

The correlation between need satisfaction and learning motivation: A self-determination theory perspective

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Abstract

To examine the relationship between need satisfaction and learning motivation, a survey was conducted in an engineering college in China. Collected data were processed and analyzed via SPSS software; then a confirmatory factor analysis was performed with SEM method. Outcomes of the research indicated that: 1) satisfaction of autonomy and relatedness contributed to autonomous motivation; 2) satisfaction of competence and relatedness helped shift controlled motivation to autonomous motivation; 3) unexpectedly, satisfaction of competence had negative effect on autonomous regulation, as did satisfaction of autonomy on controlled regulation. The outcomes imply that learners' psychological needs should be satisfied according to their pre-existing types of motivation, and that studies on motivation based on Self-determination Theory (SDT) should take cultural factors into consideration

Keywords: SDT, basic psychological needs, self-determined motivation, correlation

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1. Background

It is universally acknowledged that human needs are basically related to motivation. Maslow (1943) believes that human needs cover 5 levels: physiological needs, safety needs, love needs, esteem needs and self-actualization needs. McClelland and Burnham (1976, 1995) points out that when basic needs for survival are met, human seek the needs for achievement, power and affiliation. Deci & Ryan's (1985, 2000) self-determination theory (SDT) focuses on human psychological needs for autonomy, competence and relatedness, and maintains that satisfaction of the basic needs leads to better motivation, performance, and well-being, since the innate needs are essential 'psychological nutriments' for human beings to develop and function well. SDT also emphasizes that social contexts supportive of satisfaction of the basic needs enhance self-determined motivation, and that the needs can be met through a variety of activities and approaches.

Motivation is not only an aspiration of goal pursuit, but also the strong will and tireless efforts to achieve it (Kong, 2009). Motivation, playing a crucial role in foreign language education, has attracted researchers and educators to conduct research on it from different perspectives for nearly half a century. Gardner and Lambert (1972) identified integrative and instrumental motivation as the two extremes of a continuum. However, Deci and Ryan (ibid.) maintain that different types of motivation (amotivation, different forms of extrinsic motivation and intrinsic motivation) are on the same self-determination continuum, representing different levels of self-determination, and that these types of motivation transform in accordance to different degrees of need satisfaction. Amotivation is the lowest self-determination form of motivation on the continuum. Amotivated individuals do not perceive contingencies between their actions and the outcomes of their actions. They experience feelings of incompetence and lack of control (Deci & Ryan, 1985). When English foreign language (EFL) learners are in such a state, they may decide to stop learning EFL. Extrinsic motivation includes external regulation, introjection and identification which are ordered from lower to higher levels of self-determination. External regulation and introjection fall into controlled motivation due to lower degrees of self-determination and controlled regulation. In contrast, identification is a more autonomous form of regulation, which is grouped into autonomous motivation with intrinsic motivation. Intrinsic motivation which stems from the innate needs of competence and self-determination is the highest self-determination form of motivation on the continuum. When EFL learners are intrinsically motivated, they will learn voluntarily, in the absence of material rewards or external constraints. Deci, Ryan & Williams (1996) concluded that intrinsic motivation and internalized extrinsic motivation contributed significantly to effective and efficient learning and regulation. Many Chinese scholars (Gao, 2004; Ma, 2005; Qin, 2007; Hua, 2009; Zeng & Luo, 2012) also conducted studies on EFL motivation. However, few studies have been done concerning the relationship between satisfaction of learners' psychological needs and EFL learning motivation. This study attempts to examine the correlation between them under the theoretical framework of SDT. The outcomes of the study will provide reference for EFL education and research, and enrich EFL motivation theory.

2. Methodology

To examine the relationship between satisfaction of psychological needs and EFL learning motivation, a survey was conducted among 302 randomly chosen undergraduates majoring in engineering in China. 45 variables were measured to collect three types of research data for the study: 1) the subjects' perceived satisfaction of the basic needs; 2) the subjects' EFL learning motivation; 3) the relationship between need satisfaction and learning motivation. Collected data were processed and analyzed via SPSS software; then AMOS software was used to do a confirmatory factor analysis by using the structural equation modelling method (SEM).

