



Developmental trajectory of purpose identification during adolescence: Links to life satisfaction and depressive symptoms

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ARTICLE INFO

Keywords:

Purpose
Life satisfaction
Depression
Adolescence
Chinese
Growth curve model

ABSTRACT

Introduction: Whereas evidence has shown that a sense of purpose is linked to optimal adjustment, longitudinal work investigating the development of purpose identification as well as its effect on psychological functioning among non-Western samples during adolescence is needed. **Methods:** Three hundred and eighty-seven senior high school students (253 female, 65.37%; mean age = 15.76 years at the first investigation) from Taiwan completed surveys four times beginning in the fall of tenth grade and ending in the spring of eleventh grade with a six-month interval. Using self-ratings, purpose identification was evaluated in all four assessments and psychological functioning was examined through life satisfaction and depressive symptoms in the first and the last survey.

Results: Growth curve analyses revealed an increased slope in purpose identification over the first two years of high school, and such a trajectory was similar across boys and girls. Additionally, increases in purpose identification predicted enhanced life satisfaction and reduced depressive symptoms among both boys and girls. There was only one gender difference: The negative association between purpose identification trajectory and depressive symptoms was stronger for girls than for boys.

Conclusions: There is an increase in the development of identified purpose during middle adolescence among high school students in Taiwan. Such change not only promotes life satisfaction in adolescents but is also preventive of adolescent depression. As such, the current findings highlight the significance for adolescents to discover and commit to a purpose.

1. Introduction

Cultivating a clear sense of self has long been regarded as an important developmental task for adolescents; a smooth progress into adulthood requires a successful identity formation during adolescence (Erikson, 1968). In the past two decades, a construct closely tied to identity development—purpose—has gradually received more attention because of its particular significance for youth and emerging adults. In fact, purpose not only associates with one's identity status (Burrow, O'Dell, & Hill, 2010), but can also mediate the effect of identity on well-being (Burrow & Hill, 2011). Not surprisingly, while having purpose facilitates adaptation and resilience (Burrow & Hill, 2013; Malin, Liauw, & Damon, 2017; Malin, Morton, Nadal, & Smith, 2019), lack of purpose in life indicates a greater tendency toward maladjustment (Harlow, Newcomb, & Bentler, 1986; Okasaka, Nobuaki, Nakatani, & Fujisawa, 2008).

Although prior research has consistently pointed out the role of identifying a sense of purpose for optimal functioning (for a review, see Bronk, 2014), there are three issues with the current literature on purpose identification. First, much of the current insight

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on purpose is derived from samples of emerging or older adults. The development of purpose during adolescence deserves more exploration (Damon, Menon, & Bronk, 2003; Hill, Burrow, & Sumner, 2013). Second, findings on adolescents' purpose were often based on cross-sectional data. Longitudinal studies would further broaden our understanding of how adolescents develop purpose. Third, the majority of studies focusing on purpose were conducted in Western countries such as the United States. There is therefore a need to deepen our knowledge of purpose in other cultures. To address these issues, the present research aims to demonstrate the developmental trajectory of adolescents' purpose identification as well as its effect on psychological functioning by utilizing a four-wave longitudinal investigation among high school students in a non-Western society—Taiwan.

1.1. Purpose identification across adolescence

The subjective sense of one's life as purposeful varies between individuals and with ages. Indeed, evidence has suggested not many people can identify their purpose during adolescence: Among youth aged between 12 and 22, 20% had no purpose at all, 55% developed rudimentary life goals without real commitment or specific plans, and only 25% devoted themselves to a clear purpose in life (Damon, 2008). Nevertheless, the level of purpose identification could progress as people age. For example, the ratio of people with a purpose in life was greater for emerging adults than adolescents (Damon, 2008). Elders also scored higher on purpose than young people (Meier & Edwards, 1974; Reker, Peacock, & Wong, 1987).

