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A motivational process model explaining L2 Saudi students' achievement of English

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ABSTRACT

The aim of the present study was to develop a motivational process model illustrating how Saudi students' Basic Psychological Needs (BPN) were linked to their second language (L2) achievement in English. Motivational theories that have been extensively researched in Educational Psychology were employed as possible mediators of the BPN-L2 achievement relationship. Those theories were: Self-determination Theory (SDT), Goal Orientation (GO) and Motivational Emotion (ME). The final model suggested that the temporal order of the mediational mechanism in explaining L2 achievement should be [BPN → GO → ME → SDT], indicating that (a) students' motivation starts with fulfillment of basic psychological needs, which (b) sets the foundation for students' goal setting orientation, which in turn (c) contributes to learners' emotions in learning. Further, this study support (d) the importance of the theoretical stream of Self-determination Theory, as it was the most directly related to L2 achievement.

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1. Introduction

Motivation in learning English as a second language (L2) is a key driver to attain proficiency in English (Clément & Dörnyei, 2001; Crookes & Schmidt, 1991; Dörnyei, 2009; Gardner, 1985, 2010; Oxford, 1994; Ushioda, 2009). Motivation in L2 is a particularly important issue to Saudi learners of English as a foreign language (EFL). It has been well documented that many Saudi students of English at the university level lack motivation to acquire the knowledge and skills involved in learning English (Al-Maini, 2006; Arabai, 2016; Alrahaili, 2014; Hamouda, 2012; Moskovsky, Arabai, Paolini, & Ratcheva, 2013; Moskovsky, Assulaimani, Racheva, & Harkins, 2016). This study employed four motivational theories from the educational psychology research, to understand how English learners of Saudi context may develop an inclination and desire to study English. The four theories that this study is based on are the ones that have been, arguably, the most extensive studied motivational theories in student learning and achievement. They are: Basic Psychological Needs (BPN; Deci & Ryan, 1985; Ryan & Deci, 2000), Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), Goal Orientation Theory (GO; Elliot, 1999; Elliot & Church, 1997) and Motivational Emotion (ME, i.e., emotion relating to learning and motivation (Pekrun, 2006; Ross, 2015).

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L2 motivation as a research domain highlights learners' Basic Psychological Needs (BPN). That is, learners will have the motivation to learn when they feel satisfaction in the language learning process, by having a sense of autonomy, competence and relatedness (Alamer, Lee, & Vigentini, 2017; Hiromori, 2003; Noels, 2001; Noels, Clément, & Pelletier, 1999). Stronger feelings of satisfaction in the BPN tend to be associated with persistence, longer hours of studying, and course grades in the university foreign language courses (Alamer, 2019; Alrabai, 2017; McEown, Noels, & Saumure, 2014; McEown & Takeuchi, 2014; Noels, 2001, 2013). Although previous research has shown how learners' BPN may be associated with various aspects of EFL students' language learning behaviours (Noels, 2013), relatively little research has been devoted to entangle the learners' psychological processes of how BPN would ultimately help learners to be more or less motivated in learning English.

The purpose of the present study is to develop a motivational process model that aims to explain Saudi students' L2 achievement. The main focus is to examine how the links between BPN and L2 achievement could be established. Thus, the present research, taking an approach that BPN may ultimately lead to L2 achievement, builds, tests, and validates a model of the motivational process by adopting other motivational constructs and theories into this picture. The other, extensively-studied motivational constructs and theories of the present study include the Self-determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), Goal Orientation theory (GO; Elliot, 1999; Elliot & Church, 1997) and Motivational Emotion, i.e., emotion relating to learning and motivation (ME; Pekrun, 2006; Ross, 2015). They are, arguably, among the most dominant theories of learning motivation in the motivational research literature. At the construct-level, the motivational process model of this study comprises autonomy, competence and relatedness from the BPN; and intrinsic orientation, identified orientation, introjected orientation, extrinsic orientation, and amotivation from the SDT; mastery, performance approach, performance avoidance from the GO; and various types of emotions relating to one's life and study) from the ME. All these constructs derived from the four different sets of motivational theories have not been put together in one comprehensive model in the L2 motivation research. The motivational process model was examined among a sample of EFL Saudi undergraduate students who live in Saudi Arabia (at the time of data collection).

Relative to the volume of research delineating the role of BPN on language learning and attainment of L2 (Alamer et al., 2017; Alrabai, 2017; McEown et al., 2014; Noels, 2013), there is a lack of studies that demonstrated the process of how BPN may help L2 motivation from non-native speakers of English. Previous research conducted in the L2 motivation domain has employed the BPN, SDT, GO or ME theoretical frameworks in isolation, demonstrating that each theory is useful in understanding the necessary ingredient of L2 learning. When these motivation frameworks/theories are considered in one comprehensive model, a fuller picture of how learners of L2 may be more/less motivated to achieve the desired outcome of L2 achievement can be attained. Thus, this investigation focuses on the motivational processes underlying the associations between BPN and L2 achievement.

2. Motivation and language learning

As Ushioda (2017) pointed out, research in L2 motivation is founded in the field of second language acquisition, and much research effort has been devoted to the role of self in the motivational research. Recently, Dörnyei (2009) has introduced a self-component motivational theory (i.e., the ideal L2-self), which accounts for the conceptualisation of possible selves in learning an L2 and highlights one's desire to reduce discrepancy between learners' actual and ideal selves (Sugita McEown, Sawaki, & Harada, 2017; Ushioda & Dörnyei, 2017). More recent conceptualisation in L2 motivation has turned to the Directed Motivational Current (DMC) which focuses on long-term motivation of students (Dörnyei, Henry, & Muir, 2016). Looking beyond the stability of motivation, DMC acknowledges the uniquely self-renewing and sustainable process in pursuit of language learning goals (see Dörnyei et al., 2016 for reviews). Although this recent development of motivational framework is valuable and relevant to the current investigation, theoretical foundations to link it to the existing motivational theories that the present study adopted have not been clearly articulated in the literature as yet.

2.1. Basic psychological needs (BPN)

BPN advocates the importance of learners' autonomy, competence and relatedness to thrive in the learning environment. When the BPN are fulfilled, learners are expected to act autonomously to learn, feel good about learning, and employ a variety of approaches to learning (Ryan & Deci, 2000). Autonomy refers to a sense of control and freedom that one develops when s/he can select to engage in an activity that is personally meaningful and interesting. Competence refers to a sense of feelings when the learner feels effective, competent, and capable of completing and being successful in performing the target activities. Relatedness refers to a sense of connections with other people and feeling of security and warmth. In language learning contexts, through the process of fulfilling BPN, self-determined form of motivation such as intrinsic motivation would be nurtured in learners' mind. When these feelings are not obtained, self-determined form of motivation is likely to be undermined, which in turn may yield undesired or poor learning outcomes (see Noels, 2013 for a review).

2.2. Self-Determination Theory (SDT)

The concepts of intrinsic and extrinsic motivation in the Self-determination Theory (SDT, Deci & Ryan, 1985) were drawn from the idea that different types of achievement motivation can be delineated by varying degrees of self-determination expressed as impersonal, external, somewhat internal, and internal. When learning is personally important and integral to

the learner's sense of him/herself, intrinsic motivation towards the task will be formed. SDT entails five key motivational constructs: (1) intrinsic orientation, (2) identified orientation, (3) introjected orientation, (4) external orientation, and (5) amotivation (Deci & Ryan, 1985). Intrinsic orientation is defined as the type of motivation when an individual pursues an "activity in the absence of a reward contingency or control" (Comanaru & Noels, 2009, p. 34). Identified orientation refers to when individuals feel a good alignment between learning and other pursuits, goals, and desires that are personally important to them. For instance, learners may feel that L2 achievement can help them achieve getting into a university. Introjected orientation is believed to be activated when learners approach the task because they feel that they have to, not because the task is personally important for them. External orientation is a form of motivation where learners may not have any other reasons but to getting tangible benefits and/or avoiding negative consequences. Studies have shown that a higher endorsement of intrinsic orientation was associated with positive linguistics outcomes such as self-perception of competence, motivational intensity and a reduction in anxiety (see Noels, 2013 for a review).

2.3. Goal Orientation Theory (GO)

The GO theory, with two distinctive approaches to goal settings, i.e., mastery versus performance goal orientations (Elliot, 1999), explicates how students may view and endorse different types of goals in learning. Mastery goal orientation within the GO theory takes an attitude towards achievement, as one desires to develop competence in the target learning tasks. Students with mastery goal orientation view success using self-referential standards. Performance approach goal orientation refers to the attitudes and desire to outperform others or display their competence to others, in order to appear competent, whilst performance avoidance goal orientation refers to the attitudes and desire to avoid low performance or being outperformed by others. The theory explicates that both mastery and performance approach goal orientation may allow students to strive for achievement whereas performance avoidance goal orientation could make students avoid putting effort because of anxiety or fear of possible failure (Elliot, 1999). One of the first publications of the GO applications in the field of L2 learning is research carried out by Woodrow (2006). The study claimed that the three goals (mastery, performance approach and performance avoidance) were manifested as separate factors, but only mastery goal orientation (along with other non-cognitive variables) was related to the learner outcome in English speaking (see Woodrow, 2012).

