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Psychosocial Correlates of Gap Time to Anabolic-Androgenic Steroid Use

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Abstract

Objective—Theoretically, legal supplement use precedes and increases the risk for illicit appearance and performance enhancing drug (APED) use—also referred to as the gateway hypothesis. Little is known about associations between the speed of progression, or gap time, from legal to illicit APED use, and psychological risk factors, such as sociocultural influence, eating disorders, body image disturbance, and impulsivity.

Method—The sample taken from two studies included 172 active steroid users (n = 143) and intense-exercising healthy controls (n = 29) between the ages of 18 and 60 (M = 34.16, SD = 10.43), the majority of whom were male (91.9%). Participants retrospectively reported APED use and completed measures assessing psychological and behavioral factors, including eating concern, muscle dysmorphia, and impulsivity. Participants had a gap time from initial APED use to anabolic-androgenic steroid (AAS) use that ranged from 0 to 38 years.

Results—Continuous survival analysis indicated that interactions between self- versus other sociocultural influence on APED onset and both higher eating concern and impulsivity are associated with a shorter gap time from initial legal to illicit APED use.

Discussion—The results indicate the potential value in developing different strategies for individuals with other sociocultural versus self-influence on illicit APED use, and among more impulsive and eating-concerned APED users. Future research is needed to assess different trajectories of APED use, such that eating-concerned and impulsive individuals who perceive less other sociocultural influence may be at greatest risk for a speedier progression to AAS use.

Keywords

sociocultural influence; eating concern; impulsivity; steroids; gap time

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Appearance and performance enhancing drug (APED) use varies in severity and pattern of use, but it is generally characterized by the desire for enhanced physical appearance (e.g., added muscle or reduced body fat) and athletic performance (Evans, 2004; Hildebrandt et al., 2007). This form of polypharmacy diverges from traditional substance misuse in its breadth and relationship to psychological characteristics including disturbances in diet and

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exercise, impaired body image, and planning/regulation of drug use (Hildebrandt et al., 2011). The use of legal APEDs, such as fitness supplements, has been reported by 1.6% of American children or adolescents, as a means of enhancing athletic performance (Evans et al., 2012), and by 49% of the entire U.S. population (Bailey et al., 2012) for muscle building or performance enhancement. A commonly used example of illicit APEDs is anabolic-androgenic steroids (AAS), which encompass a wide range of synthetic androgens; they are associated with transient physical (e.g., gynecomastia, increased blood pressure, increased lipids, etc.) and psychological (e.g., depression, hypomania, etc.) side effects (Evans, 2004; Kanayama et al., 2008). Long-term AAS use may be associated with cognitive and neurological abnormalities (Kaufman et al., 2015). The U.S. lifetime prevalence of AAS use is about 1 to 1.9% (Pope et al., 2014). Further, the international prevalence rate is 3.3%, with more prevalent usage among males than females (Sagoe et al., 2014). Approximately 30% of AAS users develop AAS dependence (Kanayama et al., 2009), a rate higher than for other drugs of abuse (U.S. Department of Health and Human Services, 2013). Despite the evidenced public health significance, little is known about the factors contributing to the onset of illicit APED use.

Initial legal APED use may be a risk factor for the development of illicit APED use. For example, a developmental model of drug initiation, or the “gateway hypothesis,” posits that initial use of certain drugs precedes and increases the risk for future drug use (Kandel, 1975). For example, Kandel (1975) suggested that the use of legal drugs earlier in the developmental sequence precedes illegal drug use (e.g., heroin, cocaine). Although much less is known about APEDs than other substance use, a number of findings support the possibility that legal APEDs (e.g., fitness supplements) may act as a gateway to the initiation of AASs (e.g., Karazsia et al., 2013). Moreover, most steroid users report legal APED use prior to AAS onset (Hildebrandt et al., 2012). Legal APED-using individuals may feel that they are not acquiring sufficient gains with legal APEDS, therefore, may initiate AAS use to increase desired gains. In addition, APED users may want to speed the muscle building/fat reducing process, which can be attained with illicit APEDs.