Longitudinal designs are helpful in elucidating normative changes over time, yet so far there is a dearth of it in the research of purpose identification trajectory during adolescence. Though there were some studies examining the trajectories of another related construct—meaning—the findings are inconsistent. Whereas Kiang and Witkow (2015) found an increase in the presence of meaning among Asian Americans starting in their ninth or tenth grades and spanning four years, a stable trajectory of presence of meaning among Romanian ninth to twelfth graders over one year was observed by Negru-Subtirica, Pop, Luyckx, Dezutter, and Steger (2016). Even more notably, whether meaning and purpose are comparable is unclear given that the two constructs are different in terms of definition and component (e.g., Damon, 2008; Damon et al., 2003). Thus, research directly measuring the trajectory of adolescents' identification of purpose is necessary to precisely delineate its development.

1.2. The effect of identified purpose on psychological functioning

Leading a purposeful life not only benefits one's well-being, but also buffers against potential suffering. Indeed, studies have demonstrated that having identified a purpose in life was predictive of greater life satisfaction for adolescents and adults (Bronk, Hill, Lapsley, Talib, & Finch, 2009; Bronk, Riches, & Mangan, 2018; Burrow & Hill, 2011; Ryff, 1989). An inverse link between purpose identification and depressive symptoms was also supported by studies utilizing different purpose measures across various ethnic and demographic backgrounds of participants (Bronk et al., 2018; Liu, Shono, & Kitamura, 2009; Ryff, 1989; Ryff & Keyes, 1995; Scheier et al., 2006; Shek, 1992). For example, Shek (1992) found that perceived purpose of one's existence negatively associated with depression among Chinese between 11 and 20 years old. Altogether, individuals that have identified a purpose ought to display a more satisfactory and less depressive life. In this study, we explore the trajectory of purpose identification in relation to adolescents' psychological functioning in order to extend previous research and provide further evidence on this issue.

1.3. Gender issue

Findings on whether there are gender differences in purpose identification as well as its development and effect are uncertain. In terms of the level of identified purpose, it appears the inconsistent results of gender differences to date are related to the measures being used. For example, Damon et al. (2003) argued there was a propensity that gender differences occurred when the measures were generativity scales (McAdams, 2001), yet no difference appeared when the Life Attitude Profile (LAP; Reker & Peacock, 1981; Reker et al., 1987) was utilized. However, it seems there was less research comparing the developmental trajectory of purpose identification as well as its effect on psychological functioning between genders, though a few studies did demonstrate that men and women had different maladaptive tendencies when experiencing a lack of purpose. For instance, women were more prone to substance abuse while men were more likely to consider suicide in response to purposelessness (Harlow et al., 1986). In sum, to address the discrepancy and the paucity of the findings on gender difference in purpose identification, much work is still needed.

1.4. The present study

The primary aim of the study is to investigate the development of purpose identification and its links to psychological functioning during adolescence. An additional endeavor is to see whether the identified purpose trajectory as well as its effect on psychological functioning will be similar across adolescents of different genders. To address these issues, a longitudinal design by which four waves of surveys with approximately a six-month interval spanning two years was employed. Specifically, data collection was administered in the first two years of high schools in the fall (Wave 1) and the spring (Wave 2) of tenth grade, and the fall (Wave 3) and the spring (Wave 4) of eleventh grade.

Two features of the research should be noted. First, high school students were chosen as participants of the study because students must prepare for university education and solidify their future's direction during high school. Notably, the educational system renders the high school years a valuable time for studying purpose identification in Taiwan. In fact, Taiwanese high schools typically aim to strengthen students' competencies by focusing on fundamental subjects over their three academic years. After finishing the tenth