2.4. Motivational emotion (ME)

Emotion may be defined as affective reactions to experiences and events involving behavioural, experiential and physiological tasks. The value theory of achievement emotions places emotions at the centre of the control-appraisal and value-appraisal functioning that would lead to academic success or failure, linking emotions directly with achievement outcomes in the school-learning settings (Pekrun, 2000). The only aspect of emotion that has been traditionally appreciated in L2 research is L2 learners' anxiety. The present study adopted a more recent work by Ross (2015) because it contained a wider range of different types of emotions in learning L2.

3. The SDT as a mediator between BPN and L2 achievement

One way to understand how BPN may be associated with L2 achievement is by considering the SDT. The theory suggests that more autonomous and internalised forms of motivation (i.e., intrinsic orientation and identified orientation) would develop in learners when they perceive a sense of autonomy, competence, and relatedness with others (Ryan & Deci, 2000). Thus, the mediating role of the SDT constructs was examined in understanding how autonomy competence, and relatedness (BPN) may be further developed for L2 learners. This potentially key aspect of the motivational process model is rather sparse in the current L2 motivation research. Empirical research conducted on BPN and SDT so far in the L2 motivation domain has been rather just descriptive, and the L2 learning outcomes tend to be examined in isolation (either from BPN or SDT). In previous research, statistical analysis rarely passed beyond simple correlational tests (Noels, 2001, 2013; Noels et al., 1999). Results based on correlations were shown between the constructs of BPN and the more self-determined forms of motivation in SDT, and the more self-determined forms of motivation in SDT with L2 outcomes. However, one cannot claim or postulate any mediation mechanisms among more than two variables such as BPN, SDT, and L2 achievement variables without considering and testing a hypothesized model that delineates a structural relationship. More advanced statistical analysis such as Structural Equation Modelling (SEM) might be particularly well-suited to the examination of the mediation effects of SDT variables between BPN and L2 achievement. Thus, the present study utilised a SEM approach in order to systematically investigate the relationship among BPN, SDT and L2 achievement.

4. GO as a mediator between BPN and L2 achievement

Although L2 learning occurs in communication and interactions with others, a formal classroom setting learning is more common among the EFL and/or ESL learner when they are first exposed to the L2 learning environment. For many EFL and/or ESL learners, English is taught in the classrooms, and some take English as a study major at the university. In Saudi Arabia, English is one of the core subjects throughout the middle and high school curriculum. Many if not all universities offer an English major as an undergraduate degree program in which students learn reading, writing, listening, and speaking aspects

of English. Students, when they go through the year levels of a degree program, they are asked to perform various types of tasks demonstrating their English language skills, complete assignments, and pass the mid-term and final examinations at each year level. Given this situation where English is not only a medium of communication, but is taught in a classroom/degree program setting, the task of mastering English is often associated with performance orientation, such as completing a task, getting a degree, and obtaining a good mark. For some students, the purpose of learning English goes beyond the mindset of performance orientation and is closely tied to learning for the sake of learning (Elliot & Church, 1997; Ross, 2015). The participants of the current research were undergraduate students whose study major was English, and they learn English primarily in the classroom contexts. Thus, the evaluation of their goal orientation, that is whether they see English from the point of views of mastery, performance approach, or performance avoidance, seems to be relevant in building a motivational process model for this group.

5. ME as a mediator between BPN and L2 achievement

It is well established that emotion plays an important role in learning (Elliot, 1999; Pekrun, 2006; Pekrun, Elliot, & Maier, 2009). Motivational emotion can be defined as emotion relating to achievement motivation (e.g., MacIntyre & Gregersen, 2012; Ross, 2015). The L2 motivation research has demonstrated that learners' emotion does play a pivotal part in forming the motivational disposition towards English (Dörnyei & Ryan, 2015; Gardner, 2007; Gardner, Tremblay, & Masgoret, 1997). Among various types of emotion, 'language anxiety' has been the most widely investigated emotion variable under the general term of 'motivational emotion' (MacIntyre & Gregersen, 2012). Anxiety emerged in the early L2 motivation research (1970s) as a significant factor that impedes learners' L2 achievement. Research in the relationship between emotion and L2 motivation has continued to look into anxiety in various L2 learning settings as a major emotional reaction while learning English as a second language while ignoring other potentially equally important emotional aspects within 'motivational emotion'. Only in recent studies on L2 learning and achievement (e.g., Ross, 2015), various types of motivational emotion have been included, and the present research adopted both negative and positive motivational emotion constructs that were employed in the domain of language learning (Ross, 2015), to consider a wider conceptualisation of how different types of emotions may interplay with other motivational constructs.

6. This research

This study aims to identify the gap in the L2 motivation literature, by testing the mediating mechanisms through which BPN is associated with L2 achievement while taking into account the other constructs in the major motivational theories. Specifically, the motivational process model will be able to demonstrate how the constructs of BPN (that is, autonomy, competence and relatedness) are related to the students' SDT orientations (that is, intrinsic orientation, identified orientation, introjected orientation, extrinsic orientation and amotivation orientation), GO (that is, mastery, performance approach, performance avoidance) and ME (that is, study-related emotions and life-related emotions), which in turn collectively predict L2 achievement in the context of English learning among Saudi Arabian students. Fig. 1 presents the basic structure of the motivational process model that is initially created based on the extant. Testing the model ultimately focuses on the direct and/or indirect effects of BPN via (a) SDT, (b) GO, and (c) ME and their direct and/or indirect links to the L2 achievement.

While the initial model is created based on the information gathered from previous studies, the model was also modified by the data that was collected for this study. One hypothesis that did not get modified was to have BPN retained as an exogenous latent variable in the model while maintaining the L2 achievement as the final, criterion measure of the motivational process model. Different models that were built and tested were basically reflecting the variations in the possible changes to the temporal order of mediations of SDT, GO and ME. Thus, the present study focuses on investigating the underlying mediation processes that explain indirect associations between BPN and L2 achievement. Empirically modified models also needed to be aligned with the theoretical/conceptual expectations that can be drawn from the research literature. The overarching inquiry of this study is: can an integrative model encompassing four major theories of motivation, BPN, SDT Orientations, GO and ME be developed to predict the second language learning achievement of Saudi students? With this, specific hypotheses were formulated as the following:

Hypothesis 1. Students' basic psychological needs (BPN) and fulfilment of this would be the starting point of learners' motivation.

Hypothesis 2. Students' basic psychological needs (BPN) will be directly linked to their self-determination (SDT) orientations.

Hypothesis 3. Students' self-determination (SDT) orientations will be directly linked to their goal-setting approach (GO).



Fig. 1. Basic structure of the motivational process model to be examined.

Hypothesis 4. Students' goal-setting approach (GO) will be directly linked to their motivational emotional (ME) state.

Hypothesis 5. Finally, students' motivational emotional (ME) state will be directly linked to their language achievement outcome.

7. Method

7.1. Participants and procedures

The participants of this study were undergraduate students enrolled in a Saudi university. All students enrolled in this department are Saudi-born, learning English as a foreign language. The minimum age of students enrolled in the department is 19 years. The English course offered in this university is similar to of the English courses offered in other universities in Saudi Arabia. All students enrolled in the Department of English were approached and invited to participate in this study. Once the consent to participate in the research was made, an online survey was provided to the study participants. Those who wanted to withdraw were advised to simply refrain from completing the questionnaire and leave the web page.

8. Instruments

8.1. BPN

The Basic Psychological Needs Scale, developed by [Ilardi, Leone, Kasser, and Ryan \(1993\)](#), was used to measure the three main constructs of the BPN, autonomy, competence and relatedness. The scale is designed to elicit self-reports. It has a total of 12-items and a 5-point Likert-type response format. The 12 items were divided equally across the three constructs: autonomy (4 items), competence (4 items) and relatedness (4 items). Students were asked to indicate to what extent they agreed or disagreed with each statement.

8.2. SDT orientations

The Motivational Orientation Scale, developed by [Noels et al. \(1999\)](#) to measure motivation for English learning, was employed in the present study. There are five main constructs in this theoretical stream: intrinsic orientation, identified orientation, introjected orientation, external orientation and amotivation. The scale is a self-report measure, and has a total of 20-items. A 5-points Likert-type response format is used in the scales. Numbers of the items were divided in the manner of: intrinsic orientation (9 items), identified orientation (3 items), introjected orientation (2 items), external orientation (3 items), and amotivation (3 items). All items were prefaced with an opening item stem, asking participants 'Why are you learning English?'

8.3. GO

The constructs of mastery goal orientation, performance approach orientation and performance avoidance orientation were measured using the Goal Orientations Scale, which was developed by [Woodrow \(2006\)](#). The Woodrow's scale was selected for this study because it is the first and most widely used scale for goal orientation in the domain of second language learning (L2) research. The scale has been shown to have sufficiently good psychometric validity as well. The scale has 15-items presented with a 5- points Likert-type response format. Participants were asked to indicate to what extent they agreed or disagreed with each statement for mastery goal orientation (5 items), performance approach orientation (5 items) and performance avoidance orientation (5 items).

