# Flow State, Physiological Hyper-arousal and Social Anxiety among Non-Clinical Adolescent

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**Abstract**

Various researches have been done to investigate social anxiety among clinical and non-clinical adolescent. This retrospective research investigates social anxiety predictors (flow state and physiological hyper-arousal) among 407 of non-clinical students in university level. Here, successful visualization of self-experience is used to induce behaviour in order to analyze the correlation between flow state report and physiological hyper-arousal self-report. This research is a cross sectional descriptive design. The statistical analysis is done using SPSS 23 statistical software using regression analysis. As predicted, physiological hyper-arousal is viewed as the best reflecting mediation of flow state and social anxiety disorder. Finally, although different in the statistical sense, physiological hyper-arousal mediated the correlation between flow state and social anxiety disorder. The flow state negatively relates to physiological hyper-arousal. Meanwhile, flow state negatively relates to social anxiety disorder, and physiological hyper-arousal positively relates to social anxiety disorder. The results of this research provide support for prediction of social anxiety. The implications of this study are for the understanding of early detection. Adequate flow state is important to reduce physiological hyper-arousal associated with social anxiety of non-clinical adolescent.

*Keywords:* adolescent, flow state, physiological hyper-arousal, social anxiety

***Abstrak***

*Berbagai penelitian telah dilakukan untuk menyelidiki kecemasan sosial di kalangan remaja klinis dan non-klinis. Penelitian retrospektif ini menyelidiki prediktor kecemasan sosial (keadaan aliran, dan hiper-arousal fisiologis) di antara 407 siswa non-klinis di tingkat universitas. Di sini, visualisasi pengalaman-diri yang sukses digunakan untuk menginduksi perilaku untuk menganalisis korelasi antara laporan keadaan aliran dan laporan diri hiper-gairah fisiologis. Penelitian ini adalah desain deskriptif cross sectional. Analisis statistik dilakukan dengan menggunakan perangkat lunak statistik SPSS 23 menggunakan analisis regresi. Seperti yang diperkirakan, hiper-gairah fisiologis dipandang sebagai mediasi terbaik yang mencerminkan keadaan aliran dan gangguan kecemasan sosial. Akhirnya, meskipun berbeda dalam arti statistik, hiper-arousal fisiologis memediasi korelasi antara keadaan aliran dan gangguan kecemasan sosial. Keadaan aliran negatif berhubungan dengan hiper-gairah fisiologis. Sementara itu, keadaan aliran berhubungan negatif dengan gangguan kecemasan sosial, dan hiper-gairah fisiologis berhubungan positif dengan gangguan kecemasan sosial. Hasil penelitian ini memberikan dukungan untuk prediksi kecemasan sosial. Implikasi dari penelitian ini adalah untuk pemahaman deteksi dini. Keadaan aliran yang adekuat penting untuk mengurangi hiper-gairah fisiologis yang terkait dengan kecemasan sosial remaja non-klinis.*

*Kata kunci: remaja, flow state, physiological hyper-arousal, kecemasan sosial*

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## Introduction

Based on National Comorbidity Survey Replication, anxiety disorders is the most common mental illness of DSM-IV disorders (Kessler et al., 2005). Annual report of Centre for Collegiate Mental Health (2016) highlights that college students demonstrated consistent growth of depression, anxiety, and social anxiety disorder (SAD) over the past five years during 2010 to 2014. Social anxieties share common features in different expressions and experiences in different countries (Lim, 2013). The anxienty of Turkey's students were about teacher's manners, teaching process procedures, personal reasons, and previous experience (Scubas, 2010). American students reported that they more uncomfortable during interaction, expressing criticism, positive self evaluations, and more social anxiety in emotional or cognitive component. While Dutch students had social anxiety, then Indonesian students had social anxious on giving opinion, compliments and initiating contacts (Kraaimaat, 2012).

