

Career-related goal pursuit among post-high school youth: Relations between personal control beliefs and control strivings

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Published online: 2 October 2011
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Abstract The present research reveals the bi-directional relationship between career-related control beliefs and strivings, and their predictive relationship with hours of gainful employment. Three waves of data of a longitudinal study of 532 graduating high school seniors from four ethnically diverse schools in the Los Angeles Unified School District were analyzed using structural equation modeling. The results show individuals' career-related personal control beliefs in effort and social connections, but not in ability or luck, were significantly predictive of career-related control strivings 1 year later. Thus, only personal control beliefs in causal factors that are contingent on an individual's primary control strivings to enact effects are predictive of active motivational engagement in pursuit of career-related goals. Regarding the inverse direction of influence (i.e., strivings predict beliefs), career-related control strivings were significantly predictive of career-related personal control beliefs in ability, effort, and social connections, but not luck, 1 year later. These results support the idea that active goal engagement creates an implemental mindset that optimistically biases individuals' beliefs in their personal control over causal factors relevant to attaining a pursued career-related goal. In addition, the results show that career-related control strivings, but not career-related personal control beliefs, are significantly

positively associated with the number of hours of gainful employment worked 1-year later, supporting a beliefs-strivings-outcome sequential relationship.

Keywords Agency · Control · Motivation · School-to-work transition

Introduction

The school-to-work transition is an important developmental milestone within the life-course. During this transition, educational and occupational experiences and skills acquired throughout adolescence are invested into entering a career (Shanahan et al. 2002). However, this transition has become increasingly individualized within cultures that rely on individual choice and capacity in regard to career selection, career pursuit, and career progress (Walther 2009). Older adolescents and young adults, moreover, are likely to be focused on multiple goals, such as establishing autonomy, completing their education, pursuing leisure activities, seeking self-actualization, obtaining material wealth, starting a family, and obtaining a career (Chang et al. 2006). Among these diverse goals associated with the transition to adulthood, an ethnically diverse sample of youths about to graduate from high school gave the highest priority to completing a postsecondary educational degree, closely followed by obtaining a career (Chang et al. 2006). Previous research on the school-to-work transition has investigated youths' expectations and aspirations (Chang et al. 2010; Schoon 2001; Schoon and Parsons 2002), as well as their developmental goals (Chang et al. 2006; Salmela-Aro et al. 2007; Nurmi et al. 2002). The present article expands upon this work by investigating the interplay of career-related personal control beliefs and control

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strivings, and their relationship with number of hours worked, during the school-to-work transition.

Career-related control strivings and personal control beliefs

Career-related control strivings constitute a combination of primary and secondary control strategies enacted in pursuit of obtaining a desired career. More specifically, career-related control strivings encapsulate selective primary control, selective secondary control, and compensatory primary control strivings. Selective primary control strivings involve attempts at controlling the environment through one's own direct action (Heckhausen et al. 2010; Heckhausen and Schulz 1995). Compensatory primary control strivings involve an individual's recruitment of external resources (e.g., help from others) to facilitate goal attainment. Selective secondary control strivings are multifaceted motivation-enhancing cognitions and include enhanced perceptions of the value of one's goal and of one's capacity to control goal attainment. These enhanced perceptions help an individual to stay committed to a goal despite distractions or unexpected difficulties.

Career-related personal control beliefs are the perceptions that one can control the attainment of a career goal through one's capacity to influence major causal factors, such as *effort, ability, luck, and social connections*.¹ For example, an endorsement of the statement "I have the skills I need to get the job I want" indicates that an individual believes that he or she can control their career-related goal attainment, in part, through his or her skills. It is important to note that the present research focuses on *prospective* personal control beliefs regarding the ongoing pursuit of career-related goals. This differs from other theories that focus on *retrospective* causal attributions for already occurred events (Russell 1982; Russell and McAuley 1986; Weiner 1985). The reasoning for this is two-fold. First, young adults during and after the transition out of high school have likely not encountered enough career-related outcomes to permit a reliable assessment of control over causal factors associated with retrospective accounts of career-related goals. Second, when considering the relationship between personal control beliefs and goals, prospective accounts are more likely associated with goal

pursuit, while retrospective accounts are more likely associated with goal choice (Skinner 1996).

Expectancies and values affect career choice and investment

In an industrialized society and individualistic culture such as the United States, the choice and pursuit of a career is a complex process. Eccles and Wigfield have proposed an expectancy-value model of achievement-related choices that can be used as a conceptual framework for understanding how youth come to choose and pursue a given career (Eccles 1994, 2005; Wigfield and Eccles 1992, 2000, Eccles and Wigfield 2002). This model implies that an individual will choose the career that has the highest combination of expected attainment and perceived value among the options that are perceived as available. In contrast to the traditional achievement-related expectancy-value model that identified value as an inverse function of expectancy (Atkinson et al. 1976), Eccles and Wigfield's expectancy-value model conceptualizes the value an individual associates with a given career choice as based on a complex web of influences deriving from personal characteristics (e.g., preferences for certain activities) and various social contexts (e.g., peer group, gender roles, parental expectations). Specific to the present study, we propose that individuals' personal control beliefs in regard to a given career path will influence their expectation for success within that career path. We also propose that high levels of personal control beliefs will engage individuals to direct their motivational energy in pursuit of career-related goals.