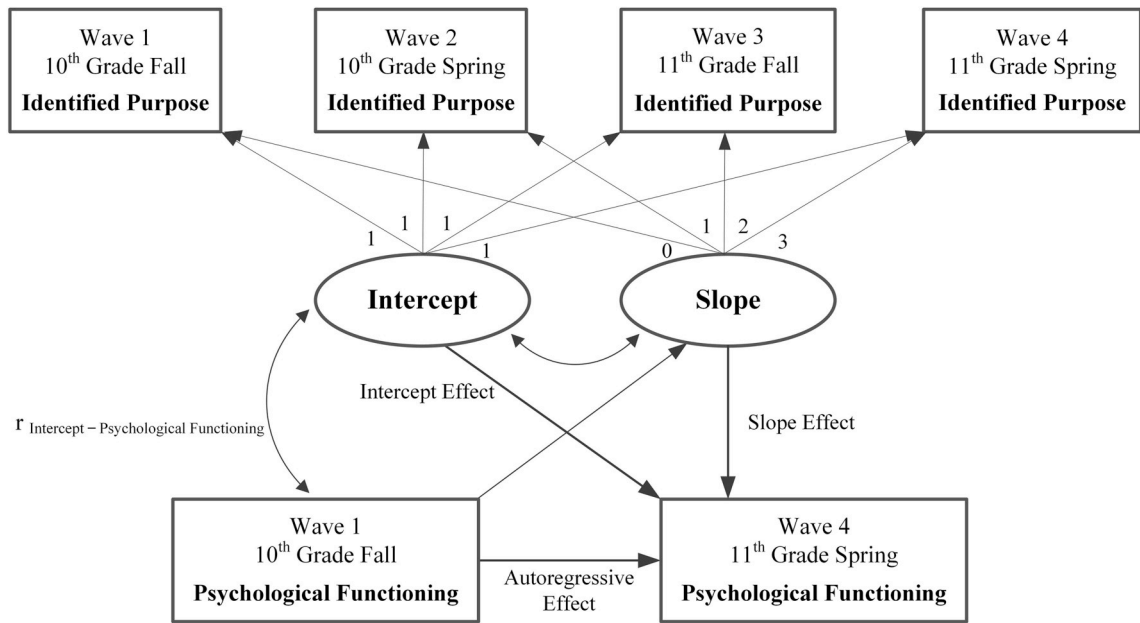


Fig. 1. Illustration of the models predicting adolescents' psychological functioning from the intercept and the slope of purpose identification, adjusting for adolescents' initial psychological functioning.

grade (i.e., the first year of high school) but before the eleventh grade (i.e., the second year of high school), students are required to decide whether they want to become science track or liberal arts track students. This is a big decision given that choosing a certain academic track influences the curricula students study in the following two years and may be indicative of their future major and career. For example, science track students take more courses on math, chemistry, physics, and/or biology, and thus are more likely to become computer science majors or engineers. Liberal arts students, in contrast, spend more time on language, history, and geography, and are therefore more likely to study law, the social sciences, business, etc. Accordingly, high school years serve as a transition for adolescents where clarifying their long-term goals and life purpose is critical.

Second, the study was conducted in Taiwan, a culturally Chinese society in East Asia. As earlier indicated, a clear sense of purpose has been regarded as an asset to optimal functioning (Bronk, 2014; Mariano & Going, 2011), but much of the evidence to date was provided by Western samples. That is, levels of, changes in, or effects of purpose in other cultures deserve further attention. As such, we started by studying the development of purpose identification and its longitudinal association with psychological functioning among adolescents in Taiwan.

Three hypotheses are proposed. First, we are interested in the developmental trajectory of purpose identification. As implied by much of the literature (e.g., Damon, 2008; Reker et al., 1987), we believe there will be an increase in identified purpose among adolescents during their high school years. Second, we test the effect of purpose identification on psychological functioning over the adolescence period studied. The effects on life satisfaction and depressive symptoms are analyzed in two different models. As shown in Fig. 1, adjusting for Wave 1 life satisfaction and depressive symptoms individually, we explore the effect of the initial level of purpose identification measured in Wave 1 as well as the effect the linear change rate of purpose identification across the four waves had on life satisfaction and depressive symptoms in Wave 4 separately. It is expected that both the initial level and the increased trajectory of purpose identification will positively predict life satisfaction and negatively predict depressive symptoms in Wave 4. Third, and related to the two hypotheses above, we examine purpose identification trajectory as well as its effect on life satisfaction and depressive symptoms by gender. We also investigate whether there are gender differences in the initial level and the linear change rate of purpose identification, as well as in all of the paths depicted in Fig. 1. Our speculation is that all estimates will hold significantly for both boys and girls, but we do not have a specific hypothesis regarding gender difference in each estimate.

