Transporting into the Past and Future:  
A Triangular Framework of How Our Perceptions of the Past and Future Self Influence Current Motivation

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The purpose of this study was to investigate holistically how both perceptions of the past and future selves interact to influence current motivation. Participants \((N = 86)\) were asked to reflect on defining memories of their past from two different time periods, and completed a self-reported Likert scale on their positive perceptions of the past and agency. Independent raters coded the narratives for agency in the past. We also asked participants to complete the Next Year Possible Selves questionnaire (Oyserman et al., 2004), assessing their projections of who they expect-to-be and avoid-to-be in the future. Independent raters coded the total plausibility score after examining each possible selves category and balance score from the future. Current motivation was measured by Cold Pressor Task duration where participants were told a cover story that the experiment was about sensation to cold temperatures, so they were not aware of any connections between past and future selves in relation to present motivation. In general, and according to our triangular framework theory, the results provide support for the past and current motivation as well as the past and future selves. However, contrary to what was expected, perceptions of the future self seemed to not contribute to current motivation. Future direction for research and practical implications of these findings for temporal selves and motivation are discussed.

**Keywords:** motivation, temporal selves, past self, future self, agency

In the field of motivation literature, there has been recent, widespread interest in narrative accounts of identity. Such approaches (e.g., Söderlund et al., 2014; Oyserman, Bybee, Terry, & Hart-Johnson, 2004) suggest that individuals’ view of their self can serve either to motivate (move them to make effort in pursuit of goals) or amotivate (lead them to be less likely to exert effort in order to bring about desirable outcomes). In reflecting on current motivation, existing bodies of literature are prominently focused on two separate time periods—either the past or the future—to reflect on current motivation. In the current study, we explore the connections between our past memories, our idealized future selves, and measures of in-the-moment motivation. Our purpose is to explore how our perceptions of past and future selves interact together to influence the present self, or more specifically, current motivation.

**Motivation and Past Self**

Memories and ideas of who we were in the past have profound impacts on our understandings of selves in the present. One way in which scholars have explored the impact of past selves is by studying autobiographical memory (AM). AM is the recollection of past episodes and is closely linked to our effort to derive personal meaning from our past experiences and set goals for our future (Colman, 2015; Söderlund, Moscovitch, Kumar et al., 2014). Conceptualizations of a past self have been shown to facilitate goal pursuit by highlighting previous achievements and increasing motivation (e.g., Bender, Woike, Burke, & Dow, 2012). However, negative reflections on previous experiences may also serve to hinder goal attainment by decreasing motivation (Brittlebank, Scott, Williams, & Ferrier, 1993; Lempert, Speer, Delgado, & Phelps, 2017; Söderlund, Moscovitch, Kumar et al., 2014; Williams &
Broadbent, 1986). For instance, previous research has found that depressed patients recalled memories about the self differently than non-depressed individuals, specifically, as compared to non-depressed persons, suicidal patients evidenced longer retrieval latency for positive (vs. negative) memories in suicidal patients (Söderlund et al., 2014; Williams & Broadbent, 1986). Furthermore, individuals who were depressed demonstrated less specificity in their recall of emotional and positively (more than negatively) toned, autobiographical memories. The evidence suggests that people who are depressed tend to have distort perceptions of their past self in negative ways and thus have difficulties envisioning their future in a positive light (McNally, Lasko, Macklin, & Pitman, 1995).

The aforementioned findings are important to the current project because there is a lot of work that suggests that recollection of memories can alter future behavior. For example, Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum (1971) proposed an attributional theory of achievement motivation in which casual attributions for success and failure based on past performance were related to feelings as well as to both actual performance and expectations of future performance. In other words, people form attributions (i.e., a causal explanation for an event or behavior) for their own behavior and outcomes (Harvey & Martinko, 2009). For example, this model of achievement motivation particularly relates to individuals’ feelings on past performance because those high in achievement motivation felt the need to attribute their success to ability and effort and attribute their failures to lack of effort; on the other hand, those low in achievement motivation felt the need to blame their failures for lack of ability (Weiner & Kukla, 1970; Weiner & Potepan, 1970). Similarly, it relates to individuals’ actual performance and expectations of future performance. As noted by Diener and Dweck (1980), helpless children who view or expect their actions as irrelevant to subsequent outcomes do not tend to recognize or remember the extent of their previous success, whereas the mastery-oriented children tend to better remember their previous successes and emphasize motivational factors that credit their ability in achieving desired outcomes (e.g., “I am smart”). The way in which children remember and frame (i.e., attributing successes on ability rather than external causes such as luck) their previous successes seem to have an impact on their present motivation.

Such findings shed light on the evaluation of self. That is, attributing success to internal factors (e.g., “I am intelligent”) or avoiding attributing failure to internal factors rather than external factors (e.g., “I did not do well on the exam because I was not feeling well”) increases motivation to persist toward goals—viewing failure as surmountable.

