# A Stressful Situation: Easing Psychological Stress Experienced by Elite Junior Tennis Players

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## Abstract

Many elite junior athletes strive to use athletics as a means of academic or economic success in their futures. However individual athletes, specifically elite junior tennis players, have been found to have heightened psychological stress as compared to their team sports counterparts. Various factors have been identified as possible causes for this issue, such as parental behavior, sleep deprivation, and improper diets. This study aims to understand those factors and their effects on psychological stress in order to create specific guidelines that can be incorporated into an ideal routine to ease psychological stress for an elite junior tennis player. Through case studies of six male elite junior tennis players that contained interviews as a means of collecting data, responses were gathered that shed light on which factors were most beneficial to the individual's level of psychological stress. A subsequent thematic analysis allowed for connections amongst common themes to be established in order to understand which factors would be included in the ideal routine. The paper was initially written with the assumption that sleeping and dietary guidelines would be main focal points of the ideal routine. Through the research process, however, it was found that instead, positive parental behavioral guidelines and sleeping guidelines would be main focal points of the ideal routine. This research further strengthens connections between sleep and psychological stress, and also indicates that parental behavior may have a stronger connection than previously thought and that certain dietary guidelines cannot be applied to competing elite junior tennis players. Therefore, this study can be used as a basis for further examination of which factors can ease psychological stress in tennis players, as well as a starting point for the creation of more personalized dietary guidelines for athletes.

## I) Introduction

Recently, the importance of athletics has risen greatly as they often help in college admission (Kissinger & Miller, 2009). Football, basketball, and baseball have been recorded to offer the most division 1 scholarships within American colleges (McQuilken, 1996). However, tennis, like most individual sport, tends to be overlooked within America. Nonetheless, tennis offers almost as many scholarship opportunities as football, basketball, and baseball, keeping it a focal point for many aspiring junior athletes (McQuilken, 1996). Team sports players often express excitement in traveling and competing in tournaments, yet this is not the case for many competitive junior tennis players. The levels of stress recorded in tennis players, especially in those that travel and compete at the highest levels, has been strongly suggested by the NCAA to be equivalent to the stress military personnel experience in battle (Humphrey, Yow, & Bowden, 2000). Heightened psychological stress can lead to poor performance during competition, and hurt the future careers of these individual sport athletes (Saferstein, 1989).

Something must be done in order to help these elite junior tennis players--defined as players who qualify for tournaments at or above United States Tennis Association advanced 16s level-- compete at the highest levels without having such immense levels of stress, while ensuring they can have the greatest opportunity for success at the college level and beyond.

As strongly suggested by many studies, elite junior tennis players suffer from a greater degree of psychological stress than other sports players, especially team sports players (Zafra, Andreu, & Redondo, 2011). Psychological stress is defined as the mental or emotional strain from activities and events in life (Kranner, Minibayeva, Beckett, & Seal, 2018). A study by psychologist James Humphrey et al, showed that recorded brain patterns for tennis players depicted increased stimulation in the lobes that relate to anxiety and nervousness when compared to team sports players. Brain scans also have found more activity in the stress signaling portion of tennis players' brains as compared to many other team sports players (Humphrey et al, 2000). Team sports players showed increased activity points towards the continued function of that portion of the brain, but it lessened after play. In elite junior tennis players, however, it has shown to be longer lasting, and at higher levels (Humphrey et al, 2000).

Seeing as this is an issue, it is surprising no widely accessible cures, or routines are available to soothe the heightened psychological stress tennis players face. A routine, defined as a series of predetermined steps or tasks someone is given before, during, and after competition, seems to be both viable and easy to administer due to its adaptability and flexibility.

The purpose of this study is to establish an ideal routine that will help elite junior tennis players ease their psychological stress. The creation of such a routine could also be applicable to many other individual sports players who suffer from similar issues. The necessity of such a routine is immense since individual sports are often overlooked, or professional psychological help for those athletes is extremely expensive. Should such a routine be successfully created, it could greatly help the careers of many aspiring elite junior tennis players.

