

ELİF KOÇ

COMPARISON OF IMPOSTER-RELATED GROUPS BASED IN PISA 2018  
DATASET

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*To my family and friends*

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Elif Koç

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İHSAN DOĞRAMACI BILKENT UNIVERSITY  
GRADUATE SCHOOL OF EDUCATION  
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January, 2023

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum & Instruction.

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**ABSTRACT****COMPARISON OF IMPOSTER-RELATED GROUPS BASED IN PISA 2018  
DATASET**

Elif Koç

MA in Curriculum and Instruction

Advisor: Asst. Prof. Dr. İlker Kalender

January 2023

Fraudulent feelings affect some people in a way that they don't attribute their success to effort and intelligence. Instead, they feel that they succeed because of luck or a mistake. These people are said to have imposter syndrome (Koç Doğan & Yenel, 2022). Identification of factors associated with imposter syndrome during school years may help (Corkett & Benevides, 2011). The study aims to examine the differences between three student groups: students with imposter feeling, students with imposter syndrome, and students without imposter syndrome based on PISA 2018 data. The students were separated into three groups, which are students with imposter feeling, students with imposter syndrome and without imposter syndrome, according to their self-efficacy, fear of failure, and mathematical literacy performances. Comparisons among three groups were made with respect to variables that are associated with imposter syndrome. The means of each group were compared. Results indicated that imposter syndrome and imposter feeling could be related to students' economic, social, and cultural status, sense of belonging to the school, parental support, and attitudes toward competition.

*Keywords:* Imposter syndrome, fear of failure, self-efficacy, mathematical literacy, PISA 2018

## ÖZET

PISA 2018 Verilerine Göre Sahtekârlık Sendromu ile İlişkili Öğrenci Gruplarının

Karşılaştırılması

Elif Koç

Eğitim Programları ve Öğretim Yüksek Lisans Programı

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Aldatıcı duygular, bazı insanları başarılarını çabaya ve zekaya bağlamayacak şekilde etkilemektedir. Bunun yerine başarılarının kaynağının şans ya da bir hata olduğunu düşünürler. Bu kişilerde imposter sendromu veya kaynaklarda geçen adıyla sahtekârlık sendromu olduğu söylenir (Koç Doğan & Yenel, 2022). Okul yıllarında sahtekârlık sendromuyla ilişkili faktörlerin incelenmesi öğrencilere bu sendromdan kurtulmaları için yardımcı olabilir (Corkett & Benevides, 2011). Çalışma, PISA 2018 verilerine bakarak sahtekârlık sendromuyla ilişkili olabilecek üç grubun arasındaki farkları incelemeyi amaçlamaktadır. Öğrenciler PISA 2018 verilerine göre; öz yeterlik, başarısızlık korkusu ve matematik okuryazarlığı performanslarına göre gruplara ayrılmıştır; potansiyel sahtekârlık sendromu olabilecek öğrenciler, sahtekârlık sendromu olan öğrenciler ve sahtekârlık sendromu olmayan öğrenciler. Sahtekârlık sendromu ile ilişkili değişkenler açısından her grubun ortalamaları karşılaştırılmıştır. Sonuçlar, potansiyel sahtekârlık sendromu olabilecek, sahtekârlık sendromu olan ve sahtekârlık sendromu olmayan öğrencilerin karşılaştırılan değişkenler arasındaki en büyük farkın ekonomik, sosyal ve kültürel statüleri, okula aidiyet duygusu, ebeveyn desteği ve rekabete yönelik tutumları olduğu görülmüştür.

*Anahtar Kelimeler:* sahtekârlık sendromu, başarısızlık korkusu, öz-yeterlik, matematik okuryazarlığı, PISA 2018

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## CHAPTER 1: INTRODUCTION

### Introduction

"Everyone here is so successful! They are so smart and accomplished.

I do not belong in this group. I wonder if I got invited by mistake."

(Chandra et al., 2019, p. 26)

The above quotation is from a person who experiences imposter syndrome.