These studies (e.g., Brittlebank et al., 1993, Lempert et al., 2017; Weiner et al., 1971) have shown us so far that there is a connection between our perceptions of past self and current motivation. But, what specific factor might have encompassed current motivation? We believe that agency, which is defined as people having control over their own actions, goals, environment, and overall their lives, is an important component of motivation (Bandura, 1989; McAdams & McLean, 2013; Welzel & Inglehart, 2010). People’s self-efficacy beliefs determine their level of motivation in overcoming arduous obstacles. That is, individuals with stronger beliefs in their capabilities (or control) are more persistent in their efforts since they exert greater effort to complete and master the challenge (Bandura, 1989). A robust sense of agency is needed to sustain persistent effort to succeed as we mentioned above in the attributional theory of achievement motivation (Bandura, 1989; Weiner et al., 1971).
Motivation and Future Self

In addition to reflecting on who we were, our actions can also be guided by an idea of who we want to be in the future. In the research on the future self, scholars have explored what has come to be known as “possible selves”. Possible selves are elements of the self-concept that represent the individual’s goals, motives, fears, and anxieties in imagined future states and circumstances (Markus & Nurius, 1986, 1987). For example, I am now a college student, but I hope to be a successful school psychologist. Possible selves can be viewed as motivational resources because individuals either want to strive toward a goal or avoid a threat in order to protect a desired image of “me” (Oyserman & Markus, 1990). From this perspective, motivation is thought to be contingent on the nature of the self-relevant structures that confer detailed, personal meaning. Such a view suggests that motivation is not fueled largely by impersonal or unconscious processes.

First, a possible self will have the greatest motivation outcome when there is a balance (i.e., having both expectations and fears of their future selves) in the same domain. This means that people who have both expected selves and feared selves in alike categories (e.g., academic or social spheres) will likely have more motivation because they are apt to desire to strive for their wanted selves and to avoid their feared selves. Oyserman & Markus (1990) found that unlike delinquent youth, non-delinquent youths were less likely to display balance between their expectations and fears (e.g., expectation: doing well in school versus fear: not doing well in school). This balanced self serves to motivate individuals to avoid their feared self and secure their expected self. Second, to sustain ongoing motivation, possible selves must be linked to behavioral strategies (Oyserman, Bybee, Terry, & Hart-Johnson, 2004). The more specific strategies are related to self-directed goals, the more likely they are going to be carried out. These researchers observed that youth with more self-regulatory academic possible selves (e.g., “Next year I expect to...go to high school (study and do good in the 8th grade), I will go to King High School (by turning in my high school application and preparing for the test”) were more apt to show signs of improving their grades, spending more time doing homework, participating in class more, and were less likely to be referred for summer school compared with their peers who have less self-regulatory academic possible selves. Feeling optimistic that the current self is mutable helps people to feel motivated to strive for goals; however, soon afterwards, the future self should have specific action plans to maintain success.

Possible selves are viewed as the components imperative for putting the self into action (Oyserman, Grant, & Ager, 1995; Oyserman & Markus, 1990; Oyserman, Bybee, & Terry, 2006). But what seems to be missing from this theory of possible selves is how the positive perception of a previous negative event (e.g., overcoming an obstacle early in life) could influence one's motivation.

Current Study

Though previous research has explored the role of either past experience or future hope on motivation, there is no current research that explores how these aspects of identity combine in a holistic way to inform motivation. We will examine how the tensions between the past and future self interact to influence an individual's current motivation by administering an interview on past memories (adapted from Kopelman, Wilson, & Baddeley, 1989, 1990; Peterson et al., 1982), the Next Year Possible Selves Questionnaire (Oyserman et al., 2004) with The Hope Scale (Snyder et al., 1991), and the Cold Pressor Task (adapted from Liu et al., 2013; Snyder et al., 2005; Verhoeven et al., 2010; von Baeyer et al., 2005) as a measure of subjects’ intrinsic motivation to persevere even in the face of uncomfortable circumstances. The project is based on the assumption that our sense of identity is not influenced either wholly
by our past or future self; but rather that human identity and motivation emerge out of a coherent integration of past and future oriented thoughts about the kind of people that we were and the kind of people that we could be. That is, the combination of both past and future self determines the strength of current motivation. We suggest, therefore, a triangular rather than a linear framework (i.e., past self or future self impacting motivation). Specifically, we formulated the following hypotheses:

**Hypothesis 1 (H1):** There are positive relationships and associations between the past self measures (i.e., positive perceptions of past memories, coded agency in the past, and self-reported agency in the past) and Cold Pressor Task time.

**Hypothesis 2 (H2):** There are positive relationships and associations between the future self measures (i.e., perceptions of agency in the future, perceptions of pathway to goals in the future, perceptions of total hope in the future, and possible selves total plausibility score) and Cold Pressor Task time.

**Hypothesis 3 (H3):** There are positive relationships and associations between the past self measures (i.e., coded agency in the past, self-reported agency in the past, and positive perceptions of past memories) and future self measures (perceptions of agency in the future, perceptions of pathway to goals in the future, perceptions of total hope in the future, possible selves total plausibility score, and possible selves balance score).

![Figure 1](image)

**Figure 1.** A triangular framework of how our perceptions of the past and future self influence current motivation.

**Methods**

**Sample**

86 undergraduate students (60 males, 26 females) from an east coast liberal arts college participated in this study. Students either received course credit or were compensated $10 for their participation. 10 respondents completed the past and future measures, but not the Cold Pressor Task due to health issues, and therefore only 76 respondents were analyzed in the final set for the Cold Pressor Task. The class year composition was 39.5% freshman, 41.9% sophomore, 9.3% junior, and 9.3% senior. The racial composition was 51.2% White, 20.9% Asian, 11.6% African American, 9.3% Hispanic, and 7% of other races.