In order to devise the most effective routine to administer to elite junior tennis players, I must first identify the factors causing these players increased psychological stress as compared to team-based sports players, and understand other possible stressors significantly affecting elite junior tennis players. To do so, it is important to review, synthesize, and analyze the current body of research on, or relating to, the subject, especially pertaining to key psychological stressors, parental factors, and sleep and diet issues that relate to psychological stress in elite junior tennis players. There has been a limited amount of studies conducted in relation to mentioned psychological factors, however, research that has been conducted is thorough and reputable.

## II) Literature Review

### Section i) Key Psychological Stressor and Parental Factors

A study conducted in 1989 on a sample of 79 junior, high-level athletes by licensed sports psychologist Daniel Saferstein, found that competitive trait anxiety(CTA), a type of anxiety in which a tendency arises to perceive competitive situation as threatening and to respond to these situations with feelings of apprehension and tension, affected tennis players more greatly than team sports players (Saferstein, 1989). The study highlighted that the portion of the brain responsible to calm one's nerves was far less active in a tennis player than a team sports player due to the heightened CTA. This corresponds to rigid movement, slower reactions, and poor decision making during competition (Saferstein, 1989). CTA can also be residual,

meaning that athletes who compete at the highest level for longer periods of time experience an increased amount of it. The study concluded that the human brain reacts more adversely to anxiety when put into a situation where someone is alone. This is because there are no peers to depend upon, which is consistent with what is visible between the psychological stress in individual versus team sports players. It becomes clear with this study, that lessening CTA will be the basis of creating an ideal routine that would ease psychological stress in an elite junior tennis player.

The uniqueness of tennis players' psychology comes not only in that they have more intense CTA, but in that often, player's parents are also the ones that offer their children additional coaching. While studies have strongly suggested this to be beneficial due to the ability to connect on deeper emotional and psychological levels, a study conducted by Camilla Knight and Nicholas Holt, a pair of Canadian sports psychology researchers, found a correlation of additional parental coaching and actions(physical and verbal) affecting tennis players psychologically, more than those in team-based situations (Knight & Holt, 2017). Parental coaching is defined as on the side, verbal coaching that can include tips and strategies during practice and competition that aren't necessarily in line with what the main coach is directing. The study, being conducted over several years and following the same juniors, found that parental actions may shape the psychological state to be either more positive or more negative (Knight & Holt, 2017). The lead researcher stated that for tennis players, positive actions such as words of encouragement like "good job" and "keep it up", and offering small verbal or physical rewards regardless of winning or losing could benefit a players psychological state. Negative actions such as verbal or physical abuse could harm a players psychological state (Knight & Holt, 2017). This is assumed to be the case since teams offer psychological reinforcement, while individuals playing tennis have no such support to help them psychologically. Over time, the actions of parents may dictate how their children's psychological state develops. However, the team stated much more research must be done on the subject and that the conclusions should not be considered very certain. Based on these findings, it could possibly be a focal point of the ideal routine to include guidelines for genuine, positive parental behavior before and after competition,

such as small words or phrases of encouragement along with positive reactions to success and avoiding negative reactions to losses.

**Section ii) Sleep and Diet Issues**

Even fewer studies have been conducted on the effect of sleep on sports psychology, and almost none that relate to tennis psychology and sleep. Due to the unpredictable nature of tennis matches, sleeping on time can become an ongoing issue that often cannot be fixed, but rather must be accounted for. This uncertainty and inability to implement strict sleeping guidelines to the routine poses the question of how the lack of sleep affects the psychology, directly or indirectly, of the junior, and if possible, how the effects of a lack of sleep can be eased. One study, led by cognitive neuroscientist at Duke University, Christopher Asplund, found a strong relationship between sustained sleep deprivation and degradation in cognitive and psychological abilities for tasks requiring sustained attention (Asplund & Chee, 2013). This means that being able to focus throughout the progression of a tennis match, becomes increasingly difficult as sleep deprivation increases. This type of handicap would be detrimental to a player's psychological stress as it would add strain, especially during crucial points. The study also found that that sleep deprivation coupled with attempting to sustain attention for long periods causes a decline in the function of the ventral visual cortex of the brain. This leads to sporadic headaches and a slight loss in depth perception and visual clarity (Asplund & Chee, 2013). Such side effects may make psychological stress far greater within elite junior tennis players who depend on depth perception and such visual capabilities during competition. From this study we can see that working proper sleep into the ideal routine could greatly benefit elite junior tennis players psychologically.

