I did my part! How can I further minimize emerging adult learners' burnout in an online learning environment?

Abstract

Emerging adults are a crucial group in our society, and research indicates that they rarely consider themselves adults because their cognitive, social, and emotional capacities are undergoing transitionary changes, affecting how they learn. Prior studies have not considered sufficiently the characteristics and needs of emerging adult learners in an online environment. This study aims to address this gap in the literature by examining the psychological needs and academic burnout of emerging adult online learners during the Covid-19 pandemic. Through self-determination theory (SDT) and Stimuli-Organism-Response (S-O-R) theory, the key arguments and constructs include the effects of structural and social bonds on emerging adult learners' psychological needs, the effect of psychological needs on academic burnout, and the moderating roles of mindfulness. A valid sample of 294 collected through the survey was the basis of the analysis. PLS-SEM was used to analyze and test the hypotheses. Findings indicate that structural and social bonds affect psychological needs at varying strengths, which is generally consistent with prior findings but with different groups of learners. The moderating roles of mindfulness, however, were mixed. The model robustness further highlights the predictive analysis, which complements the exploratory perspective. This study contributes to the literature by identifying the predictors that fulfill the basic psychological needs of emerging adult learners and examining the effect of this fulfillment on the burnout during the online learning. In addition, this study implies how online trainers and educational institutions can build an optimal environment to reduce the burnout and then improve the learning effectiveness for emerging adult learners. Limitations, and agenda for future research were further discussed to conclude the study.

Keywords: Online learning, Structural bond, Social bond, Mindfulness, Psychological needs, Burnout

Introduction

An adult learner is defined by Iremeka *et al.* (2021) as someone who is socially accepted by adults and is pursuing some form of systematic formal training to meet societal demands or changes in society. However, among the adults, a unique subset, emerging adults, has been under-represented in research. Following Dachner and Polin (2015) description, emerging adults are aged 18 to 25 years. Though they are legally considered adults, in most cases, however, they are not cognitively, emotionally, or socially representative of a mature adult. In fact, they do not even consider themselves to have reached adulthood (Dachner and Polin, 2015).

Although many have alluded to a unique development period at the end of adolescence and the beginning of adulthood, Arnett (2000) introduced the concept of emerging adulthood as a distinct period of development. Likewise, Vannucci *et al.* (2017) indicated that individuals at this stage tend to be in the transitionary phase where they are experiencing cognitive, emotional, and social characteristics changes as they try to enter and settle down into a long-term adult role. Emerging adults, therefore, are distinct demographically, cognitively, emotionally, and socially. Consequently, adopting recommendations from literature meant for adult respondents would yield limited results.

Despite these differences in characteristics, the harsh realities of life affect everyone regardless of age, as shown from 2020 until the present time - the COVID-19 pandemic. As early as February 2020, many countries, in response to the COVID-19 pandemic, ceased all face-to-face (f2f) sessions and started using the internet to deliver training (Ayoko *et al.*, 2022). Though f2f sessions have now resumed progressively, some countries witnessing resurgences of COVID-19 cases are re-introducing online learning as part of their prevention strategies (Shockley *et al.*, 2021). Online learning is progressively overtaking f2f sessions as the primary medium of instruction. Greenhow *et al.* (2022) defined online learning as educational activities conducted over an electronic medium, where the trainers and learners are separated physically. It would mean that trainers would deliver live lectures remotely over an internet platform to learners, who watch synchronously or asynchronously. Despite the value presented by online learning, especially in minimizing the number of hours students are in school, many scholars such as Zheng *et al.* (2020), Hong *et al.* (2021), Maqableh and Alia (2021), question its effectiveness. Given this backdrop, this study attempts to address four theoretical and methodological gaps in the current literature.

First, few studies have focused on the factors that influence the basic psychological needs of emerging adult learners in an online environment. A great deal of research using Self-determination theory (SDT) as a theoretical framework has concentrated on the traditional f2f setting for learning (e.g. Briner and Denyer, 2012, Li, 2021, Jang *et al.*, 2010). There has been little discussion about the influence of these factors over

online mediums (Manoharan *et al.*, 2022). Besides, Yu *et al.* (2018) further spotlighted that the basic psychological needs of autonomy, relatedness and competence are the key sources of any learner's inherent and proactive intrinsically motivated tendency to seek out novelty, pursue the optimal challenge, exercise, and extend their capabilities to explore, and learn. In other words, the fulfilment or non-fulfilment of the basic psychological needs can affect learners' intrinsic motivation towards learning. Since prior studies such as Van der Burgt *et al.* (2019), indicated the lack of motivation as an essential aspect of a learning process, insights into emerging adult learners' motivation in online learning is useful to develop an optimal environment for effective learning to transpire.

The last decade witnessed an increase in global interest in studying and promoting learners' mental health (Portoghese *et al.*, 2018). Accordingly, attending lessons have been a stressful experience for many learners. A meta-analysis by Kaggwa *et al.* (2021) further highlighted that the causes of learners' burnout ranged from high academic demands to attending classes and meeting submission deadlines. For emerging adult learners, balancing different commitments, financial pressure, and disruption due to the COVID-19 pandemic added a layer of complexity, subjecting them to higher degrees of stress, anxiety, and depression (Zuljevic *et al.*, 2021). Despite these prevalent trends, studies examining the effects of online learning on the respective dimensions of burnout are conspicuously missing (e.g. Barratt and Duran, 2021, Zuljevic *et al.*, 2021, Li, 2021). Maslach and Jackson (1981) pointed out that having a composite score for burnout would mask nuanced interrelationships between burnout dimensions and the predictor. Taken together, this study addresses the second gap by extending the body of knowledge of online learning on the dimensions of burnout, which earlier studies failed to address adequately.