2. Method

2.1. Participants

A total of 387 participants (253 female and 134 male; 65.37% and 34.63%, respectively) took part in a two-year longitudinal project of Adolescent Purpose Development in Taiwan. At the first wave of data collection, all participants were tenth graders with a mean age of 15.76 years ($SD = 0.31$). Specifically, the project was carried out within 14 classrooms at a public senior high school situated in a mid-sized city of Northern Taiwan. Students in the participating senior high school were from the located city as well as from more than 15 surrounding towns, and thus ranged from a variety of geographic backgrounds as well as socioeconomic statuses. In Taiwan, which high school students attend is determined predominantly by their academic performance on a high stakes

standardized test rather than by school district. Also, it is common for Taiwanese high school students to study at schools from 8 a.m. to 5 p.m. and to go to cram schools between 7 p.m. and 10 p.m.

2.2. Procedure

This study followed the guidelines of the university research ethics committee. Parental consent was obtained for all participants before data collection; overall, the response rate was 92%. As mentioned previously, there were totally four waves of data collection with six-month intervals: two waves during the fall (Wave 1) and the spring (Wave 2) of tenth grade, and another two during the fall (Wave 3) and the spring (Wave 4) of eleventh grade. These took place in November 2016, May 2017, November 2017, and May 2018, respectively. Data collection followed the same procedure in each wave: The questionnaire was administered by the homeroom teacher to the participants in their classroom within a single session of class time (i.e., 45 min). At the beginning of the session, a brief description of the research goal was provided and assents were obtained from all participating students. Participants were assured of the confidentiality of their survey responses and the voluntary nature of participation was emphasized.

2.3. Measures

Purpose identification was evaluated in all four waves of data collection. Psychological functioning was examined through two indicators—life satisfaction and depressive symptoms—and both were assessed in Wave 1 and Wave 4. All constructs were estimated through the same questionnaires using traditional Chinese at different time points. Given that all of our measures were created in English initially, we made a considerable effort to ensure the quality of our Chinese versions through a three-step procedure. First, a series of translations and back-translations was conducted by bilingual scholars of English and Chinese. Second, we invited a group of high school teachers to help us scrutinize the wording. Finally, all measures were administered through preliminary surveys with two samples of Taiwanese high school students. After ensuring that all measures possess satisfactory psychometric properties, we finalized all measures and then collected the data of the present study.

Identified purpose. Modifying the *commitment to purpose* subscale of the Revised Youth Purpose Survey (RYPS; Bundick et al., 2006), participants rated their purpose identification (e.g., “I have discovered a satisfying life purpose”) through 7 items on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). Higher scores represented greater identification of purpose.

Life satisfaction. Adapting from the Student's Life Satisfaction Scale (SLSS; Huebner, 1991), participants reported their global life satisfaction (e.g., “I like the way things are going for me”) through 7 items on a 4-point Likert scale (1 = strongly disagree; 4 = strongly agree). Higher scores suggested greater satisfaction in life.

Depressive symptoms. Using a 10-item short version Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), depressive symptomatology (e.g., “I felt sad”) was measured on a 4-point Likert scale (1 = never; 4 = always). Higher scores indicated greater depression.

Information on the means, standard deviations, and internal reliabilities of the measures among the entire sample and by gender in the current research are presented in Table 1.

3. Results

Three sets of analyses were conducted. First, we attempted to establish measurement invariance over the four waves of assessments among the entire sample and across participants of different genders. Second, we examined the developmental trajectories of purpose identification over adolescence among the entire sample and by gender. We also compared whether there are gender differences in such trajectories. Third, we investigated the effect of purpose identification trajectory on psychological functioning (i.e., life satisfaction and depressive symptoms) among the entire sample and by gender. We also compared whether there are gender

Table 1

Means, standard deviations, and internal reliabilities of the measures among the entire sample and by gender.