8.4. ME

The Language Learner Emotion Questionnaire (LLEQ) developed by [Ross \(2015\)](#) was also employed in the current study to measure the students' emotions related to life and study contexts. Two sub-scales were labelled as "Life-Related Emotions (LRE)" and "Study-Related Emotions (SRE)". The LLEQ contains 36-items on a 5-points Likert-type response format. The LRE has 20 items, intended to measure the following emotions: positive emotions–use (6 items), positive emotions–future (3 items), happiness and enjoyment (6 items), and fear and embarrassment (5 items). The SRE has 16 items, intended to measure the following emotions: excitement (2 items), fear and embarrassment (5 items), happiness and enjoyment (6 items), and pride and confidence (3 items). Students were asked to indicate to what extent they agree or disagree with each statement.

8.5. The criterion measure

The criterion measure of the present study is students' L2 achievement. L2 achievement was measured by students' grade point averages (GPA) in their English courses. The Saudi EFL students' GPA in the context of this study is deemed a suitable measure of their English proficiency. The units of English lessons include subjects of Reading, Writing, Speaking, Listening,

Vocabulary, Phonetics, and so on. The students who achieved high GPA (regardless of their current level) were considered to be those who achieved success and progressed well in learning English, comparing to other students at the same level.

9. Statistical analyses and their assumptions

9.1. Confirmatory factor analysis (CFA)

CFA is an advanced statistical technique that uses correlations as input to build the models. CFA is often undertaken before conducting any SEM analysis because structural relationships cannot be examined without the establishment of measurement relationships between the items (i.e., observed variables) and the constructs. The measurement models were assessed by the criteria (Hair, Black, Babin, & Anderson, 2010): (a) chi-squared χ^2 and normed χ^2 (χ^2/df) values; (b) model goodness-of-fit indices; and (c) path coefficient estimates between the constructs and their observed variables. Therefore, it is customary to evaluate several alternative model fit indices in CFA and SEM alike (Hair et al., 2010). The alternative fit indices that were used in CFA and SEM analyses are: Comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA) and standardized root mean residual (SRMR). It is suggested that CFI and TLI be in the region of 0.90 or above to reflect a good fit. On the other hand, both RMSEA and RMR are recommended to be around 0.07 or preferably less, although larger values can be acceptable when other indices (e.g., CFI and TLI) show a good model fit (Hair et al., 2010).

Assessment of the CFA measurement models would also include the estimates of factor loadings. When the items show low factor loadings, they should be considered. To be removed from the model. The suggested cut-off value for removal is factor loadings of below 0.5. However, when the item-factor loading estimates are statistically significant at $p = .05$ level, careful consideration is needed to evaluate whether to remove the items or not (Hair et al., 2010).

9.2. Assumptions of CFA and SEM

There are some assumptions that need to be fulfilled in conducting CFA. The most important assumption in CFA is related to sample size. A suggestion is 100 cases as the minimum sample size requirement to conduct any CFA and 200 cases for SEM analysis (Hair et al., 2010). However, 300 cases are required with low communalities among variables when a small number of factors are examined (for example, three factors). CFA and SEM also assume that the data is multivariate normal. Outliers should also be inspected and removed before conducting the analysis.

9.3. Outliers

Outliers are defined as unusual values that are inconsistent with the rest of the data set (Woodrow, 2014). They can occur in the forms of: (a) a procedural error, such that a researcher might have made errors in entering the data; or (b) an extraordinary event, where extreme observations among the data can be noticeably deducted. Respondents' carelessness or intentional idiosyncrasies (e.g., answering all items with one response) are also considered potential outliers. In the present study, outliers were carefully examined.

9.4. Univariate and multivariate normality

It is important in multivariate analysis research to check the univariate and multivariate normality of the data set. The term 'normality' refers to the shape of the distribution of an individual metric variable that is associated to the normal distribution (Hair et al., 2010). Univariate normality has to do with a single variable that is normally distributed on a scale. Multivariate normality also examines univariate normality but involves the assessment of normality of combinations of variables. Violations of the multivariate normality can result in biased results, for example, in χ^2 statistical tests or standard errors.

In evaluating univariate normality, the distribution of each observed variable is examined for its skewness and kurtosis. In order to evaluate the skewness, a +3/-3 guideline has been often adopted in social science research (Kline, 2005). For kurtosis, a guideline of +10/-10 has been often adopted in social science research (Kline, 2005).

Mahalanobis d-squared statistics, which can be calculated in IBM SPSS Amos program, is conventionally used to evaluate multivariate normality. An individual variable with a D^2 value that is distinctively apart from all the other D^2 values is a candidate for removal. In particular, multivariate outliers are those cases with critical values of χ^2 below at a $p < .001$ level, and any cases exceed this level are deemed as multivariate outliers and are recommended to be removed accordingly (Byrne, 2010).

9.5. Reliability and validity of the measurements

Reliability examines the consistency of the research results and how sure the researcher can be of the replicability of the project on other similar samples (Woodrow, 2014). The most frequently used test to calculate and report the reliability of research results is perhaps the Cronbach's alpha (α). Because Cronbach's alpha (α) value is only computed from simple correlations and does not consider the possible influence of latent variables and measurement errors, construct reliability was additionally considered (Hair et al., 2010). Construct reliability is recognized as more advantageous since it accounts for model

parameters especially in measurement errors. It is based on the assumption that each item should be weighted in terms of its individual item reliability, that bring about different weights for individual items. Generally, a value of 0.7 or higher is considered to be a good indicator of construct reliability as well as of Cronbach's alpha (α).

9.6. Effect size

Statistical significance tests (based on p-values) were reported in this project as one indicator of the importance of the data obtained in the study. Nevertheless p-values are criticized as being insufficient in providing the reader with the extent of the importance of the project findings. It is well-known that p-values is usually determined in statistical research by using the cut-off value of $< .05$. In this way, p-value does not tell the reader with the strength of the relationship, influence or differences among the variables. In addition, p-values will often reach the statistical significant level in large-enough sample sizes with tests such as correlation (Cohen, 1994). To solve this issue, effect size can be considered, which refers to the magnitude parameter of the effect of one variable on the other(s). Effect size does not change if sample size change, thus, it provides the results that have sufficient power to be believed as important (Larson-Hall, 2010). A guideline for calculating the effect size in this project is based on (Cohen, 1988) who indicated that correlation coefficients r can be used as an effect size indicator. Such that $r = 0.10$ is small effect size and $r = 0.30$ is medium effect size, and $r = 0.50$ is large effect size.

10. Results

10.1. Preliminary analyses

In the total sample ($N = 441$), 42% were male ($n = 181$) and 58% were female ($n = 260$). The higher level of a semester indicates the more advanced level of English subjects being taught. In terms of age, most of them were between 18 years old (the minimum age for university entry in Saudi Arabia) and 22 years old (a typical age of university graduation in Saudi Arabia).

10.2. Missing data

It is suggested that an individual case who misses more than 10% of the total responses can be removed (Hair et al., 2010). Thus, the study participants whose survey completion rate was lower than 90% were excluded from the subsequent analysis. Ten cases were identified as having less than a 90% responses rate and thus, removed, which resulted in a total sample size of 431. Missing data of cases with more than a 90% responses rate were imputed by the imputation method of using the mean values for the missing data points.

10.3. Outliers

The data of this study were directly imported from the Survey Monkey survey system to the IBM SPSS software package, and there were no manual entering of the data. Moreover, visual examination of the data points led to the conclusion that there was no evidence of systematic or intentional carelessness of the survey participants (e.g., providing only one answer throughout the survey). Overall, it was concluded that there were no outliers in the dataset.

10.4. Univariate and multivariate normality

Skewness and kurtosis of the data distribution were examined to determine univariate normality. Skewness refers to a balance of the frequency distribution and kurtosis concerns the peak and tails of the frequency distribution. A $+3/-3$ guideline was adopted to evaluate skewness, and a guideline of $+10/-10$ for kurtosis (Kline, 2016). Using these thresholds, all the item responses fit within the normal range.

11. Descriptive statistics

11.1. Descriptive statistic of BPN

Students' perceptions about autonomy, competence and relatedness are presumed to be the main constructs of the BPN. Descriptive statistics, along with skewness and kurtosis are presented in Table 1. Reliability coefficients of each scale that comprised of the intended items were assessed via Cronbach's alpha (α). The Cronbach's alpha (α) values of the three scales of BPN were within an acceptable range (i.e., higher than 0.60). On the other hand, the lowest Cronbach's alpha obtained in the relatedness scale could be improved although it was within an acceptable range ($\alpha = 0.60$). Removing a potentially problematic item (based on the information under the 'alpha if item deleted' column in the SPSS output) improved the Cronbach's alpha (α) of this scale as shown in Table 1.

Table 1
Means, S.D., and Cronbach's alpha (α) of Autonomy, Competence and Relatedness of the BPN.