Critics, however, argue that the causality assumed by the gateway hypothesis is deemed negligible if we consider the large population that uses legal substances without progressing to illegal use (Vanyukov et al., 2012). Furthermore, many individuals may use illicit substances without prior legal substance use (Tarter et al., 2006). There is also evidence for the *reverse gateway hypothesis*; for example, nicotine addiction can precede cannabis use and cannabis might also predict onset of nicotine abuse (Patton et al., 2005). In AAS research, it is common that AAS users report using multiple APEDs as part of or in between cycles, including legal APEDs. Critics also point out that, in addition to the existence of these reversed drug use pathways, the gateway hypothesis fails to consider the different levels of drug use (i.e., use versus dependence; Vanyukov et al., 2012). Theoretical limitations to the gateway hypothesis also exist. For instance, prior legal substance use alone is not sufficient to progress towards illegal substance use, and additional, nonsubstance use, variables must explain and contribute to this progression (Karazsia et al., 2013). The present study, therefore, explores psychological and behavioral variables that may contribute to this progression.

Evidence from animal and human research indicates that AAS use is related to aggressive and impulsive behavior (e.g., Kanayama et al., 2009; Oberlander and Henderson, 2012). Translational models reliably demonstrate that AAS exposure increases offensive aggression in response to provocation, and aggressive youth are more curious and have stronger future intentions to use AASs (Sagoe et al., 2016). These results suggest that impulsivity and aggression might predict rapid onset of APED use and that those who might perceive benefit from these behaviors would escalate their drug use to the most potent set of substances more quickly.

In addition to the impulsive APED user profiles, many APED users are driven by self-influences such as appearance investment (Tanner, Miller, & Alongi, 1995) and body dissatisfaction (Pope & Kanayama, 2012). Sociocultural factors, such as media, peer, and parent influence have been implicated in female body dissatisfaction and disordered eating behaviors (McCabe and Ricciardelli, 2001). Recent research suggests that the tripartite influence model can also explain maladaptive body change behaviors in men, such as AAS use (Smolak et al., 2005). Social pressure, from media, family, or peers, might, therefore, lead males to socially compare themselves and seek out the societal ideal—a muscular, lean body (Field et al., 2005). Internalization of the appearance ideal perpetuated by these sources of influence also leads males to have body image disturbance and desire the muscular ideal for themselves by engaging in disordered eating attitudes and behaviors (Foster et al., 2014; Karazsia & Crowther, 2010; Olivardia et al., 2014). Males with more severe body image concerns also engage in high-risk behaviors, such as AAS use, to attain the desired muscular, athletic body (Stapleton et al., 2014). The tripartite influence model in females and males, therefore, describes the internal processes or self-influences that drive body image disturbance and body change behavior.

However, to explain steroid onset, it is also important to consider the direct, external sociocultural influences, such as individuals who encourage AAS use or even supply it. For example, sports participation is associated with increased likelihood for legal and illicit APED onset because athletes are exposed to a social environment that is knowledgeable about and potentially supportive of drugs that enhance performance (Dodge & Jaccard, 2006). According to a systematic review of AAS literature, the major sources of pressure for initiating AAS use, and those likely to supply individuals, are peer/teammates and family members (Sagoe et al., 2014). Other important sources were coaches and physicians complicit with the individual or teams' goals. Further, onset of steroid use is partially explained by contact with AAS users (Stilger & Yesalis, 1999), suggesting the role of peer influence in initiation of drug use. Intense-exercising individuals, for example, might be susceptible to the APED-using social network at the gym and associated online communities.

On the contrary, perceiving one's own ability to resist pressure from others is associated with lower intentions among adolescents, to initiate steroid use, as well as lower incidence rates of supplement and steroid use (Lucidi et al., 2008). However, people who resist pressure from others might still be self-influenced to initiate APED use (e.g., internalization, social comparison). It is unknown if there are any differences in developmental patterns of

APED use among users who reported their use as independent of sociocultural influence compared with users who were influenced by their external social environment.

A meaningful intervention or prevention effort is implemented when someone is at proximal risk—before transitioning into more dangerous AAS use. It might, therefore, be important to use proximal risk factors to understand the progression of behavioral phenomena, such as illicit drug use. The construct of gap time is defined as the progression or duration from the onset of legal APEDs to the onset of illicit AAS use. Measuring the speed of progression from supplement use to AAS use, or gap time, helps us characterize the relationship between these two states—legal and illicit APEDs. For example, short gap times might characterize APED users who have a greater connection to the APED network, for example bodybuilding community in gyms, and therefore, with more social influence and access, transition more quickly to illicit APED use. For this population, intervention and prevention efforts might target the social environment. In contrast, long gap times might characterize less informed APED users who spend years using exercise and other appearance controlling behaviors before transitioning to illicit APEDs. For these users, many individual and personal factors could alter the course of APED use, and better understanding this can inform intervention and prevention of illicit AAS use that evolves over longer time periods.