Should there be a difficulty in implementing the desired sleeping guidelines in a routine, there are still actions that can be taken to lessen the effects of sleep deprivation. Several studies have looked into factors that can ease the effects of poor sleeping. One of such studies, led by cognitive psychologist Diana Martella, tested whether a differential outcomes procedure(DOP) would help the focus and memory of sleep-deprived individuals. A DOP is the combination of specific stimuli with more general stimuli in order to see patterns in memory (Martella, Plaza,

Estévez, Castillo, & Fuentes, 2012). The study suggests that DOP can aid in overcoming sleep deprivation impaired recognition memory that is responsible for focus and memory. However, it was concluded that nothing can fully cure the drawbacks of chronic sleep deprivation besides proper sleep (Martella et al, 2012). Martella suggests that even quick naps can help in catching up on sleep. So in regards to the routine, this may mean that players may request longer breaks between matches if allowed, in order to take quick "burst" naps of 30-45 minutes to regain some of the losses that sleep deprivation enacted.

Inadequate amounts of sleep have also been linked to heightened risks of injuries to junior athletes. The increased possibility of injury can bring additional stress in the already tense situations of competition play. A study recently published in the Scandinavian Journal of Medicine & Science in Sports, that aimed to find correlations between lack of sleep and injuries in elite junior athletes, found that adolescents that sleep 8 hours or more a night reduce their injury risks by 61% (Rosen et al, 2017). This means that implementing and further observing the benefits of sleep on psychological stress should be a factor that this research focuses on.

The same study also had a secondary focus on analyzing how diet fit into the injury risks of the same elite junior athletes. Notably, they found that proper dietary intake can reduce injury likeliness by around 64%. What is concerning, however, is that they found that even in these elite athletes, intakes of fruits and vegetables were not met 20% and 39% of the time (Rosen et al, 2017). This sheds light on a very important point that is often discounted by even the most dedicated junior players: diet. Within the junior age group of tennis players, very few adhere to strict diets that could reduce their injury likeliness, and consequently improve their psychological state. This means that this is could be a necessary addition to a routine to aid elite junior tennis players psychologically.

In this study, guidelines for proper dietary consumption on a daily basis will be reviewed from the 2015-2020 dietary guidelines set forth by the United States Department of Agriculture(USDA) due to their applicability to many sizes and ages of individuals, and then will be implemented into routines to further understand the effects they have on the psychological stress in elite junior tennis players. Similarly, as the importance of sleep is clear, sleeping guidelines shall be implemented as well. Together--or even alone--sleep and diet guidelines can

possibly decrease the risks of injury which can ease the psychological stressors that impact elite junior tennis players before, during and after competition.

It becomes evident through the reviewed literature that there have been studies on numerous individual factors that are related to psychological stress in elite junior tennis players. But not many, if any, have been conducted on the combination of factors and the effect they can have on psychological stress. Due to this limitation in the current body of literature, my study will be unique as it attempts to bridge this gap in research by combining and understanding the effects of sleeping, dietary, and parental behavioral factors on psychological stress in order to devise an ideal routine to ease psychological stress in elite
junior tennis players.

## III) Hypothesis

I hypothesize that the ideal routine to ease psychological stress in elite junior tennis players will mainly focus on USDA dietary guidelines appropriate for the individual's size and age and set sleeping guidelines that will allow at least 8 hours a sleep per night, with positive parental behavioral guidelines having a significantly smaller part if any. This was based on the strong connections found between sleep, diet, and psychological stress from the reviewed literature, and the uncertainty of conclusions that came from reviewed research conducted on the connection between parental behavioral factors and psychological stress in tennis players.

