

Adolescence Romantic Relationship and Executive Functions: Literature Review Regarding Attention Control and Academic Competence

Yitong Zhou^{1,a,*}

¹Woldingham School, Surrey, CR3 7YA, United Kingdom
a. zoezhou0912@outlook.com

*corresponding author

Abstract: In this article, I review the association between middle adolescent romantic relationships and cognitive control of attention. I identify the cognitive development in executive functions due to romantic love, which is found to be positive over the romantically stable period. I present the findings in both positive and negative aspects, as well as clarifying the relationship between increasing executive functions and academic or social competence. Finally, I propose a brief description of a feasible research plan on the correlation between adolescent romantic love and attention control, associating the mean reaction time in Task-switching.

Keywords: Adolescent Romantic Love, Executive Functions, Attention, Task-Switching Task, Academic Competence

1. Introduction

Middle adolescent romantic relationships are growing much more commonly and acceptably worldwide, whereas the romance of adolescents in the Chinese context remains unsupported, regarding the conservative attitudes that one's academic competence will be detrimentally affected. [1] Previously, an approach between adolescent romantic relationships and executive function concurrently is rare, yet several significant research has been done regarding the two aspects independently. According to preceding research [2], presents a reciprocal correlation between middle to late adolescents' romantic relationships and social as well as academic competence from its longitudinal observation. In the other national estimate study [3], we learned that over 70% of adolescents in the US are involved in romantic relationships before graduating high school. Hence, this increasing percentage can be applied similarly worldwide due to the open-minded approach in the contemporary world. As a result of increasing emotional relationship with peers, Holmes and his colleagues [4], claims that increasing peer problems, including peer rejections, heightened the chance of lower executive functions [4,5]. Also, it is worth noting that, the euphoric stage will last mainly a minimum of six months which will be considered emotionally stable, which indicates that there would be a reduction in active romantic thoughts and transition of attention on oneself [6]. Therefore, we should expect the corresponding effect in duration of relationship to attention control.

2. Cognitive Development from Romantic Relationships

We acknowledge that a romantic relationship has beneficial impacts on one's cognition control, including EFs, which are profound on attention control and working memory [5]. Langeslag et co-workers confirm that romantic experience modulates cognition since it is controlled by affective factors [6]. Hence, the impact of romantic love is not trivial for attention control daily.

From the outset, romantic relationships enhance emotion regulation which also happens in the practice of mindfulness [7]. Mindfulness has been defined as a Buddhist tradition in regulating non-judgmental thoughts in a conscious state [8] yet involves the practice of attention control and inhibition among the EFs [9]. Hence, the practice of mindfulness, and cognitive thoughts, research show that it leads to an increase in the control of attention to inhibit prepotent responses [10].

To investigate the impacts of a romantic relationship on attention or interference control, Stroop-like and flanker tasks [5] are adopted. In the experiment, participants are required to answer as accurately and quickly as possible in the Stroop task with a set of 96 questions. A questionnaire is done lastly and ultimately takes 20 minutes in total. Analysis of the result has also considered the time taken for error answers with post-error slowing procedure [11]. In the previous studies using a similar procedure, no association between actively or voluntarily thinking about one's beloved and interference control has been found [11]. However, in that study, the researcher suggests that the Passionate Love Scale used positively correlates with interference, attention, control by 85% statistical power [5]. Therefore, the reported congruent trial with longer-term relationship advantages better on interference control, thus, to consider more about the positive cognitive development from romantic love, especially for adolescents, is important in future studies.