The present study aims to assess the associations between the progression from legal to illicit APED use and psychological risk factors such as body image disturbance, sociocultural influence, and impulsivity. Although previous research has supported the progression from legal APED use to illicit AAS use, we hypothesized that the speed of the progression is modulated by multiple factors. Specifically, we hypothesized that sociocultural influence (self vs. other) to APED onset, and psychological factors, such as eating disturbance, body image disturbance, and impulsivity, will be negatively associated with gap time to AAS use.

Method

Participants and Procedures

Secondary data analysis was conducted using baseline data from an ongoing longitudinal study of steroid users (*N* = 83) and archive data from another study (*N* = 89), which were collected from 2006 to 2013 (Hildebrandt et al., 2011). Both studies had similar inclusion and exclusion criteria. Participants were included if they had either current illicit APED use, defined by having used an illicit APED in the past 12 months and planning on using it in the future or if they were healthy controls, with no history of illicit APED use. Participants must also have been over the age of 18. Exclusion criteria included symptoms of psychosis. The longitudinal study also excluded comorbid drug dependence. There was a total of 172 participants. The sample consisted of active steroid users (*n* = 143) and intense-exercising healthy controls (*n* = 29), 91.9% of whom were male (*n* = 158). All participants were recruited from the same gyms. All intense-exercising controls must have engaged in weight training, to match the steroid using sample. Consequently, the samples reported similar emphasis on cardiovascular fitness and power, strength, and size activities (AAS-users: *M* = 4.44, *SD* = 1.46 vs. Controls: *M* = 4.02, *SD* =1.47), on a scale ranging from 0 (*exclusively cardio/endurance*) to 7 (*exclusively strength, power, or size*). Intense-exercising controls were within 1 standard deviation of the AAS-user sample means on frequency (in days) in the past month (AAS-users: *M* = 16.38, *SD* = 7.17 vs. Controls: *M* = 14.88, *SD* = 7.83) and duration (in minutes per day) of exercise (AAS-users: *M* = 101.87, *SD* = 22.14 vs. Controls: *M* = 90.04, *SD* = 19.38). Steroid users and intense-exercisers were also mean-matched by age. The ages of participants ranged from 18 to 60 (*M* = 34.16, *SD* = 10.43). The sample was 61% Caucasian (*n* = 105), 18% Black or African American (*n* =31), 1% Native American (*n* = 2), 3% Asian (*n* = 6), and 17% (*n* = 28) with unknown races. The sample was also 28% Hispanic/Latino. The sample was 73.3% primarily heterosexual (*n* = 126), 16.9% primarily homosexual (*n* = 29), 7% bisexual (*n* = 12), with 2.9% (*n* = 5) not reporting anything. All participants provided informed consent and procedures were approved by the Icahn School of Medicine at Mount Sinai Institutional Review Board.

Measures

Appearance and performance enhancing drug use schedule (APEDUS; Hildebrandt, Langenbucher, Lai, Loeb, & Hollander, 2011).—The APEDUS is a semi-structured interview which assesses patterns of drug use and psychological, behavioral features (e.g., Compulsive Exercise, Dietary Control, Body Image and Appearance Control) associated with APED use. In this study, we used select items from the Background and Demographics, Nutritional Supplements and Prohormones, and the First Appearance and Performance Enhancing Drug Cycle modules. From these modules, we used the ages of initial use and the primary sociocultural influences associated with initial onset ("Who, if anyone, influenced your decision to go on this first cycle?"), in our proposed model. If individuals reported more than one primary influence, they were instructed to choose which was most influential. The APEDUS has adequate interrater and test-retest reliability (Hildebrandt et al., 2011). The measure is available upon request and can be accessed via Researchgate.

Muscle dysmorphic disorder inventory (MDDI; Hildebrandt et al., 2004).—This measure is a 13-item questionnaire (α = .868) which measures male body image disturbance (e.g., "I think my chest is too small"), with scores ranging from 13 to 65 and higher scores representing greater body image disturbance. The measure has established significant convergent validity and good test-retest reliability. Higher scale scores on the MDDI occur in men with muscle dysmorphia and anorexia nervosa, demonstrating concurrent validity of the measure (Murray et al., 2012). The coefficient alpha in the current sample was .87 for the total MDDI score.