	Autonomy	Competence	Relatedness	Relatedness (without Item 4)
Mean	3.28	3.99	3.31	3.38
S.D.	1.07	.93	1.01	1.19
Cronbach's alpha	.77	.81	.60	.75
Composite reliability	.78	.78	–	.76

11.2. Descriptive statistic of SDT

The SDT is based on five main constructs: intrinsic orientation, identified orientation, introjected orientation, external orientation, and amotivation. Descriptive statistics, along with skewness and kurtosis for the five subscales under the SDT orientations are shown in Table 2 shows the means, standard deviations (S.D.) and Cronbach's alpha (α) values for the five subscales. Cronbach's alpha values ranged from 0.76 to 0.93, showing reasonably good internal reliability of each of the subscales of the SDT orientations.

11.3. Descriptive statistic of GO

The means, standard deviations, and Cronbach's alpha values of the three scale scores are presented in Table 3. The alpha values of each of the GO constructs were reasonably good. Woodrow (2006) also showed an application of the GO scale in the context of learning English as a foreign language.

11.4. Descriptive statistic of ME

Descriptive statistics of each domain of ME, life- and study-related emotions are presented in Table 4 and Table 5. The scales' Cronbach's alpha values were greater than 0.84, indicating good internal consistency of these four scales.

12. CFA of BPN subscales

Within the BPN framework, three constructs are expected to emerge as separate psychological entities. A CFA testing this three factor structure was performed to examine if the subscales of autonomy, competence and relatedness existed as separate factors. The CFA results showed that all 11 items were loaded on to the expected constructs, shown by substantial factor loadings and good model fit results (see Fig. 2 and Table 6).

Table 2
Means, SD, and Cronbach's alpha (α) of Intrinsic orientation, Identified orientation, Introjected orientation, External orientation and Amotivation under of the SDT.

	Intrinsic	Identified	Introjected	External	Amotivation
Mean	3.96	4.38	3.56	4.20	1.46
S.D.	1.03	.90	1.32	1.04	.99
Cronbach's alpha(a)	.93	.82	.76	.83	.91
Composite reliability	.92	.84	.76	.85	.92

Table 3
Means, SD, and Cronbach's alpha (α) of Mastery goal orientation, Performance approach orientation, and Performance avoidance orientation of the GO.

	Mastery goal orientation	Performance approach orientation	Performance avoidance orientation
Mean	4.02	3.90	3.01
S.D.	.85	.92	1.06
Cronbach's alpha(a)	.80	.78	.77
Composite reliability	.78	.78	.76

Table 4
Means, SD, and Cronbach's alpha (α) of Life-related Emotions.

	Positive emotions – use	Positive emotions – future	Happiness and Enjoyment	Fear and Embarrassment
Mean	4.26	4.61	4.20	3.02
S.D.	.93	.71	.88	1.17
Cronbach's alpha(a)	.91	.84	.88	.87
Composite reliability	.90	.90	.90	.87

Table 5
Means, SD, and Cronbach's alpha (α) of Study-related Emotions.

	Happiness and Enjoyment	Excitement	Pride and Confidence	Fear and Embarrassment
Mean	4.29	3.68	3.78	3.01
S.D.	.89	1.23	1.03	1.24
Cronbach's alpha(a)	.90	.88	.77	.90
Composite reliability	.90	.90	.90	.90

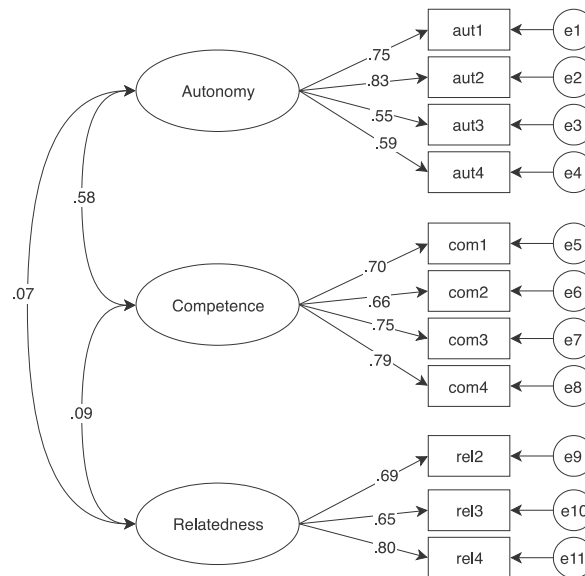


Fig. 2. A Measurement Model of the BPN Constructs based on CFA.

Table 6
Model Fit Indices for the BPN based on Confirmatory Factor Analysis (CFA).

χ^2	p	χ^2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI
79.898	.00	1.95	.07	.04	.97	.95	.97	.95

12.1. CFA of SDT subscales

A five-factor CFA measurement model was tested for the five subscales of SDT constructs. Overall, the tested model showed the presence of the five latent variables of intrinsic orientation, identified orientation, introjected orientation, extrinsic orientation and amotivation. All items were loaded on the expected constructs, as shown in Fig. 3. Although the overall fit to the data was reasonably good with RMSEA = 0.09; CFI = 0.91; NFI = 0.88, they were slightly lower than the threshold indicating a good model fit. Also, Item 3 (the benefits I obtained from entry into the English community) was not highly loaded on the expected factor of “extrinsic orientation” (with about 0.57 factor loading). This item, however, could not be removed because the removal of this item will leave the construct to be measured by only two observed scores, which can cause the construct-observation identification issue (Hair et al., 2010).

12.2. CFA of GO subscales

In the measurement models for the subscales under the GO theory, 15 items were expected to be loaded on to the three latent variables: mastery goal orientation approach, performance approach orientation and performance avoidance orientation (see Fig. 4). Except for two items: ‘p_av1’ (“it is very important to me that others won't think I'm poor at English”) and ‘p_a5’ (“I would feel good if I am the only one who could answer question”), all the other items were loaded on to their expected subscales with reasonably strong factor loadings. While Item ‘p_av1’ and ‘p_a5’ were loaded on to their respective factors, i.e., performance avoidance orientation and performance approach orientation, respectively, their factor loadings were rather low: $\beta = 0.35$ for ‘p_av1’ and $\beta = 0.48$ ‘p_av1’. This issue of low factor loadings with the two items contributed to the less than satisfactory model fit (see Table 8). After removing these two items (‘p_a5’ and ‘p_av1’) from the CFA model, the model fit improved to a satisfactory level [RMSEA = 0.07; GFI = 0.93; AGFI = 0.92; CFI = 0.95; NFI = 0.91], as also presented in Table 7.

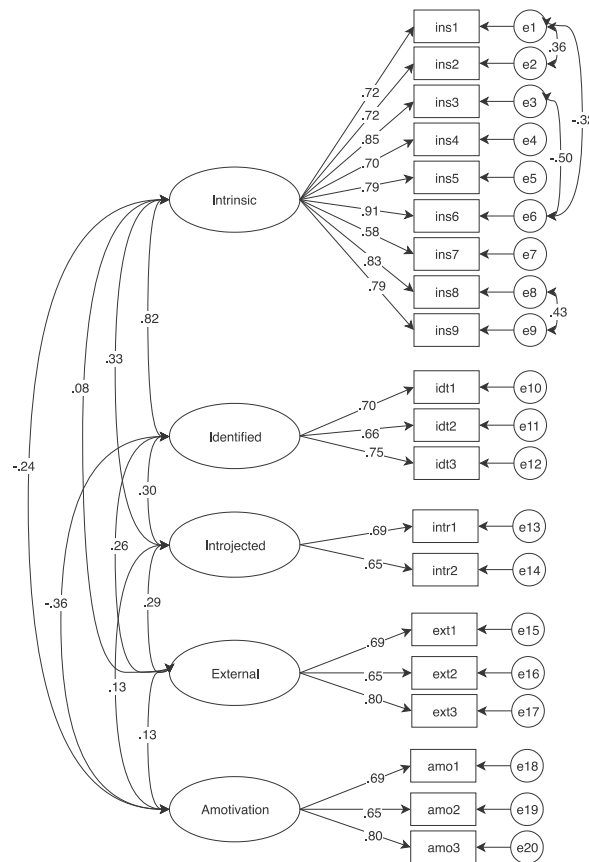


Fig. 3. A Final Measurement Model of SDT Orientations based on a CFA.

12.3. CFA of ME subscales

12.3.1. Life-related Emotions

There were four subscales postulated to emerge under life-related emotions: positive emotions-use (“PoUse” for short), fear and embarrassment (“LifeFe” for short), happiness and enjoyment (“LifeHap” for short), and positive emotions-future (“PoFut” for short). However, improvement of the overall model fit was considered due to the results indicating less than a satisfactory model fit, indicated, for example, RMSEA = 0.09; CFI = 0.90; NFI = 0.87 (see Table 9). Although a reasonably good overall model fit was obtained, it was evident that there were some moderately high correlations among the subscales of life-related emotions. In particular, “PoUse” was moderately strongly correlated with “LifeHap” and “PoFut” ($r = 0.83$ and $r = 0.68$, respectively). In addition, “LifeHap” and “PoFut” were also strongly correlated with each other ($r = 0.79$). These rather substantial inter-correlations indicate a possibility of a higher-order factor among these three constructs. Conceptually, these three variables were all about positive emotions in learning English, which share similar meanings. Thus, a higher-order construct containing the three aspects of positive emotion was created, included and tested in the higher-order CFA framework (see Fig. 5). The second-order construct was labelled ‘positive life emotions’. The factor structure of the modified measurement model for the life-related emotions domain is presented in Fig. 5.