	Entire Sample			Boys			Girls		
	M	SD	α	M	SD	α	M	SD	α
Identified Purpose									
Wave 1	4.11	1.13	.92	4.25	1.07	.91	4.03	1.16	.92
Wave 2	4.32	1.10	.93	4.44	1.00	.91	4.26	1.15	.94
Wave 3	4.36	1.12	.93	4.51	1.08	.92	4.29	1.14	.93
Wave 4	4.37	1.08	.95	4.53	1.05	.95	4.29	1.09	.94
Life Satisfaction									
Wave 1	2.60	.73	.92	2.68	.67	.91	2.55	.75	.93
Wave 4	2.55	.71	.94	2.65	.68	.94	2.49	.72	.95
Depressive Symptoms									
Wave 1	1.83	.51	.87	1.73	.51	.87	1.88	.51	.87
Wave 4	1.90	.53	.90	1.80	.54	.91	1.95	.52	.89

Note. Wave 1 = fall of tenth grade; Wave 2 = spring of tenth grade; Wave 3 = fall of eleventh grade; Wave 4 = spring of eleventh grade.

differences in these effects.

All analyses were conducted using structural equation modeling (SEM) by Mplus 8 (Muthén & Muthén, 1998–2017), which implements Full Information Maximum Likelihood (FIML) estimation for handling missing data. To evaluate individual SEM models, a Root Mean Square Error of Approximation (RMSEA) less than 0.08 and a Comparative Fit Index (CFI) as well as a Tucker-Lewis index (TLI) greater than 0.90 were considered an acceptable fit (McDonald & Ho, 2002).

3.1. Measurement invariance

For each measure, sets of confirmatory factor analyses (CFA) using SEM were carried out to evaluate longitudinal and cross-gender measurement invariance. The individual items of a measure were used as indicators for the latent construct of that variable in the CFAs. In all CFA models, each latent construct with their correspondence at different waves were allowed to correlate. The error term for each indicator with their correspondence at different waves were also allowed to correlate in order to address first-order autocorrelated error (Vandenberg & Lance, 2000). Longitudinal measurement invariance was examined among the entire sample first and then within boys and girls individually; additionally, two-group CFAs were used when testing cross-gender measurement invariance. For both longitudinal and cross-gender measurement invariance, we attempted to reach metric and scalar invariance given that the former allows valid comparisons of the associations between constructs and the latter permits formal comparisons between means (e.g., Widaman & Reise, 1997). A series of comparisons based on nested models between unconstrained and constrained models were made for estimating both longitudinal and cross-gender measurement invariance. For metric invariance, the factor loadings of the same indicators were forced to be equal in the constrained models, whereas the factor loadings of the same indicators were freely estimated in the unconstrained models. For scalar invariance, while the factor loadings and the intercepts of the same indicators were both forced to be equal in the constrained models, the intercepts, but not the factor loadings, of the same indicators in the unconstrained models were freely estimated. According to Chen (2007), invariance is evidenced by a change less than 0.010 in CFI and a change less than 0.015 in RMSEA.

Longitudinal Measurement Invariance. For all of the three measures, we examined over-time invariance among the entire sample and within boys and girls, separately. The unconstrained models (RMSEAs < 0.08, CFIs > 0.92, TLIs > 0.91) and the constrained models (RMSEAs < 0.08, CFIs > 0.91, TLIs > 0.91) all fit the data adequately. Moreover, changes in RMSEA and CFI were all less than 0.010. Therefore, all measures possessed metric and scalar invariance across the waves for the entire sample as well as for participants of either gender.

Cross-Gender Measurement Invariance. For all of the three measures, we also examined invariance across boys and girls. The unconstrained models (RMSEAs < 0.08, CFIs > 0.92, TLIs > 0.92) and the constrained models (RMSEAs < 0.07, CFIs > 0.92, TLIs > 0.92) all fit the data adequately. In addition, changes in RMSEA and CFI were all less than 0.010. Consequently, metric and scalar invariance across participants of both genders were established for all measures.

3.2. Trajectories of purpose identification

Changes in purpose identification during the period of adolescence were first explored with growth curve modeling for the entire sample. There are two correlated latent constructs, the intercept and the slope, in the growth curve model. The factor loadings of the intercept at the four waves were all fixed to 1 and the factor loadings of the slope at the first to the fourth wave were fixed to 0, 1, 2, and 3, respectively. In this way, the intercept reflects the initial level of identified purpose when the study began in Wave 1; the slope indicates the linear rate of change in identified purpose across the four waves. Results from 10,000 bootstrap resamples of the growth parameters of purpose identification among the entire sample are shown on the left of Table 2. On average, there is a significant linear increase in purpose identification across the first two years of high school (slope = 0.08, SE = 0.02, $p < .001$). The model fit the data acceptably (RMSEA = 0.07, CFI = 0.99, TLI = 0.98).