Third, this study focuses on emerging adult learners, identified as a significant research gap, because earlier studies such as Li (2021) generally focused on younger learners. A report by Tan and Sheng (2021) found that adult learners prefer online learning as it provides convenience and flexibility compared to younger students. Yet, the same report also highlighted that those adult learners, similar to younger learners, spoke about the elements of "humanness" missing from the online environment, the possibility of building friendships and the value of such interaction to their learning (Tan and Sheng, 2021). Accordingly, it is apparent that adult learners have unique learning needs, which existing studies have not addressed holistically, let alone emerging adult learners. Such dissimilarities in needs could be because both groups of learners face different forms of constraints, as highlighted earlier. Besides, they could be furloughed from their jobs due to the declining economy and wish that the newly acquired skills would provide new career opportunities (Manoharan *et al.*, 2022). Therefore, we argue that the direct application of findings obtained from past studies, which focused on younger learners would not be applicable due to the unique challenges faced by emerging adult learners. Consequently, this study addressed the following questions:

1. What are the predictors of the psychological needs of emerging adults, and which of these needs is the most significant? 2. How would fulfilling the psychological needs reduce online learning burnout and increase motivation among emerging adults?

Finally, predictive modelling was used in this study, which provides differentiation from prior works. According to Shmueli *et al.* (2019), many researchers would tend to focus on whether the coefficient is significant and if it aligns with their hypothesized directions. However, for research to make meaningful managerial implications, the results would need to provide certainty into the future through its ability to predict new cases. Therefore, without an additional assessment, managerial implications made in different papers such as Maqableh and Alia (2021), Hong *et al.* (2021), Tan and Sheng (2021) may be far-fetched as we are unsure if the model estimates will produce similar results in terms of the outcome variables across time, samples, and context. This is worrying as many organizations are leveraging the outcomes from these papers in developing policies and practices for emerging adult learners. In sum, we contend that assessing a statistical model's predictive power is equally important to identify the likelihood of future outcomes based on historical data. The goal is to go beyond knowing what has happened to provide the best assessment of what will happen in the future. Subsequently, the theoretical contributions of this study include the fresh perspective on how SDT affects emerging adult learners' burnout, and in advancing understanding of the context by addressing the sparse literature on relational bond, psychological needs, and burnout constructs in one model.

Literature Review

Theoretical Framework

In psychology, self-determination theory (SDT) is a crucial concept highlighting individuals' ability to make choices and affect their own lives (Deci and Ryan, 2008, Van den Broeck *et al.*, 2016). Prior research reviewed by Deci and Ryan (2008) indicates that SDT can be applied effectively to educational issues such as motivation and can predict various learning outcomes, including performance, persistence, and course satisfaction. Therefore, SDT has the potential to provide a clear theoretical lens for examining these issues, investigating possible solutions, and proposing recommendations for pedagogical practices. As a macro theory of human motivation, SDT works on the premise that any motivation would be optimal when the three basic psychological needs of autonomy, competence and relatedness are satisfied (Van den Broeck *et al.*, 2016).

Autonomy refers to individuals feeling the volition to control their behaviors and goals, where they can take direct action to result in the actual change (Martela and Riekki, 2018). As a result, individuals would have the inherent need to gain mastery of tasks and learn different skills (Van den Broeck *et al.*, 2016). In

other words, when people feel that they have the skills needed for success, they are more likely to take actions that will help them achieve their goals. Finally, relatedness refers to the individuals' sense of belonging (Chiu, 2021). This need is satisfied when people see themselves as members of a group, experience a sense of communion, and develop close relations. SDT further postulated that fulfilling these needs requires some form of motivation. These motivations can motivate the individual to engage in a fully internalised behaviour and integrate within the self (Deci and Ryan, 2008). By doing so, individuals would experience pride and joy when engaging in the behavior, and in turn, would experience psychological growth, internalization, and well-being.

Another theory that complements this study is the Stimuli-Organism-Response (S-O-R) theory. Being a dominant theory in environmental psychology, the central tenet of S-O-R theory lies in how different forms of stimuli (S) drive internal organism (O) that eventually shapes behavioral response (R). The S-O-R theory has been used in studies related to online learning. For instance, Pandita *et al.* (2021) found that students suffered from academic anxiety, fear, Mysophobia, etc. As far as behavioral responses are concerned, the following behavioral changes have been found; Panic buying, e-learning, community support, support for prime-minister, etc. Similarly, Zhai *et al.* (2019) leverage the S-O-R framework and their findings show that two types of privacy concerns (abuse of knowledge and unauthorized access to private data) can positively influence students' knowledge hiding perception, which subsequently can negatively affect their participation in online collaborative learning. Following the above, applying the S-O-R model to this study is appropriate and relevant.

Putting these two theories together, our model (see Figure 1) operationalizes the stimuli as the presence of structural and social bonds. Different studies such as Wongkitrungrueng and Assarut (2020) highlight that these bonds enhance individuals' experiences in an online space. In other words, these would evoke a sense of fulfillment of the three psychological basic needs of emerging adult learners (O) and, in turn, reduce the propensity of feeling emotionally exhausted and cynicism (R).

*** Insert Figure 1 ***

Effect of structural bond on the three psychological needs

In relationship marketing, the structural bond is the ability of sellers to provide valuable information about the product and solve problems for consumers (Shanka and Buvik, 2019). From the perspective of training, a trainer can perform structural bonds by paying attention to the topics that learners are interested in, providing relevant and accurate information, and using a myriad of learning tools to serve teaching and learning goals (Chiu, 2021). In a f2f space, studies have found that trainers providing these pieces of information fulfill learners' needs and keep them engaged (Luthans, 2012, Priscislla, 2017). Likewise,

Arghode and Wang (2016) found that the ability to provide the correct information, coupled with good presentation and organization skills, adds to the learners' credibility. Such strategies would increase the likelihood of engagement and subsequent learning taking place.