**Measures**

**Cold Pressor Task (CPT).** The Cold Pressor Task (CPT) was used to assess participant’s current level of motivation to complete a task with no obvious reward (adapted from Liu et al., 2013; Snyder et al., 2005; Verhoeven et al., 2010; von Baeyer et al., 2005). The apparatus consisted of two insulated rectangular buckets (16.42 in. long x 12.87 in. wide x 5.90 in. high). One container was filled with warm water (36°C ± 1°C) and one was filled with cold water and ice (approximately 0-1°C). Participants were first told to wash their hands up to the mid-forearm with soap for preparation. The experimenter then marked 5 cm. above the participants’ non-dominant wrist, using an innocuous gel pen, so that arm submersion levels were the same.
across participants. During the baseline phase, participants were given instructions to put their non-dominant hand palm up (without making a fist) in the warm water, without movement, for two minutes to ensure that everyone started out at the same temperature. They then moved onto the CPT testing phase, where they transferred their non-dominant hand into the ice-water bath using the same arm and hand placement instructions. During the testing phase, participants were asked to keep their hands in cold water as long as they could, and to terminate the immersion when they could not tolerate the pain anymore.

Unknown to the participants, there was a maximum time limit of 4 minutes at which point they were asked to remove their non-dominant hand from the cold water (if they had not already done so). This immersion task time-out was used to ensure safety. Moreover, participants were pre-screened for health problems that might interact with the CPT (e.g., cardiovascular disease, fainting, seizures, frostbite, open cuts or sores on non-dominant hand, Reynaud’s phenomena, etc.).

Immediately, after the CPT, participants were asked to report their ratings on the level of pain experienced. There were two Likert scales with the endpoints (0) indicating ‘no pain or discomfort imaginable’ and (10) indicating ‘worst pain or discomfort imaginable.’ Subjective pain was assessed by the following two questions: “Recall the most intense and/or physically uncomfortable pain you have ever experienced. On a scale of 1-10, rate the level of pain of the experience you have just recalled.” and “Recall the test you have just performed in this lab. On a scale of 1-10, rate the level of pain you have just experienced.”

**Autobiographical Memory Interview (AMI).** An autobiographical memory interview (AMI) and questionnaire were given to assess participant’s reflection on their past selves (adapted from Kopelman, Wilson, & Baddeley, 1989, 1990; Peterson et al., 1982). Participants were asked to choose and verbally reflect on a single memory that has defined them from two life periods: early childhood (0 to 10 years of age) and adolescent-teenage years (ages 10 to the present). In selecting the life periods, we used the middle point of college students’ typical age. The following questions were inquired into: “Tell me about a memory that has defined you in the time period between 0-10 years” and “Tell me about a memory that has defined you in the time period between 10-now” (adapted from Kopelman, Wilson, & Baddeley, 1989, 1990).

Participants also completed close-ended measures after the Autobiographical Memory Interview. The first scale assessed participants’ perception of their previous memories from the AMI, asking them to rate whether “These particular memories have made a positive impact on my life (circle one number).” A seven-point Likert scale labeled “Not at all positive” (scored 1) to “Very positive” (scored 7) was used for responses. Higher scores indicated greater positive perception of past memories. Furthermore, self-reported agency was measured with the following question: “Is the cause of your particular memories due to something about you or to something about other people or circumstances (circle one number)” (adapted from Peterson et al., 1982). Response categories ranged from 1 (totally due to other people or circumstances) to 7 (totally due to me).

**Next Year Possible Selves.** The Next Year Possible Selves questionnaire was given to assess participant’s projections of who they hope to be in the future (previously used by Oyserman, Bybee, Terry, & Hart-Johnson, 2004). Using a written sheet, respondents were asked to generate expectations (“Next year, I expect...”) and concerns (“Next year, I want to avoid being/doing...”) for the upcoming year. Respondents also described any strategies for working toward their expected and away from
their feared or to-be-avoided next year possible selves (e.g., “For each concern or to-be-avoided self that you marked Yes, use the space at the end of each line to write what you are doing this year to reduce the chances that this will describe you next year”). This component of inquiring about participants’ ways of getting to their future goal was vital because some individuals may have had overly optimistic future selves and no plans of getting to their desired self and/or goals (e.g., someone who wants to be president but has no plans for how to accomplish this goal).

**Adult Hope Scale (AHS).** The Adult Hope Scale is a dispositional scale developed by Snyder, Irving, & Anderson (1991) to measure future hope via a combination of agency (i.e., belief in one’s capacity to initiate and sustain actions) and pathways (i.e., belief in one’s capacity to think of routes) to reach goals. The measure contained 12 items that participants responded to on an 8-point Likert-type scale ranging from 1 (definitely false) to 8 (definitely true). This self-report measure assessed pathway and agency thinking, which emerged as an overarching hope factor: four items measured pathway thinking, four items measured agency thinking, and four items were fillers. Possible scores ranged from 12 to 96, with higher scores indicating higher levels of hope. The scale has been found to be both temporally stable (test-retests of .85) and internally reliable (alphas of .74 to .88) (see Snyder et al., 1991 for review).

**Procedure**

Upon entering the lab room (in the waiting area), participants were given informed consent. Participants were then given a packet of questionnaires assessing demographic and health information (for the Cold Pressor Task) and then were randomly assigned to complete either the CPT first then AMI, or the AMI first then CPT to reduce order-effects.