Indonesia had happiness rank on 74 out of 106 countries in 2012 to 2014 (Helliwell et al., 2015). Data by *Riskesdas* in 2013 shows emotional mental disorder with depression and anxiety were about 14 billion people or 6% people in Indonesia (Health Ministry of Republic of Indonesia, 2016) and 15,8 % had moderate SAD (Vriends et al., 2013).

SAD affects how adolescent present their characteristics of anxiety. Previous study about social anxiety disorder has been associated by the heightened cortisol reactivity during clinical youth (Gunnar, 2001), social deficit, and impairment (Early et al., 2017) then affects the influences of cognitive biases in socially anxious and non-anxious individual (Bitran & Hotmann, 2010). Several research influenced by the experiences of social anxiety, coping motives, and desire to drink (Blumenthal et al., 2016). No deviant interpretation of facial trustworthiness (Cooper et al., 2014). Another research reported the protective perspective in adolescent delinquency, concurrent perspective in adult delinquency (Mercer et al., 2017), and self compassion (Werner et al., 2012). Furthermore, the information about SAD were based on age, comorbidity status, and types of social situations feared as genuine differences in experience as opposed to biases measurement (Crome & Baillie, 2014).

SAD theoretical framework in this research is based on DSM V. SAD occurred in individuals when they face feared social or performance situations, embarrassment and afraid that others will judge them as weak, "crazy", stupid, and fear of public speaking due to others notice on their trembling hands or inarticulate voice (American Psychiatric Association, 2013). The link between an individual's perceived skills and the challenge of a task often seen as prerequisite for flow experience. The balance between high skills and high challenge often contrasted with anxiety. Flow challenges exceed skills, people feel overwhelmed and anxious (Csikszentmihalyi, 1975).

In flow state context, challenge and skill are greater than the individual's average. The flow state has optimal experience or positive experiences in everyday life that perceived balance between situational challenge and personal skill. Whereas perceived imbalance causes anxiety (Csikszentmihalyi, 1975). Interaction between level of fear by negative evaluation and self-perceived ability affected student's anxiety level (Subasi, 2010). Women tend have more report of being and feeling anxious. It was highly negative associated with anxiety report (Miller et al., 2006). A flow state is associated with an emotional state characterized by dimensions of

valence and arousal and organize not only subjective but also somato-physiological responses. After reaching the optimal performance or flow state (FS), individual will experience optimal level of physiological hyper-arousal (PH). The flow which can be characterized as a state of optimal experience that entails participants to be totally immersed in the action effect cause experience of psychological arousal (Csikszentmihalyi, 1975). Physiological arousal will increase heart rates then the blood pressure may produce body sensations so individual tend to respond with fear for sensations or anxiety provoking (Curzik & Begic, 2011). Physiological arousal activation, at least one physiological symptom intends to reflect arousal in social anxiety disorder.

PH covers the somatic arousal (Clark & Watson, 1991). PH is very common feature of anxiety disorders and diagnostic criteria for many anxiety disorders including physiological arousal (American Psychiatric Association, 2013). PH makes higher-order temperamental trait especially underlying anxiety, a predisposition to experience sympathetic nervous system reactivity such as heart rate, respiration, muscular tension, shortness of breath, shaky hands, light-headedness or dizziness, and sweating (Philipp et al., 2008). Individuals with performance anxiety exhibit high PH. High PH is not associated with SAD (Anderson et al., 2010). Noted that the correlation between performance and physiological arousal will be an inverted U in low anxiety, and the correlation will perform dramatically decrease in high anxiety (Cottyn et al., 2006). However, it is important to find better understanding of the correlation between flow state, physiological hyper-arousal, and social anxiety disorder in non-clinical adolescents.

### The Present Study

The present research has been done to investigate a predictive role in the social anxiety disorder on Indonesian university students. This research attempts to replicate a research conducted by Chorpita (2002) using different sample and add FS as independent variable. Understanding of FS, PH, and SAD are some particular interest to be the main focus of this research. It is hypothesized:

a. FS is negatively associated with SAD
b. FS is negatively associated with PH
c. FS is positively associated with SAD
d. FS would have a direct influence on PH, which would lead to SAD.