Further support for the importance of career-related personal control beliefs and control strivings during the school-to-work transition comes from research conducted by Schoon and colleagues using large-scale longitudinal data sets of British youth maturing into adulthood (Schoon 2001, 2007; Schoon and Parsons 2002). These researchers found that occupational attainment at the age of 33 was significantly related to individual factors at age 16, such as motivational commitment to attaining a career goal and a belief in one's overall ability, in the context of factors such as an individual's social background and gender (Schoon 2001; Schoon and Parsons 2002).

Personal control beliefs affect performance and performance affects beliefs

Beliefs about one's capacity to control an outcome develop through childhood and adolescence by way of a beliefs-performance feedback cycle that has been studied, and partly develops within the context of school achievement (Skinner et al. 1998). This cycle involves the relationship

¹ This conceptualization of personal control beliefs uses the framework introduced by Skinner et al. (1988) that differentiates between control, means-ends, and agency beliefs. "Agency" pertains to the individual, "means" refer to the methods of exercising control, and "ends" refer to the outcome toward which control is directed. The present research focuses on the agents-means-ends pathway, in that our interest lies in individuals' perception of their capacity to control the outcome of a career-related goal pursuit.

between beliefs in one's capacity to control an outcome through causal factors, and an individual's past, present, and future performance in domain-relevant outcomes. A belief about one's capacity to control an outcome through relevant causal factors promotes an individual's investment of motivational resources, or control strivings, to achieve the outcome (Schmitz and Skinner 1993). This increases an individual's commitment to the goal, and in turn increases the likelihood of goal attainment. Given a successful outcome, individuals are likely to develop enhanced beliefs about their capacity to control related outcomes in the future, and these beliefs then influence the next goal-directed pursuit.

Mirowsky and Ross' (2007) research supports the existence of a personal control beliefs-performance cycle. Using a longitudinal study of adults in the United States, the researchers examined adulthood trajectories of beliefs regarding personal control over positive and negative life events. Their findings show that personal control beliefs take diverging trajectories across adulthood, with higher educational attainment fostering higher baseline levels of personal control beliefs in young adulthood and leading to a continued increase of these beliefs throughout mid-life. These trajectories first show strong divergence during the school-to-work transition, as educational attainment becomes solidified and individuals move into their careers. This research supports the idea that the personal control beliefs-performance cycle continues into adulthood, and that the school-to-work transition is an influential phase in establishing an individual's adulthood trajectory of personal control beliefs.

Further evidence of the importance of career-related control strivings during the school-to-work transition comes from a longitudinal study of German youth (Haase et al. 2008). In this study the researchers found that youth who engaged in career-related goal pursuit during the school-to-work transition had higher well-being and positive affect, and for girls, this goal engagement was also associated with the actual attainment of a pursued apprenticeship. However, this research was performed in the context of the German apprenticeship system of vocational training, which is unparalleled in the United States (Hamilton 1990), and involves substantially greater transparency of employment potential but also much less permeability between different educational and career tracks (Hamilton 1994). The present study expands upon this previous work by investigating the interplay between career-related personal control beliefs and control strivings for United States youth, and these constructs' predictive relationship with the extent to which youth are involved in gainful employment (i.e., number of hours worked per week) after graduating from high school.

Control strivings affect personal control beliefs

Converging ideas and evidence for the influence of control strivings on personal control beliefs come from motivational research that addresses the implemental mind-set individuals adopt once they have decided on a goal (Achtziger and Gollwitzer 2010; Gollwitzer et al. 1990). An implemental mind-set refers to an optimistically-biased and task-focused state of mind that supports action planning and goal pursuit. Research has shown that individuals with an activated implemental mind-set show an enhanced view of their capacity to control a relevant outcome (Gollwitzer and Kinney 1989; Gollwitzer 2003). Goal engagement related control strivings reflect an implemental mindset, and as such can be expected to lead to optimistically enhanced personal control beliefs. However, this prior research was performed with an experimental methodology, and did not examine career-related domains. The present research provides an important addition to this prior research by examining the interplay between career-related control strivings and personal control beliefs during the school-to-work transition.

