms that measure two main types of anxiety: state (STAI-S) and trait anxiety (STAI-T).

3. Results

3.1. Mental health

To ensure that participants in both groups of Classroom Transition were equated in terms of mental health, we first examined their depression and anxiety levels. The DASS scores revealed no difference in the depression levels between the transitioned group (27.81, *SE* = 1.128) and the online group (25.94, *SE* = 1.14), $t(129) = 1.048, p = .296$. Comparison of the DASS scores for stress also revealed no difference between the two groups, $t(129) = 0.502, p = .617$ (transitioned group stress score was 27.45, *SE* = 1.04; online group stress score was 26.63, *SE* = 1.28). Similarly, the participants in the two classroom conditions did not differ in either state anxiety level, $t(129) = 1.560, p = .121$ (transitioned group STAIS score was 46.62, *SE* = 1.34 and the online group was 43.17, *SE* = 1.78), or trait anxiety level, $t(129) = 1.279, p = .203$ (transitioned group score was 45.82, *SE* = 1.21, and the online group was 43.41, *SE* = 1.46). In short, both participant groups were generally equated on the basis of depression and anxiety based on our available measures.

3.2. Moderated regression analysis

To examine the moderation effect of classroom transition on the relationship between Present-Hedonistic (PH) orientation and the belief in free will, we performed a moderated multiple regression in SPSS that included two steps. Step 1 examined the individual effects of PH time perspective and Classroom Transition on belief in free will (Classroom Transition was coded “1” for a transition from an in-person modality to an online platform and “2” for the online platform without transition). In step 2, an interaction term between PH time perspective and Classroom Transition was added. Results from Step 1 revealed that PH time perspective was positively related to free will scores, but Classroom Transition condition was not (Table 1). The regression model also showed that 17.0% of the variance in the free will score was accounted for by PH perspective and Class Transition, $F(2,128) = 13.077, p < .001$. Critically, in Step 2, the interaction (computed as the product of PH and Classroom transition) was significantly related to the free will score. That is, the interaction term contributed to an additional 2.52% in the variance of free will score, $F(1,127) = 3.981, p = .048$, suggesting a moderating effect of the Classroom Transition (Fig. 1).

3.3. Moderating effect of classroom transition with respect to other time perspectives

To examine whether the moderating effect of Classroom Transition

was specific to the PH individuals, we performed additional correlations and moderated regressions on the interaction terms between Classroom Transition and each of the other time perspective types. As shown on Table 2, each of the time perspective variables was either positively correlated (Present-Hedonistic, Past-Positive, Past-Negative, Future-Perspective) or negatively correlated (Present-Fatalistic) with the belief in free will. However, with the exception of PH, the moderated regression analysis revealed that these relationships were not moderated by Classroom Transition. While the ΔR^2 in Step 1 in each of the regression models was significant, none of the ΔR^2 outputs in Step 2 were statically significant, suggesting that the moderating effect of Classroom Transition is unique to the effect of Present Hedonistic time perspective on the belief in free will.

3.4. The effect of classroom transition: Post-hoc pairwise comparisons

We performed additional analyses to further examine the moderating effect of classroom transition on the predictive relationship between PH and the belief in free will. The significant effect of the interaction term between PH and Classroom Transition (Fig. 1) prompted a post-hoc pairwise comparison of the free will scores between low PH individuals in the two Classroom Transition modes, and between high PH individuals also in the two Transition modes. We first performed a median split of the PH scores within a classroom mode (Median_{in-person-to-online} = 3.27, Median_{online-to-online} = 3.53) and classified the free will scores into four groups: Low PH/In-Person (*N* = 33, PH score = 2.86, *SD* = 0.33), Low PH/Online (*N* = 30, PH score = 3.17, *SD* = 0.28), High PH/In-person (*N* = 35, PH score = 3.77, *SD* = 0.37), High PH/Online (*N* = 33, PH score = 4.06, *SD* = 0.39). Free will scores were subjected to an independent *t*-test between the Low PH/In-Person group and the Low PH/Online group. The results revealed a significant difference between the two groups, $t(1,61) = 2.061, p = .044$, such that those who had to switch from an in-person to an online learning platform reported less belief in free will ($M = 75.06, SE = 2.20$) compared to those who did not have to make a classroom transition ($M = 81.83, SE = 2.46$). The data suggest that while these two groups of students had a similarly low hedonistic perspective, the involuntary classroom transition seemed to have a stronger effect on the belief in free will compared to those who did not transition.