To disguise the true purpose of the study, we constructed a credible cover story for why we wanted participants to put their hand in cold water. Participants were told that they were completing a sensory perception task instead of a CPT. During the CPT, participants were asked to sit on an adjustable height chair (for comfort when submerging hand into water) in front of a table. Participants were then run through the CPT as outlined above. To avoid social bias, the experimenter left the room and instructed participants to come out of the room when finished with the task. Participants were monitored by the experimenter in another room via an unobtrusive camera in the lab pointed at the participant’s arm. Seconds of immersion were coded offline using the video recording and a digital stopwatch.

Following completion of the CPT, participants were moved to an area of the testing room outfitted with sofas for completion of the AMI, close-ended past self measures, Next Year Possible Selves, and AHS, in that order. To maintain respondent confidentiality for the AMI, each student was interviewed separately. The respondent’s name was not attached to any of the interview material.

Interviewers were trained to elicit as much information as possible. For example, if participants were unclear in their responses or did not seem to fully answer the question, examiners asked them to clarify or asked follow-up questions using a semi-structured interview style (Drever, 1995). Participants were also capped at 5 minutes for each question on the interview for consistency among individuals. All interviews were recorded on the Philips Voice Tracer DVT600/00 and lasted between 8 to 10 minutes. Using McAdams’ agency coding scheme (2002), three coders, who had achieved at least 95% agreement with the expert scoring on practice materials and were blind to all identifying information on the participants, independently rated the salience of agency in accounts of past memories. Each episode was coded for the presence (score +1)
or absence (score 0) of agency themes. The four agency themes are: 1. Self-Mastery (SM), 2. Status/Victory (SV), 3. Achievement/Responsibility (AR), and 4. Empowerment (EM). An agency score for a particular memory was the sum of the four agency themes in that memory, ranging from a minimum score of 0 (no agency themes in that memory) to a maximum score of 4 (containing all agency themes in that memory). Scores from each episode (in this case, a memory from 0-10 years old and a memory from 10-present) were averaged to calculate total agency score. Scoring reliability was calculated in two ways — category agreement and total score correlations — and coders reached agreement about differences (difference occurred in 5% of the cases).

Participants were then given a questionnaire packet, which included the following: close-ended past self measures (adapted from Peterson et al. 1982), Next Year Possible Selves (Oyserman, Bybee, Terry, & Hart-Johnson, 2004), and AHS (Snyder, Irving, & Anderson, 1991). The experimenter briefly explained each measure in this packet and how to adequately complete them (e.g., for the questions about next year I expect to be and next year I avoid to be, they were reminded that they do not need to fill out all of the blanks, but only as it is relevant to them).

In regards to the Next Year Possible Selves measure, coders counted the number of possible selves and strategies for goals on the basis of self-regulation coding developed by Oyserman, Bybee, Terry, & Hart-Johnson (2004). There were six main categories of Next Year Expected and Feared Possible Selves: achievement (i.e., related to school and school interactions with teachers, achievement related activities), interpersonal relationships (i.e., involved family, friends, relationships, and social interactions, except with teachers), personality traits (i.e., related to personality characteristics, self-descriptions of traits), physical/health-related (i.e., related to physical/mental health, weight, and height), material/lifestyles (i.e., related to material possessions and living situations, including moving), and negative (i.e., included all negatively worded responses) (refer to Oyserman & Markus, 1990 for coding scheme). Each category had a score of 0 to 5. Scores of 0 was reserved for individuals with no strategies and only a single, vague possible self (or no possible selves at all). Scores of 5 was reserved for individuals with multiple possible selves and strategies for attaining goals (and avoiding feared selves). An example of a 5-level self-regulatory response is “Next year I expect to be productive (I am getting myself in a habit of working productively), focused (Getting distractions out of my life), and proud (Working with BSU). Next year I want to avoid being ignorant (Educating myself) and unconfident (Being positive towards myself).” Three independent coders blind to other responses each worked on a randomly assigned subset of the possible selves responses. After coding through the first round, responses were randomly selected to be double coded by two other coders; coders compared codes and came to a 95% agreement rate. Lastly, all participants were then debriefed, thanked, given credit or compensation of $10, and dismissed.

Results
Our main dependent variable of interest was Cold Pressor Task time because it was used as a measure of current motivation. Since the Cold Pressor Task time was strongly, positive skewed and was thus not normally distributed, we performed a logarithmic transformation for normality. A series of preliminary one-way ANOVAs were conducted to determine if Cold Pressor Task differed according to demographic breakdown including: gender, race/ethnicity, and class year. Results showed no significant effect for race/ethnicity and class year, but a significant difference of gender ($F(1, 74) = 8.470, p < .05$). Males were significantly more likely to
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submerge their non-dominant hand in ice-cold water for a longer period (2.0 seconds ± 0.3) than females (1.7 seconds ± 0.4), which is consistent with previous literature showing gender differences in the Cold Pressor Task (e.g., Back et al., 2005; Robinson et al., 2003; Snyder et al., 2005). These results suggest that males may have been fulfilling the male stereotype of being “strong”, while females may have been responding to the stereotype of being “sensitive.” Another potential reason could stem from hand size since skin area immersed in the ice-cold water affects pain tolerance (Snyder et al., 2005). In other words, males typically have larger hands than females so they could have endured the pain in the Cold Pressor Task for a longer period of time. As such, gender was included as a variable in subsequent analyses involving the Cold Pressor Task.