## Method

### Participants

The research applied on adolescent college student from Faculty of Psychology, in Pekanbaru, Riau, Indonesia. The research subjects are adolescents who had at least one year experience studying at Faculty of Psychology. After excluding four participants which do not fill out all the item of these research's scales, a total number of valid sample as research participant are 407 adolescents (M =19,621 months, range = 17-23 month, SD = 1,153; 87,5

% girls, and 12,5 % boys). Before participant fills out the data collection tools, all participants fill (a) informed consent about the confidentiality of their responses and the academic purposes of the research, and (b) personal identity form about demographic features of participant like age, gender, academic grade used to identify data including active years in college.

## Procedure

Participants are recruited from students in first, second, third, and fourth semester of psychology faculty through announcements in class. Participants provided with certain session before fulfilled the questionnaire. They are provided with several instructions to experience the flow state based on the happiest moment after finish the academic challenge such as final exam. Participant are cautioned not to discuss their flow experienced to others, and if they feel their flow experienced, they can start to write their responses for the questionnaire packets suddenly.

## Measures

### *Flow State (FS) Scale*

The Flow State Scale was developed based on the theoretical framework of peak performance or flow to evaluate the experienced consist of nine dimension of dispositional flow from Csikszentmihalyi (2014). This 36 items are measured using 5 point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). This established scale contains 9 sub scales with 34 items modified scale from Jackson and Marsh (1995). The nine sub scales of flow state area: challenge–skill balance (four items;e.g.,"I was challenged, but I believed in my skills"), action awareness emerging (four items;e.g., "I made the correct movements without thinking of trying to do so"), clear goals (four items; e.g., " It was really clear to me that I was doing well"), unambiguous feedback (four items; e.g., "I knew clearly what I wanted to do"), concentration on task at hand (four items;e.g., "my attention was focused entirely on what I was doing"), sense of control (four items; e.g., "I felt in total control of what I was doing"), loss of consciousness (four items; e.g.,"I was not concerned with what others may have been thinking of me"), transformation of time (four items; e.g., "Time seemed to alter either slowed down or speeded up"), autotelic experience (four items; e.g., "I really enjoyed the experience"). Items rating are summed to get a total score. The reliabilities are adequate ranging from 0,85 to 0,87 across one wave. Alpha in the present is 0,86 (M=122, 31).

### *Physiological Hyper-arousal (PH) Scale*

The physiological hyper-arousal scale that included nine items (such as: "I often have trouble on getting my breath, I have trouble on breathing, My heart beats too fast, I have trouble swallowing, I feel shaky, My hands get sweaty, Often I feel sick in my stomach, I sometimes feel faint, and my mouth gets dry") from the tripartite of emotion scale modified from Chorpita (2002). This nine items are measured using 5 point Likert type scale ranging from 1 (never

true) to 5 (always true). The reliabilities for PH Scale are ranging from 0,729 to 0,781 and those are good at all three waves. Alpha in the present is 0,775.

### *Social Anxiety Disorder (SAD) Scale*

The Social Anxiety Disorder Scale contains nine items (such as: "I am afraid that I will make a fool on myself in front of people, I worry when I think I have done poorly at something, I worry I might look foolish, I worry what other people think of me, I worry about making mistakes, I am scared when I have to take a test, I worry that I will do badly at my school work, I am afraid if I have to talk in front of my class, and I am worried when I think someone is angry with me") based on dimension of anxiety disorder from DSM IV modified from Chorpita (2002). This nine items are measured using 5 point Likert type scale ranging from 1 (never true) to 5 (always true). The reliabilities in the present scale are ranging from 0,726 to 0,768 and it is good at two waves. Alpha in the present is 0,767.