However, online learning is not the same as face-to-face classes. In an online learning environment, Hampel (2009) has argued that trainers' expertise goes beyond just being familiar with the training contents. It is also about the ability of trainers to facilitate online group work, identify development needs, try out the potential of specific asynchronous and synchronous tools to support collaborative learning and try possible development activities. To achieve these goals, trainers should be challenged to reflect on their former experiences, assumptions, and beliefs regarding teaching and learning (Philipsen *et al.*, 2019). It involves transferring the same concepts, structures, and class organization from the f2f space to virtual space. In this regard, it is timely to examine if the structural bond provided by the trainers in the online environment serves the three psychological needs of the learners.

H1a. Structural bond positively influences emerging adult learners' need for autonomy during online learning.

H1b. Structural bond positively influences emerging adult learners' need for competency during online learning.

H1c. Structural bond positively influences emerging adult learners' need for relatedness during online learning.

Effect of social bond on the three psychological needs

Another relational bond suggested in the literature is the social bond, which focuses on developing interpersonal interactions with the other party (Hu and Chaudhry, 2020). In business services, social bond refers to the human side of the business service, including personal contacts, liking and trust (Chang *et al.*, 2019). It includes familiarity, friendship, and personal confidence built through the exchange process (Alagarsamy *et al.*, 2021). In this perspective, we can analogize social bonds in a learning environment to trainers' ability to develop a mutually trusting relationship with the trainees. To achieve this, Murphy *et al.* (2018) argued that there needs to be a gradual release of responsibility to control the discussion from teacher to students. Vacca *et al.* (2021) further contend that there is a need to shift "the burden of learning from teachers' shoulders to students" (p. 7). From these pieces of literature, it is evident that social bonds can be likened to giving a sense of autonomy to the learners where they can chart their learning directions.

Additionally, the SDT highlights the importance of the social context of learning and its impact on motivation (Jang *et al.*, 2010). In other words, learners must be provided opportunities to build relationships

to support them throughout the learning process. Previous research on college students found that positive relationships with others was associated with a lower risk of depressive symptoms (Chang *et al.*, 2016) and that social connectedness was associated with improving students' psychological well-being (Lynch, 2013). Separately, another study by Thomas *et al.* (2014) explained that first-year students from diverse backgrounds reported greater engagement, a better grasp of learning contents, and a sense of camaraderie when they experience a sense of belonging. This implied that social bond influences one's sense of competency. In other words, the absence of relatedness can result in decreased persistence in learning, reinforce the feelings of disconnectedness, and eventually lead to poorer competence in the unit. Based on the above arguments, here is the second set of hypotheses:

H2a. Social bond positively influences emerging adult learners' need for autonomy during online learning.

H2b. Social bond positively influences emerging adult learners' need for competency during online learning.

H2c. Social bond positively influences emerging adult learners' need for relatedness during online learning.

Effect of three psychological needs on academic burnout dimensions

Our model also proposes specific relationships between the three psychological needs on burnout dimensions. While there have been no studies, to our knowledge, that systematically linked the three basic psychological needs to burnout in online learning, there are conceptual reasons to expect these relationships. First, it was argued that the lack of autonomy drives the experience of burnout (De Francisco *et al.*, 2020). After all, the lack of autonomy means one would not have the volition and psychological freedom to perform tasks for which one has passion (Krause *et al.*, 2019). To feel satisfied and competent in tasks, individuals need to have a sense that they are in control and its outcomes. As Maslach *et al.* (2001) explained, a lack of control can lead to a situation when they have insufficient authority over their tasks or cannot shape the environment to align with their values, thereby resulting in burnout. According to Huang *et al.* (2021), the real danger of burnout is the experience of exhaustion and fatigue, where one would distance themselves cognitively and emotionally from others. Therefore, when a person is deprived of basic psychological needs, it would exacerbate such sentiments where they develop a cynical attitude towards individuals and, at the same time, see themselves as incapable. Studies in different contexts, such as sports science, has provided empirical evidence to support this perspective (e.g. Vílchez Conesa *et al.*, 2020, De Francisco *et al.*, 2020). Given the above arguments, the following hypotheses postulate that fulfilling these three psychological needs is essential in addressing burnout conditions.

H3a. Emerging adult learners' need for autonomy negatively influences emotional exhaustion.

H3b. Emerging adult learners' need for competency negatively influences emotional exhaustion.

H3c. Emerging adult learners' need for relatedness negatively influences emotional exhaustion.

H4a. Emerging adult learners' need for autonomy negatively influences cynicism

H4b. Emerging adult learners' need for competency negatively influences cynicism

H4c. Emerging adult learners' for relatedness negatively influences cynicism

Mindfulness as the moderator

Mindfulness is considered a form of intentional, nonjudgmental attention that involves self-regulation to be fully present, aware of where we are, what we are doing, and not overly reactive or overwhelmed by what is going on around us (Grover *et al.*, 2017). While mindfulness can be considered a disposition, state, or practice that contains or elicits these characteristics (Good *et al.*, 2015), we adopt Yang *et al.* (2017) explanation that mindfulness is also a human tendency, with individuals differing in their natural levels of mindfulness. Different studies have found that the possession of mindfulness is critical in reducing the impact of burnout. For instance, studies such as Shahzad *et al.* (2019), Xu *et al.* (2017), Grover *et al.* (2017) found that the moderating role of mindfulness moderated burnout syndromes of teachers. Among them, the common argument is that every individual has varied levels of mindfulness in different situations and time, that individuals with higher mindfulness, tend to have stronger self-regulated behavior and positive emotional states. During the period of the pandemic, mindfulness has become very relevant as emerging adult learners are faced with economic, academic, and social uncertainties, without a clear plan and direction. Thus, considering the positive personality trait of mindfulness, we believe that it would help emerging adult learners perceive their own feelings and thoughts non-judgmentally in different challenges. When emerging adult learners focus on their learning tasks, it will reduce their psychological burden from online training. Hence, the final set of hypotheses:

H5a. Mindfulness moderates the relationship between emerging adult learners' need for autonomy and emotional exhaustion.