Some successful people might suffer from fraudulent feelings, and they might believe that they are not successful. They feel that they succeed not because of effort or intelligence. Instead, they think their achievement results from luck or a mistake (Bothello & Roulet, 2019; Chandra et al., 2019). Such people are called having imposter syndrome.

In the literature there are different definitions for imposter syndrome. The first appearance is defined by Clance and Imes (1978), who described it as a phenomenon. They defined 'impostor phenomenon' while they were working for their psychotherapy study with more than 150 academically successful women, some of whom doubt their achievement is not the result of their effort or intelligence. Clance and Imes (1978) defined these women as having imposter syndrome. They believed that they were lucky, or their academic skills were overestimated. People suffering from imposter phenomenon demonstrate anxiety, lack of self-confidence, depression, and frustration related to inability to meet expectations of a given task, expectations of their colleagues and superiors. Additionally, Bothello and Roulet (2019) defined students as having imposter syndrome; they do not take credit for their success and are unaware of their potential. In general, imposter syndrome can be related to self-doubt about people's achievement, so that this syndrome can be

known as a fraud syndrome and perceived fraudulence (Bravata et al., 2020). Also, imposter syndrome can be seen as imposter phenomenon (Harvey, 1981; Kolligian & Sternberg, 1991). In the literature, sometimes the word imposter is spelled with an e and sometimes with an o (i.e., impostor); in the current study the former spelling were used.

This chapter provides a summary of key research in the literature on students with imposter syndrome. Then, it presents the problem, the purpose, and the research questions and significance of the study. Definitions about the research is provided at the end of this chapter.

### **Background**

Academic achievement might be associated with students' skills and with the ability to transmit these skills orally and/or written in schools. The current academic achievement of students could be an indicator for their future life and career. In parallel to this, there is much research conducted about the achievement of students. There are several variables that affect achievement, such as socio-economic status of students, parental support, teachers' expectations, students' motivation, students' emotional and physical well-being, students' attitudes toward school, and the relationships between friends (Kpolovie et al., 2014; Sonnak & Towell, 2001; Thompson et al., 1998).

Students' self-efficacy is one of the predictors of their academic achievement (Pajares & Johnson, 1996; Pajares & Kranzler, 1995; Pajares & Miller, 1994). Bandura (1995) defines self-efficacy as people's belief in their capabilities of action needed to achieve specific situations. Many researchers demonstrated that students' self-efficacy and academic performances are correlated (Özer & Anıl, 2011; Pajares & Johnson, 1996; Pajares & Kranzler, 1995; Pajares & Miller, 1994; Phan, 2012).

This is valid for several domains. For example, self-efficacy and other self-concepts are significant variables associated with students' perceptions about their academic achievements in mathematics. In addition to this, PISA 2003 data shows that there is a strong relationship between mathematical self-efficacy and mathematical achievement (Phan, 2012). Additionally, Özer and Anıl (2011) analyzed PISA 2006 data and demonstrated that mathematical achievement is related to mathematical self-concept.

Despite these findings, some students' self-efficacy and self-concept are not major contributors to their academic achievement. These students may not be aware of their academic success and their potential. They may believe their school grades or success are the results of luck or chance. although these students are successful, they have low self-concept and low self-efficacy. That is why these students' self-concepts and self-efficacy are not predictors of their academic achievement (Bothello & Roulet, 2019).

Clance and Imes (1978) were among the first researchers to give a title to these successful individuals with self-doubt. They defined the “impostor phenomenon” for the first time in the literature after working with more than 150 academically successful women for their psychotherapy study. These women who experienced imposter syndrome believed that they were not successful enough to be in their current place. They believed that they were lucky, or their academic skills were overestimated. That is why they might have negative feeling about themselves about lack of meeting expectations. Therefore, although they are high achievers, they tend to suffer from a lack of self-efficacy and self-concept, and many express self-doubt.