12.3.2. Study-related Emotions

The items measuring study-related emotions were also tested in CFA to confirm existence of the four latent variables, i.e., happiness and enjoyment (“HappEnjoy” for short), excitement (“Excitement”), pride and confidence (“Pride” for short), and fear and embarrassment (“StudyFear” for short). The initial model, where the items were presumed to measure the expected constructs, did return an acceptable goodness of model fit to the data with reasonably substantial factor loadings on to each of the latent variables (see Fig. 6 and Table 10). It was also noted, however, that three constructs (“HappEnjoy”, “Excitement”, and “Pride”) were moderately strongly related to each other: $r = 0.76$ between “Excitement” and “Pride”; $r = 0.67$ between “HappEnjoy” and “Excitement”; and $r = 0.71$ between “Pride” and “HappEnjoy”. Conceptually, these three constructs represent positive emotions related to studying English. Such moderately strong correlations suggest a possibility of the existence of a

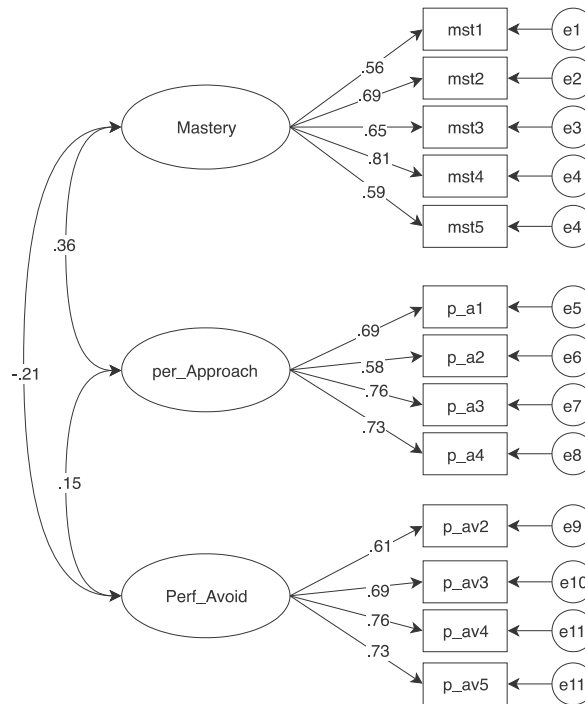


Fig. 4. A Final Measurement Model of GO based on a CFA.

Table 7
Fit Indices for SDT Orientations based on CFA.

	χ^2	p	χ^2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI
Initial Model	705.144	.00	4.41	.11	.09	.85	.80	.91	.88
Final Model	496.726	.00	3.18	.11	.07	.90	.86	.94	.92

Table 8
Model Fit Indices for GO based on a CFA.

	χ^2	p	χ^2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI
Initial	436.864	.00	4.22	.12	.08	.90	.86	.87	.84
Final	209.429	.00	3.37	.09	.07	.93	.92	.95	.91

Table 9
Two Models Fit Indices for Life-related Emotions based on CFA.

	χ^2	p	χ^2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI
Initial Model	710.523	.00	4.33	.08	.09	.84	.80	.90	.87
Higher-order Model	537.509	.00	3.70	.08	.08	.88	.84	.93	.90

higher-order factor that encompasses the shared variances among these three constructs. It makes sense that positive feelings such as happiness, excitement, and pride in learning English could co-exist, resulting in an empirical as well as conceptual overlap among these constructs. Thus, a second-order factor labelled 'positive study emotions' was formed and a CFA model including this second-order factor was tested. The final higher-order factor structure and the associated factor loadings are presented in Fig. 6.

12.4. Correlations among the motivational constructs

Pearson bivariate correlation coefficients were computed for all pairs of variables to be included to the motivational process model (Table 11). This section presents and discusses only the pair of correlational results that contribute to the creation or modification of the hypothesized model.

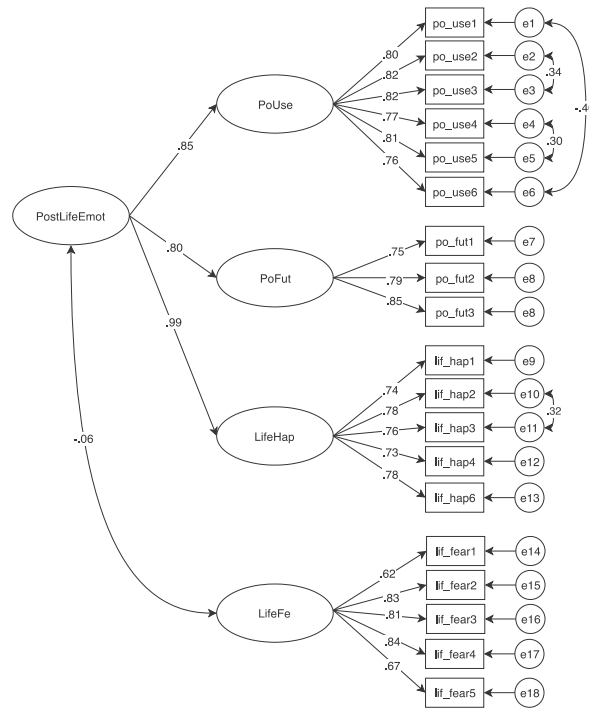


Fig. 5. Final Measurement Model of Life-related Emotions Constructs based on CFA.

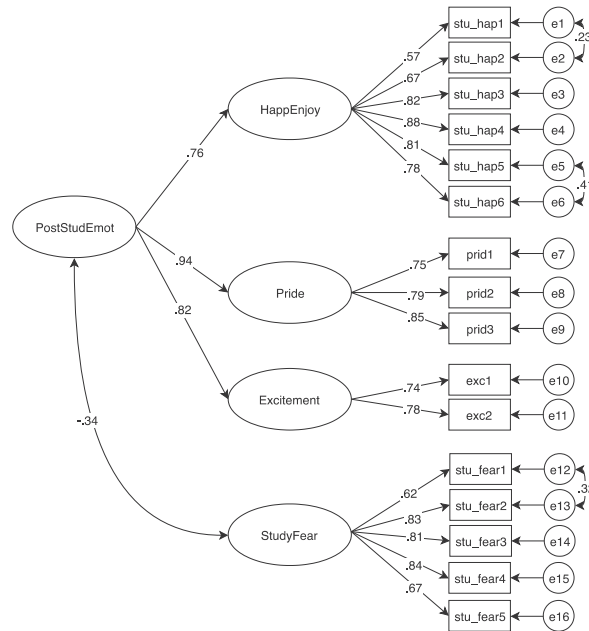


Fig. 6. A Final Measurement Model of Study-related Emotions Constructs based on a CFA.

12.5. The motivational process model

As mentioned, the main goal of this study is to develop an empirically and theoretically sound motivational process model for students learning English as their second language. When the models did not show a minimum cut-off criterion of a good fit to the data, SEM models were modified and tested again. At this point, the main source of the model modification, to identify links that are either problematic or potentially increase the overall model fit, was modification indices. Potential

Table 10
Two Model Fit Indices for Study-related Emotions based on CFA.

	χ^2	p	χ^2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI
Initial Model	525.114	.00	4.74	.08	.09	.90	.86	.94	.91
Higher-order Model	375.483	.00	3.49	.07	.08	.91	.87	.94	.92

Table 11
Zero-order correlations for the motivational process model variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.GPA	1															
2. Autonomy	.21**	1														
3. Competence	.35**	.48**	1													
4. Relatedness	.04	.09	.08	1												
5. Intrinsic orientation	.43**	.44**	.53**	.17**	1											
6. Identified orientation	.39**	.32**	.49**	.25**	.71**	1										
7. Introjected orientation	-.01	.06	.04	.41**	.26**	.20**	1									
8. External orientation	-.14*	.10*	.09	.33**	.15**	.24**	.29**	1								
9. Amotivation	-.24**	-.19**	-.29**	.06	-.22**	-.33**	.13**	-.11*	1							
10. Mastery goal orientation	.35**	.37**	.66**	.06	.57**	.55**	.06	.06	-.40**	1						
11. Performance approach	.11*	.15**	.26**	.31**	.30**	.29**	.19**	.30**	-.16**	.27**	1					
12. Performance avoidance	-.15**	-.05	-.16**	.35**	-.06	-.06	.34**	.20**	.24**	-.15**	.22**	1				
13. Positive life emotion	.32**	.30**	.46**	.30**	.60**	.57**	.26**	.16**	-.37**	.56**	.31**	-.02	1			
14. Life fear	-.21**	-.19**	-.29**	.25**	-.15**	-.16**	.25**	.16**	.30**	-.29**	.06	.46**	-.07	1		
15. Positive study emotion	.38**	.39**	.54**	.16**	.59**	.47**	.16**	.10*	-.32**	.56**	.19**	-.15**	.62**	-.28**	1	
16. Study fear	-.21**	-.20**	-.32**	.28**	-.17**	-.17**	.26**	.14**	.26**	-.32**	.07	.54**	-.08	.75**	-.27**	1

** Correlation is significant at 0.01 level.

* Correlation is significant at 0.05 level.

modifications were further inspected to check whether they are supported by the related literature. Testing alternative models is a standard procedure before making a decision about the final model (Byrne, 2010; Steiger, 2001; Weston & Gore, 2006). When there were minor differences in the model fit indices between two models, a model with a simpler structure was chosen because a simpler model is typically preferred in SEM modelling when all other conditions are equal. The IBM SPSS Amos software was used for all SEM analysis in this study.