Eating disorder examination- questionnaire (EDE-Q; Fairburn and Beglin, 1994).—The EDE-Q is a 41-item questionnaire measuring eating pathology over the past 28 days, across two dimensions: behavioral (e.g., vomiting) and attitudinal (e.g., shape concern). The current study used the Eating Concern subscale of the EDE-Q because of its unique connection with distress about eating, which is a more conceptually valid measure of the pathology in our sample (Hildebrandt et al., 2010). This measure has demonstrated acceptable psychometric properties in male and adult populations (e.g., Barnes, Masheb, White, & Grilo, 2011; Rose, Vaewsorn, Rosselli-Navarra, Wilson, & Weissman, 2013). The coefficient alpha in the current sample was .79 for the Eating Concern subscale, and .93 for the global score.

Barratt impulsiveness scale, version 11 (BIS; Patton et al., 1995).—The BIS is a 30-item trait measure of impulsivity which has three subscales (attentional, motor, and nonplanning impulsiveness). The coefficient alphas for the subscales in the current sample were .74, .72, and .70, respectively, and .85 for the total score.

Statistical Analysis

The gap time from initial APED use to AAS onset was examined using continuous survival analysis. In this context, survival was defined as having a longer gap time between the two events. Legal APEDs included were fitness supplements, prohormones, and fat burners. Because of the variability in the order of substance use onsets, we collapsed the independent APED categories of fitness supplements, prohormones, and fat burners, into a single event variable: age of legal APED use. The earliest age was entered as age of onset, among users of multiple APEDs. Furthermore, four participants reported nutritional supplement use before the age of 10, which was unusually young and represented an outlier in the sample. Although these four cases reported vitamin use, they did not have significant appearance or performance enhancing- related substance use until a later age; therefore, we decided to use the ages of prohormone or fat burner onset for these participants, to identify their initial APED use.

Continuous survival analysis using the Cox Regression model requires right censoring of data where one or both events were not experienced yet by an individual. Events in the model were legal APED (i.e., nutritional supplements, prohormones, or fat burners) and AAS onset. Six participants never used legal APEDs, 4 did not experience either event, and there were also 3 individuals who experienced the second event (i.e., AAS use) prior to the first event. These individuals were right censored. The dependent variables or time-to-event variable was gap time from legal APED to AAS onset. Further, the baseline hazard function was a non-parametric stepwise hazard.

The survival model also included predictors of the APED onset and gap time hazard probabilities. Our predictor variables were MDDI, EDE Eating concern subscale, BIS, sociocultural source influencing APED onset, and age of legal APED onset. Sociocultural influence was operationalized into a dichotomous variable, such that 0 represented self-influence ($n = 53$) and 1 represented other sociocultural influence, such as media ($n = 9$), family member or friend ($n = 78$), physician ($n = 3$) or sports-related (e.g., coach; $n = 23$). There were six individuals with missing sociocultural influence data. We also included interactions between sociocultural influence and legal APED age of onset with MDDI, Eating Concern, and BIS. Missing data for continuous predictor variables were replaced by multiple imputation using Bayesian estimation methods in Mplus (Rubin, 2004; Schafer, 1997). Continuous predictor variables were also grand mean centered to aid in interpretation of logit coefficients. Statistical analyses were performed using Mplus v.6 (Muthén & Muthén, 2010) and SPSS. The base survival model information criteria were compared with our proposed model, such that lower sample adjusted BIC and log likelihood values indicated a better-fitting model.

Results

Descriptives

Of our included participants ($n = 172$), three participants used prohormones, 16 used fat burners, 112 used fitness supplements, prior to any other legal or illegal substance, and two reported the same age of onset for prohormones and fat burners while 26 reported the same age of onset for supplement as either fat burner or prohormone use. There were also participants who never experienced the first event (i.e., legal APED onset; $n = 6$; 3.5%), participants who did not experience either event ($n = 4$; 2.3%), and those who experienced the second event (i.e., AAS use) prior to the first event ($n = 3$; 1.7%). Furthermore, the gap time between legal APED and AAS onset ranged from 0 to 38 years ($M = 6.58$, $SD = 6.78$).