Personal control beliefs affect control strivings

Although personal control beliefs imply an individual's belief in his or her capacity to control a given outcome, the causal factors one endorses are likely to be differentially associated with control strivings. More specifically, it can be expected that personal control beliefs in causal factors that are directly contingent on an individual's primary control striving are likely to lead to increased goal engagement control strivings. This is because causal factors provide differential amounts of incentive for an individual to invest effort (selective primary control) or recruit help (compensatory primary control) to attain a career-related goal. The causal factors that most directly correspond to primary control strivings are *effort* (with selective primary control) and *social connections* (with compensatory primary control), and as such we expect these causal factors to increase goal engagement control strivings. Conversely, *ability* and *luck* exist independent of an individual's primary control striving. If individuals believe that their *ability* or *luck* will enable them to attain a career-related goal, there is not an increased incentive to invest effort or recruit help. Only if individuals believe that they have personal access to an important causal factor that is contingent on their primary control striving, will they be motivated to activate the causal factor via their primary control striving. Prior research examining the relationship between personal control beliefs and goal engagement within achievement-related domains has focused on the influence of retrospective attributions on academic

self-concept and related objective indicators in adolescence (Marsh et al. 1984; Marsh et al. 2005; Skinner et al. 1998). The present research expands upon this research by examining how personal control beliefs influence control strivings for post-high school youth in the career domain.

In addition, we expand on the notion of *social connections* as an important causal factor. Prior research has addressed “powerful others” as an external and uncontrollable causal factor (Skinner et al. 1998), an example of which is a teacher who affects school performance beyond the control of an individual child in the class. In the present research we include causal conceptions about *social connections* to others who can help or advise the individual with his or her career-related goals. These *social connections* can be expected to be goal-engagement promoting when individuals feel that they have personal access to this causal factor (Skinner et al. 1998). It is only in cases when individuals believe *social connections* are an important causal factor through which to attain a pursued goal, and at the same time do not believe they have access to these *social connections*, that this causal factor would inhibit goal engagement.

The present research uses the agency-means-ends version of the career-related causal factor *social connections*, and an endorsement of this indicates that an individual feels that this is an important causal factor that he or she has access to. We expect *social connections* to be goal-engagement promoting and lead to increased career-related control striving. Prior research supports this assumption within a US college graduating population in which an increase in social networking use was predictive of increased job search intensity (Song and Werbel 2007). The researchers suggest that social network ties serve to inform individuals of a broader range of jobs than they would experience alone, and in so doing outline possible paths toward acquiring these jobs. Other research utilizing qualitative methodology adds the insight that many of the contacts assist career-directed behavior by eliminating non-feasible and undesirable career fields (Mortimer et al. 2002). Furthermore, supportive relationships with parents and peers have been shown to facilitate adolescent’s career exploration (Kracke 2002). Thus, *social connections* can either directly support career entry (e.g., by helping to find a job), or play an important role by pointing out a feasible path toward career attainment that makes an individual better prepared to choose their career and establish an effective plan toward establishing that career.

Rationale for present study and presentation of hypotheses

The present study focuses on the bi-directional relationship between career-related personal control beliefs and control

strivings. In addition, we examine the influence of career-related personal control beliefs and control strivings on the number of hours of gainful employment that an individual works. We offer three groups of hypotheses, the first dealing with the influence of personal control beliefs on control strivings, the second dealing with control strivings as predictors of personal control beliefs, and the third dealing with the predictive nature of career-related control strivings on number of hours of gainful employment worked. The expected pattern of relationships is that personal control beliefs in causal factors (*effort* and *social connections*) that are contingent on an individual’s primary control striving will have a positive relationship with strivings for control of career-related goals. In contrast, causal factors (*luck* and *ability*) that are independent of an individual’s primary control striving will show no relationship to control strivings. Further, we expect that career-related control strivings will have a positive relationship with all aspects of personal control beliefs. Finally, we propose that an individual’s career-related control strivings will predict objective outcomes of their actual engagement in career-related goals, namely number of hours worked in gainful employment. Specifically, the present research tests the following hypotheses:

1. Individuals who report high career-related personal control beliefs in primary control contingent causal factors, *effort* and *social connections*, will report increased career-related control strivings 1 year later.
2. Individuals who report high career-related personal control beliefs in primary control independent causal factors, *ability* and *luck*, will not report increased career-related control strivings 1 year later.
3. Individuals who report high career-related control strivings will express beliefs in increased personal control of all causal factors (*effort*, *ability*, *social connections*, and *luck*) involved in career-related goal attainment 1 year later.
4. Career-related control strivings will be positively associated with number of hours of gainful employment that an individual is working 1 year later.

Method

Participants

The present study utilizes data collected from the first three waves of the Los Angeles Unified School District (LAUSD) longitudinal study of high school seniors (Chang et al. 2006). At the time of the first data collection, participants were within 1 month of graduating from high school. The second wave of data collection took place

roughly 1 year later, and the third wave took place 1 year after the second wave. Participants were recruited from four LAUSD schools representing an ethnically diverse sample from working and middle-class backgrounds. Approximately 81% of the recruited individuals, representing a total sample of 1,183 students, participated in the first wave of the study. Of these, a total of 532 (45%) participants had sufficient Time 1, Time 2 and Time 3 data for analysis. Only the participants who had completed the personal control beliefs and control strivings scales for Time 1 and Time 2, and reported whether they were working for pay and how many hours of gainful employment they were working at Time 3, were included in the present analyses.