In order to explore the relationships and associations between reports of past, current, and future selves, a number of correlations and chi-square analyses were run. The results of these analyses are delineated below. Figure 2 presents an overarching summary of significant correlations in this triangular framework.

![Figure 2. Significant correlations of triangular framework. *p < .05](image)

**Past Self and Current Motivation**

To explore relationships among the various past self measures and Cold Pressor Task time, partial correlations controlling for gender were run. First, a Pearson’s partial correlation was run to assess the relationship between coded agency in the past and time in the Cold Pressor Task. Preliminary analyses showed the relationship to be linear with both variables normally distributed after logarithmic transformation on the Cold Pressor Task time, as assessed by Shapiro-Wilk’s test ($p < .05$), and there were no outliers. There was a small positive correlation between coded agency in past and time in the Cold Pressor Task, $r(76) = .204$, $p < .05$, with time in the Cold Pressor Task explaining 4.2% of the variance in past coded agency (see Figure 3). However, a second Pearson’s partial correlation found no significant relationship between positive perceptions of past memories and time in the Cold Pressor Task, and self-reported agency in the past and time in the Cold Pressor Task (all $ps > .05$). Taken together, these correlations suggest that although coded agency in the past related to the underlying current self-construct, positive perceptions of past memories and self-reported agency in the past are not tapping into present motivation.
In order to further explore this relationship between coded agency in the past and Cold Pressor Task time, we median-split each variable, creating two categories (high, low) for each. A chi-square test was used to determine whether there was an association between Cold Pressor Task duration (low duration, high duration) and coded agency in the past (low agency, high agency; Table 1). All expected cell frequencies were greater than five. There was a statistically significant association between Cold Pressor time and coded agency in the past, $\chi^2(1) = 5.077, p = .024$. There was a moderate association between Cold Pressor time and coded agency in the past, $\phi = .258, p = .024$. People who submerged their hand in ice-cold water for a long duration had high agency in their past compared to those who submerged their hand in ice-cold water for a short duration. Additional chi-square analyses were run broken out by gender, however, there was no significant effect between males and females (all $ps > .05$).

<table>
<thead>
<tr>
<th>Cold Pressor Task Time</th>
<th>AMI Coded Agency (Past)</th>
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<tbody>
<tr>
<td></td>
<td>Low Agency</td>
</tr>
<tr>
<td>Short Duration</td>
<td>18 (69.2%)</td>
</tr>
<tr>
<td>Long Duration</td>
<td>8 (30.8%)</td>
</tr>
</tbody>
</table>

*Note. $\chi^2 = 5.077^*$, df = 1. Numbers in parentheses indicate column percentages. $^*p < .05$

**Future Self and Current Motivation**

To assess relationships among the various future self measures and Cold Pressor Task time, partial correlations controlling for gender were examined. A Pearson’s partial correlation was run to assess the relationship between perceptions of agency in the future, perceptions of pathway to goals in the future, perceptions of hope in the future, possible selves plausibility, and time in the Cold Pressor Task. There was no significant relationship between any of the future selves measures and current motivation (all $ps > .224$). Furthermore, there were no significant chi-square associations between any of the future measures and current motivation. This
suggests that there was not as a strong relationship and/or association between future and current self as there was between past and current self.

**Past and Future Self**

To assess relationships among various self-concept measures used, partial correlations controlling for gender were examined. Of particular interest was the various past measures correlated with different future measures. A Pearson’s partial correlation was run to assess the relationship between coded agency in the past and perceptions of agency in the future. Preliminary analyses showed the relationship to be linear with both variables normally distributed, as assessed by Shapiro-Wilk’s test ($p < .05$), and there were no outliers. There was a small positive correlation between coded agency in past and perceptions of agency in the future, $r(86) = .202, p < .05$, with coded agency in past explaining 4.1% of the variance in perceptions of agency in the future (see Figure 4). Additional Pearson’s partial correlations found no significant relationship between the following variables: 1. agency in the past and perceptions of pathway to goals in the future; 2. agency in the past and perceptions of hope in the future; 3. agency in the past and possible selves plausibility; 4. positive perceptions of past memories and perceptions of agency in the future; 5. positive perceptions of past memories and perceptions of hope in the future; 6. positive perceptions of past memories and perceptions of hope in the future; and 7. positive perceptions of past memories and possible selves plausibility (all $ps > .087$).

![Figure 4. Relationship between coded agency in the past and perceptions of agency in the future. Pearson’s $r = .202$ and $* p < .05$.](image)

There was no significant chi-square association between coded agency in the past and perceptions of agency in the future (see Table 2). Similar analyses were run for positive perception of the past and perceptions of pathway to goals (see Table 3). All expected cell frequencies were greater than five. There was a statistically significant association between positive perceptions of past memories and perceptions of pathway to goals in the future, $\chi^2(1) = 5.657, p = .017$. There was an association between Autobiographical Memory Interview impact scores and Adult Hope Scale pathway scores, $\varphi = .256, p = .017$. Individuals with greater positive perceptions of their past memories had more perceptions of pathway toward their goals than individuals with less positive perceptions of their past memories. There were no further significant chi-square associations between other past self measures and future self measures: 1. AMI coded agency and AHS pathway; 2. AMI coded agency and AHS total hope; 3. AMI coded agency and possible selves total plausibility score; 4. AMI coded agency and possible selves balance score; 5. AMI self-reported agency and AHS agency; 6. AMI self-reported agency and AHS pathway; 7. AMI self-reported agency and AHS total hope; 8. AMI self-reported agency and possible selves...
total plausibility score; 9. AMI self-reported agency and possible selves balance score; 10. AMI impact and AHS agency; 11. AMI impact and AHS total hope; 12. AMI impact and possible selves total plausibility score; and 13. AMI impact and possible selves balance score.