Table 1 summarizes the relationships between age of AAS onset, age of supplement, prohormone, and fat burner onset, and predictor variables. Age of AAS onset was positively correlated with age of fitness supplement use ($r = .649$, $p < .001$), age of prohormone use ($r = .952$, $p < .001$), and age of fat burner onset ($r = .769$, $p < .001$). MDDI scores were negatively correlated with age of AAS onset ($r = −.194$, $p = .026$), and the Eating Concern subscale of the EDE was negatively correlated with age of prohormone ($r = −.296$, $p = .002$) and AAS onset ($r = −.220$, $p = .003$). Sociocultural influence was also positively correlated with the Eating Concern subscale ($r = 0.174$, $p = 0.04$).

Gap Time Associations

The proposed model (Log likelihood = 815.81; BIC = 1664.58) indicated better fit than the base survival model (Log likelihood = 5960.10; BIC = 11961.83).

A feature of the Cox regression model is that you cannot interpret the shape of the baseline hazard function, but rather the effect of predictors (Newsom et al., 2013). As indicated in Table 2, there were significant interactions between sociocultural influence on AAS use and Eating concern as well as BIS scores. The interaction between susceptibility to self-influence and eating concern levels led to increased likelihood for a shorter gap time, particularly in the first 5 years of legal APED use ($\beta = −0.746$, $p = 0.001$). Similarly, the interaction between self-influence and impulsivity levels led to increased likelihood for a shorter gap time ($\beta = −0.055$, $p = 0.002$). There was also a significant interaction between BIS scores and age of APED onset ($\beta = 0.003$, $p = 0.032$), such that higher impulsivity and later APED onset predicted a shorter gap time.

Discussion

In the present study, we provide preliminary support for the relationship between the duration from legal to illegal APED onset and psychosocial variables. Prior research has suggested that other sociocultural influence, such as coaches or friends (e.g., Sagoe et al., 2014), plays an important role in the onset of APED use. The present study indicated that, among individuals who report self-influence, higher eating concern and impulsivity are associated with a speedier progression to AAS use than among those who report other sociocultural influence on APED onset.

In the interaction between high impulsivity and self-influence, individuals might not be consulting with any social networks, and their additional impulsive nature might be propelling a shorter gap time to AAS use and a lack of an elaborate decision-making process. Further, individuals with greater eating concern or impulsivity and a perceived independence in APED onset might not be relying on learning about APEDs and considering the opinions of friends or other social networks in their decision process; therefore, shortening gap time.

However, it is important to consider that the APEDUS question assessing sociocultural influence is phrased to measure what influenced an individual the most in their decision to use steroids. Many responded that they themselves were the largest influence, indicating self-influence. Those perceiving an independent decision to start APED use might still, however, have been indirectly influenced by external sources (e.g., networks of steroid users, athletic community)—a more passive social pressure (MacKinnon et al., 2001). Researchers have also described the APED indoctrination process involving knowledge from and communication with experienced APED users (Evans, 1997; Monaghan, 2002). If this indoctrination into use is experienced as internalization of the APED culture, it might additionally explain why impulsive and highly eating concerned individuals were likely to more quickly transition to AAS use while not perceiving external influence. In addition, reporting self-influence might be interpreted as an individual taking ownership and certainty over their decision rather than attributing their onset to others. The current study was unable to measure the possibility of multiple weighted influences on APED initiation and, consequently, is limited to inferences about perceived primary sociocultural influence over the decision to use illicit APEDs. A better understanding of how individuals internalize the information in APED social networks might tell us more about how to target sociocultural influence in AAS prevention.

There are several limitations to the current study. For example, sociocultural influence on AAS onset was measured using a single, dichotomized item on the APEDUS, which may simplify the complex role that sociocultural influence has in AAS onset. In addition, social desirability may influence the reporting of social pressures. Future research is needed to develop and assess psychometrically valid continuous measures of AAS social influence, and better understand the role of the social environment in attitudes towards and use of AAS. Further, it is also difficult to establish temporal precedence of psychological symptoms, for example, if impulsivity was high prior to AAS onset or if AAS use exacerbated impulsivity (Pope et al., 2000), affecting the extent that we can causally interpret our findings. However, research indicates higher levels of trait impulsivity among AAS users (e.g., Kanayama et al., 2003) and the BIS is considered a relatively stable trait measure of impulsivity (Stanford et al., 2009). Moreover, Hildebrandt et al. (2007) suggested different groups of steroid users who vary based on patterns of use, side effects, and motivations. Therefore, the results might not generalize to every type of APED user. Further, the present study sample had a wide age range and large variability in gap time. A larger sample size with a larger control group might allow for a study of heterogeneity in AAS users. Nevertheless, the wide age range

(18–60) is also a good representation of steroid users and individuals at risk for initiating use, as the onset of steroid use occurs on a wide spectrum of age.