Participants in the sample ($n = 532$) had a mean age of 17.71 years, $SD = 0.55$, at Time 1, and were 61.8% female. The sample included 55 (10.3%) participants who identified themselves as African American, 60 (11.3%) who identified themselves as Filipino, 50 (9.4%) who identified themselves as East and South East Asian, 102 (19.2%) who identified themselves as Mexican–American, 51 (9.6%) who identified themselves as Central & South American, 121 (22.7%) who identified themselves as White, 90 (16.9%) who identified themselves as other or multi-ethnic, and 3 (0.6%) who did not provide this information.

Procedure

One week prior to data collection, members of the research team distributed a study information sheet and parental consent forms to students in their classrooms. On the days of data collection students who agreed to participate in the study, and if they were a minor had obtained parental consent, were administered the questionnaire. Participants were compensated by entry into a lottery that awarded two \$20 gift certificates per class and two \$100 gift certificates per school. One year later participants were mailed a Time 2 survey, accompanied by a pre-paid return stamped envelope. Participants who responded to the second wave survey were compensated \$40. Two years after Time 1, participants were contacted by phone and asked to complete the Time 3 survey. Participants did not receive compensation for completing the Time 3 assessment.

Measures

Career-related personal control beliefs

Career-related personal control beliefs were measured using an 8-item scale, with two items each regarding *ability*, *effort*, *social connections*, and *luck*. These items were based on items from the agency beliefs subscale of

the Control, Agency and Means-Ends Brief Interview (CAMI) developed by Skinner et al. (1988) for the classroom context and modified to fit the context of career goals in the school-to-work transition. Participants were asked to indicate how much they agreed with each statement, on a 5-point scale with a value of 1 = *strongly disagree* and a value of 5 = *strongly agree*. Each set of personal control beliefs was summed independently to produce four separate career-related personal control belief scores, one each for *ability*, *effort*, *social connections*, and *luck*.

Personal control beliefs in *ability* to get a good job were measured with the following two items: “I have the skills I need to get the job I want.” and “My grades are good enough to find a good job.” These items had an *alpha* of 0.52 in wave 1 and 0.63 in wave 2 of the study. Personal control beliefs in *effort* to get a good job were measured with the following two items: “I will keep looking for the kind of job I want.” and “I will apply for as many jobs as I need to find a good one.” These items had an *alpha* of 0.60 in wave 1 and 0.59 in wave 2 of the study. Personal control beliefs in *social connections* regarding getting a good job were measured with the following two items: “I know the right people who can help me get a good job.” and “I can find a good job through contacts that I have.” These items had an *alpha* of 0.77 in wave 1 and 0.77 in wave 2 of the study. Personal control beliefs in *luck* regarding getting a good job were measured with the following two items: “My luck will not run out when I search for a good job.” and “I have enough luck to find a good job.” These items had an *alpha* of 0.62 in wave 1 and 0.68 in wave 2 of the study. Participants completed the career-related personal control beliefs scales during both Time 1 and Time 2 of the study.

Career-related control strivings

Career-related control strivings were measured using the Optimization in Primary and Secondary Control Scale for Occupational Goals (OPS) (Heckhausen and Tomasik 2002). The 11-item scale includes three items representing selective primary control strivings, four items representing compensatory primary control strivings, and four items representing selective secondary control strivings. These three types of control strivings are associated with goal engagement and constitute different ways in which individuals actively strive to control the outcome of their goal pursuit (Heckhausen et al. 2010). Participants were asked to indicate how much they agreed with each statement, on a 5-point scale with a value of 1 = *strongly disagree* and a value of 5 = *strongly agree*. The response-values for the eleven items were summed to construct the measure of career-related control strivings. Examples of items used to construct control strivings include: “If I run into difficulties

in my career, I will work harder to overcome them” (selective primary control); “When I think about my career, I try to be confident that I will be successful” (selective secondary control); and “If my career path is not going in the right direction, I will get help from others” (compensatory primary control). Participants completed these scales during both waves 1 and 2 of the study. The 11-item, career-related control strivings scale had an *alpha* of 0.81 in Time 1 and an *alpha* of 0.84 in Time 2 of the study.

Number of hours of gainful employment worked

During the Time 3 assessment, participants were asked whether they were working for pay. Those that were working for pay also provided the number of hours that they were currently working in an average week. Responses were later broken into four categories: those who were not working ($n = 162$), those who were working 1–20 h per week ($n = 164$), those who were working 21–34 h per week ($n = 90$), and those who were working 35 or more hours a week ($n = 116$). This was done to eliminate the unnecessary influence of extreme outliers on the upper end of the distribution while retaining these individuals in the analyses.