Table 2
Results of Chi-square Test and Descriptive Statistics for Past Agency by Perceptions of Future Agency

<table>
<thead>
<tr>
<th>AMI Coded Agency (Past)</th>
<th>AHS Agency (Future)</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Low Agency</td>
<td>High Agency</td>
<td></td>
</tr>
<tr>
<td>Low Agency</td>
<td>13 (35.1%)</td>
<td>14 (28.6%)</td>
<td></td>
</tr>
<tr>
<td>High Agency</td>
<td>24 (64.9%)</td>
<td>35 (71.4%)</td>
<td></td>
</tr>
</tbody>
</table>

Note. $\chi^2 = .422$, df = 1. Numbers in parentheses indicate column percentages. *$p > .05$ (no significance)

Table 3
Results of Chi-square Test and Descriptive Statistics for Positive Perceptions of Past Memories by Perceptions of Future Pathway

<table>
<thead>
<tr>
<th>AMI Impact (Past)</th>
<th>AHS Pathway (Future)</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>Low Pathway</td>
<td>High Pathway</td>
<td></td>
</tr>
<tr>
<td>Low Impact</td>
<td>17 (50.0%)</td>
<td>13 (25.0%)</td>
<td></td>
</tr>
<tr>
<td>High Impact</td>
<td>17 (50.0%)</td>
<td>39 (75.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Note. $\chi^2 = 5.657^*$, df = 1. Numbers in parentheses indicate column percentages. *$p < .05$

Discussion
In this study, we sought to explore whether individuals’ perceptions of both their past and future selves influenced current motivation. In other words, does viewpoint of temporal (i.e., past, present, and future) selves affect motivation in-the-moment?

Past Self and Current Motivation
First, we compared the effects of Cold Pressor Task (CPT) time with those of high agency in the past and low agency in the past. As expected, participants differed in duration of arm submission on the CPT. Participants with high agency in their past (coded from their autobiographical interviews) were able to endure the pain from the ice-cold water for a longer period of time compared to participants with low agency in the past. When asked to recall a defining memory from their past, the more agentic individuals generated responses such as “I learned to not let others manipulate me after coming out of an emotionally toxic relationship” or “I started to make my own choices and not be dependent on my mom or dad, especially when my parents conflicting opinions worsened after their divorce” or “After working with refugees in Jordan, I realized that I could help them establish better health and education for them.” In contrast, low agentic individuals typically generated responses with a low sense of self-awareness or self-understanding, little significant recognitions among peers, barely feeling too confident in their abilities to achieve tasks or being in charge of things, and/or not empowered through someone or something
where the self becomes a more powerful agent of some sort. That is, those who felt that they had more control and influence over themselves, others, and the environment (McAdams & McLean, 2013)—or agency—had more motivation in the present to power through a difficult time.

This finding is consistent with previous work, which found that levels of agency should be related to motivation (e.g., Karsh et al., 2016; Lopes & Chambel, 2017). Specifically, according to self-determination theory (SDT), there are two central forms of motivation: autonomous motivation and controlled motivation (Deci & Ryan, 2008). Autonomous motivation is defined as someone who acts with freedom or is a self-chooser of their actions, while controlled motivation is defined as someone who behaves with an experience of pressure to think, act, or feel in particular ways due to external conditions, such as fulfilling other people’s expectations rather than one’s own—not self-endorsed in actions. From this self-determination theory, higher levels of autonomous motivation yield more desirable outcomes than controlled motivation, showing that agentic people perform better in-the-moment than non-agentic people (Deci & Ryan, 2000, 2008).

However, contrary to what was expected, there was no significant relationship between valanced perceptions of past memories (i.e., self-rating of how positive their autobiographical memories were) and current motivation. This may be due to demand characteristics. As Fisher (1993) noted “respondents are unwilling or unable to report accurately on sensitive topics for ego-defense or impression management reasons” (p. 303). The resulting outcome from this phenomenon may be unrepresentative answers or biased data toward socially desirable answers. Our study directly inquired respondents to rate on a scale from 1-7 how positive of an impact their past memories were, which could have influenced the results. Future studies should implement strategies to decrease the likelihood of participants “faking good” or “faking bad” such as using the Marlowe-Crowne Social Desirability Scale (1960), in conjunction with self-reported measures, or creating an indirect measure of positive perceptions toward one’s past (e.g., count the number of past positive feelings versus the number of past negative feelings from the Autobiographical Memory Interview). Moreover, in view of these findings, a previous study (e.g., Shipp et al., 2009) has suggested individuals who think of the past may not be pushed by positive attitudes toward the present time period.

Furthermore, some researchers have found that people tend to create false memories of their past (Loftus, 1997; Loftus & Pickrell, 1995; Meyersburg et al. 2009). Positive events can also be remembered with the same type of distortions as negative events, and it has been shown that positivity in valance can increase memory confidence (Kensinger & Schacter 2006). Thus, because individuals were questioned to recall how their past memories had made a positive impact on life, it is possible that we were inadvertently building space for false memories (i.e., where participants began to believe that their past memories were very positive or impactful to them). It would be particularly interesting in future studies to integrate the theoretical assumptions of false memories (Loftus, 1997; Zaragoza et al., 1996) in the past jointly with present motivation. In particular, asking whether the positive aspects of false memories can effectively be integrated to increase positive perceptions of one’s past, thereby increasing current motivation.