## IV) Method

In order to test the hypothesis, a case study method containing interviews followed by a thematic analysis was employed. Case studies are close examinations or analyses of people, organizations, or phenomenon (Zucker, 2009). This research is focused on six male elite junior tennis players ranging from 16 to 18 years of age, who were administered the same seven, potentially psychological stress easing routines over a 14-week period. The participants were hand selected due to the small number of elite junior tennis players in a reasonable vicinity of the researcher's location. The participants were all male because accounting for the chemical and physical differences between males and females that could affect psychological stress was

beyond the scope of this study. The case study method allowed for personal and honest responses that allow for the best understanding of the effects of a given routine. Additionally, the case study method allowed for information to be collected very easily, and then enabled the use of a thematic analysis in which the identified themes could be used in the study's purpose of forming an ideal routine.

**Section i) Routines**

In this study, each routine was administered for a two-week time period. The first routine was a baseline with no manipulations to the participants weekly schedule, while the following six routines contained a manipulation of the participants' normal schedule. The first manipulation was enforcing USDA dietary guidelines appropriate for the participant's size and age, the second manipulation was enacting sleeping guidelines that allow at least 8 hours of sleep every night, the third manipulation was giving the participant's guardian(s) guidelines for positive behavior(words and physical actions) to take before, during, and after competition, which included things such as going to the child's competition and offering words of encouragement. The fourth manipulation was a combination of the sleep and dietary guidelines, the fifth manipulation was a combination of sleep and positive parental behavioral guidelines, and the sixth and final manipulation was enacting, sleeping, dietary and positive parental behavioral guidelines. The different combination of factors in the routines were implemented to allow the observation of the full array of the outcomes sleeping, dietary, and parental behavioral factors have with respect to psychological stress.

**Section ii) Interviews**

In order to collect the data necessary to understand the effect of the sleep, diet, and parental behavioral factor manipulations on the psychological stress in elite junior tennis players, informal, open-ended structured interviews were conducted. Informal, open-ended, structured interviews consist of predetermined questions that can be answered in as many or as few words as the participant desires, but lack the formality of a business interview (Maher, 1991). The interviews' lack of formality is necessary to obtain the most honest responses from the

participants, and the open-endedness allows responses to cover a wide spectrum while allowing the participants to feel comfortable in their responses. In this study, the interviews were conducted by the researcher either in person or over video chat during the time of each competition. Participants were interviewed the night before competition, 15 minutes prior to competition, and 15 minutes after competition. Interview questions were posed to assess the participant's personal evaluation of their sleep, diet, and/or guardians' behavior with respect to the routine and psychological stress during competition. The participants' evaluation of their level of psychological stress was used as the measurement of psychological stress in this study. To establish reliability in the study and to draw valid conclusions from the data, it is assumed that all participants followed the routines completely unless they state otherwise, and that their responses will be honest. Additionally, it is assumed that parents will follow the given positive parental behavioral guidelines when asked for from them by a routine.

**Section iii) Thematic Analysis**

After the interviews were completed, the research proceeded to the qualitative thematic analysis. Thematic analysis is a method of analysis which determines a relationship between common themes in a sample of collected data (Thomas, 2010). For the purpose of this research, this method was employed to analyze and classify the responses from the interview process. Then to identify how common themes across all responses from all six participant interview could be used in the formation of an ideal routine.

The thematic analysis was split into two sections. The first being identifying similar, recurring outcomes--which came as a result of the administered routines to the participants--from differing interview responses. And the second being to group the similar outcomes and labeling them with overarching themes. Some parts of the responses were not related to psychological stress, and so were omitted from the thematic analysis as they were not significant for the purpose of my study.

The first section of the thematic analysis was used to understand what each manipulation did for the psychological stress in the participants and to allow for the establishment of themes. In the second section, the found themes were analyzed for recurrence within the responses in

order to achieve a deeper understanding of which manipulations best eased psychological stress in the participants. The overall goal of the thematic analysis then, was to achieve this deeper understanding in order to make valid conclusions about which factors should be included in an ideal routine to ease psychological stress in elite junior tennis players.