Potential moderators

Gender, ethnicity, parental education, and means-ends control beliefs were assessed and included as potential moderators. Parental education was measured as the highest level of education completed by either of the participant’s parents. Level of education ranged from less than high school through professional. For the purposes of this analysis parental education was broken into three groups: high school and less, 2-year degree, and 4-year degree or higher. Ethnicity was collapsed from its original 7-group structure into five groups representing Black, Asian, Latino/a, White, and other or mixed participants.

Data analytic plan

Data analysis proceeded as follows. Attrition analysis was first performed to examine differences on the independent and dependent variables of interest between individuals who remained in, and those who left the study between Time 1 and Time 3. Next, we examined mean level stability characteristics of the independent and dependent variables between Time 1 and Time 2, and the inter-item correlations among all variables. To test the hypotheses, a path-model using maximum-likelihood structural equation

modeling was examined. After conducting the path-analysis, gender, ethnicity, and parental education were examined for potential moderating effects on the structural equation model. These potential moderators were assessed as categorical variables in the structural equation model to enable an analysis of their moderating effects, instead of controlling for their potential effects by assessing them as continuous covariates.

Results

Attrition analysis

A one-way ANOVA analysis was performed comparing Time 1 personal control beliefs and control strivings of participants who remained in the study through Time 3 ($n = 532$) to those participants that were excluded due to attrition or incomplete data on the independent and dependent variables ($n = 644$). Mean levels of personal control beliefs in one’s *ability*, [$F(1, 1111) = 0.97, p = .325$], *effort* to attain career-related goals [$F(1, 1,105) = 1.54, p = .215$], *social connections* helpful in attaining career-related goals, [$F(1, 1,108) = 0.027, p = .870$], and *luck* related to attaining career-related goals, [$F(1, 1,108) = 0.54, p = .464$], did not significantly differ between the included and excluded participants. Nor did mean levels of control strivings significantly differ between the two groups, [$F(1, 1,176) = 0.13, p = .911$].

Descriptive statistics

The means and standard deviations of the key variables are presented in Table 1. Career-related personal control beliefs in *ability* significantly increased over the 1-year period, [$t(531) = 10.62, p < .01$]. Career-related personal control beliefs in *effort* significantly increased between Time 1 and Time 2, [$t(531) = 6.71, p < .01$]. Similarly career-related personal control beliefs in *social connections* significantly increased between Time 1 and Time 2, [$t(531) = 3.29, p < .01$]. Career-related personal control beliefs in *luck* did not change significantly between Time 1 and Time 2, [$t(531) = 1.18, p = .24$]. Career-related control strivings did not change significantly between Time 1 and Time 2, [$t(531) = 0.83, p = .41$].

The bivariate correlations of the key variables are presented in Table 1. The correlations between career-related personal control beliefs and control strivings significantly increased from Time 1 to Time 2 for *ability* [$Z = 2.62, p < .01$], and *effort* [$Z = 1.99, p < .05$], but not for *luck* [$Z = 1.34, p = .18$], or *social connections* [$Z = 1.91, p = .06$].

Table 1 Inter-item correlations among personal control beliefs and control strivings

Variable	1	2	3	4	5	6	7	8	9	10	Mean (SD)
1. Control strivings 1	1										4.37 (0.53)
2. Control strivings 2	0.35*	1									4.35 (0.56)
3. Ability beliefs 1	0.18*	0.11*	1								3.89 (0.87)
4. Ability beliefs 2	0.19*	0.33*	0.26*	1							4.34 (0.74)
5. Effort beliefs 1	0.34*	0.26*	0.33*	0.19*	1						4.20 (0.73)
6. Effort beliefs 2	0.17*	0.44*	0.17*	0.42*	0.31*	1					4.44 (0.64)
7. Contact beliefs 1	0.14*	0.17*	0.41*	0.19*	0.26*	0.13*	1				3.52 (1.01)
8. Contact beliefs 2	0.12*	0.25*	0.24*	0.45*	0.16*	0.33*	0.34*	1			3.68 (0.95)
9. Luck beliefs 1	0.16*	0.11*	0.51*	0.24*	0.32*	0.16*	0.45*	0.21*	1		3.58 (0.90)
10. Luck beliefs 2	0.10*	0.24*	0.24*	0.46*	0.12*	0.31*	0.26*	0.47*	0.30*	1	3.63 (0.91)
11. Hours worked 3	0.02	0.12*	−0.02	0.02	0.08	0.06	0.06	−0.02	−0.03	−0.01	18.28 (16.45)

* $p < .05$

Path-model

Structural equation modeling

The bi-directional relationship between career-related personal control beliefs and control strivings, and their association with Time 3 h of gainful employment worked were examined using the maximum likelihood estimation method with AMOS 18 (Arbuckle 2007). This methodology allows for the analysis of cross-construct relationships while controlling for within-construct correlation (Burkholder and Harlow 2003). By doing so, the use of cross-lagged structural equation modeling can approximate a ‘causal’ relationship between the tested variables. Further, this methodology allows for the analysis of the effects of moderating variables on the path-models.