H5b. Mindfulness moderates the relationship between emerging adult learners' need for competency and emotional exhaustion.

H5c. Mindfulness moderates the relationship between emerging adult learners' need for relatedness and emotional exhaustion.

H6a. Mindfulness moderates the relationship between emerging adult learners' need for autonomy and cynicism.

H6b. Mindfulness moderates the relationship between emerging adult learners' need for competency and cynicism.

H6c. Mindfulness moderates the relationship between emerging adult learners' need for relatedness and cynicism.

Methodology

Sample and procedure

To test the proposed model, we adopted a questionnaire-based survey and purposive sampling in identifying potential respondents. To ensure that only bonafide respondents participated in the survey, the filter question of whether they were going through some form of online training was asked. Using *wenjuanxing*, the online survey was distributed to them. *Wenjuanxing* is a Chinese commercial online survey service provider, with one of its key advantages of pushing the survey directly through a local messaging platform such as WeChat, which provides accessibility and convenience to respondents (Mei and Brown, 2017). Besides, the recent cybersecurity laws that control web content in China mean that some traditional data collection software would be unstable or inaccessible (Mei and Brown, 2017). Hence, *wenjuanxing* is considered appropriate and more popular software used by researchers in China, as indicated in Xu *et al.* (2020), Sun *et al.* (2019), and Zhong *et al.* (2022) studies.

Through *wenjuanxing*, a web link has been generated and disseminated to all respondents. On the cover page, we explained the purpose of the survey to the participants, promising anonymity and confidentiality. Respondents gave their consent before continuing the survey. We acquired 352 responses in total. After data cleaning, the final usable sample size was 294. Following Kock and Hadaya (2018), this is sufficient for data analysis as it exceeded the minimum required sample size of 160. From Table 1, the percentages of males and females are 36.7% and 63.3%, respectively. About 72.3% of the respondents were pursuing a bachelor's degree. The majority of our respondents were in the age range of 21-23 years old.

*** Insert Table 1 ***

Measures

All survey items were identified from previous studies, with minor modifications to fit the context of online learning. All the measurement items were initially written in English. Since the survey targeted Chinese respondents, all survey items were translated into Chinese and translated back into English before dissemination.

The five items social bonds and five-items structural bonds were obtained from Hsieh *et al.* (2005). Sample item of social bonds is "During online learning, the teacher pays attention to my needs", while sample item of structural bonds is "During online learning, the teacher answers my questions professionally." Both social and structural bonds are measured on a 5-point Likert scale. Psychological needs are measured via the three dimensions of the need for autonomy (five items), need for competence (four items) and need for relatedness (five items). All the items were measured on a 5-point Likert scale and were adopted from Pelikan *et al.* (2021). A sample item for the need for autonomy is "I can decide which class work I want to practice.". Similarly, a sample item on the need for competence is "I feel competent after participating in online learning.", and the need for relatedness is "With the other students in online learning, I feel understood."

Emotional exhaustion was measured using Maslach (1993) Maslach Burnout Inventory. It consisted of five items measured on a 5-point Likert scale with a sample item such as "I feel emotionally drained by my studies." Like emotional exhaustion, the five items measuring cynicism were adopted from Maslach (1993), with a sample item such as "I have become more cynical about whether my university work contributes anything." Finally, mindfulness was adapted from Hsieh *et al.* (2021). The five items were measured using a 6-point Likert scale with a sample item: "I was preoccupied with the future or the past."

Common method bias

As this is a cross-sectional study, it is easily susceptible to common method bias (CMB). We applied procedural remedies recommended by Podsakoff *et al.* (2012) to reduce CMB. First, we assure the respondents that all responses are anonymous and confidential, and they should answer as honestly as they can. Second, instruments of different scale endpoints were introduced to prevent respondents from using their initial ratings to unconsciously anchor the scale and thereby influence the scaling of their subsequent judgments. The instruments were also adopted from the literature and pre-tested to confirm the clarity of all survey instructions. A psychological separation was created where respondents' profiles were inserted between instruments measuring dependent and independent variables. Statistically, Harman's single factor test shows that the largest single factor explains only 34.7% of the total variance. According to Babin et al. (2016), CMB had no severe impact on this study.

Data analysis method

The data are analyzed using the partial least squares-structural equation modeling (PLS-SEM). PLS-SEM is a composite-based approach that has been widely used in social sciences or business studies (Henseler, 2017). Hair et al. (2017) mentioned that its reliance on composites indicates that it would not produce inconsistent estimates. Besides, PLS-SEM permits the complex configurational model of HRM practices

that capture the synergistic results taking higher-order constructs and the performance of predictive analysis that are not found in covariance-based SEM (Hair *et al.*, 2018). Finally, PLS-SEM has been utilized across a wide range of studies of different contexts, including education (Tan *et al.*, 2020b, Sim *et al.*, 2020), technology adoption (Tan *et al.*, 2019b, Leong *et al.*, 2020), human resources (Tan *et al.*, 2020a, Tan and Yeap, 2021, Tan *et al.*, 2019a, Tan *et al.*, 2020d), tourism (Fam *et al.*, 2020, Tan *et al.*, 2020c) and consumer behavior (Zhong *et al.*, 2022, Le *et al.*, 2021, Tan *et al.*, 2022).