## V) Research Findings

Before discussing why the findings were coded into a table, it is necessary to first define what each theme represents. From all six sets of interviews, five themes emerged. Those themes along with their definition have been coded into the Table 1 below.

**Table 1: Theme Definitions**

| **Theme** | **Definition** |
|---|---|
| Helpful Sleeping Guidelines | Participant identified that set sleeping guidelines that allow at least 8 hours of sleep per night were helpful in easing psychological stress. |
| Helpful Dietary Guidelines | Participant identified that USDA dietary guidelines helped ease psychological stress. |
| Unbeneficial Dietary Guidelines | Participant identified that USDA dietary guidelines did not help ease psychological stress, or that the guidelines added to psychological stress. |
| Helpful Positive Parental Behavior | Participant identified that the guided positive parental behavior was helpful in easing psychological stress. |
| Unbeneficial Positive Parental Behavior | Participant identified that the guided positive parental behavior was not helpful in easing psychological stress, or that it added to psychological stress. |

The responses collected from the 14 week period of informal, open-ended, structured interviews have been compiled in the second column of the table below. Due to the focus of this study, the participant responses have been condensed to include only the most key points that are related to

dietary guidelines, sleeping guidelines, positive parental behavioral guidelines, and psychological stress. Participants have not been identified by name, hence the first column is simply a number that has been randomly assigned to the participant. The importance of coding the data into a table is that it makes identifying common key points easier, allowing for clarity when labeling themes among the responses, which has been done in the third column. The table also enables the establishment of which themes were recurring. Those themes, when thematically analyzed, can help establish which specific factors were most helpful and should be included in the creation of an ideal routine to ease experienced psychological stress. In essence, the use of coding information into a table is to list the most important factors that the participants identified as psychologically easing or hurting, and then to assign themes and understand what overall common themes can be established in order to draw valid conclusions afterward.

**Table 2: Summary of Participant Responses**

| Participant # | Key Points of Responses | Corresponding Themes |
|---|---|---|
| 1 | Felt that sleeping at least 8 hours per night rather than usual 5-6 hours per night greatly helped performance and eased stress felt during competition.<br>*****<br>Positive change in parental behavior decreased pressure to perform and participant felt that this enabled him to feel the best he had felt psychologically ever.<br>*****<br>Dietary guidelines felt forced and difficult to follow and showed no improvement in stress levels according to the participant. Participant felt hungry often when dietary guidelines were in place. | Helpful Sleeping Guidelines<br><br>Helpful Positive Parental Behavior<br><br>Unbeneficial Dietary Guidelines |
| 2 | Positive behavior from parents helped ease psychological stress during competition by achieving a newfound feeling of support.<br>*****<br>Dietary guidelines were difficult to remember due to strong consumption habits already present and so they were not followed well.<br>*****<br>Participant identified that he did not sleep at least 8 hours every day when the given routine asked of it. But he did say that when he slept 8 hours or more a night, he felt reduced the level | Helpful Positive Parental Behavior<br><br>Unbeneficial Dietary Guidelines<br><br>Helpful Sleeping Guidelines |