3. Effects of Attention Control on Future Academic Competence

Competency in social and academic aspects has been considered significant worldwide in children's education, as it is the apparent skill required in living. Whether the adolescent is in a romantic relationship or not, the impact on EFs remains significant throughout one's growth as many studies identify a close correlation of it with competency [12, 13], while others might disagree with their research results [14, 15]. In a six-year longitudinal study [16], children who are rated with higher executive functions achieve higher grades in middle or high school, further proving the belief that attention control and working memory among the EFs are crucial in developing academic and social competence [17]. In a study [18], the researchers selected a wide collection of adolescents (N=2036) aged from 5 to 17 in participating in CAS (Cognitive Assessment System) which is regular and standardised. The further sub-test measures the correlation between the EFs and academic performance by adopting results from maths and reading. The result shown indicates a significant correlation at $p < .05$ between EFs and two areas of academic achievements, even though the researchers mention the unclarified relations with age. Another study conducted by Alavi and his colleagues identifies that the previous studies had not been considering the overall community influence, after focusing on age and gender, etc. [19] Participants in adolescents are being asked to complete a questionnaire (TRCAICQ) in measuring attention, as well as impulsive control [20]. Then the teachers, or instructors, of the participants will rate the attention level on a 5-point Likert scale to predict EFs' relation to academic performances using Chi-Square. Ultimately, the results continue to support the previous studies which show higher attention and impulsive control hold better academic performance. Hence, over decades and aspects, research took place in proving that higher attention control with different variables increases academic competence.

4. Positive Impact of Romantic Relationship on Adolescents

Over decades, there has been a positive attitude of romantic relationships in adolescents [21], more prevalent under Western cultures for identity formation compared to the East. Many studies indicate that peer relationships have a profound influence on one's academic and social behaviours [22]; many researchers have been focusing on the notable emotional and behavioural impacts of romantic love on adolescents [23] and proved to have an increased positive support [24]. Some studies state that positive personal relationships, including relationships with family, peers and partners, exert significant increase in academic achievement, as it links to one's attachment state [25] which is importantly noticeable for their psychosocial competence [26].

Furthermore, it is proven that being in a romantic relationship is beneficial to academic performance at Secondary School Certificate Level [27]. Based on the research done by Giordano and colleagues [1], proves a significant correlation between having a romantic partner and reciprocally achieving a better grade [28]. This academic statistic proves the adolescents' ability in cognitive control, especially the role of attention and impulse or behavioural control by achieving a decent result academically. From a long-term perspective, Giordano indicates the development of academic and social competence when one reciprocally influences the other, as well as grasping social building skills [29] and self-worth [30]. In some studies, the researchers suggest the negative impact of romantic relationships on academic performance will be reduced as adolescents get older [31] as they value their academic results more [24]. Overall, Martel and his colleagues confirm that the self-perceived competence grasped from a romantic relationship will eventually benefit the general competence, proving the positive impact of romantic love [32].

5. Negative Impact of Romantic Relationship on Adolescents

Schmidt and Lockwood indicate the rare outcomes of romantic love influence compared to peer relationships [1], showing the possibility of notable positive or negative impacts. Thus, on the other hand, Chen and co-workers [33] identify the tendency of negative views toward adolescent romantic relationships [34]. The development of romantic relationships in adolescence by Cambridge press edited by Furman and his colleagues indicates that early romantic relationships increase the risk of drug intake as well as depression [34]. Additionally, it indicates many reasons that are given for unsupportive attitudes to adolescents' romantic love. First, many adolescents are reluctant in discussing their romantic love with the elderly, also to negative social stigma [35], which possibly leads to a failure in knowing how to be emotionally apt [24]. This leads to positive or negative emotions which can potentially be detrimental to children. Davila and colleagues [36] indicate that romantic relationships can act as a predictor of depressive syndrome for teenagers, as mostly they lack the ability in regulating their emotions independently [36]. Especially the indirect effects caused by emotions that are not obvious and worse - fall beyond control - when the detrimental emotional thoughts transfer to biological effects, including depression and physically expressed. Additionally, studies indicate that romantic relationships would directly or indirectly affect class attendance in a university context, with the students acknowledging the likely consequences [31]. This experiment is mainly the students in romantic relationships over 3 months (90%) as they are likely to be more stable. However, this research did not manage to find a direct correlation between romantic relationships and poor attendance and impacts on GPA, which means although they clarify the failure in course performance academically, the overall influence on competency remains unclear.

From the social perspective, some people suggest a negative correlation between romantic relationships and future academic competence. Firstly, Halfors and colleagues [37] found that adolescents dating behaviours pose detrimental threats to academic achievement and emotional stability etc. For girls, it has been found that depressive symptoms from a romantic relationship

increase the likelihood of behaving in high-risk situations. Moreover, other research [33] also shows significant depressive symptoms on externalising behaviours, adapting the 20-items scale of CES-D at alpha 0.85 [37]. Furthermore, it remains unclear whether romantic relationships in adolescence would affect self-esteem due to several studies done with various results [38, 39]. However, there is a possibility that low self-esteem brings lower academic competence [40]. Overall, many studies above demonstrate the negative impacts of early romantic relationships as all the variables indicated have consequences on one's academic achievement, among mental, emotional, and physiological aspects.