2.1 Hypotheses

Based on SDT, the research hypotheses are formulated as follows.

- 1) The subjects' perceived satisfaction of psychological needs for autonomy, competence and relatedness is moderate, and their EFL learning motivation mainly belongs to extrinsic or instrumental motivation;
- 2) Satisfaction of the psychological needs is positively related to EFL learning motivation;
- 3) Satisfaction of learners' psychological needs can not only enhance autonomous regulation, but also gradually reduce controlled regulation and facilitate lower self-determination forms of motivation to transform into higher ones.

2.2 Subjects

The subjects of the study were 302 randomly chosen undergraduates in an engineering college in China. Their English language proficiency and English learning motivation were different but weak overall.

2.3 Instruments

The formally validated instrument "the Basic Psychological Need Satisfaction and Frustration Scale" (Chen, Vansteenkiste, et al., 2015) was used to measure the subjects' perceived satisfaction of the three psychological needs. The questionnaire included a balanced combination of satisfaction and frustration items of three subscales, each of which consisted of 8 items. The previously validated questionnaire "Learning Self-Regulation Questionnaire" (Williams & Deci, 1996; Black & Deci, 2000) was employed to investigate the subjects' EFL learning motivation. The questionnaire was formed with just two subscales: autonomous regulation (intrinsic motivation or identified regulation) and controlled regulation (introjected or external regulation). Each category contained 6 items with a total of 12. In past studies, the alpha reliabilities for these two subscales have been approximately 0.75 for controlled regulation and 0.80 for autonomous regulation. In order to collect valid data, the instruments were translated into Chinese, piloted and adapted slightly to ensure that the subjects could understand the questions and requirements well. The subjects were required to respond to a 7-point Likert scale ranging from 1 (not at all true) to 7 (very true) to indicate the degree to which the statement is true for them.

In order to find out the correlation between satisfaction of the psychological needs and EFL learning motivation, the researcher designed 9 items to examine how well motivated the students were when their psychological needs for autonomy, competence and relatedness were satisfied at 3 different levels (high, medium and low). The students responded to a 7-point Likert scale ranging from 1 (poorly motivated) to 7 (fully motivated) to express their EFL learning motivation based on different levels of need satisfaction. Additionally, 4 open-ended questions were set for both the questionnaire and subsequent interviews. The survey was conducted among 315 undergraduates majoring in engineering by the researcher and well-trained teachers in class and the completed questionnaires were collected on the scene. Then 22 randomly chosen subjects were interviewed to find out more about the subjects' identified relationship between need satisfaction and learning motivation, and to find out the inner causes of the answers

3. Results and discussion

315 copies of the questionnaire were delivered and 302 valid questionnaires were collected. The collected data was processed and analyzed using SPSS and AMOS. Results of the survey were divided into two parts: descriptive statistics analysis and confirmatory factor analysis.

3.1 Descriptive statistics analysis

Descriptive statistics analysis consisted of two parts: 1) results of the subjects' perceived satisfaction of the psychological needs and their EFL learning motivation; 2) data concerning the correlation between the subjects' need satisfaction and their EFL learning motivation.

3.1.1 Descriptive analysis of need satisfaction and motivation

The results of the survey show that the subjects reported slightly above moderate to satisfaction of psychological needs for autonomy, competence and relatedness in their EFL education, and to two categories of self-determined motivation, namely, autonomous motivation and controlled motivation (as shown in Table 1).

Table 1. Results of need satisfaction and EFL learning motivation

Latent Variables	Item No.	α	Mean	SD	Supplementary description
Autonomy	8	0.701	4.3	1.53	Students had autonomy beyond classroom, but no autonomy in class.
Competence	8	0.859	4.3	1.62	The aim of EFL education was to help learners gain language competence.
Relatedness	8	0.832	5.3	1.56	Students felt related but lacked a climate of collaboration.
Autonomous Motivation	6	0.791	4.2	1.61	The intrinsic motivation mean was 3.3; the identified regulation mean reached 5.1.
Controlled Motivation	6	0.625	4.6	1.69	The introjected regulation mean was 4.8; the external regulation mean was 4.4.