Next, purpose identification trajectory for boys and girls were estimated through a two-group growth curve model. To test whether there were differences in the intercept and the slope between boys and girls, sets of two-group nested models between the baseline models in which the intercept or the slope were freely estimated and the constrained models in which the intercept or the

Table 2
Trajectories of purpose identification among the entire sample and by gender.

	Entire Sample		Boys		Girls	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept						
Mean	4.17***	.06	4.30***	.09	4.10***	.07
Variance	.96***	.10	.78***	.15	1.04***	.12
Slope						
Mean	.08***	.02	.09**	.03	.08***	.02
Variance	.05***	.01	.06**	.02	.05**	.02

Note. Estimates for the intercept and the slope are in unstandardized form.

** $p < .01$. *** $p < .001$.

Table 3

Estimates for each path among the entire sample and by gender.

	Entire Sample		Boys		Girls	
	Estimate	SE	Estimate	SE	Estimate	SE
Life Satisfaction						
1 Intercept Effect	.33***	.08	.35**	.13	.33*	.13
2 Slope Effect	.49***	.10	.43**	.14	.55**	.20
3 Autoregressive Effect	.48***	.07	.42***	.12	.52***	.13
4 W1 Life Satisfaction → Slope	-.21*	.10	-.17	.14	-.25	.13
5 r Intercept–Psychological Functioning	.48***	.05	.44***	.08	.49***	.06
Depressive Symptoms						
1 Intercept Effect	-.14*	.06	-.08	.09	-.20	.14
2 Slope Effect	-.40***	.08	-.24*	.12	-.52**	.17
3 Autoregressive Effect	.59***	.05	.60***	.08	.56***	.08
4 W1 Depressive Symptoms → Slope	.05	.08	.02	.12	.07	.11
5 r Intercept–Psychological Functioning	-.42***	.05	-.33***	.09	-.46***	.06

Note. All estimates are in standardized form. W1 = Wave 1—fall of tenth grade. r Intercept–Psychological Functioning represents the correlation between the intercept of purpose identification and life satisfaction or depressive symptoms in Wave 1.

* $p < .05$. ** $p < .01$. *** $p < .001$.

slope were forced to be equal across boys and girls were compared. A significant chi-square difference ($\Delta\chi^2$) relative to its degrees of freedom between the baseline and the constrained models suggested a gender difference in the intercept or the slope.

Results from 10,000 bootstrap resamples of the growth parameters of identified purpose by gender are shown in the middle and the right of Table 2. The two-group growth curve model indicated that the results were similar to that among the entire sample—the significant linear increase in purpose identification across the four waves applied to both boys (slope = 0.09, $SE = 0.03$, $p < .01$) and girls (slope = 0.08, $SE = 0.02$, $p < .001$). The model fit the data adequately (RMSEA = 0.07, CFI = 0.99, TLI = 0.99). Moreover, model comparison through chi-square difference tests revealed that there was no significant difference in the initial level of purpose identification in Wave 1 between boys and girls since the intercept-constrained model (RMSEA = 0.06, CFI = 0.98, TLI = 0.98) and the baseline model (RMSEA = 0.06, CFI = 0.99, TLI = 0.98) fit similarly well ($\Delta\chi^2 = 2.78$, $p > .05$). There was also no significant difference in the linear change rate of purpose identification across the four waves between boys and girls since the slope-constrained model (RMSEA = 0.05, CFI = 0.99, TLI = 0.99) and the baseline model fit similarly well ($\Delta\chi^2 = 0.02$, $p > .05$).