| | | |
|---|---|---|
| | psychological stress. | |
| 3 | Participants felt that positive parental behavior played no role in reducing psychological stress, he actually felt more pressure to perform.<br>*****<br>Participant identified that the set sleeping guidelines made the participant feel like he had better decision making during competition which lessened psychological stress.<br>*****<br>Dietary guidelines helped aid psychological stress. The participant felt better about himself physically at the end of the second week both times dietary guidelines were enforced. | Unbeneficial Positive Parental Behavior<br><br>Helpful Sleeping Guidelines<br><br>Helpful Dietary Guidelines |
| 4 | Participant felt that being able to sleep at least 8 hours a night was 'extremely' helpful in feeling more relaxed during competition, which the participant said reduced psychological stress greatly.<br>*****<br>The dietary guidelines felt unfulfilling as the participant was used to eating 'much more' than the USDA guidelines called for. The guidelines did not ease psychological stress.<br>*****<br>Positive parental behavior, especially encouraging words, made participant feel additional motivation to perform well. This translated into better focus and decreased psychological stress as stated by the participant. | Helpful Sleeping Guidelines<br><br>Unbeneficial Dietary Guidelines<br><br>Helpful Positive Parental Behavior |
| 5 | Participant identified that positive parental behavior eased psychological stress significantly by reducing the pressure to perform. The participant also stated that this allowed him to play more freely and he played 'as good as he ever had' which drew more positive parental behavior.<br>*****<br>Participant stated that he normally slept less than 4 hours nights before competition. When he slept closer to 8 hours a night, he said that he felt like a new, more confident person, which greatly lowered psychological stress.<br>*****<br>Participant stated that dietary guidelines helped with energy levels during the later stages of competition. The participant stated this in turn lessened their psychological stress during competition. | Helpful Positive Parental Behavior<br><br>Helpful Sleeping Guidelines<br><br>Helpful Dietary Guidelines |
| 6 | Participant felt that the dietary guidelines were not personal | Unbeneficial Dietary |

| | | |
|---|---|---|
| | enough and far too restrictive. The participant stated that the guidelines had no impact on reducing psychological stress.<br>*****<br>Participant was clear in stating that positive parental behavioral guidelines were not helpful in easing psychological stress. The participant said the behavioral changes noticed due to the guidelines seemed forced and were difficult to connect with.<br>*****<br>Participant said that by sleeping at least 8 hours a day, especially before competition, his anxiety level and thus his psychological stress levels decreased noticeably. | Guidelines<br><br>Unbeneficial Positive Parental Behavior<br><br>Helpful Sleeping Guidelines |

## VI) Results of Thematic Analysis

The responses collected through the informal, open-ended, structured interviews outlined the effects that guided sleeping, diet, and positive parental behavior had on the psychological stress in the elite junior tennis players. These effects were categorized by theme, and then examined through a thematic analysis. The raw, condensed responses and the corresponding themes can be found in Table 2, and each theme's definition is listed within table 1. This section mainly discusses the results of the thematic analysis as well as the conclusions that my research data suggests. Firstly, it is crucial to see which themes are repeated throughout all six responses. By establishing which themes were recurring, it will be possible to observe which effects as a result of the administered routines came up most often in the participants. Although there were a total of five themes that emerged in the responses, only three surfaced consistently. Therefore, these three themes can shed light on what common effect each of the manipulated factors had on the participants with respect to psychological stress, allowing us to understand which factors to include in the ideal routine to ease psychological stress in elite junior tennis players.

### Recurring Theme 1: Helpful Sleeping Guidelines

Out of the five identified themes, the one that was most common in each of the six responses was helpful sleeping guidelines. All six of the participants stated that the sleeping guidelines that allowed at least 8 hours of sleep per night were helpful in easing psychological stress, especially during competition. Most of the reasons that the participants cited as to why

they believed the sleeping guidelines were helpful in easing psychological stress were along the lines of being more refreshed physically and mentally, which usually resulted in boosted confidence. For example, in their response to the interview after a competition during the week that only sleeping guidelines were enforced, participant 1 stated that,

*"I could feel it from when I woke up. I felt more, uh, more energetic you could say. I didn't have the same struggle as I usually did to get out of bed and get ready to compete. Even on the way to the tournament location I wasn't feeling nearly as nervous, or anxious, would be a better word to use. When I noticed the difference the most was when I began my 10 [minute warm up] against the guy I was facing in my first round. I definitely felt looser at the start and I think that helped me play better from the start which really boosted my confidence when the match went into the later stages. I know for sure that I wasn't nearly as tired as I usually would have been during the 9th game [of the set] when it really starts getting stressful. I was probably thinking more clearly too, maybe quicker, if that makes any sense."*