Table 1 shows the number of items, Cronbach's alphas, mean, standard deviation of five latent variables. All subscales had internal reliability coefficients (α) above 0.70 except the controlled motivation (0.625), indicating that these measures met the required reliability and that the questionnaire was internally consistent. Each variable's mean and standard deviation represent composite scores from the observed items related. Mean of latent variables suggests that the subjects' need for relatedness was basically satisfied (5.3), but their needs for autonomy and competence were met just sometimes (value 4.3); and that the subjects' controlled motivation (scored 4.6) slightly outweighed autonomous motivation (scored 4.2). Specifically, the subjects' identified regulation scored 5.1, introjected regulation 4.8, external regulation 4.4 and intrinsic motivation only 3.3. Data collected from the open-ended question about motivation also prove the above results. 59.7 % of the subjects described that their EFL learning motivation as moderate, which could be considered as identified regulation and introjected regulation in the study. 26.1 % of them said that their EFL learning motivation was rather weak, and they needed external forces to push them to study, which is external regulation. Only 14.2 % of them had intrinsic motivation and enjoyed

English learning. The results basically verified the first hypothesis that the students’ perceived satisfaction of psychological needs was moderate and their EFL learning motivation mainly belonged to extrinsic or instrumental motivation.

3.1.2 Analysis of the correlation between need satisfaction and motivation

The relationship between need satisfaction and learning motivation was analyzed based on the data gathered from the questionnaire, and the results of open-ended questions and the subsequent interviews.

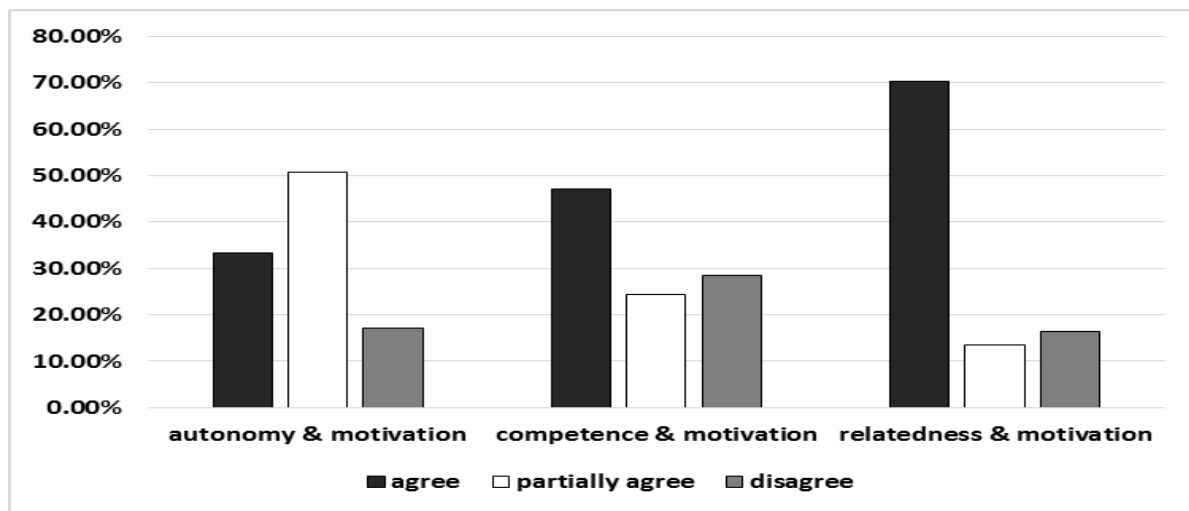
Table 2. Results of the relationship between need satisfaction and motivation from the questionnaire