3.3. The effect of identified purpose on psychological functioning

Presented on the left of Table 3, results from 10,000 bootstrap resamples found significant intercept and slope effects in predicting psychological functioning among the entire sample. Specifically, both the initial level ($\beta = 0.33$, $p < .001$) and the linear change rate ($\beta = 0.49$, $p < .001$) of purpose identification were predictive of adolescents' heightened life satisfaction in Wave 4, adjusting for life satisfaction in Wave 1. The model fit the data acceptably (RMSEA = 0.05, CFI = 0.99, TLI = 0.99). Conversely, both the initial level ($\beta = -0.14$, $p < .05$) and the linear change rate ($\beta = -0.40$, $p < .001$) of purpose identification predicted fewer depressive symptoms in Wave 4, adjusting for depressive symptoms in Wave 1. The model also fit the data adequately (RMSEA = 0.05, CFI = 0.99, TLI = 0.99).

Results from 10,000 bootstrap resamples of the two-group analysis investigating the effect of identified purpose on psychological functioning by gender are shown in the middle and the right of Table 3. Among boys and girls, both the initial level ($\beta = 0.35$ for boys and 0.33 for girls, $ps < .05$) and the linear change rate ($\beta = 0.43$ for boys and 0.55 for girls, $ps < .01$) of purpose identification were predictive of heightened life satisfaction in Wave 4, adjusting for life satisfaction in Wave 1. The model fit the data acceptably (RMSEA = 0.07, CFI = 0.98, TLI = 0.97). However, adjusting for depressive symptoms in Wave 1, the linear change rate of purpose identification was predictive of fewer depressive symptoms in Wave 4 across genders ($\beta = -0.24$ for boys and -0.52 for girls, $ps < .05$), yet the effect of the initial level of purpose identification became non-significant for both genders ($\beta = -0.08$ for boys and -0.20 for girls, $ps > .05$). The model also fit the data adequately (RMSEA = 0.05, CFI = 0.99, TLI = 0.99).

Sets of two-group nested models were further conducted to explore whether any of the paths in the models differed between boys and girls. A gender difference in each path was evaluated by comparing baseline models in which all parameters were freely estimated (RMSEAs < 0.07 , CFIs > 0.98 , TLIs > 0.97) to the constrained models in which each path was forced to be equal across genders (RMSEAs < 0.06 , CFIs > 0.98 , TLIs > 0.97). Results of chi-square difference tests suggested that the effects of all paths did not differ between boys and girls ($\Delta\chi^2$ s < 1.79 , $ps > .05$), with the only exception being the path predicting depressive symptoms in Wave 4 from the linear change rate of purpose identification—the slope effect on depressive symptoms were significant for both genders but was greater for girls than for boys ($\Delta\chi^2 = 6.64$, $p < .05$).

4. Discussion

The aims of the study were, first, to describe how high school students' purpose identification develops with age; second, to

examine the effect of purpose identification on two psychological functioning indicators—life satisfaction and depressive symptoms; and third, to clarify whether there were gender differences in the development and the effects of identified purpose. Findings revealed that there was an increase in purpose identification over the first two years of high school on average, and that the trajectory was similar across boys and girls. More importantly, increases in purpose identification predicted enhanced life satisfaction and reduced depressive symptoms among both boys and girls. Only one gender difference was found: The negative association between purpose identification trajectory and depressive symptoms was stronger for girls than for boys.

Previous cross-sectional research indicated that people may become more purposeful from middle adolescence. For example, Reker et al. (1987) demonstrated that the purpose scores for adolescents between 17 and 19 were lower than emerging adults and older. Meier and Edwards (1974) also showed participants between 16 and 29 scored lower on purpose than participants of older age groups. Although such work provides information on the purpose state among people of different developmental stages, the cross-sectional nature and/or broader age ranges prevent us from delineating the average development of purpose among participants over a specific period of time. Different from previous studies, the present work illustrates the developmental changes of purpose among the same participants by means of a longitudinal design in combination with the use of growth curve modeling. Our focus on the first two years of high school also allows us to provide evidence of the increased trajectory of purpose during middle adolescence. However, given that there is a modicum of work examining purpose development, the increase of identified purpose showed in the current research warrants future corroboration.