The next step was to evaluate the full structural model by inspecting the model fit through goodness-of-fit indices, as was the case for the CFA procedure. This was followed by an inspection of R² values, indicating the extent to which the variance in the criterion variable was accounted for by the structural model.

Goodness-of-fit indices of the initial, full structural model (Fig. 7) were examined, and the results showed that the model did not fit the data very well. As can be seen in Table 12, χ^2 value was rather high, 609.056, resulting a high ratio of χ^2/df , 8.23. The RMR and RMSEA (0.12 and 0.14, respectively) were also higher than the conventional cut-off value of 0.07 indicating a good model fit (Hair et al., 2010). The GFI, AGFI, CFI and NFI were also all below the conventional cut-off value of 0.90 indicating a good model fit (Hair et al., 2010). Thus, it was concluded that there was no sufficient level of fit between the model and the data.

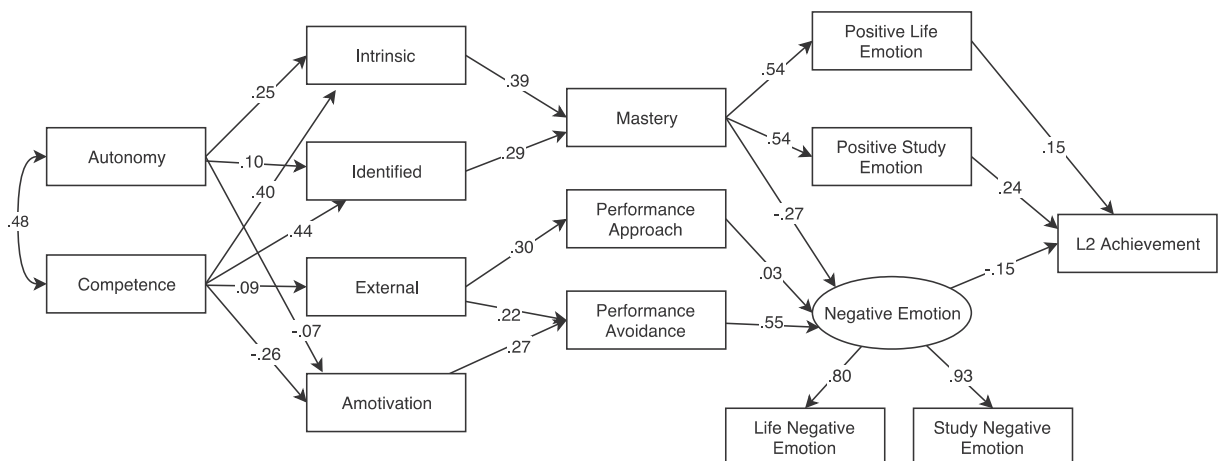


Fig. 7. The initial hypothesized model of the motivational process.

Table 12
The fit indices of model 1.

χ^2	p	χ^2/df	RMR	RMSEA	RMSEA Lo 90%	RMSEA Hi 90%	GFI	AGFI	CFI	NFI
609.056	.00	8.23	.12	.14	.10	.17	.83	.75	.77	.76

12.6. Model modification and Re-specification

The correlation analysis results (presented in Table 11) showed that among the four theoretical frameworks, the variables under the SDT variables showed the strongest correlations with L2 achievement. Therefore, it was postulated that SDT could be the most proximal variable, directly relating to the L2 achievement in the full structural model. Thus, the SDT variables were placed just before the L2 achievement variable in the model. The modified tested model is presented in Fig. 8. The goodness-of-fit indices of the “new” revised model were calculated (see Table 13). The normed χ^2/df value is now 3.86, which decreased from the initial model ($\chi^2/df = 8.23$) and approached the conventional cut-off value region of 3 indicating a good model fit. Both RMR and RMSEA values were just above the conventional cut-off value of 0.07. The GFI, CFI and NFI values were within the conventional cut-off value of 0.90, indicating a good data fit to the model. An exception was the AGFI value (0.88), which approached the conventional cut-off value of 0.90. The value of R² was examined to determine the extent to which the model explained the variance of the outcome variable, i.e., L2 achievement (as measured by students’ GPA in English). The revised model accounted for 28% of the variance in L2 achievement whereas the initial hypothesized model accounted for 15%. This improvement may be attributable to the modification made in the temporal order of the constructs specified in the model.

12.7. Indirect effects of the BPN on L2 achievement in the final model

As presented in Table 14, the indirect effect of autonomy on L2 achievement was mediated by internal orientation: the indirect effect size was calculated by the direct paths [$0.18 \times (0.47) = 0.08$ ($\beta = 0.08$, $p < .05$), see #1].

The total indirect effect of competence on L2 achievement was produced by summing the indirect effects. While three indirect effects were not statistically significant (see #3, #5, and #8), the overall indirect effect from competence on L2 achievement showed a moderately strong effect [$\beta = 0.37$], see #9 in Table 13].

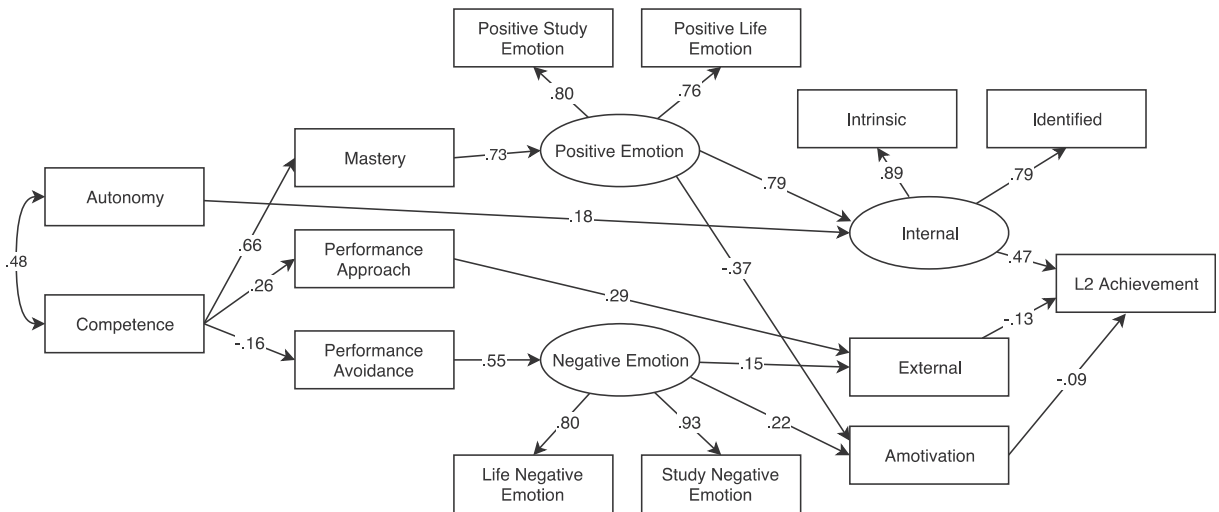


Fig. 8. The final model of the motivational process.

Table 13
The fit indices for the final full structure model.

χ^2	p	χ^2/df	RMR	RMSEA	RMSEA Lo 90%	RMSEA Hi 90%	GFI	AGFI	CFI	NFI
270.699	.00	3.86	.08	.08	.07	.09	.92	.88	.92	.90

Table 14
Standardized indirect and total effects in the motivational process model.

Predictor variable	Outcome variable	β	p	
Indirect Effects				
#1	Autonomy → Internal orientation	L2 achievement	.08	<.01
#2	Competence → Mastery → Positive emotion → Internal Orientation	L2 achievement	.22	.02
#3	Competence → Mastery → Positive emotion → Amotivation	L2 achievement	.02	.07
#4	Competence → Mastery → Negative emotion → external orientation	L2 achievement	.01	.09
#5	Competence → Mastery → Negative emotion → Amotivation	L2 achievement	.09	<.01
#6	Competence → Performance approach → External orientation	L2 achievement	.01	.08
#7	Competence → Performance avoidance → Negative emotions → External orientation	L2 achievement	.01	.10
#8	Competence → Performance avoidance → Negative emotions → Amotivation	L2 achievement	.01	.09
#9	Competence (Total)	L2 achievement	.37	
#10	Mastery → Positive emotion → Internal orientation	L2 achievement	.27	<.01
#11	Mastery → Positive emotions → Amotivation	L2 achievement	.02	.07
#12	Mastery → Negative emotions → External orientation	L2 achievement	.01	.09
#13	Mastery → Negative emotions → Amotivation	L2 achievement	.01	.08
#14	Mastery (Total)	L2 achievement	.31	
#15	Performance approach → External orientation	L2 achievement	-.04	<.01
#16	Performance avoidance → Negative emotion → External orientation	L2 achievement	-.02	.07
#17	Performance avoidance → Negative emotion → Amotivation	L2 achievement	-.02	.07
#18	Performance avoidance (Total)	L2 achievement	-.04	
#19	Positive emotion → Internal orientation	L2 achievement	.37	<.01
#20	Positive emotion → Amotivation	L2 achievement	.03	.06
#21	Positive emotion → Internal orientation (Total) (Total)	L2 achievement	.40	
#22	Negative emotion → External orientation	L2 achievement	-.02	.07
#23	Negative emotion → Amotivation	L2 achievement	-.02	.07
#24	Negative emotion (Total)	L2 achievement	-.04	

12.8. Indirect effects of the GO on L2 achievement in the final model

As shown in Table 14, indirect effects of mastery goal orientation on L2 achievement were found by the mediating effects of the motivational emotion variables (see #10 to #14), resulting in a moderate strength of a total indirect effect ($\beta = 0.31$, see #14). Two indirect paths from mastery goal orientation to L2 achievement were not statistically significant, both of which had amotivation as a direct predictor of L2 achievement (#11 and #13 in Table 13).