Variables	Levels of satisfaction	Mean of motivation	SD	Supplementary description
Autonomy & Motivation	high	4.5	1.62	Students needed a certain degree of autonomy to motivate them, but too much autonomy might not work due to their weak self-monitoring, and little autonomy would undermine their motivation.
	medium	5.4	1.46	
	low	3.1	1.66	
Competence & Motivation	high	4.4	1.54	Students needed competence to motivate them, lacking competence had a negative influence on motivation. Interestingly, high and medium competence stimulated nearly the same motivation.
	medium	4.3	1.31	
	low	3.1	1.52	
Relatedness & Motivation	high	5.8	1.26	Relatedness was positively related to learning motivation. The more friendly social contexts students were in, the better they were motivated.
	medium	4.4	1.34	
	low	2.8	1.78	

Table 2 displays the mean of learning motivation and standard deviation when the subjects’ psychological needs were met at high, medium and low levels. The results show that need satisfaction predicted EFL learning motivation positively at varying degrees. Generally, students gained stronger learning motivation when their psychological needs were better satisfied. It is worth noting that students were not fully motivated when their need for autonomy was fully met. Data show that a moderate degree of autonomy could motivate students well. China’s cultural environment and the traditional educational system made Chinese students get used to following the arrangements and decisions of their teachers and parents. They looked forward to being autonomous, but they often felt lost when given complete autonomy. Interestingly, satisfaction of the need for competence at high and medium levels inspired similar learning motivation. Instrumental motivation and lacking social contexts to use English could account for the phenomenon. In the EFL environment, learners learned English language knowledge and practice English communication skills just to find they didn’t have many opportunities to use them in their daily life. Therefore, when they were competent to learn or to use English, many students would have stopped working on English and shifted their time and energy to learn or do something else.

Results of open-ended questions and the interviews show that most of the participants agreed that satisfaction of the psychological needs for autonomy, competence and relatedness could enhance their EFL motivation, but that need satisfaction might not necessarily have strong positive correlation with learning motivation (see Figure 1).

Figure1. Results of correlation between need satisfaction and motivation from open-ended questions and the interviews



As shown in Figure 1, 33.2% of the participants agreed that the more autonomy they had, the better motivated they would be. No autonomy made them feel bored at EFL learning. However, 50.7% of the subjects just partially agreed with the opinion. They believed that being given autonomy without any constraint might not work well with them because of their feeble willpower and self-control. They definitely enjoyed the freedom of making their own decisions or choices according to personal situations and interests, but they also needed assignments and learning tasks to push them forwards. 17.1% of the students denied the connection of autonomy to EFL learning motivation. They confessed that they would give up EFL learning if they had the freedom to make such a choice.

With respect to the relationship between motivation and competence, 47.2% of the participants totally agreed that EFL learning motivation was positively related to learners' competence, which allowed them to gain confidence and motivation. 24.3% of them partially agreed on the statement above. They confessed that once they gained competence in EFL learning, they might not feel an urgency to learn, and thus their motive weakened gradually. 28.5% of them insisted that there was no link between competence and motivation. For them, motivation and aspiration to learn EFL came from personal interests and needs.

As for the relationship between satisfaction of need for relatedness and EFL learning motivation, 70.3% of the participants held the opinion that learning motivation was positively correlated to a supportive learning context which would motivate them to study enthusiastically. Encouragement and support from teachers and peers really counted, especially when they were frustrated or discouraged. 13.4% of them believed that learning motivation had a link to relatedness to a certain degree. However, 16.3% of them argued that personal learning motivation had nothing to do with other people. A few of them even claimed that the more they were ignored, the harder they would work to prove their ability. The results in this section partially proved the second hypothesis that need satisfaction related to EFL learning motivation. However, there existed a couple of interesting phenomena which needed to be tested further.

3.2 Confirmatory factor analysis

In order to get persuasive outcomes, the structural equation modelling method (SEM) was used to examine the factor structure of SDT and to test the hypothesized relationship between participants' perceived satisfaction of psychological needs and their self-determined motivation. SEM is a statistical procedure that allows the researcher to address theory-driven causal research questions for both latent variables and the measurement models (Hancock & Mueller, 2006). The confirmatory factor analysis includes measurement model analysis and structural model analysis.