Participant 1 essentially felt that the sleeping guidelines were a great factor in reducing the psychological stress experienced not only during competition, but also before it. Rather than the normal stiffness and anxiety, participant 1 stated that the sleeping guidelines lessened the severity of both issues, which in turn lowered psychological stress. Although their reasonings were slightly different from one another, all participants expressed a similar sentiment with respect to the routine easing psychological stress in some capacity. Even though participant 2 did not follow the sleeping guidelines all the time, when he did, he too noted that he felt less psychological stress. Participant 2's data would only be unreliable had it not shown that the sleeping guidelines were helpful. However, since the response *did* show that the guidelines eased psychological stress, this especially demonstrates that even minimal compliance to the sleeping guidelines can show promising results in terms of easing psychological stress. Because of the prominence of the helpful sleeping guidelines theme in all six responses, the research findings suggest that sleeping guidelines that allow for at least 8 hours of sleep per night should be a main focal point in the ideal routine to lessen psychological stress in elite junior tennis players.

**Recurring Theme 2: Helpful Positive Parental Behavior**

As stated in Table 1, identifying that positive parental behavioral guidelines were helpful in easing psychological stress defined the helpful positive parental behavior theme. Four out of the six participant responses fell underneath this theme. Specifically, participants 1, 2, 4, and 5 stated in their interviews that the positive parental behavior eased psychological stress during competition in some way. One specific interview response that highlighted exactly how impactful the positive parental behavioral guidelines were, was from participant 5. The following response came during the 2-week period in which the only manipulation was enacting the parental guidelines. The participant stated,

*"Usually my dad comes to watch and I feel this crazy pressure to perform because of how critical he is of how I played after [ the competition]. But like when he had to follow the guidelines, or whatever, he seemed to chill down a lot more and I felt like he was happy with me as long as I tried my best, which I always did. It was specifically the second week though, [because] the first week seemed kinda forced, you know? But he got a hang of it, you could say, and he started actually showing more positive gestures and I felt less pressure and I felt like that helped me loosen up and play my best tennis. And surprisingly, he was even more positive than ever, and it sort of started this cycle where he'd be positive before [the competition] and I'd play really good and he'd be even more positive and supportive and it kept getting better and better."*

Participants 1,2, and 4 also had similar responses, citing that they felt less pressure during competition due to the increased feeling of support, thereby easing psychological stress. Participant 5's response gives insight on how helpful the parental guidelines can be, and that after just a few weeks of enforcing them, the positive parental behavior can become natural and create a better, less stressful environment for the player to succeed. Seeing as how such a simple factor can have such great results in easing psychological stress for the majority of the

participants, validates that guidelines for positive parental behavior must be another focal point in the ideal routine to lessen psychological stress in elite junior tennis players.

**Recurring Theme 3: Unbeneficial Dietary Guidelines**

Four of the participants-1,2,4 and 6-stated in one or more of their responses that the dietary guidelines were not helpful or even added to psychological stress. It became obvious when analyzing the data that a majority of the participants had complaints on how restrictive or difficult the guidelines were to follow. After further review of the USDA guidelines, although they do offer age and size specific dietary suggestions, it was found that they are not personalized enough to account for the amount of physical activity a tennis player will perform during a competition. As put by participant 6, " The dietary guidelines felt more like a chore and in the end they had no impact [on psychological stress], at least for me. I usually eat a lot more than what I was allowed by the guidelines, so they definitely were not the right guidelines for my diet." Participant 6 acknowledges an important point in that the guidelines are meant for the average human, not for an elite junior tennis player. All four participants also mentioned that their routines were "easier" or more "convenient" without the use of the USDA dietary guidelines. like participant 6, participant 1 also said he would normally eat more food than what was allowed by the guidelines. Participant 1 elaborated in saying that he often felt hungry during competition because of this, which could have increased psychological stress. Even though two of the participants did say that the dietary guidelines helped reduce psychological stress, since the majority had justified reasons as to why the guidelines were not beneficial, it is logical to conclude that USDA dietary guidelines should not be included in the ideal routine to lessen psychological stress in elite junior tennis players.