Findings

Measurement model

The measurement model in Table 2 shows that the construct reliability and convergent validity were met. All loadings on the items met the cut-off value of 0.708. At the same time, the associated constructs to the items demonstrated that it had met the threshold of at least (a) 0.50 for the average variance extracted (AVE), (b) 0.70 for Cronbach's alpha and (c) 0.70 for composite reliability (Hair *et al.*, 2017). Similarly, Table 3 shows that discriminant validity was achieved as the heterotrait-monotrait (HTMT) criterion values were less than 0.90 (Henseler *et al.*, 2015). Overall, the results indicate that the proposed model demonstrated good convergent validity, reliability, and discriminant validity.

*** Insert Table 2 ***

*** Insert Table 3 ***

Structural model

The structural model assessment starts with identifying multicollinearity (Hair *et al.*, 2017). Table 4 shows that the variance inflation factor (VIF) is less than 3.3 indicating that multicollinearity is not a concern in this model. From Table 4, it is evident that provisioning of structural bonds has a positive effect on emerging adult learners' needs for autonomy (H1a: β= 0.337, $p < 0.001$), need for competence (H1b: β= 0.282, $p < 0.001$), and need for relatedness (H1c: β= 0.423, $p < 0.001$). Similarly, social bonds met our emerging adult learners' needs for autonomy (H2a: β= 0.252, $p < 0.001$), competence (H2b: β= 0.231, $p < 0.01$), and relatedness (H2c: β= 0.245, $p < 0.001$). Hence, H1a, H1b, 1c, 2a, 2b, and 2c are all supported.

However, among the three forms of needs, only the need for competence reduced emotional exhaustion (H3b: β= -0.268, $p < 0.001$), the other two needs for autonomy (H3a: β= -0.009, $p = 0.456$) and relatedness (H3c: β= 0.015, $p = 0.499$) failed to establish any significant relationship with emotional exhaustion. On the other hand, need for competence (H4b: β= -0.202, $p < 0.01$) and need for relatedness (H4c: β= -0.171, $p < 0.05$) effectively reduced one's cynicism. In addition, the results show that fulfilling the need for

autonomy does not reduce one's cynicism (H4a: β= 0.015, p = 0.416). Hence, only H3b, H4b and H4c were supported.

The moderation analysis indicates that mindfulness moderated only the relationship between the need for relatedness and cynicism (H6c: β= -0.104, p < 0.05). In other words, mindfulness did not moderate the relationships between need for autonomy (H5a: β= 0.057, p = 0.360), need for competence (H5b: β=0.106, p = 0.111), need for relatedness (H5c: β= -0.088, p = 0.182) on emotional exhaustion. Similarly, mindfulness did not moderate the relationships between need for autonomy (H6a: β= -0.012, p = 0.816), and the need for competence (H6b: β= 0.085, p = 0.091) on cynicism. Hence, only H6c was supported. Further examination of the significant moderation results (see Figure 2) shows that the gradient for high mindfulness is steeper than the line for low mindfulness, indicating that the negative relationship between need for relatedness and cynicism is stronger when one's mindfulness is high.

Referring to Table 4 again, we can see that the structural bonds and social bonds explain moderate to large variances in need for autonomy (R^2=0.294), need for competence (R^2=0.222), and need for relatedness (R^2=0.380). At the same time, the three basic psychological needs accounted for 2.9% and 6.1% in emotional exhaustion and cynicism, which is a moderate model according to Cohen (1988). On the effect sizes, structural bonds have small to medium effect in R^2 for the need for autonomy (f^2=0.086), need for competence (f^2=0.054), and need for relatedness (f^2=0.153). Social bonds, on the other hand, displayed small effect in R^2 for the need for autonomy (f^2=0.048), need for competence (f^2=0.036), and need for relatedness (f^2=0.051). Overall, the results also show that the three basic psychological needs displayed small effect sizes in producing the R^2 of emotional exhaustion and cynicism.

** Insert Table 4 **

** Insert Figure 2 **

Predictive analysis

A fundamental shortfall of existing studies such as Manoharan *et al.* (2022), Tay *et al.* (2021), Maqableh and Alia (2021) is the absence of predictive analysis. Sarstedt and Danks (2021) explained that predictive analysis uses data to make highly informed guesses about future outcomes. While earlier works such as Tan *et al.* (2019a) uses Q^2 as an indication of predictive relevance, Shmueli *et al.* (2019) has criticized it for being inaccurate as it leverage data that combines both in-sample and out-of-sample prediction. As such, this study uses the PLS prediction technique, a more reliable technique to assess the predictive relevance of a model, splits the data into training and testing data. From Table 5, most of the root mean squared error

(RMSE) values for the PLS model were smaller than that of the linear model (LM), indicating that the model has medium predictive power.

*** Insert Table 5 ***

Discussion

Grounded on SDT and S-O-R theory, this study examined the predictors that fulfill the three basic psychological needs of emerging adult learners and how the fulfillment of these needs reduces online learning burnout. In addition, this study sought to discover if mindfulness is a moderator in these relationships.

The findings indicate that both the presence of structural and social bonds fulfill the three basic psychological needs for autonomy, need for competence, and need for relatedness. This finding aligns with existing literature such as Yu *et al.* (2018) and Tay *et al.* (2021). A possible explanation for this finding is the complexity of online learning environments. While online learning provides flexibility, Roddy *et al.* (2017) added that emerging adult learners bring along other complications, including work obligations and family commitments, which all have been found to influence one's completion rate. In the absence of the richness of interactions available to on-campus students, online trainers become an even more critical element in helping to engage, motivate and retain emerging adult learners. In other words, online trainers go beyond providing knowledge. They act as a node of connection to ensure emerging adult learners continue to receive learning support and experience a sense of belonging and community.

On this basis, we further examine if the fulfilment of these three basic psychological needs reduces one's propensity of experiencing emotional exhaustion or cynicism. Unlike studies such as Franco *et al.* (2021), Vílchez Conesa *et al.* (2020), De Francisco *et al.* (2020), we have observed mixed results in our findings. Three possible explanations for these outcomes include.