3.2.1. Measurement model analysis

The questionnaire covered five factors: satisfaction of needs for autonomy, competence, relatedness, autonomous motivation and controlled motivation. The reliability test of the questionnaire showed its overall Cronbach's alpha reaching 0.825, suggesting that these measures were internally consistent. The relationship between measures and their latent factors was determined using the maximum likelihood method with all factors allowed to covary so that possible discrepant associations could be identified. The observed variables with factor loading over .50 (see Table 3) were kept to do goodness-of-fit tests and factor model analysis.

Table 3. Factors' loadings in the measurement model

Factors	V1	V2	V3	V4	V5	V6
satisfaction of need for autonomy	.680	.618	.534	.582		
satisfaction of need for competence	.535	.644	.645	.613	.733	.691
satisfaction of need for relatedness	.541	.575	.572	.689	.674	.801
autonomous motivation	.737	.741	.675			
controlled motivation	.697	.526	.585			

Note: $p < 0.1$; V: observed variable; Variables with factor loading ≤ 0.5 were left out.

Table 3 shows that the measured variables were significantly loaded on their corresponding factors. Factor loadings ranged from .526 to .801. The cumulative variance contribution rate of the factors was higher than 50%, indicating that the observed variables were closely related to the factors by concept, and that it was suitable for confirmatory factor analysis. The goodness-of-fit tests of the five-factor data model were conducted using AMOS software. Indices of the goodness-of-fit tests were listed below (Table 4).

Table 4. Indices of goodness-of-fit tests

Indices	χ^2 (df)	NFI	IFI	TLI	CFI	RMSEA	AIC	BCC	ECVI
Result	380 (139)	.901	.964	.908	.960	.056	345.240	350.204	0.872

According to the joint criteria recommend by Hu and Bentler (1999), the data-model fit can be considered good. As shown, SRMR was .056, and CFI was .960, indicating that the factor structure based on SDT fit well with the collected data. Indices of goodness-of-fit tests also justified the validity of the questionnaire and the reliability of the measurement model. Therefore, further structural modelling analysis could be performed on the data.

3.2.2. Structural model analysis

The results of the SEM (see Table 5 and Figure 2) confirmed the four causal paths between satisfaction of the three psychological needs and two types of motivation: autonomy → autonomous motivation, relatedness → autonomous motivation, competence → controlled motivation, relatedness → controlled motivation. It is worth noting that satisfaction of need for autonomy had weak negative prediction to controlled motivation, as did satisfaction of need for competence to autonomous motivation.

Table 5. Standardized parameter estimates of the theorized causal paths in SEM

Path	<i>P</i>	Parameter Estimate	Description of causal effects
Autonomy → Auto motivation	.009	.461	Autonomous motivation would be enhanced 46% with 100% satisfaction of need for autonomy.
Competence → Auto motivation	.000	-.274	Autonomous motivation would be reduced 27% with 100% satisfaction of need for competence.
Relatedness → Auto motivation	.000	.608	Autonomous motivation would be enhanced 61% with 100% satisfaction of need for relatedness.
Autonomy → Ctrl motivation	.014	.241	Controlled motivation would be enhanced 24% with 100% satisfaction of need for autonomy.
Competence → Ctrl motivation	.000	-.452	100% satisfaction of need for competence would reduce controlled regulation by 45% and become more autonomous.
Relatedness → Ctrl motivation	.000	-.457	100% satisfaction of need for relatedness would reduce controlled regulation by 46% and become more autonomous.