Furthermore, in the Chinese context, early romantic relationships used to be considered against the social norms and parental discipline [41,42], and less normative compared to Western cultures [3], foreshadowing a negative outcome over the influence of adolescence romance. In China, early romantic love is a deviant action and is called 'precocious love' - Zao Lian [33] - and the elderly tend to hold a conservative attitude towards topics concerning romantic love and sex in adolescence stage [43]. Nevertheless, the tension in adolescent romance has been reducing continually. This strong conflict of self-doubt and social expectations in adolescents eventually leads to negative impacts [36, 44] on depressive behaviours and emotions which could be detrimental [45]. Chen and co-workers [33] selected a large and stratified sample of Chinese adolescents in Beijing in which the collection presents a high possibility of depressive symptoms, including stress among academic, parental or social discipline [45], romantic issues and breakups [46].

6. General Discussion

After analysing some influential research regarding the topic, I propose a research method about middle adolescent romantic relationships and attention control, adopting Task-switching. The participants will be acknowledged with informed consent, then the research will be conducted in two separate parts. Firstly, the participants will be given a questionnaire regarding their age, sex, ethnicity, In or Out of a romantic relationship, duration of the current romantic relationship, and the longest duration of romantic relationship ever. Moreover, a Task-switching game contributing to Attention Control will be given to the participants. Participants will take part in 2 tasks that are independent of each other. Task 1 will be "Assign the given figure as Even or Odd"; Task 2 will be more difficult to "Assign the given sentence to the field of Biology or Mathematics". In this game of experiment, the participants will be required to answer the fastest they could by pressing the key "E" and "I". Hence, the mean reaction time will be calculated for comparison. The stimuli are presented at fixation. The digits "1", "9", "11", "13" or "2", "4", "6", "8"; The sentences "haemoglobin binds with oxygen", "transpiration allows evaporation of water", "active transport requires energy", "osmoregulation is the control of water content in body" or "four plus five", "one hundred divided by four", "the sum is the result of adding", "product is the result of multiplication" will be presented. Ultimately, questionnaires will be sent using survey sheets; and the game will be programmed using Inquisit by Millisecond software. Thus, the major access to the experiment will be laptop with the millisecond application downloaded on individuals' own devices. Lastly, the data collected will either be delivered back to the creator account directly or screen-record the experiment then sent back individually. We used G*Power 3.1 to estimate the sample size for the current study. An effect size of $d = .3$ is estimated. A sample size of over 111 will allow us to achieve a .95 statistical power of 0.95 using a paired t-test (one-tailed).

This investigation examines the association between middle adolescence romantic relationships and attention control can essentially influence one's current academic and social competencies. Given that attitudes toward adolescent romantic relationships are controversial and complex in the Chinese context due to the opposition from the elderly [33], this research on this present correlation should be considered preliminary. On the other hand, this correlation may not be as significant as predicted

since several regions like Beijing and Shanghai, where the experiments are likely to take place, are modernised and hence generating a regional discrepancy [47]. Li compares and indicates that Beijing has 25%-30% prevalence of adolescent dating [48], contrast to the lower statistics in Li and colleagues' findings [42] in the less liberalised region. This analysis provides a possibility of regional discrepancy under the same cultural influence and therefore potential different executive functions.

Therefore, future studies may further explore the association between early romantic relationships and factors among executive functions, conveying any significant correlation. To deepen the research, the investigation of executive functions may be analysed using fMRI which would increase the accuracy and validity of empirical data. Moreover, there may be other potential interpretations if the hypotheses are valid. According to [49], the research indicated that participants previously with maths difficulties have lower attention control. This is a possible interpretation of the hypothesis of early childhood experience and the amount of exposure to a different environment. In secondary data research [50], suggests that bilingualism can increase attention control by constantly dealing with dual language conflict compared to monolingualistic. On the other hand, future research may also be focusing on further developed methods in measuring executive functions and hence enhancing the significance and reliability of EFs-related experiments.

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