First, the convenience of online learning provides emerging adult learners with the flexibility to tailor the pace of the course. When an emerging adult learner experiences autonomy, the learner usually sets higher goals. When one demonstrates independence through setting goals for their learning, they would then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment (Oates, 2019). However, emerging adult learners face more challenges, including managing their family and work responsibilities. Coupled with the study load, it is not surprising that findings in this study demonstrate that emerging adult learners experience emotional exhaustion and cynicism, despite meeting their needs for autonomy.

Second, fulfilling the need for relatedness reduces emerging adult learners' cynicism, not emotional exhaustion. The explanation for the differentiated findings lies in the role of this need. Following Van den Broeck *et al.* (2016), the need for relatedness is explained as individuals' inherent propensity to feel connected to others, be a member of a group, love and care, and be loved and cared for. Hence, this need is satisfied when emerging adult learners see themselves as members of a group, experience a sense of communion, and develop close relations. As such, the sense of cynicism, which reflects the emotional distance that is born out of mistrust, would naturally reduce.

Finally, we can also explain the result from the perspective of social cognitive theory (Heo *et al.*, 2021). Feeling competent builds a sense of efficacy (Recksiedler and Landberg, 2021). In alignment with the theory, the findings demonstrate that when one feels efficacious, it enhances one's judgement of an individual's capabilities, technically and emotionally, to organize and execute actions required to attain designated performance. Hence, fulfilling the need for competency reduces both emotional exhaustion and cynicism.

Although mindfulness did not moderate most of the relationships, the findings showed that mindfulness moderated the relationship between the need for relatedness and cynicism. Consistent with previous findings Hsieh *et al.* (2021), Lu *et al.* (2019), this finding demonstrates the importance of mindfulness as a resource that reduces the negative learning stress appraisal. In this vein, the finding shows that individuals with higher mindfulness are more conscious of the constraints they are working in. In turn, these individuals can control better the activation of cognitive schemas that help in self-regulation of emotional and cognitive thoughts and reduce reactions to potentially emotional and stressful stimuli.

Theoretical implications

Theoretically, the findings reveal several contributions. Firstly, this study provides a new perspective on how SDT influences emerging adult learners' burnout dimensions. Despite earlier studies such as Tay *et al.* (2021) that focus on younger students, findings in this study showed that the various basic psychological needs produced a differential effect among emerging adult learners, which complemented existing work by understanding the emotional effects emanating from the different forms of stimuli. In this respect, these outcomes addressed Tay *et al.* (2021) call to extend the context, for example, by including different groups of learners. Second, we have advanced the understanding by addressing the lack of literature examining the relational bonds, the constructs of the basic psychological needs, and dimensions of burnout in a single model during the pandemic. In doing so, this study supported Bianchi *et al.* (2017) to provide a unique verification of burnout as a multidimensional construct, which in the process, enhanced clarity and elucidates more information. Finally, the research model's robustness is further demonstrated through

predictive analysis. It supplemented the explanatory perspective with a predictive focus, which Sarstedt and Danks (2021) noted is particularly important to social science researchers.

Managerial implications

Managerially, this study provides several implications for online trainers and education institutes. Unlike f2f teaching, which depends on physical presence and trainers' immediacy, teaching presence in an online environment is especially crucial. The findings indicate that it is not just about providing knowledge. The trainer has to provide the necessary care and support, especially to emerging adults who may face the harshness of the working society during the Covid-19 pandemic. Establishing an online teaching presence, therefore, is essential. According to Daumiller *et al.* (2021), teaching presence begins even before the commencement of the course. It includes activities leading to the course delivery, such as planning and designing the course materials and overall content. Once the trainer establishes an online teaching presence through designing the online course, facilitating online discourse, and providing direct instruction to the emerging adult online learners, it contributes to online students' sense of learning, accomplishment, and a positive perception of the community.

Similarly, the findings also demonstrate that the need for competence is the most important among the three forms of basic needs. To develop competence entails providing emerging adult learners with the lever to improve their sense of self-efficacy. Instead of simply sharing knowledge, motivate them by acknowledging their inputs and their unique circumstances. Besides, discussions must be meaningful. Whether conducted verbally, over class chatroom, or in breakout sessions, it is essential to complement the sessions with the knowledge delivered. More so, online trainers should be sufficiently sensitive to identify emerging adult students who may be struggling to follow the pace of the class. Some emerging adult learners need academic support, and others may need technological assistance. Many may need non-academic support. The ability of the trainer to do so through regular check-ins and proactively sending out alerts are essential in building the students' sense of competency.

Limitations and future research directions

This study has the usual limitations of cross-sectional survey research based on self-reported measures. We adopted several procedural remedies to minimise this, indicating that common method bias does not pose a severe threat to this study. The findings could be better analyzed by having a time-lagged data collection exercise or by conducting multiple data sources. Another limitation is the snowball sampling method used in this study, resulting in a non-generalizable sample. Future studies should consider leveraging random sampling to ensure a more representative sample. In addition, the results could be further analyzed with appropriate mindfulness interventions aimed at reducing emerging adult learners' burnout. Finally, future

studies could consider a multilevel perspective, considering how mindfulness affects emerging adult learners' engagement in an online learning environment or the learning climate.