### Analytic Strategy

These research hypotheses analyses are conducted using the SPSS 23.0 and test of significance for the indirect effect are done using the Sobel test by Preacher and Hayes (2004). To answer the first research question, analysis regression is conducted to examine how FS and SAD are related to each other. To answer the second research question, analysis regression is conducted to examine how FS and PH are related to each other. To answer the third research question, analysis regression is conducted to examine how PH and SAD are related to each other with will be accounted for controlling FS. Furthermore, in fourth analyses, we examine analysis regression on how FS and SAD are related to each other with can be accounted for controlling PH. Over all, to find out the predictive value of the total effect FS to SAD and will be accounted for indirect effect through PH, data are analyzed using Sobel Test by Preacher and Hayes.

## Results

Descriptive statistics and Cronbach's alpha coefficients calculated for all of the instruments. Table 1 shows the mean, standard deviation, internal consistency (Cronbach alpha values) for all measures and inter-construct correlation within all variables. The result shows that all variables have significant correlation each other. Descriptive statistics calculated for all of the instruments in this study. Table 2 shows the mean, standard deviations for all measures, and inter-construct correlation among FS dimensions, PH and SA.

**Table 1**

*Mean, Standard Deviation, Alpha and Inter-correlation among All Variables*

| Variable | Mean | SD | Alpha | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| 1.Flow state (FS) | 122.31 | 12.78 | 0.86 | - | | |
| 2.Physiological hyperarousal (PH) | 19.83 | 5.36 | 0.78 | -.23** | - | |
| 3.Social anxiety disorder (SAD) | 29.52 | 5.48 | 0.76 | -.15** | .34** | - |

*Note*. n=407. * $p < 0.05$. ** $p < 0.01$.

Hypotheses analyses used SPSS 23 and test of significance for the indirect effect used the Sobel test by Preacher and Hayes (2004). The first model tested the hypotheses that;

a. FS is negatively related to social anxiety (path c)
b. FS is negatively related to Physiological hyper-arousal (path a)
c. FS is positively related to social anxiety (path b)
d. Total effect on social anxiety will be accounted for indirect effect through physiological hyperarousal (path ab).

**Table 2**

*Descriptive Statistic and Inter-correlation among Flowstate Dimensions, Physiological Hyper-arousal and Social Anxiety*

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Challenge Skill Balance [(a)] | 14.07 | 2.16 | - | | | | | | | | | | |
| 2. Clear goals [(a)] | 12.07 | 2.41 | .46** | - | | | | | | | | | |
| 3. Unambiguous feedback [(a)] | 15.64 | 2.28 | .49** | .28** | - | | | | | | | | |
| 4. Concentration on task at hand [(a)] | 14.52 | 2.24 | .58** | .35** | .62** | - | | | | | | | |
| 5. Action awareness emerging [(a)] | 13.88 | 2.00 | .40** | .11* | .47** | .50** | - | | | | | | |
| 6. Sense of control [(a)] | 13.85 | 2.33 | .51** | .40** | .55** | .60** | .52** | - | | | | | |
| 7. Loss of self consciousness [(a)] | 11.83 | 2.95 | .16** | .29** | .04 | .06 | -.03 | .19** | - | | | | |
| 8. Transformation of time [(a)] | 13.46 | 1.82 | .14** | .09 | .18** | .09 | -.03 | .01 | -.04 | - | | | |
| 9. Autotelic experience [(a)] | 15.49 | 2.39 | .552** | .324** | .527** | .624** | .385** | .474** | .104* | .089 | - | | |
| 10. Physiological hyper-arousal [(b)] | 19.83 | 5.36 | -.24** | -.05 | -.14** | -.19** | -.21** | -.22** | -.01 | -.11* | -.18** | - | |
| 11. Social Anxiety [(c)] | 29.52 | 5.48 | -.15** | -.09 | -.01 | -.11* | -.13** | -.16** | -.12* | .01 | -.07 | .63** | - |

*Note*. n=407. * $p < 0.05$. ** $p < 0.01$.