To test associations a six-construct, three-wave, cross-lagged effect model was generated. Each Time 1 personal control belief (*ability*, *effort*, *social connections*, and *luck*) were examined for their association with their respective Time 2 counterpart, and Time 2 career-related control strivings using a cross-lagged effect model. Similarly, Time 1 career-related control strivings were examined for their association with their Time 2 counterpart, and with all Time 2 personal control beliefs. Time 2 career-related personal control beliefs and control strivings were assessed for their relationship with Time 3 number of hours of gainful employment worked. To control for the significant associations between personal control beliefs, the error variances of within-time personal control beliefs were allowed to covary in the model. Figure 1 shows the path model, which had good fit, $\chi^2(17) = 39.166, p = .002; GFI = 0.987, NFI = 0.969, CFI = 0.982, RMSEA = 0.050$. The specific hypothesis testing pathway coefficients are as follows.

Personal control beliefs in one’s *ability* at Time 1 were not significantly predictive of control strivings at Time 2, [$b(0.03) = -0.03, z = -1.16, p = .244$]. This result supports hypothesis 2. Control strivings at Time 1 were significantly predictive of personal control beliefs in *ability* at Time 2, [$b(0.06) = 0.23, z = 3.84, p < .001$]. This result supports hypothesis 3.

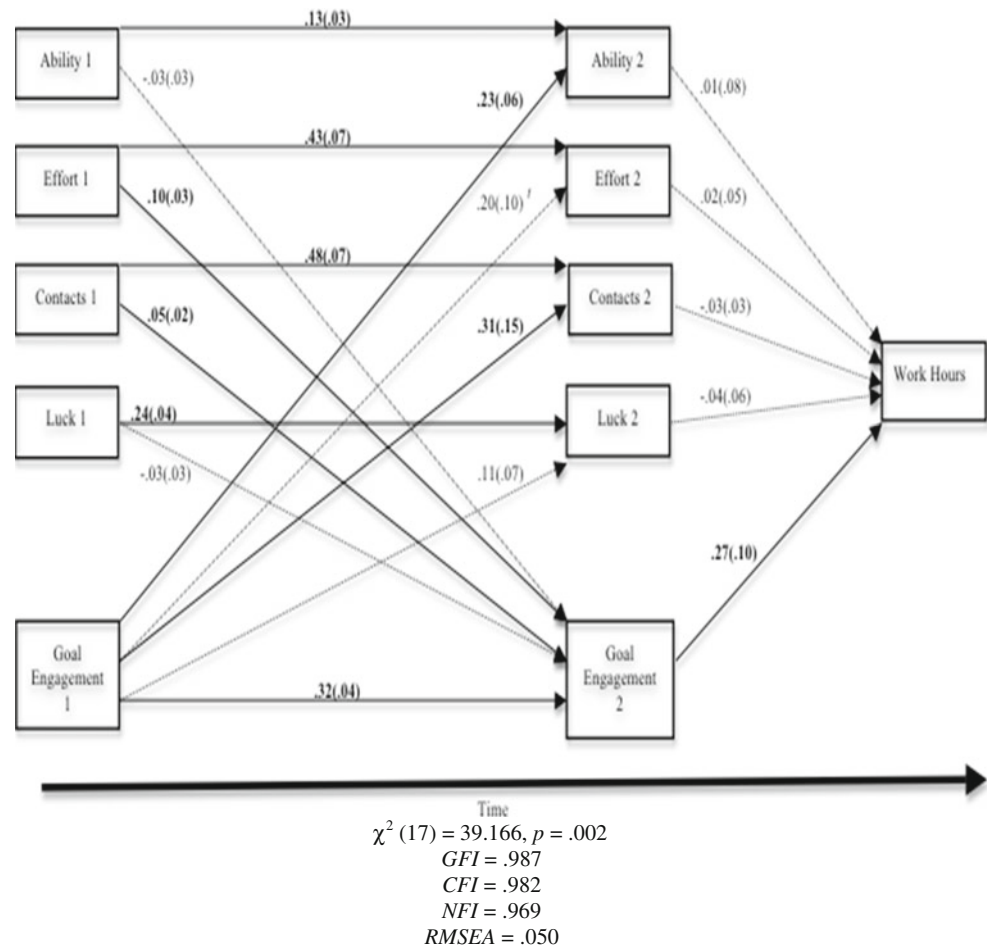
Personal control beliefs in one’s *effort* at Time 1 were significantly predictive of control strivings at Time 2, [$b(0.03) = 0.10, z = 3.17, p = .002$]. This result supports hypothesis 1. Control strivings at Time 1 were not significantly predictive of personal control beliefs in *effort* at Time 2, [$b(0.10) = .20, z = 1.91, p = .056$]. Although not significant, this result is trending toward significance and provides partial support hypothesis 3.