Data availability: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Competing interest: There are no relevant financial or non-financial competing interests to report

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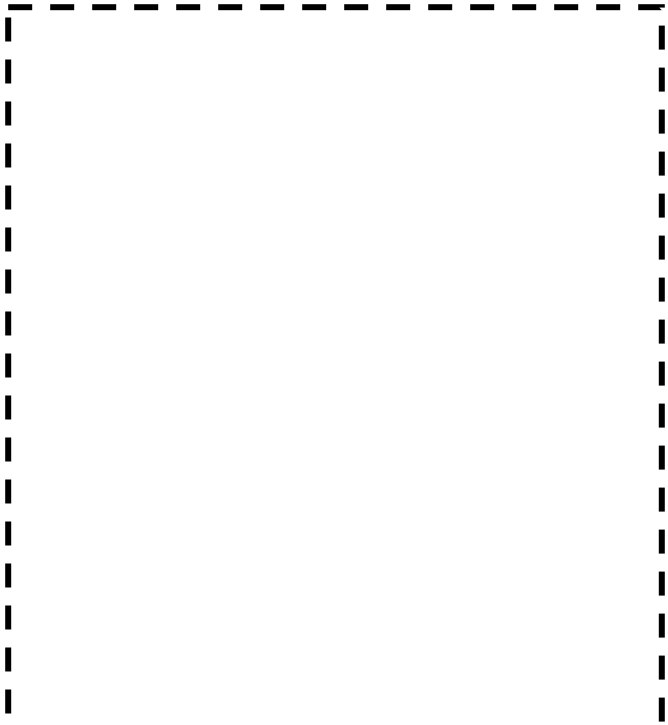
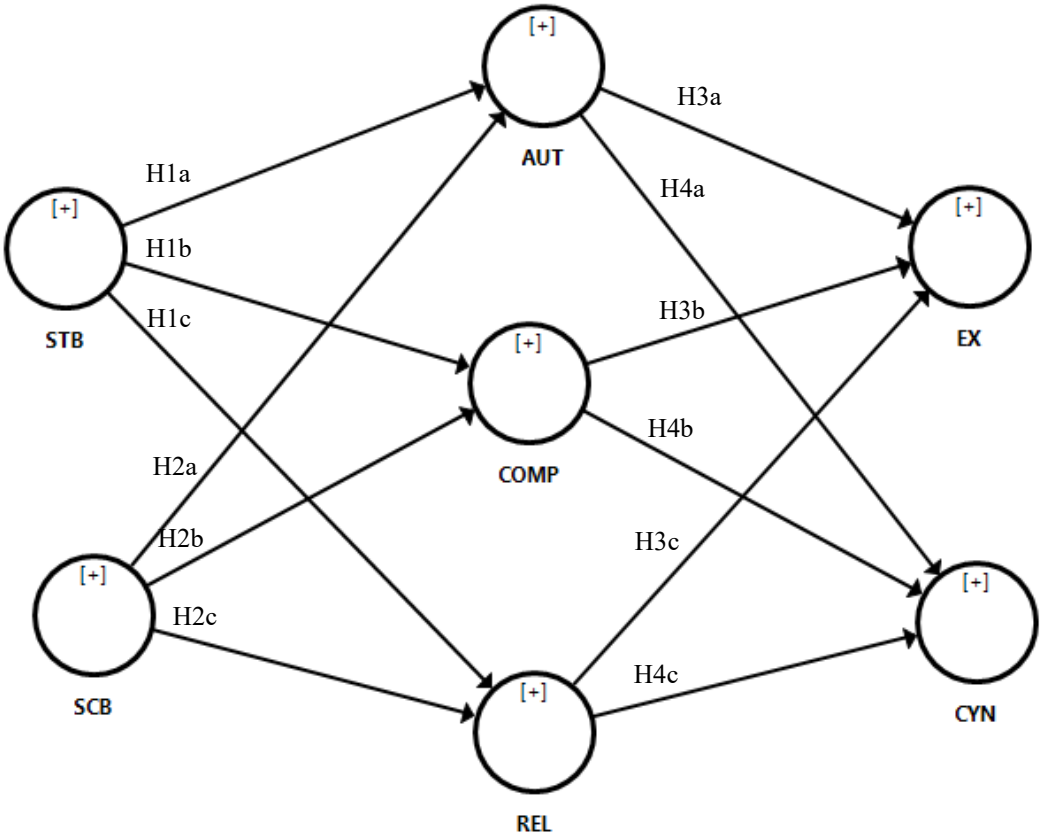
Figure 1. Conceptual model





Note: (i) AUT-Need for autonomy; COMP-Need for competency; CYN-Cynicism; EX-Emotional exhaustion; REL-Need for relatedness; SCB-Social bonds; STB-Structural bonds; Mind-Mindfulness

Figure 2. Interaction plot

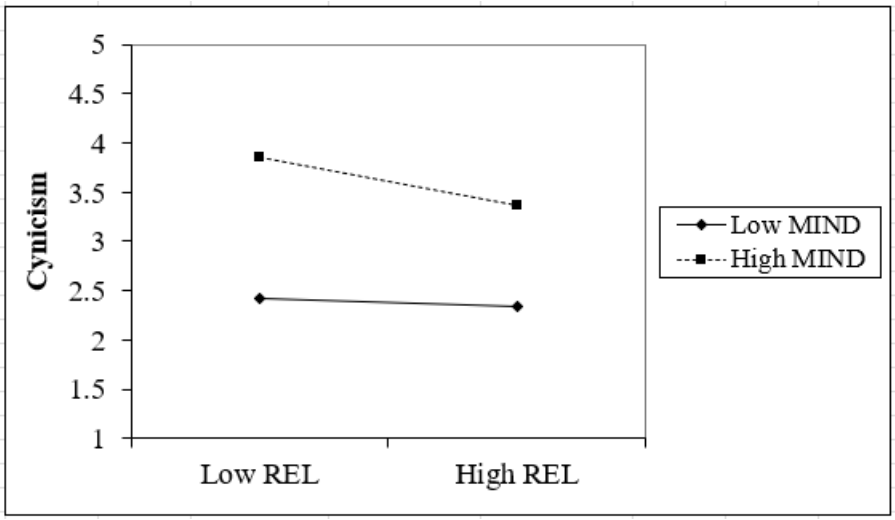


Table 1. Respondents' Profile

		Frequency (n=294)	Percent
Gender	Male	107	36.4
	Female	187	63.6

Age	18-20 years old	85	28.9
	21-23 years old	138	46.9
	24-25 years old	71	24.2
Education	Secondary school or below	1	0.3
	Junior college	9	3.1
	Bachelor Degree	213	72.4
	Master's Degree	67	22.8
	Doctorate Degree	3	1.0
	Other	1	0.3
Income	Less than 1,500 RMB	21	7.1
	1,501-2,500 RMB	93	31.6
	2,501-3,500 RMB	80	27.2
	3,501-4,500 RMB	28	9.5
	4,501-5,500RMB	24	8.2
	More than 5,500 RMB	48	16.3