Note : *p* <.05

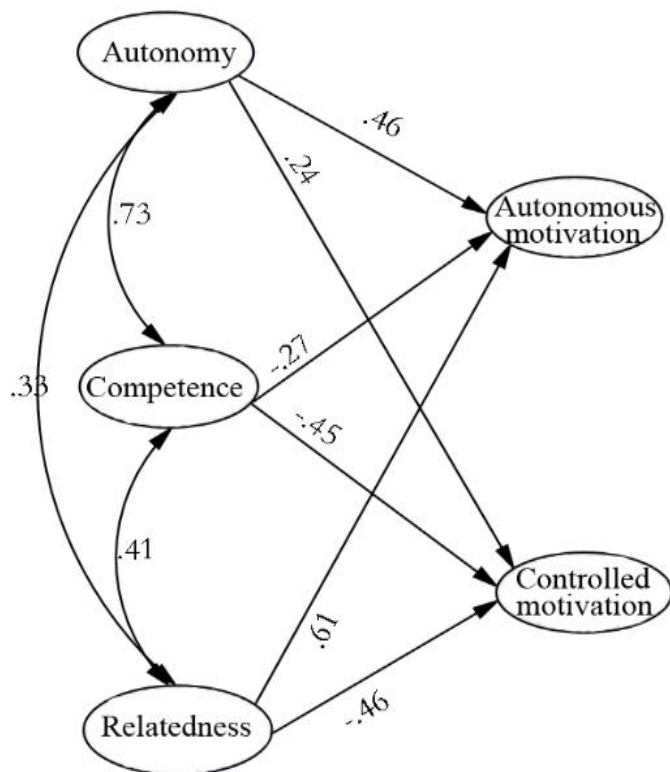


Figure 2. Hypothesized model examined in SEM

As shown in Table 5 and Figure 2, satisfaction of autonomy and relatedness could enhance learners' autonomous motivation in EFL learning, and satisfaction of competence and relatedness could facilitate the transformation of controlled regulation into autonomous regulation gradually. Additionally, the three psychological needs were correlated with coefficients .734, .406 and .332, which were consistent with the self-determination theory. Overall, the structural equation model in the study supported the major part of the third hypothesis. Unexpectedly, satisfaction of competence predicted negatively to autonomous motivation, whilst satisfaction of autonomy contributed to controlled motivation which made learners even more passive.

Chinese culture and instrumental motivation could account for the phenomenon. Most of Chinese students get used to following teachers' requirements, and they usually learn English as a subject for instrumental purposes. Therefore, they may have lost the enthusiasm to challenge English learning when they became competent to learn EFL. As for controlled learners who needed external rewards or constraints to push them to study, they were very likely to choose to stop learning when given full autonomy and freedom. These unexpected results reveal the noticeable influence of Chinese cultural factors on the applied study of SDT. These findings are in agreement with the survey results regarding the relationship between psychological need satisfaction and learning motivation.

4. Conclusion

The present study basically validates the correlation between satisfaction of the psychological needs and EFL learning motivation. This doesn't mean, however, that they are related to each other strongly and positively. Results of the descriptive statistics analysis suggest that satisfaction of learners' psychological needs for autonomy, competence and relatedness had positive prediction to their EFL motivation, but the theorized relationship between them was not fully supported. Results of the confirmatory factor analysis indicate that satisfaction of the psychological needs had different effects on the autonomous motivation and the controlled motivation. Specifically, satisfaction of autonomy and relatedness contributed to autonomous regulation; and satisfaction of competence and relatedness helped shift controlled regulation to autonomous regulation. Unexpectedly, satisfaction of competence had negative causal effect on autonomous motivation, and satisfaction of autonomy enhanced controlled motivation which made learners more passive. Therefore, studies on motivational strategies based on SDT should first identify learners' pre-existing motivation types, and then try to meet their psychological needs accordingly.

This study also reveals that cultural factors had noticeable influence on the applied study of SDT, which is primarily based on western culture. Western culture supports independent individuals, while Chinese culture advocates collectivism. This can help explain why Chinese EFL learners with either autonomous motivation or controlled motivation had a need for relatedness, which also proved that interactive and collaborative learning could effectively stimulate learning motivation (Lantolf, 2000). Additionally, the educational system and the EFL learning context in China resulted in instrumental motivation. As a result, satisfaction of need for competence had a different effect on autonomous or controlled motivation. Lastly, cultural factors made Chinese students' desire for autonomy not as strong as that of western learners. Admittedly, autonomy is the core of autonomous learning, but "autonomy" by no means refers to individuals' inner control or helplessness (Deci, Koestner & Ryan, 1999). In reality, many Chinese autonomous learners enjoyed team work. As for Chinese EFL learners with controlled motivation, possession of authority over their actions is no guarantee that they have the power to determine how to exercise the authority properly (Buss, 2013). Consequently, studies on satisfaction of psychological needs and motivation based on self-determination theory should take cultural factors into consideration.

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