## VII) Limitations

Before moving on to discuss the results my study yielded, it is necessary to identify limitations of the research. The biggest of these was the time frame allotted to each routine. Due to the allowed time period to complete the research and the need to cover as many combinations of factors possible, it was only possible to administer each routine for a two-week period. Having

additional time would have greatly increased the depth of understanding achieved of each factor, especially the dietary guidelines. Participant 3 had stated in a response that he felt better psychologically “near the end of the second week”, which shows that the dietary guidelines may need more than the allocated two week period to take effect. Since time was a limitation in this study, the number of factors that were tested became a limitation. Because this study sought to be thorough in its research and analysis, it was only possible to test diet, sleep, and parental behavioral factors. Testing more factors could have helped in making the ideal routine to ease psychological stress in elite junior tennis players in a more complete and effective manner. Another limitation of this study is sample size and population. Upon searching for participants, only six junior males were willing to commit to the 14-week study period within fifty miles of my location. Having more participants to interview would have made the results more robust, and possibly produced more accurate conclusions. Furthermore, since all the participants were junior males, the conclusions of this study are only applicable to male elite junior tennis players.

## VIII) Discussion of Results

Therefore, the results of this study suggest that the initial hypothesis was partially incorrect: rather than the ideal routine having main focuses on sleeping and USDA dietary guidelines, with positive parental behavioral guidelines playing little to no part, the main focuses should be sleeping guidelines and positive parental behavioral guidelines, with USDA dietary guidelines playing little to no part. Furthermore, due to the extent to which participants cited that the sleeping guidelines eased psychological stress, it can be concluded that sleeping guidelines that allow 8 hours of sleep per night must be the primary focus of the ideal routine to ease psychological stress. The positive parental behavioral guidelines were cited to ease psychological stress often as well. However, the two participants who did not believe the parental guidelines were helpful demonstrate that the guidelines may need to be adjusted based on the individual’s personal needs and habits. Nonetheless, positive parental behavioral guidelines, just as sleeping guidelines, must be implemented into the ideal routine to ease psychological stress.

The conclusion of this study has multiple implications for the future of elite junior tennis players and the study of psychological stress. The conclusion of this study supports and possibly

confirms the conclusions set forth by the Canadian research team that looked specifically at the relationship between parental actions and psychological stress. Just as their study asserted, my study found that parental behavior can positively shape the psychological state of the player. Additionally, my conclusion was in line with the findings of Michael Chee's research. The responses that I collected exemplified that *more* sleep *improved* cognitive abilities which makes sense as Chee stated that *less* sleep *decreased* cognitive abilities.

The disparity between the initial hypothesis of USDA dietary guidelines being a main focal point in the ideal routine, and the final conclusion of USDA guidelines should not be a focal point in the ideal routine, suggests that elite junior tennis players require very specific and personal dietary guidelines that can address the increased activity performed and energy needed during competition. The initial hypothesis was based on the findings that eating the proper amounts of nutritious foods can reduce injury likelihood in athletes, which can consequently reduce psychological stress(Rosen et al, 2017). However, seeing as the hypothesis was disproved, it will be necessary for further research to be conducted on the subject of diet and its relation to psychological stress. Two of the participants did notice improvements with the implementation of the dietary guidelines, so it is possible that with more focused research on diet, new dietary guidelines can be created that are more personalized and effective in reducing psychological stress than the administered USDA guidelines.

Through the results of my study, it is possible for elite junior tennis players to adopt the sleeping guidelines and for their parents to employ the positive parental behavioral guidelines. As of now, the ideal routine shall only consist of these two factors, but they can be a good beginning point for junior elite players to ease psychological stress and be more successful in competition.

As mentioned, sleeping and parental guidelines shall only be a beginning point. To update and perfect the ideal routine to ease psychological stress, further research should be conducted on, but not limited to, additional factors such as age, physical build, and academic performance and their relationship with psychological stress. Moreover, further research could also be centered on finding whether the conclusions found by this study can be applied to females, or what alterations are necessary to better suit the female elite junior tennis player.

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