There is no unique way to diagnose imposter syndrome. For example, to measure and diagnose impostor syndrome, Harvey (1981) developed a 14-item scale and, Clance (1985) created a scale with 20 items for measuring the impostor phenomenon. Additionally, there are other scales such as the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991). Moreover, Holmes et al. (1993) compared several indicators of imposter syndrome and reported that imposters tend to face more fear of failure, fear of others' opinion about their success, feeling inadequate and that they might not deserve their current achievements.

Besides imposter scales, there are much other research about imposter syndrome. For example, there are some studies about common personality types of imposters (Chandra et al., 2019; Clance & Imes, 1978; Lane, 2015; Lee et al., 2021), they found common features of imposters such as high anxiety level because of the fear failure, and tendency of having depression. Therefore, students' well-being, mental health and attitudes towards school values might be associated with imposter syndrome. Emotional status can be related to family pattern and their background like socio-economic status. Besides, Bussotti (1990) revealed families' attitudes may influence the development of having imposter syndrome. Additionally, they demonstrated imposters may share common motivational patterns. Based on Deci and Ryan's study (2000) motivation has three components which are competence, autonomy, and relatedness. That is why there might be relationship between sense of belonging at school and imposter syndrome. Furthermore, people with imposter syndrome have anxiety because of fear of under covered by others and they would think imposters do not deserve their current status. Thus, imposters tend to demonstrate themselves to other people. Vaughn et al. (2020) suggested imposters might have extrinsic motivation because of the desire of the need for approval by

others. Although imposters live with self-doubt, they might have high expectations from themselves and have perfectionist approaches. That is why imposters achievement goals, motivational patterns need to be considered. These people tend to affect the peer relation in learning environment. Peer collaboration, competition and imposter syndrome can be associated with each other. Canning et al. (2020) stated that imposter students might feel more competitive. On the other hand, Ames and Archer (1988) recommended they might feel less comfortable in group work in consequence of fear of uncovering as having lack of intelligence.

### **Problem**

The literature mentioned self-efficacy and academic achievement are correlated with each other (Özer & Anıl, 2011; Pajares & Johnson, 1996; Pajares & Kranzler, 1995; Pajares & Miller, 1994; Phan, 2012). Even though, for students with imposter syndrome have self-doubt and lack of self-efficacy, they are academically high achievers. Thus, imposter syndrome is an interesting concept for education. As noted in the background, PISA data typically shows that students in with high self-efficacy have strong academic achievement. Are there exceptions to this pattern? Can the differences between students with imposter syndrome and students without be demonstrated by analyzing the PISA data? Although PISA data have not been analyzed to study this syndrome, this study could provide some insights and inferences into factors that contribute to academic achievement in mathematics.

Also, while researchers identified some of the factors that contribute to imposter syndrome, why some individuals suffer from imposter syndrome is unclear. Further research is necessary to examine the factors associated with imposter syndrome, especially for adolescents. Arnett (2000) claimed that, imposter syndrome might emerge during adolescents and continue adulthood. Much research

demonstrates living as an imposter is challenging for their mental health (Langford & Clance, 1993; Vilwocck et al., 2016). That is why imposter syndrome should be studied with high school students more. What is more, in the literature, most studies focused on the comparison of people with imposter syndrome and without. However, there might be students needed to consider as students with potential imposter syndrome who could deal with lack of self-efficacy and fear of failure. That is why, comparison between three student groups; students with potential imposter syndrome, students with imposter syndrome and students without imposter syndrome is needed.

### **Purpose**

The purpose of the study is to compare three different groups of 15-year-old students with respect to some variables that were considered to be associated with imposter syndrome based on PISA 2018 data set. This study used responses given to student questionnaire defined three different groups of students (i.e., students with imposter feeling, students with imposter syndrome and students without imposter syndrome). Comparison was made with respect to the following variables: index of economic, social and cultural status of students' families, family support, students' learning goals and motivation, attitudes towards peer collaboration and competition, sense of belonging to school, and attitudes towards school values.