Performance approach orientation had one negative indirect effect on L2 achievement, mediated via external orientation ($\beta = -0.04$, $p < .05$, see #15).

The indirect effect of performance avoidance orientation on L2 achievement (see #16 to 18) was obtained by negative emotion and external orientation ($\beta = -0.02$, see #16) and by negative emotion and amotivation ($\beta = -0.02$, see #17) although both failed to reach a statistical significance ($p < .07$).

12.9. Indirect effects of ME on L2 achievement in the final model

As presented in Table 14, there were two indirect paths from positive emotion to L2 achievement, one through internal orientation (see #19) and the other one through amotivation (see #20), resulting in a total effect of $\beta = 0.40$ (see #21). This total indirect effect was the strongest one among all indirect effects specified in the final model. Negative emotion also had two indirect paths through the mediations of external orientation (see #22) and amotivation (see #23), but the total indirect effect was quite small ($\beta = -0.04$, see #24).

13. Discussion

The main objective of the present research was to develop a motivational process model by which BPN are linked to L2 achievement via the mediations of the key constructs within the theoretical streams of SDT, GO and ME. Although previous research has shown that learners' BPN are associated with motivation relating to language learning behaviours (Alrabai, 2017; Hiromori, 2003; Noels, 2001, 2013; Wu, 2003), few studies have illustrated the mediational mechanism of how BPN might facilitate learners' L2 motivation and eventually, L2 achievement. In addition, previous studies in the L2 research have not attempted to incorporate the major motivational theories (i.e., BPN, SDT, GO, ME) into one framework in spite of thirty years of history of research demonstrating the relevance of each of these theories in the second language learning achievement (Alamer et al., 2017; Cheng & Dörnyei, 2007; Dörnyei, 2001; Gardner, 2007; McEown et al., 2014; Oxford, 1994).

The present study has taken an ambitious and comprehensive approach by employing all four major motivational theories into one model and test the predictive utility of the model in relation to L2 achievement. In the process, mediational relationships among BPN, SDT, GO and ME were hypothesized in a motivational process model to explain L2 achievement. The results obtained from the SEM analysis established the motivational process model in this study, which (1) clarified how BPN is eventually linked to L2 achievement through the key constructs of SDT, GO and ME; and (2) illustrated the relationships



Fig. 9. A simplified version of the final model of the motivational process.

among the key constructs of the four major theoretical streams of motivation (i.e., BPN, SDT, GO, ME). As presented in the introduction, this study started with hypotheses that students' fulfilment of basic psychological needs (BPN) would be the starting point of learners' motivation (Hypothesis 1); Students' basic psychological needs (BPN) will be directly linked to their self-determination (SDT) orientations (Hypothesis 2); Students' self-determination (SDT) orientations will be directly linked to their goal-setting orientations (GO) and approach (Hypothesis 3); Students' goal-setting approach (GO) will be directly linked to their motivational emotional (ME) state (Hypothesis 4); and finally, students' motivational emotional (ME) state will be directly linked to their language achievement outcome (Hypothesis 5). The final model that was derived, however, had partial support for some of these hypotheses, because the best model representing the four theoretical accounts of motivation had the linear sequence of BPN → GO → ME → SDT, instead of the initially hypothesized BPN → SDT → GO → ME. Therefore, Hypothesis 1 and Hypothesis 4 were supported, while Hypotheses 2, 3, and 5 were not supported in the present study. The simplified, final model is presented in Fig. 9.

The final model suggests that students' motivational tendencies may start with their feeling of fulfilment of psychological needs, which is directly related to whether and how they set the learning goals. Thus, it can be argued that students' needs satisfaction should be met first and such satisfaction would may lead to an increase of adoption of mastery or performance approach goal for learning. Further, mastery or performance goal setting process can also lead to how they feel about learning and motivation. Specifically, mastery goal orientation would predict the life and study-related motivational emotions positively. On the contrary, performance avoidance goal led students to hold negative life and study emotions. Positive emotions allowed the students to endorse internal motivation and less likely amotivation orientations, while negative emotions may lead to achievement based on external rewards or avoiding bad experiences and possibly losing interest in learning the language. Thus, motivational emotion was directly linked to the nature of the learners' motivation (i.e., Intrinsic, Identified, Introjected, External, or Amotivation) in the SDT framework. Out of four streams of theoretical models, the SDT motivational constructs had the most direct relationships to learners' achievement. Further, the internal forms of motivation (Intrinsic and Identified), in turn, have positive relationships to achievement, and the external form of motivation has a negative relationship to achievement.

In the present study, we found that the SEM indicated that the motivational process model accounted for about 28% of the variance in learners' achievement of English, indicating that the joint effects of BPN, GO, SDT, ME showed a good predictive validity for L2 achievement and that the model was useful in understanding the motivational factors relating to students' L2 achievement. As mentioned earlier, previous studies have illustrated the link between each of the motivational theories to L2 achievement itself: such as between BPN and L2 achievement (Alamer, 2019; McEown et al., 2014; Noels, 2001; Noels et al., 1999); between SDT and L2 achievement (Hiromori, 2003; Noels, Clément, & Pelletier, 2001; Wu, 2003); between GO and L2 achievement (Woodrow, 2006, 2008); and between ME and L2 achievement (MacIntyre & Gregersen, 2012; Ross, 2015). The present study is the first one to clarify how the four theoretical frameworks of motivation are linked to each other to explain L2 achievement. In doing so, the temporal order of the motivational constructs [GO → ME → SDT] was proposed and tested a sample of Saudi Arabian students living and learning.

13.1. The mediating role of the motivational constructs

The initial model of motivational processes for L2 achievement was linking BPN variables (i.e., autonomy, competence and relatedness) directly to Self-determination Theory variables (i.e., intrinsic orientation, identified orientation, introjected orientation, external orientation and amotivation). The final model, however, suggested that the BPN variables were more closely linked to GO variables (mastery goal orientation, performance-approach and performance avoidance), especially due to the link between competence and other GO variables. A snapshot depicting the relationships between these two theoretical orientations is presented in Fig. 10. This figure is just a portion of the final model (Fig. 8) illustrating the relationships between the variables between the BPN and GO (the final model does not have the relatedness variable because it was not connected to any of the variables in the model, but it is included here for the presentation of all three variables under the BPN).

The present study demonstrated that competence was moderately-strongly related to mastery goal orientation as well as modestly to performance approach, but negatively related to performance avoidance. However, there was virtually no direct relationship between autonomy and any variables of GO, so was between relatedness and any variables of GO. Instead, autonomy was directly linked to the internal form of motivation from the SDT framework. In L2 motivation research literature, the link between BPN and GO has not been demonstrated, while the association between autonomy and intrinsic motivation has been shown in many empirical studies (McEown et al., 2014; Noels, 2001; Reeve, Ryan, Deci, & Jang, 2008).

Previous research has shown the relationships between competence and the mastery goal orientation from the GO framework (Kaplan & Midgley, 1997; Wolters, Yu, & Pintrich, 1996). What the present research suggests is that when all four

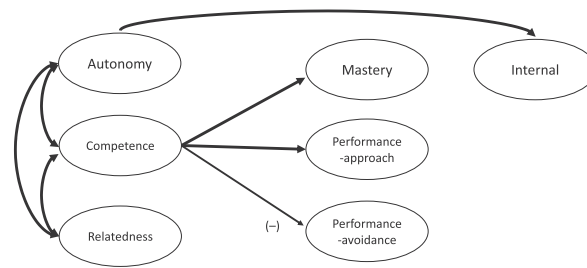


Fig. 10. The relationship between BPN and go variables.

Note. The final model does not have the relatedness variable because it was not connected to any of the variables in the model, but it is included here for the presentation of all three variables under the BPN.

theoretical frameworks were considered simultaneously, competence might be closer to the GO variables than to the SDT. That is, learners who feel competent at carrying out the language learning tasks may also feel that they can master the language tasks as well as feel like they outperform other students in showing their competence in L2 achievement. Students endorsing mastery goal orientation and performance approach goal orientation may already feel confident and competent in their learning abilities, and thus, competence can be said to be an instrumental antecedent of goal endorsements. Autonomy, however, may not necessarily relate to the endorsement of any types of goal orientations while learning the second language, rather it was rather an active element for holding internal form of motivation.