[(a)] Modified flow state scale from Jackson and Marsh (1995).

[(b)] Modified child anxiety and depression scale - physiological hyper-arousal subscale (Chorpita et al., 2000).

[(c)] Modified anxiety disorder scale - social anxiety disorder subscale (Chorpita et al., 2000).

The model accounts for a significant amount the variance in SAD (F (2,404) = 28.22, p < .001, adjusted R2 = .12). FS is significantly related to SAD (path c; p = .003), as well as significantly related to PH (path a; p <.001) and PH is significantly related to SAD (path b; p < .001). Finally, analyses also indicate an indirect effect of FS to SAD through with PH by Sobel test (path ab, b=-.0323, Z= -3.906, *p* <0.001). It is mean that the PH become mediator between FS and SAD.

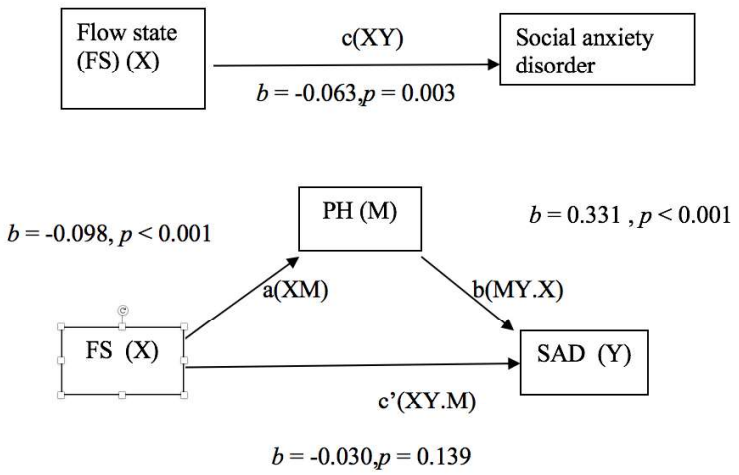
We hypothesize that flow state, and physiological hyper-arousal will be associated with lower level of social anxiety. Further, we hypothesize that adolescent who experienced high level of flow state will be more likely to report slow level social anxiety.

## Discussion

This ongoing analysis continues to the extant research in the situation of social anxiety in youth. Physiological hyper-arousal relates between flow state present to social anxiety disorder indicators determined in this research. Adolescents generally encounter issues in various communal condition, for instance when they must communicate in presence of the class to perform their opinions, deal with communications in everyday public speaking, counseling to their classmates or instructors, and show up social tasks. In such conditions, youths able to encounter several physical manifestations such as annoying breathing, eating, nervous, sweating, and sick in abdomen. Those physical manifestations will arouse physiological hyper-arousal in teenage, leads to get soft and extreme social anxiety. Individuals with social anxiety usually think that they will be blamed by other people or they will respond or accomplish thing that will cause them cautious, or shame on themselves even though they do further interpret and manage their social anxiety manifestations because they can sense flow in their everyday activity.

**Figure 1**

*The Final Model Predicting Proportional Physiological Hyper-arousal Related Social Anxiety*



Due to the SAD previous investigation on this situation, the challenges were greater than the individual's average, meanwhile experiences were fewer than individual's average (Csikszentmihalyi, 1975). The flow state occurs when the challenges and skills after the individuals completely engaged in what they were working out, and when they come together during the performance of their chosen activity (Csikszentmihalyi, 1975). Therefore, this research reported for significant correlation between FS and SAD by handling the presence of PH. This research discovery is coherent with new analysis, whereas when adolescent experience the flow state. They might concentrate for optimal action and supposed to reduce the anxiety from progressive flow. When adolescent experience of flow state, they discover no conflict of opinions or no shames in communication (Kapitan, 2013). Low PH is correlated with SAD and people manage to understand positive social situations and endurance of SAD (Alden et al., 2008; Anderson et al., 2010). PH is a somatic anxiety factor that consists of reactions of tension and panic or SAD (Greene & Chorpita, 2009). SAD is a worry or prevention of being and may avoid swallowing, consuming or working in community that interfere necessarily with the people's routine activities whereas occupational or academic functioning, or social projects or communication, or distress experience (American Psychiatric Association, 2013). The correlation between flow state whereas performance (includes challenges and skills) are greater meanwhile the anxiety tends to dynamic and competitive. Therefore, continuous measurement of anxiety during flow state performance is fundamental. However, the correlation between behaviour and anxiety based on physiological parameters, it is insufficient to expose.