Remarkably, although the significant slope effect of purpose identification over the first two years of high school on depressive symptoms in the spring of eleventh grade was evident for the entire sample and across genders, the significant intercept effect of purpose identification in the fall of tenth grade on depressive symptoms no longer existed when the entire sample was split into boys and girls. This may suggest that an increasing pattern, in contrast to the initial level, of purpose identification could be more stable and crucial in predicting adolescents' psychological functioning over time. As such, being aware of their own purpose at a particular point may not be sufficient—thoroughly discovering and continuously committing to a meaningful purpose appear to hold greater significance in the lives of adolescents.

Taken together, the present findings shed light on the importance for adolescents to discern their purpose progressively. Indeed, adolescents who gained purpose during their high school years are able to materialize their general goals into specific career roles (Malin, Reilly, Quinn, & Moran, 2014), and such processes seem to be conducive to more life satisfaction and less depression. Hence—while it is critical for adolescents to engage in self-exploration and to form the contours of their own life purpose—efforts to monitor the implementation plans and acquire strategies to attain one's ultimate goals should also be highlighted (Shin & Steger, 2014) in order to give a clear way forward for a sustained development of purpose.

The only gender difference appeared in the effect of purpose identification trajectory on depressive symptoms, with the negative prediction more evident for girls than for boys. Such findings may imply that the buffering role of increased purpose identification on depression is stronger for girls than for boys. However, there is little research observing such results previously, to the best of our knowledge. As such, the more salient effect of purpose identification trajectory on girls' depressive symptoms needs to be validated. More importantly, the mechanisms underlying this gender difference also require further clarification, if the difference is indeed replicable.

5. Limitations and future directions

Several limitations should be considered. First, the sample of the current research was recruited solely from a high school in Northern Taiwan. Whether the results can generalize to adolescents of other backgrounds in Taiwan remains unknown. Second, we relied on adolescents' self-ratings for all studied variables. Although adolescents serve as fine informants for their own purposes, such exclusive use can result in potentially biased conclusions not only because desirable variables (e.g., purpose, life satisfaction) could be over-reported through self-reports (Gosling, John, Craik, & Robins, 1998), but self-ratings of behavioral and emotional problems (e.g., depression) also correlated weakly with other reporters such as parents, teachers, or trained workers (Achenbach, McConaughy, & Howell, 1987). Hence, our findings should be interpreted carefully and could be further strengthened by means of a multi-informant approach. Third, although our work across the first two years of high school supported an increase of purpose identification during middle adolescence, a wider span of the longitudinal design could delineate the long-term development more thoroughly.

Though our findings generally echoed the literature to date, more cultural and cross-cultural research on purpose identification trajectory are desired for at least two reasons. First, by requiring high school students to decide which programs they will study in, the system of academic tracks in Taiwan could precipitate adolescents' purpose identification particularly during the first two years of high school. Nevertheless, adolescents from other cultures may follow different educational systems. The findings therefore need to be validated in other cultures and samples. Second, research suggested the prevalence of purpose was different between the United States and East Asian countries, with Americans tending to cultivate a stronger sense of purpose than their counterparts in China (Shek, Hong, & Cheung, 1987) and Japan (Steger, Kawabata, Shimai, & Otake, 2008). But still, the answers to questions addressing cross-cultural comparisons on purpose development, such as whether adolescents of different cultures develop their purpose at the same pace, are unclear. To sum up, we believe that replications of our findings within other cultures and cross-cultural studies on purpose trajectory are both necessary.

Much more work on the association between purpose and various aspects of psychological functioning by gender is also needed. It is notable that, in addition to our results concerning the more prominent effect of purpose identification trajectory on depressive symptoms for girls, Harlow et al. (1986) also showed gender differences in the effect of purpose on substance abuse and suicide

ideation. Taken together, it seems purpose could have different effects on maladjustment indicators between males and females, but such arguments should be undergirded by more evidence. Moreover, while the positive role of purpose is believed to hold across genders, whether such strength will differ significantly between genders merits more attention.

Declaration of competing interest

None.

Acknowledgement

This work was supported by Ministry of Science and Technology, Taiwan (grant number: MOST 103-2410-H-003-048-SS3).

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