However, when the free will scores of high PH individuals were subjected to a comparison between classroom transition groups (in-person to online group: 88.11, *SE* = 1.99 and online to online group: 88.12, *SE* = 1.63), we observed no significant difference, $t(66) = -0.003, p = .998$. This suggests that the free will belief in those with high PH perspective, despite the involuntary imposition to switch classroom modalities, did not differ from those of high PH orientation and did not have to make a classroom transition. In short, the moderation effect of involuntary classroom transition impacted those whose Present-Hedonistic was low, rendering a lower belief in free will.

Table 1
Moderated multiple regression results.

Variable	B	SE	β	t	R	R ²	ΔR^2	F
Step 1					.412	.170	.170	13.08**
PH	8.92 [CI: 5.28; 12.55]	1.84	.41	4.854**				
Classroom transition	.60 [CI: -3.66; 4.87]	2.15	.02	.280				
Step 2					.441	.195	.025	3.98*
PH	14.74 [CI: .463; 51.411]	3.44	.67	4.289**				
Classroom transition	25.94 [CI: .463; 51.411]	12.87	1.01	2.015*				
PH × Classroom transition	-2.42 [CI: -4.820; -.020]	1.21	-1.09	-1.995*				

Note. **p* < .05, ***p* < .01, ΔR^2 indicates the extent of the effect of the variable(s) on the belief in free will.

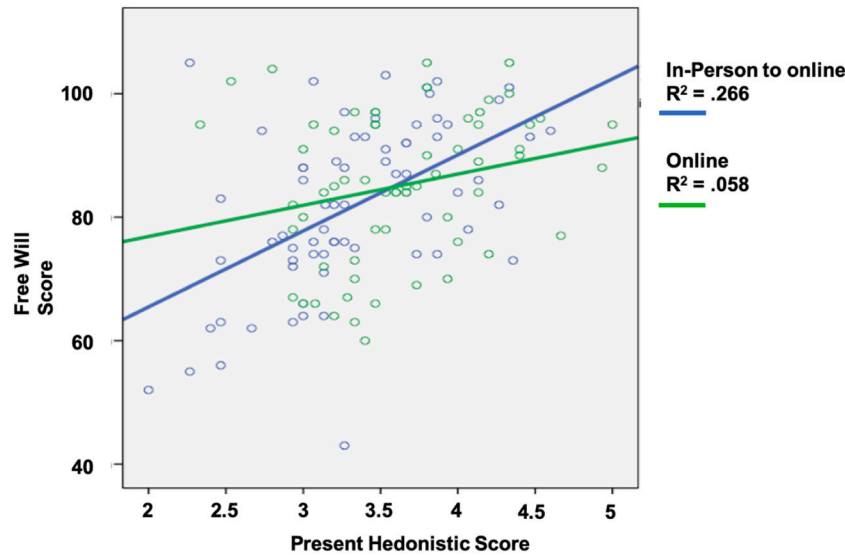


Fig. 1. Scatterplot of Present Hedonistic score and Free Will score for those transitioning from an in-person to an online classroom (blue) and those who have remained in an online learning format (green). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Table 2. Results of moderated multiple regressions for each Time Perspective.

Variable	Correlation with Free Will score	R	R2	ΔR2	F
Present Hedonistic	.411**				
Step 1		.412	.170	.170	13.08**
Step 2		.441	.195	.025	3.98*
Present Fatalistic	-.179*				
Step 1		.222	.049	.049	3.308*
Step 2		.235	.055	.006	.830
Past Positive	.284**				
Step 1		.291	.085	.085	5.920*
Step 2		.297	.088	.003	.473
Past Negative	.204*				
Step 1		.260	.068	.068	4.636*
Step 2		.262	.069	.001	.142
Future Perspective	.269**				
Step 1		.296	.087	.087	6.128*
Step 2		.307	.094	.007	.993

Note. * $p < .05$, ** $p < .01$, ΔR^2 indicates the extent of the effect of the variable(s) on the belief in free will.

4. Discussion

The current study investigated the relationship between temporal personality orientation and belief in free will in the context of a significant, life-changing event related to the COVID-19 pandemic. During this time, many in-person activities were suspended to mitigate the transmission of the virus and such changes resulted in different physical and mental responses. We examined two groups of college students: one group involuntarily transitioned from an in-person classroom to an online platform while the other group started and remained in an online environment. On the assumption that the involuntary transition reduced a sense for agency, we asked whether the transition would moderate the belief in free will especially in those who exhibit a great desire for choice and capacity for change (i.e., Present-Hedonistic orientation, [Zimbardo & Boyd, 1999](#)).

We observed a moderation effect in the following manners. The

involuntary transition weakened the belief in free will of those with a lower Present-Hedonistic orientation but did not moderate the effect in those with higher Present-Hedonistic orientation. We speculate that the two constructs of choice and change capacity co-contributed to the effect observed in those of lower Present-Hedonistic orientation. That is, these individuals, who had to make an involuntary classroom transition, were likely to experience a decrease in the sense of agency ([Barlas & Obhi, 2013](#)) while at the same time were not adaptive to the change, leading to the perception that the circumstance was beyond their control. Thus, these individuals exhibited a lower belief in free will.