The true nature of the correlation and repeated assessment of cognitive anxiety and physiological arousal during balance beam performance able to give insight into the correlation between performance and anxiety (Cottyn et al., 2006). Manzano et al. (2010) describe about the flow to have physiological effects, the correlation between psychophysiological methods and flow clearly establishes that the understanding has identified to a rise during arousal. Flow by definition is identified by feelings of pleasure and positive affect, since a strong autotelic experience can indeed make external redundant rewards appeared (Csikszentmihalyi, 1997). Furthermore, the state is understood when thoroughly and strongly participated in a task, going on at the peak of understanding under high grades of concentration, which for most tasks shows a state of enhanced arousal. The association between flow on one part and influence arousal on the diverse measures that the flow experience carries certain emotional matter. The performance correlates with a rise in physiological arousal in the competitive context (Cottyn et al, 2006). Specific physiological arousal are flutter, racing mind, and excitement of breathing (Clark & Watson, 1991). Physiological hyper-arousal is an identical constituent of anxiety (McTeague & Lang, 2012). The physiological sense is strong predictors of fearful arousal to anticipate social-speaking state anxiety (Finn et al., 2009).

Anxiety symptoms are more predictive of psychological arousal after end to achieve a troublesome job (Dieleman et al., 2010). Flow experiences contribute to obtain from a harmony between challenges and skills to challenge the person but not so often as to produce anxiety. Imbalance of challenges and skills will lead to inequality and displayed

anxiety (Csikszentmihalyi, 2014). Anxiety have varies physiological hyper-arousal to which it is live (Jordan & Okifuji, 2011).

New analysts have undertaken to find the relationship between PH and specific anxiety disorder. PH is significantly associated with panic disorder (Chorpita, 2002; Brown et al., 1998), general anxiety disorder and is not further associated with social anxiety disorder (Brown et al., 1998). Physiological hyper-arousal is an element of anxiety that characterized anxiety form depression (Joiner et al., 1999). The stronger task-described increases in perceived physiological arousal and present social anxiety. Enhanced levels of heart rate reactivity after end the assignment represent high social anxiety symptoms than those are low in social anxiety syndromes (Gramer et al., 2012). In youths who have social anxiety trajectory are represented by their self-description that involve negative perceptions and physiological and cognitive variables-including distortion awareness and attention of physically anxiety symptoms will forecast the SAD (Siess et al., 2013).

## Strengths, limitations and future directions

There are several limitations of this research. First, research participation is non clinical adolescents and self appraisal report. Subsequent research should consider social anxiety disorder in clinical adolescents, handle certain social anxiety disorder, use the compound assessment of tripartite model of emotion (consists of positive affect, negative affect, and physiological hyper-arousal), apply qualitative phenomena to explore the data. Future analysis should explore correlation between FS, PH and SAD across diverse culture and situations and not particularly measuring perceived physiological hyper-arousal but also actual physiological hyper-arousal too. Those will possibly promote further find out for social anxiety disorder.

## Conclusions

The important present findings of this research is the correlation between the directional negatively FS related to SAD, negatively related FS to PH, positively related FS to SAD, and SAD will be accounted for indirect effect through PH. However, Physiological arousal has been established as key component when individual join a social situation, experience their flow state are estimated to be worried about the visibility of socially anxiety manifestations.

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