### **Research Questions**

This study addressed the following a main and sub-questions:

1. What are the characteristics of students in Turkish data set with imposter feeling, students with imposter syndrome and students without imposter syndrome based on PISA 2018 student questionnaire variables?

2. What are the differences between students with imposter syndrome and without imposter syndrome based on PISA 2018 Turkish data set in terms of
  - a. Family background in terms of the index of economic, social and cultural status
  - b. Parental support perceived by students
  - c. Students' attitudes towards school
  - d. Students' sense of belonging at school
  - e. Students' attitudes towards competition
  - f. Perception of student' towards co-operation
  - g. Perception of student' towards co-operation competition
  - h. Students' motivation to mastery tasks
  - i. Students' learning goals

### **Significance**

This study investigated the potential differences between imposter syndrome based on PISA data. There are several variables for measuring students' perceptions that may be associated with imposter syndrome. However, there are items and/or factors specifically designed to assess self-efficacy and fear of failure in the PISA data set. Therefore, by using those variables in PISA 2018 cycle, this study may distinguish students experiencing imposter syndrome by looking at variables on PISA 2018 Turkish data set.

Investigation of potential differences between these three groups of students may demonstrate the factors behind feeling like an imposter. According to Pajares and Miller (1994), students who have a misconception about their ability may result in high anxiety and undesirable attitudes towards lessons. Students may receive help

to increase their self-efficacy if the factors are known behind this syndrome. The results of this study may shed light on this matter.

Additionally, instructors' teaching approaches could influence students' attitudes toward schools and students themselves; therefore, teachers may help students gain more accurate perceptions (Corkett et al., 2011). Teachers might use the findings of this study to decrease the fear of failure of students and increase their self-efficacy. Moreover, they can help their students increase their intrinsic motivation and mastery of the task. This study may also provide some clues for parental support.

## CHAPTER 2: REVIEW OF RELATED LITERATURE

### Introduction

This study investigated the differences between 15-year students with imposter feeling, imposter syndrome and students without imposter syndrome. This study used PISA 2018 dataset (variables self-efficacy and fear of failure) to define a profile of students with imposter syndrome and nine student questionnaire variables (students' attitudes towards school, index of economic, social, and cultural status, competitiveness, students' perception of competitiveness at school and cooperation at school, parents' emotional support perceived by students, work mastery, sense of belonging) to compare three groups of students; the students with imposter feelings, students with imposter syndrome and students without imposter syndrome.

This chapter reviews the literature related to imposter syndrome. It begins by presenting earlier studies about imposter syndrome and comparing their findings to current studies. Next, studies that have identified symptoms of imposter syndrome are highlighted. To date, no studies have used PISA data to explore attributes of imposter syndrome; however, researchers have manipulated the data to examine other characteristics that affect students' achievement. Therefore, the final section of this review presents a few of these studies and discuss how the research strategies may be applied to current research.

### Early Investigations of Imposter Syndrome

Clance and Imes (1978) defined and used the term *imposter syndrome* for the first time in the literature. They used the term "impostor phenomenon" (imposter and impostor are used interchangeably) while working with more than 150 high achiever women for their psychotherapy research; participants believed that they were not

successful enough to be where they are. They thought that they were just lucky or that their academic skills were overrated. After the study, based on their observations, they identified those women as having imposters syndromes.

People who demonstrated common personal characteristics, called imposters, were acting like they were not suitable and adequate in their places. People with this pattern stated that they had anxiety that others would understand they did not deserve their achievements and places. Clance and Imes' study (1978) investigated women with PhDs in particular. Even though researchers defined these women as high achievers, the participants insist that their success is related to everything but their effort or intelligence.

The first study about imposter syndrome focused on women and the common belief that people who suffer from the imposter phenomenon were primarily women. Moreover, they mentioned that families' and society' anticipations for women, gender roles, and stereotypes might affect these women's self-validation. It is well-known that women were not expected to succeed academically in that period of time, and possible still today. On the other hand, the following research demonstrated that men could live with imposter syndrome as well, since there are no statistically significant differences between genders in facing the impostor phenomenon (Bussotti, 1990; Langford, 1990). Also, current studies have shown that imposter syndrome can be seen in both genders almost equally; therefore, gender may not be an indicator of imposter syndrome based on recent studies (Calesman et al., 2006; Langford & Clance, 1993; Noskeau et al., 2021; Thompson et al., 1998).