Personal control beliefs in one’s *social connections* at Time 1 were significantly predictive of control strivings at Time 2, [$b(0.02) = 0.05, z = 2.10, p = .036$]. This result supports hypothesis 1. Control strivings at Time 1 were significantly predictive of personal control beliefs in *social connections* at Time 2, [$b(0.15) = 0.31, z = 2.12, p = .034$]. This result supports hypothesis 3.

Personal control beliefs in one’s *luck* at Time 1 were not significantly predictive of control strivings at Time 2, [$b(0.03) = -0.03, z = -0.96, p = .337$]. This result supports hypothesis 2. Further, control strivings at Time 1 were not significantly predictive of personal control beliefs in *luck* at Time 2, [$b(0.07) = 0.11; z = 1.48, p = .140$]. This result does not support hypothesis 3.

Career-related control strivings at Time 2 were significantly predictive of hours of gainful employment worked at Time 3, [$b(0.10) = 0.27; z = 2.69, p = .007$]. This result supports hypothesis 4. No personal control belief was significantly predictive of hours of gainful employment worked at Time 3.

Fig. 1 Results for the structural equation model. The relationship between personal control beliefs at time 1 and time 2, and control strivings at time 1 and time 2 are depicted in a cross-lagged effect model, with time 2 personal control beliefs and control strivings predicting time 3 h worked. Unstandardized estimates are presented on the pathways with their respective standard errors in parentheses. Solid pathways depict statistically significant relationships at $p < .05$. t = trend level significance of $p = .056$



Moderator analysis

The structural equation path model was tested for possible moderating effects of gender, ethnicity, and parental education. Multigroup analysis for ethnicity did show a significant difference between the constrained and unconstrained models, $\Delta\chi^2 (264) = 352.77, p < .05$. After examining each cross-path, only allowing the path from career-related control strivings to personal control beliefs in luck to vary significantly increased the fit of the model, $\Delta\chi^2 (4) = 14.027, p < .05$. Specifically, individuals of Latino decent had a significant positive association, $b (0.12) = 0.38, p < .05$, while all other ethnic groups did not show a significant association. Multigroup analysis for parental education did show a significant difference between the constrained and unconstrained models, $\Delta\chi^2 (132) = 189.76, p < .05$. However, there was not a significant difference between the constrained and unconstrained models for any of the tested cross-paths. Regarding gender, multigroup analysis did not show a significant difference between the constrained and unconstrained models, $\Delta\chi^2 (66) = 75.145, p = .21$.

Discussion

As hypothesized, the present research found that high school seniors' career-related personal control beliefs in primary-control-contingent causal factors, specifically *effort* and *social connections*, predicted career-related control strivings 1 year later. Career-related personal control beliefs in primary-control-independent causal factors, specifically *luck* and *ability*, did not predict career-related control strivings. These results indicate that only career-related personal control beliefs in primary-control-contingent causal factors will lead an individual to extend motivational engagement to pursue career-related goals. The research also found support for the hypothesis that increased career-related control strivings optimistically biases beliefs that one has personal control over causal factors related to pursuit of career-related goals. In addition, career-related control strivings, but not career-related personal control beliefs, were significantly positively associated with number of hours of gainful employment worked. These relationships are discussed below.

Career-related personal control beliefs influence control strivings

We found that only personal control beliefs in primary-control-contingent causal factors (*effort* and *social connections*) motivate individuals to actively strive for control in pursuit of a given goal. When an individual feels he or she can attain a goal through personal access to a primary-control-contingent causal factor (*effort* and *social connections*), there is an increased incentive to direct control strivings in pursuit of a goal. This is because these causal factors are particularly responsive to, and contingent on, an individual's active motivational engagement. It is important to note that our conception of *social connections* as being contingent on an individual's primary control strivings is different from other researchers' conception of the related causal factor *powerful others*, which is generally seen as an external, and therefore, uncontrollable causal factor (Skinner et al. 1998). In the work of Ellen Skinner and her colleagues *the powerful other* is the teacher, whereas in our study it is a social connection that a person can activate to help them find a job in the career they aim for. We recognize that having such connections in the first place may only be partly controllable, albeit an individual can actively seek to make such connections over time (e.g., networking). However, the activation of existing social connections to help with one's job search is controllable and contingent on an individual's primary control strivings. We refer to these personal contacts as *social connections* to avoid confusion with these previous concepts of *powerful others*.