Another limitation is the use of the EDE-Q eating concern subscale to approximate eating pathology in a predominantly male sample, who engage in muscle-building behavior. Eating disorder literature does not yet include a validated measure of muscularity-oriented eating pathology despite the distinct behaviors encompassing it, such as combinations of high-caloric and low-caloric food intake (Griffiths, Murray, & Touyz, 2013). Future research is needed to assess the associations between steroid use and muscularity-oriented eating pathology.

Furthermore, the retrospective self-report of substance onset led to some participants having the same age of onset for legal APEDs as AAS use. For these participants, it is unclear which substance onset preceded the other, and for data analysis, a zero gap time was converted to .001 which assumes a sequence of APED leading to AAS use. A longitudinal design would allow for a better mapping of developmental pathways from initial APED use to later illegal APED onset. Retrospective reporting also generally introduces recall bias; however, the APEDUS, used to measure age of onset, indicates interrater and test-retest reliability (Hildebrandt et al., 2011). Further, unlike other substances of use, the decision to use APEDs, especially anabolic-androgenic steroids, involves planning and navigation of an elaborate network of sources which includes significant investment in learning how to use these substances. Therefore, unlike attempting to retrospectively report the first use of cannabis, which involves intoxication and may occur gregariously or upon impulse, the first use of steroids is distinct and much more likely to be recalled.

The cross-sectional nature of the present study most importantly offered the opportunity to generate hypotheses to guide future research in understanding the predictive value of psychosocial factors, such as eating concern, impulsivity, and sociocultural influence on progression from legal to illegal APED use. Future longitudinal designs, following the progression to AAS use among legal APED users, may help draw more conclusive findings, supporting the results of the present study. Moreover, more sophisticated measurement of sociocultural influence, including the APED indoctrination process, may further clarify the potential role of sociocultural influence on progression from legal to illegal APEDs. Further tests of hypotheses regarding the psychosocial predictors of progression from legal to illegal APED use may have important implications on improving AAS prevention efforts.

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Table 1

Correlations between Ages of Onset, Eating and Body Image Concern, Impulsivity, and Sociocultural Influence

Variable	**1** ***n* = 157**	**2** ***n* = 82**	**3** ***n* = 118**	**4** ***n* = 143**	**5** ***n* = 172**	**6** ***n* = 172**	**7** ***n* = 172**	**8** ***n*=165**
1.Supplement age of onset	-	0.75**	0.59**	0.65**	−0.13	−0.002	−0.02	0.10
2. Prohormone age of onset		-	0.76**	0.95**	−0.30**	−0.05	−0.02	−0.12
3. Fat Burner age of onset			-	0.77**	−0.18	−0.09	−0.02	0.08
4. AAS age of onset				-	−0.22**	−0.19*	−0.03	0.04
5. EDE-Eating concern					-	0.26**	0.27**	0.17*
6. MDDI						-	0.30**	−0.01
7. BIS							-	0.08
8. Sociocultural Influence [a]								-
Means (SD)	20.85(7.72)	25.32(8.71)	23.34(6.61)	27.90(9.37)	.887(0.87)	32.72(9.56)	62.75(11.47)	

[a] Sociocultural influence is a binary variable and correlations are reported in Spearman’s rho.

* $p < .05$.

** $p < .01$

Table 2

Beta Coefficients for Predictor Variables of Gap Time

Predictor	Beta (β)	P-Value	95% CI
Supplement age of onset	0.021	0.419	[−0.022, 0.088]
EDE Eating Concern	**0.743** **	0.001	[0.384, 1.304]
MDDI	−0.005	0.734	[−0.028, 0.032]
BIS	**0.033** *	0.019	[0.010, 0.069]
Social Influence	−0.188	0.248	[−0.456, 0.231]
Interactions Terms:			
Social Influence* EDE eating concern	**−0.746** **	0.001	[−1.130, −0.146]
Social Influence* MDDI	0.033	0.075	[0.002, 0.080]
Social Influence*BIS	**−0.055** **	0.002	[−0.085, −0.008]
Social Influence*Age	−0.010	0.764	[−0.065, 0.076]
EDE Eating Concern*Age	−0.019	0.360	[−0.053, 0.035]
MDDI*Age	0.002	0.278	[−0.001, 0.005]
BIS*Age	**0.003** *	0.032	[0.001, 0.006]

* $p < .05$

** $p < .01$