In contrast to those of less Present-Hedonistic perspective, we observed that individuals of a more Present-Hedonistic orientation in both the transitioned and online groups did not differ in their belief in free will. In other words, despite the involuntary transition, the belief in free will was maintained in those with higher degree of Present-Hedonistic orientation. The results are inconsistent with the prediction that the pandemic restrictions would reduce the belief in free will by way of hindering a sense of agency. Instead, it appears that the individuals of high Present-Hedonistic were able to maintain their free will belief. We speculate this may be attributed to the individuals' higher capacity for change. In general, hedonistic individuals welcome new opportunities and unique experiences ([Veenhoven, 2003](#)), and it is possible that high Present-Hedonistic individuals in our study viewed a classroom transition as an opportunity to explore something new and to 'live in the moment,' enabling the ability to maintain a stronger belief in free will.

In addition to the capacity for change, those with a Present-Hedonistic orientation might also maintain the belief in free will as a result of choice. Although the pandemic hindered their ability to choose the classroom format, these individuals nevertheless could exercise agency by choosing to welcome the opportunity of an online learning experience. Such interpretation would still be consistent with the intention attribution hypothesis, which posits that when actions or behaviors are self-generated, there is a stronger sense of free will (e.g., [Rigoni et al., 2012](#)). This speculation needs further empirical evidence to support that a choice to embrace change leads to a stronger sense of agency.

Overall, our results provide evidence that different degrees of Present-Hedonistic perspective, coupled with involuntary classroom transition, affected the belief in free will. Although we have focused our study on these two factors, the results nonetheless paint a picture that

personality and temporal perspectives, along with the impact of the pandemic, can have a significant interaction with one's feeling of freedom. As we have demonstrated that inability to choose a classroom format partially moderated a sense of free will, this too could be applied to other public health mandates such as mask wearing and indoor gatherings. Within some personality constructs, mandatory mask wearing is perceived as a limitation to one's freedom to choose, and may result in a reduction in the belief in free will. The reverse may also be true; those with a stronger belief in free will are likely to seek out and appreciate choices. Pandemic mitigations and restrictions can be perceived by some as an imposition, and therefore some personality traits might be less likely to comply. As such, how an individual mentally responded to the pandemic could vary according to their personal beliefs and perspective.

4.1. Limitations and future directions

In the current study, we operationally defined the Transition group as students who initially enrolled in an in-person modality, but due to the pandemic, had to involuntarily change their learning platform to an online format. This change from an in-person to online learning was imposed by circumstances beyond their control. However, despite being involuntary, it is possible that some participants welcomed this transition. A future study could examine the moderating effect of welcomed and unwelcomed involuntary change on the belief in free will.

In addition, the Transition and Online groups were assumed to be equated in educational and technical background. A future study should consider equating the two groups on multiple levels including technological and learning abilities, instructors, class content and requirements. Moreover, we assessed participants' belief in free will using the overall scores from the FWD (Rakos et al., 2008). Future studies may consider subscales within the FWD to or other free will assessments (e.g., the Free Will Inventory, FWI; Nadelhoffer et al., 2014) to explore aspects such as moral responsibility and agency.

Although our study focused on the belief in free will, the examination of classroom transitions also has a practical implication in education. There was frequent discussion in the media that the pandemic online platform compromised learning. Was learning hindered solely due to the nature of online delivery method, or could the negative effect be attributed, at least partially, to a reduction in a sense of agency? If the students had the choice to remain in an in-person classroom, but decided on their own to go online, thus exercising free will, would they be more receptive to and learn more effectively despite the new platform? A future study could examine a belief in free will in the context of learning effectiveness in students who voluntarily choose to return to an in-person classroom from an online platform.

Our results serve as a potential basis for future investigations on voluntary decisions and capacity for change. At the time of this writing, COVID-19 vaccinations were available and the United States was entering the new stage of "post-pandemic" life. How individuals with different perspectives exhibited their belief in free will within the constraints of the pandemic could also serve as a predictor for how an individual might respond to the new challenges associated with post-pandemic adjustments. This could be a unique opportunity to examine constructs of choice and openness to change that commonly underlie the belief in free will and have the potential of impacting human behaviors, mental health, and wellbeing.

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CRedit authorship contribution statement

Eve A. Isham: Conceptualization, Investigation, Formal analysis,

Writing – original draft. Sara Lomayesva: Conceptualization, Investigation, Data curation, Writing – original draft, Writing – review & editing.

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