The effect on control striving and general motivational engagement is different in the case of causal factors that are independent of primary control striving. As in the case of *ability* and *luck*, when an individual feels that he or she can attain a goal through personal access to a primary-control-independent causal factor, there is no need to activate control strivings in pursuit of goal attainment.

Career-related control strivings influence personal control beliefs

As hypothesized, the present research found that career-related control strivings predicted career-related personal control beliefs in causal factors of *ability*, *effort*, and *social connections*. These results lend support to the concept that individuals who are actively engaged in pursuit of a goal optimistically bias their perceived belief that they are in control of causal factors relevant to goal attainment. This finding is consistent with the construct of functionally adapted motivational mind-sets. Within a goal engagement cycle it is possible to distinguish between two contrasting mindsets, deliberative and implemental, that differentially

affect personal control beliefs (Heckhausen and Gollwitzer 1987). The deliberative mindset, which operates before an individual chooses a goal, necessitates an unbiased assessment of personal control in order to effectively match an individual's aptitude with an appropriate goal (Gollwitzer and Kinney 1989; Gollwitzer 2003). In contrast, the implemental mindset, which occurs after an individual has chosen a goal, results in an optimistically biased assessment of personal control. This optimistically biased assessment of personal control serves as a form of selective secondary control that maintains motivational engagement in efforts to attain the pursued goal.

Personal control beliefs in *luck*, although explicitly linked to the participant's career progress did not show the expected optimistic bias. Perhaps possessing personal control over luck is not seen as an instrumental or viable means of acquiring career-related goals. If this is so, then individuals are not likely to experience an optimistically biased assessment of their luck when actively engaged in pursuit of a career-related goal. It may be that only personal control beliefs in causal factors that directly contribute to the outcome of goal pursuit are optimistically biased during motivational engagement. However, future research is needed to examine this relationship in greater detail.

Career-related control strivings predict hours of gainful employment worked

The present research found a significant positive association between career-related control strivings and the number of hours of gainful employment worked 1 year later. Interestingly, no such relationship was found for personal control beliefs. This is in line with the theoretically suggested causal relationship between beliefs, intentions, and outcome. According to our theory, career-related personal control beliefs (beliefs) influence career-related control strivings (strivings), which in turn influence the number of hours an individual works (outcome). Although personal control beliefs are influenced by control strivings, they are not directly related to outcomes, instead it is through control strivings that these personal control beliefs influence later outcomes.

While number of hours worked does not capture all aspects of an individuals' employment, we believe that for youth in the early years of the post-high school transition it is a valid objective indicator of their engagement in employment-related pursuits. As youth in the early years of the post-high school transition are not expected to be employed in jobs that are representative of their future career, other employment related variables such as job satisfaction and job type may not provide meaningful information. Additionally, many youth in our sample were

not employed ($n = 162$, 30.5%). While not working any hours is meaningful, these individuals' job satisfaction and job type would not be relevant. For these reasons, we view employment in the early post-high school years as a transitional indicator of individuals' employment-related engagement that is best captured by number of hours worked.

Limitations

One of the limitations of the present study was the reliance on only two time-points of data collection regarding personal control beliefs and control strivings. This limitation precluded the study of a complete cyclical relationship between career-related personal control beliefs and control strivings. Further, this limitation compromised the strength of the predictive associations analyzed by reducing the amount of available data. Future research using at least three distinct time points is needed to study the hypothesized cyclical relationship between career-related personal control beliefs and control strivings. The current study also has sample-based limitations, including the restriction of participants to graduating high-school seniors in Los Angeles area schools. Future research that includes individuals of the same age who did and did not graduate from high school, and were more nationally representative, would be useful in extending the present research findings.

Conclusion

Using an economically and ethnically diverse sample, this research illustrates the bi-directional relationship between young adults career-related personal control beliefs and control strivings during the school-to-work transition. Although individuals are likely to place varying emphasis on the different causal factors through which they believe they can control their career-related goal pursuit, the present research suggests that only personal control beliefs in causal factors that are primary-control-contingent (e.g., *effort* and *social connections*) are likely to lead to increased career-related control strivings. These results provide support for career-related attributional retraining interventions focused on promoting individuals' perceptions of goals as being attainable through their increased expenditure of effort (Luzzo et al. 1996; Jackson et al. 2009). In addition, the present research extends these previous studies by illustrating that *social connections*, as well as *effort*, are motivation-promoting causal factors and should be considered in future career-related attributional retraining interventions.

Regarding the influence of control strivings on control beliefs, active career-related control strivings were found to optimistically bias the amount of personal control an individual believes he or she has over causal factors instrumental in attaining career-related goals. The research also found a significant positive association between career-related control strivings and number of hours of gainful employment worked 1-year later. However, no significant association was found between career-related personal control beliefs and number of hours of gainful employment worked. These results illustrate a possible sequential relationship between career-related beliefs, intentions, and outcomes during the school-to-work transition.

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