Beyond the potential explanations above for the non-significant relationship between positive perceptions of the past memories, it is also vital to understand why there was an insignificant relationship between self-reported agency in the past and current motivation as measured by Cold Pressor Task time. This non-significant finding seemed
ironic because as we mentioned before, there was a significant relationship between coded agency in the past and current motivation. Given this pattern of relationships, and further non-significance in correlation between self-reported agency in the past and coded agency in the past, we suggest that, as in the reports of memory valence, participants were providing answers conferring to their perceptions of what is “correct” or socially desirable (Maccoby & Maccoby, 1954). Future studies should replicate this study with The Marlowe-Crowne Social Desirability Scale (1960) or The Social Desirability Scale-17 (Stöber, 2001), which as stated previously, might tap this construct more indirectly.

**Future Self and Current Motivation**

Although there were significant correlations and associations between measures of past and present motivation, there were no significant correlations and/or associations with measures of future and present motivation. Previous literature had found that those with high perceptions of their hope in the future were able to find greater benefits in coping with on-going stressors than those with low perceptions of hope in the future (Affleck & Tennen, 1996), and those with high perceptions of hope in the future were able to endure the pain of freezing cold water longer in-the-moment than those with low perceptions of hope in the future (Snyder et al., 2005). Yet, inconsistent with our hypothesis and prior studies (as mentioned above), higher perceptions of agency, pathway, and hope in the future as well as higher total possible selves and balance did not yield longer Cold Pressor Task time. This finding might be due to college student’s lack of certainty of their future. For example, several studies have found that career indecision (Tien, 2001, 2005; Tien et al., 2005), major indecisiveness (Chapman, 1981; Titley & Titley, 1980), and facing struggles to come into terms with their racial, cultural, and gender identity (Jones, 2013; Torres & Hernandez, 2007) were all prevalent among college students. Thereupon, perhaps, college students were more motivated by their past selves compared to their future selves. This may be due to their unsureness about what the future holds for them, despite having plans for the next year, as those tentative plans could be subject to change. This particular alternate explanation of our study findings go hand-in-hand with research conceptualizing the role of first-year college GPA (or past behavior) as a predictor of current major persistence (Allen & Robbins, 2008). That is, the feeling of uncertainty of the future is determined by past experience (like how well one performed academically in the past), which then impinges on current motivation (e.g., persistence to continue on with the chosen major). Future selves might not be driving current motivation because there seems to be a fickle perspective of the future (Jones, 2013). Future studies should further facilitate this reasoning and conduct a longitudinal analysis to examine whether college students actually achieved their expected and feared selves in the future. Alternatively, one could explore these relationships in individuals who have a slightly more solidified view of what the future might hold.

**Past Selves and Future Selves**

We hypothesized that past measures (i.e., coded agency in the past, self-reported agency in the past, and positive perceptions of past memories) would be correlated and/or associated with future measures (i.e., perceptions of agency, pathway, and hope in the future, possible selves total plausibility score, and possible selves balance score). As predicted, we found a significant relationship between coded agency in the past and perceptions of agency in the future. The assumption underlying this work is that most individuals direct their attention to more than one-time period—in this case, the past and the future (Shipp et al., 2009). Thus, having strong agency in the past may have increased
perceptions of agency in the future because the self-adapted strategies from one’s memory also apply to future scenarios (Welzel & Inglehart, 2010).

In addition, consistent with our hypothesis, we found that people with greater positive perceptions of their past memories had more perceptions of pathways to their goals in the future than people with less positive perceptions of their past memories. These findings dovetail with previous research. For example, a study of college students’ retention of science, mathematics, and engineering (SME) majors suggest that students with positive perceptions of SME majors upon college entrance (i.e., interest in SME majors originating from their past) were likely to enter college equipped to meet academic requirements for their intended SEM majors (i.e., pathway to meet future goal of finishing a degree in that major) (Bonous-Hammarch, 2000). Therefore, their previous positive association with these areas of study correlated with their ability to succeed as majors in the future. However, future studies should examine this finding further through replication with another measure of positive perceptions of individuals’ past memories because we did not find any other significance with this particular measure (as mentioned before).

We did not expect the insignificant relationship and/or association between coded agency in the past and the following future variables: perceptions of pathway in the future, perceptions of hope in the future, possible selves total plausibility score, and possible selves balance score. Even though this finding in the study is puzzling, a possible explanation could be that we cannot directly compare past measures of agency with non-agency measures of the future, or that these past reflections simply do not influence plans for the future. Future studies might incorporate past and future measures that are in the same domain (e.g., pathway to goals in the past and perceptions of pathway to goals in the future) to see how similar measures hold up across time periods. Another possible explanation for this finding could be due to a lack of clarity between independent versus dependent variables (or collinearity) of the past variable with future measures. This possibility is supported by prior studies where reversing variables in a self-efficacy model changed the results outcome (Bandalos et al., 1995; Benson & Bandalos., 1989).