Table 2. Measurement model

	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
AUT1	**D**	0.836	0.890	0.670

AUT2	0.814			
AUT3	0.851			
AUT4	0.767			
AUT5	0.839			
COMP1	0.898	0.936	0.954	0.838
COMP2	0.919			
COMP3	0.924			
COMP4	0.920			
CYN1	0.912	0.906	0.928	0.764
CYN2	0.919			
CYN4	0.840			
CYN5	0.786			
EX1	0.746	0.893	0.911	0.673
EX2	0.767			
EX3	0.820			
EX4	0.882			
EX5	0.876			
REL1	0.918	0.937	0.953	0.801
REL2	0.921			
REL3	0.914			
REL4	0.907			
REL5	0.809			
SCB1	0.794	0.714	0.824	0.540
SCB2	0.784			
SCB3	0.676			
SCB4	0.679			
STB1	0.796	0.870	0.905	0.657
STB2	0.787			
STB3	0.814			
STB4	0.811			
STB5	0.845			

Note: AUT-Need for autonomy; COMP-Need for competency; CYN-Cynicism; EX-Emotional exhaustion; REL-Need for relatedness; SCB-Social bonds; STB-Structural bonds

Table 3. Discriminant validity

	AUT	COMP	CYN	EX	REL	SCB	STB
AUT							

COMP	0.521					
CYN	0.171	0.269				
EX	0.135	0.233	0.748			
REL	0.635	0.678	0.286	0.153		
SCB	0.614	0.514	0.185	0.12	0.652	
STB	0.577	0.474	0.253	0.153	0.641	0.869

Note: (i) AUT-Need for autonomy; COMP-Need for competency; CYN-Cynicism; EX-Emotional exhaustion; REL-Need for relatedness; SCB-Social bonds; STB-Structural bonds (ii) Discriminant validity achieved at $HTMT_{0.90}$

Table 4. Structural model

	Path	Path Coefficient	Standard Error	t-value	5.00%	95.00%	VIF	f^2	r^2	Q^2
H1a	STB -> AUT	0.337	0.068	4.926***	0.223	0.446	1.879	0.086	0.294	0.188
H1b	STB -> COMP	0.282	0.072	3.914***	0.162	0.395	1.879	0.054	0.222	0.182
H1c	STB -> REL	0.423	0.062	6.846***	0.316	0.519	1.879	0.153	0.380	0.301
H2a	SCB -> AUT	0.252	0.065	3.881***	0.142	0.356	1.879	0.048		
H2b	SCB -> COMP	0.231	0.071	3.248**	0.111	0.341	1.879	0.036		
H2c	SCB -> REL	0.245	0.061	4.020***	0.141	0.342	1.879	0.051		
H3a	AUT -> EX	-0.009	0.079	0.111$^{(NS)}$	-0.134	0.122	1.515	0.000	0.074	0.029
H3b	COMP -> EX	-0.268	0.066	4.062***	-0.364	-0.146	1.714	0.045		
H3c	REL -> EX	0.000	0.081	0.001$^{(NS)}$	-0.130	0.132	1.994	0.000		
H4a	AUT -> CYN	0.015	0.073	0.211$^{(NS)}$	-0.100	0.139	1.515	0.000	0.108	0.061
H4b	COMP -> CYN	-0.202	0.073	2.756**	-0.308	-0.068	1.714	0.027		
H4c	REL -> CYN	-0.171	0.080	2.129*	-0.300	-0.038	1.994	0.016		
H5a	AUT*MIND -> EX	0.057	0.067	0.850$^{(NS)}$						
H5b	COMP*MIND ->EX	0.106	0.066	1.586$^{(NS)}$						
H5c	REL*MIND ->EX	-0.088	0.066	1.335$^{(NS)}$						
H6a	AUT*MIND -> CYN	-0.012	0.050	0.232$^{(NS)}$						
H6b	COMP*MIND -> CYN	0.085	0.050	1.692$^{(NS)}$						
H6c	REL*MIND -> CYN	-0.104	0.046	2.234*						

Note: (i) AUT-Need for autonomy; COMP-Need for competency; CYN-Cynicism; EX-Emotional exhaustion; REL-Need for relatedness; SCB-Social bonds; STB-Structural bonds; Mind-Mindfulness (ii) NS – Not significant; *p < 0.05, **p < 0.01, ***p < 0.001

Table 5. PLS Predict

	PLS		LM		PLS-LM	
	RMSE	Q^2_predict	RMSE	Q^2_predict	RMSE	Q^2_predict
CYN1	1.946	0.045	1.923	0.067	0.023	-0.022
CYN2	1.865	0.045	1.861	0.049	0.004	-0.004
CYN4	1.988	0.022	2.022	-0.012	-0.034	0.034
CYN5	1.941	0.019	1.967	-0.007	-0.026	0.026
EX1	1.607	-0.003	1.622	-0.021	-0.015	0.018
EX2	1.699	-0.007	1.724	-0.037	-0.025	0.030
EX3	1.851	-0.002	1.879	-0.033	-0.028	0.031
EX4	1.964	0.031	1.993	0.002	-0.029	0.029
EX5	1.806	0.005	1.84	-0.033	-0.034	0.038

Note: (i) CYN-Cynicism; EX-Emotional exhaustion