13.2. The relationship between GO and ME

The final model contained the links from the link from the GO variables (mastery goal orientation, performance approach and performance avoidance) the ME variables (positive emotion and negative emotion) (see Fig. 11). Mastery goal orientation was strongly and positively associated with positive emotion and moderately and negatively associated with negative emotions. Performance avoidance was found to be moderately and positively associated with negative emotion. On the other hand, performance approach did not have direct relationships with any ME variables and instead, showed a direct association with external orientation from Self-determination Theory (SDT). It is noteworthy that performance approach did not show the association with either positive or negative emotion. On the other hand, the model showed that students whose idea of learning is focused on demonstration of their performance and comparison to others were also holding the externally oriented motivation. Both performance approach and external orientation tap into similar features of motivation subtypes; learning has an instrumental purpose and the source of motivation was external. The pairing of performance approach and external motivation seems rather obvious but the link had not been explored with respect to L2 learning in previous studies. It is only through the approaches that the present study has taken, employing SDT, ME, and GO in one model, the lack of link between GO and ME and the link between GO and SDT were formally tested and demonstrated.

Overall, goal orientations were found to be related to various types of emotions that learners experience during learning, as suggested in Pekrun's Value Theory of Achievement Emotions (Alamer, Lee, & Vigentini, 2018; Pekrun, 2000, 2006; Pekrun et al., 2009). Specifically, mastery goal was positively correlated with enjoyment, hope and pride, and negatively related with boredom (Pekrun, 2006). Similar patterns of relationships were obtained in the present study, although the positive emotion variables were combined into one variable so were the negative emotion variables. The present study also extended the application of these relationships between the GO and ME, in the L2 research domain, which has not been carried out in previous research.

13.3. The relationship between ME and SDT

Incorporating motivational emotion with the SDT has not been extensively studied in the previous literature although the SDT explicates that intrinsic motivation may bring about the tendencies to choose activates that may consequently influence

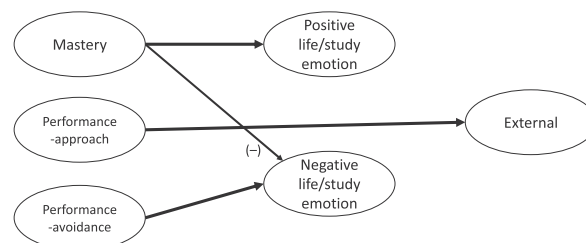


Fig. 11. The relationship between go variables and me.

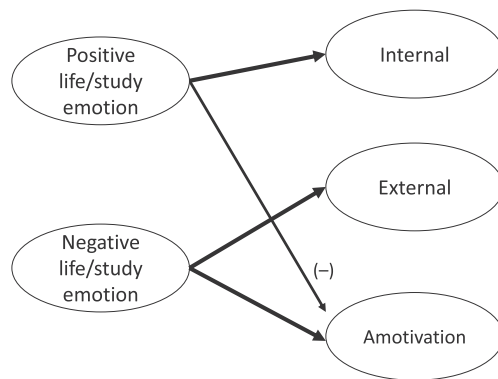


Fig. 12. The relationship between me and SDT variables.

individuals' development of positive emotions (Deci & Ryan, 2000). As presented in Fig. 12 the present study has shown that students who may perceived L2 learning in a positive light and experience enjoyment in language learning may also develop a more internalised form of motivation. In this research, fine-grained differentiated emotion types as suggested in the literature were not verified among Saudi L2 students. This suggests that the ME scale may need to be re-examined or quantitative statistical method may not have been appropriate to capture more fine-grained differentiated types of emotions. As such, the results on ME should be interpreted with some caution.

The negative association between positive emotion and amotivation indicates that students with no purpose in learning the language were less likely to have positive emotion in learning. On the other hand, the positive relations between negative emotion and external orientation and between negative emotion and amotivation suggest that there might be a need to explore an emotional state of learners in order to understand why learners develop externally oriented motivation or lack an appropriate level of motivation for learning. In previous research, the link was explored from the SDT to ME, given that external orientation and amotivation may likely prompt fear, anxiety and embarrassment of learners (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014). Based on the existing literature, the initial SEM model postulated that the ME variables would be antecedents of the motivational profiles differentiated in the SDT. The present study findings, however, suggest the other way around that positive or negative emotion triggered during learning may contribute to a certain type of motivational profile of learners. Language educators may benefit from understanding the mechanism between emotion and motivation, and find various ways to assist learners to develop positive emotion to foster a more internalised form of motivational dispositions.

13.4. The relationship between SDT and L2 achievement

The present study showed that internal orientation was positively linked to L2 achievement. In contrast, external orientation and amotivation were negatively linked to L2 achievement (see Fig. 13). These findings suggest that students' motivational orientations should be considered and assessed to support and nurture more self-determined and internalised forms of motivation (intrinsic and identified orientations) to promote successful language learning outcomes. The initial hypothesis was to position the ME variables to be directly linked to L2 achievement. However, the SEM model supported the SDT variables to be the most proximal variables that are directly linked to L2 achievement. All three pathways (from internal,

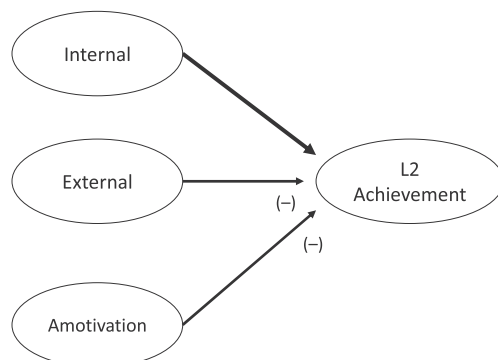


Fig. 13. The relationship between self-determination theory variables and L2 achievement.

external, and amotivation) showed statistically significant associations with L2 achievement. While the strong link between the SDT and L2 achievement have been suggested in the previous studies (McEown et al., 2014; Noels, 2013; Noels, Pelletier, Clément, & Vallerand, 2000), the unique information that came out of this research is that the SDT appeared to be superior to the other motivation theories when it comes to the predictive validities in the learning a second language domain.

14. Limitations and suggestions for future research

A few limitations of the present research should be noted. First, this research was about EFL Saudi learners. Therefore, the findings can be generalised only to Saudi learners of English. It would be fruitful to examine the usefulness of the final model, with learners of English in other cultural contexts or with learners of other languages. Although English is a global language that is taught as a second language in many countries, other second language learning situations may be characterised by the similar motivational processes that were identified in this study.

Although further investigation of how the final model can be apply to culturally different samples of language learners would be a valuable research endeavour, that type of research would require a different theoretical framework, i.e., social-cultural contextual framework (as opposed to the motivational framework that the present research adopted). Taking a different theoretical framework would require a whole set of research design, which was out of scope for this investigation. That type of investigation would require the inclusion of another set of variables that are well-thought-out to examine the differences in the potential cultural, social and contextual learning factors that could influence motivation and or emotion among Saudi learners in Saudi Arabi. This was purposely omitted from this research as the main focus was on the motivational processes among Saudi students.

Third, the present study employed only a cross-sectional survey design. Thus, any claims about cause-and-effect relationships among the variables of the motivational process model were not to be made based on the final model of this research, and the model was limited in that it depicts only the associations between the temporal order of how different types of motivational profiles may be linked to each other. However, it should be noted that the temporal ordering of the constructs and directional pathways amongst the constructs demonstrated in this research did clarify how motivational subtypes should be understood and viewed by practitioners and researchers alike. Nevertheless, future research should consider a longitudinal design to test plausible propositions about cause-and-effect relationships among the motivational variables employed in this research.

Fourth, this study employed questionnaires that had been established in the field of language learning. Although effort has been devoted to select the best available scales that assess the motivational frameworks involved in the current investigation we observed that two latent variables, namely, 'excitement' under ME framework and 'introjected' under SDT framework had only two observed variables. In using measures assessing psychological constructs, it is advisable not to use less than three items per construct (Hair et al., 2010). Limiting the number of observed variables to two items often poses issues while fitting the data in CFA. Although new scale development was not a focus of our study, enhancing these subscales by including a sufficient number of items to improve their dimensionality and validity should be considered in future research.

Lastly, the present study was based on self-report data, gathered from one online survey. The respondents found the length of the survey a bit too long (about 100 items altogether), which led to an increase in missing values in the section toward the end of the survey. Self-report survey data entail the inevitable challenge of the "truthfulness" in the responses. However, it was the best possible option to utilise one (long) survey by having the respondents to answer the survey only once, instead of having them answer the survey in multiple sessions. Also, subtle differences in the motivational subtypes would not have been measured effectively if qualitative data were used to understand how different motivational constructs may be related to each other. In the end, the present research followed the traditional method of conducting motivation research by employing the most extensively used scales in the research domain. By doing so, it was also possible to compare the effectiveness of the different motivational theories in understanding the students' L2 learning motivational profiles and achievement. It is hope that the information presented in this research can be disseminated to Saudi Arabia research communities and be known to teachers and educators of Saudi Arabia to be used for their teaching and learning practices.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.system.2019.102133>.

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