Similarly, inconsistent with our hypotheses, there was a non-significant relationship and/or association between self-reported agency in the past and the following future variables: perceptions of agency in the future, perceptions of pathway in the future, perceptions of hope in the future, possible selves total plausibility score, and possible selves balance score. Unexpectedly, we also found no significance in relationship and/or association between positive perception of past memories and the following future variables: perceptions of hope in the future, possible selves total plausibility score, and possible selves balance score. The overall lack of direct relationship and/or association may be due to social desirability responses on these self-reported measures as mentioned previously. Furthermore, the results with regard to the insignificant relationship between positive perception of past memories and possible selves total plausibility score may have to do with a more complicated relationship—perhaps, an inversely-related relationship rather than a linear relationship. Previous studies (e.g., Lennings, 2000; Shipp et al., 2009) have pointed out that past-focused individuals were negatively related to optimism, specifically among young-aged people. As a result, a potential inverse relationship might have incurred between the above variables (i.e., positive perceptions of the past and possible selves total plausibility score) in which too many positive perceptions in the past can be related to too much optimism.
for a sense of goals and plans in the future, whereas no positive perceptions in the past can be related to no sense of goals and plans in the future. Future studies should explore optimism as a mediator in this relationship and confirm whether this type of inverse relationship exists.

**Limitations**

Although this study presented important strengths in relation to a novel combination of methods and relatively large sample size, certain limitations should be taken into consideration when interpreting the results. First, our method of obtaining past measures might have been more inclusive than future measures because, in regards to our past measures, we were able to ask respondents follow-up questions during the Autobiographical Memory Interview (adapted from Kopelman, Wilson, & Baddeley, 1989, 1990; Peterson et al., 1982). But, we were unable to do so for our future measures, which might cause concerns about an imbalance between our temporal measures. Future studies are needed with similar methods in both time periods to replicate and extend our results. Second, the current study also has potential limitations in the generalizability of our findings because this research was conducted within college students in a Western culture. As stated earlier, the transient nature of student life might mean that reflections of the of future are a bit shaky at best. This may mean that their ability to plan or predict life plans are not as developed as older adults. Future studies should be conducted among older populations because their conception of the future might differ from than that of college students (Arnett, 1994). Third, we are aware that there is a possibility of false positives in reference to our results. But, these connections are firmly grounded in the previous literature and significance was also found in our secondary analyses, suggesting more than a simple type 1 error. Future studies might better explore these relationships via a larger sample size or using convergent methods to better understand the strength of these connections.

Finally, it’s important to explore the limitations of our main variable of interest: Cold Pressor Task duration. Though this paradigm has been used extensively in previous research (e.g., Liu et al., 2013; Snyder et al., 2005; Verhoeven et al., 2010), results can vary significantly depending on the context of the testing situation. For example, people tend to submerge their hand for longer if they are told that the task was tied to monetary outcomes (e.g., Schmeichel & Zell, 2007) or social stimuli (e.g., von Baeyer et al., 2005), and shorter if the task was not tied to monetary outcomes or social stimuli. In the current study, we gave participants no external motivation to complete the task, and thus we hoped it was tapping a “raw” form of in-the-moment motivation (persevering for the sake of perseverance). However, we have no way to check if this was actually the case, which may be why some previously hypothesized relationships (e.g., between CPT and future measures) did not emerge. In the future, it may be wise to collect additional measures of current motivation (for example, current grades in school or self-reported success) in order to verify that the CPT was tapping it’s intended construct.

**Implications for Practice**

In spite of some insignificant relationships between the past, present, and future selves, it is important to note the significant relationships and/or associations between coded agency in the past and Cold Pressor Task time (i.e., the connection between past and current motivation), coded agency in the past and perceptions of agency in the future as well as positive perceptions of past memories and perceptions of pathway to goals in the future (i.e., the connections between the past and future selves). This pattern of results seems to highlight the importance of past self on current motivation more than future self on current motivation—showing that perceptions
of the past might be more vital to motivation in-the-moment than perceptions of the future. We noticed that asking students to reflect on the past and/or future may have left beneficial effects on the conception of the self. For example, some students have said that this study was therapeutic to them. Therefore, we believe that we could implement practices where we ask participants to cue highly agentic past memories and talk about them in detail, in order to increase current motivation. Moreover, past studies show that college students may be unsure of their future (e.g., Chapman, 1981; Jones, 2013; Tien, 2001, 2005; Tien et al., 2005; Titley & Titley, 1980; Torres & Hernandez, 2007), thereby not having a connection to their current motivation. It’s possible that this fact could be used to help with understanding and remedying their uncertainty of the future, aiding them to establish a connection between the future and current self (e.g., showing them that they can indeed achieve their goals in the future).

References


**Exploratory Analyses**

1. **Past Self and Current Motivation Measures**
   - There was a positive correlation between self-mastery in the past and time in ice-cold water (r = .253, p ≤ .05).
   - There was a negative correlation between empowerment in the past and reported pain on the Cold Pressor Task (r = -.236, p ≤ .05).

2. **Past Self and Future Self Measures**
   - There was a positive correlation between empowerment in past and pathway to goals in the future (r = .224, p ≤ .05).
   - There was a positive correlation between empowerment in past and perceptions of hope in the future (r = .249, p ≤ .05).
   - There was a positive correlation between empowerment in past and possible selves total plausibility score (r = .207, p ≤ .05).
   - There was a positive correlation between self-mastery in past and perceptions of hope in the future (r = .197, p ≤ .05).