Bussotti's (1990) was one of the first studies conducted on the relationship between imposter syndrome and family environment, demonstrating a significant relationship between them. He used the Family Environment Scale (FES) to compare

family attitudes of imposters and non-imposters. One of the findings is that imposters tend to define themselves as less helpful and unsupportive. Their relationships are more distant and may be based on rules and conflicts.

Additionally, Bussotti (1990) mentioned the relationship between family roles and imposter syndrome. People with imposter syndrome might feel a lack of self-esteem and negative self-impression because of the expectations of their families and their role in their family environment. Bussotti (1990) states that gender roles, birth order, and imposter syndrome are related. As an example of these findings, Bussotti provides an imposter male middle children example. They tend to identify themselves as "popular", "sensitive" and "needing to please" (p. 75) compared to male participants without imposter syndrome.

### **Identification of Imposter Syndrome**

For identifying people with impostor syndrome, several tools were developed. Before Imposter Phenomenon Scales, research was conducted via researchers' observations. For example, Harvey (1981) developed the first imposter syndrome scale, including 14 items. Every item provides seven options for participants. There is also another scale which is called Clance Imposter Scale, developed by Clance in 1985. This scale includes 20 items, and each offers five options for participants; 1 is for not at all true, 2 is for rarely, 3 is for sometimes, 4 is for often, 5 is for very true. Harvey (1981) and Clance's (1985) scales have common points that could indicate common symptoms of imposter syndrome. Scales are based on general characteristic traits of imposter phenomenon like fraudulence, high fear of failure, the anxiety of being undercover from others, and underestimation of intelligence and ability. However, diagnosis of imposter syndrome might be

challenging from observation, because imposters might be scared of unrevealing from others. That is why, they might act differently during the observations.

As it is mentioned in previous sections, imposter syndrome was defined in 1978, then the first imposter syndrome scale was created by Harvey in 1981. The previous research was based on observations (Hellman & Caselman, 2004). However, Harvey Imposter Phenomenon Scale (1981) is problematic to many researchers because of inconsistency and insufficiency of distinguishing between people with imposter syndrome and those without (Chrisman et al., 1995). Harvey Imposter Syndrome Scale (1981) includes 14 items based on a 7-point Likert-type response. Participants may choose a response between 0 to 6. Zero stands for “not at all true”, and 6 stands for "very true". The scale is meant to measure students' perception of their success. Participants' attribution about their ability and effort were assessed in seven different situations.

According to Hellman and Caselman (2004), identifying imposters might be challenging by just looking at the expectation and efforts of participants. Clance and Imes' (1978) identification is different than Harvey's, as they stated that people with imposter syndrome might manipulate others to cover their feeling of inadequacy by working hard, so measurements should be multi-dimensional. Also, Harvey Imposter Syndrome Scale was found to have a low level of internal consistency, and this scale may not identify imposters for people without imposter syndrome (Chrisman et al., 1995).

After revealing that Harvey's scale was found problematic in identification and unacceptable inconsistency due to not differentiating people with imposter and without, Clance developed a new scale (1985) called the Clance Imposter Phenomenon Scale (CIPS). The scale includes 20-items using 5-point Likert type

questions with high reliability to identify imposters from others with high internal consistency (Campbell, 1986). According to Lee et al. (2021), the CIPS measures the fear of failure and recovery from others (fear that others would find out imposters are not suitable where they are), fear of evaluation, and fear of their achievements will not repeat.

The next scale implemented to measure imposter syndrome was the Perceived Fraudulence Scale (PFS) which includes 51 items using a 7-point response Likert format. Chrisman et al. (1995) compared the CIPS and PFS for measuring imposter syndrome by using depression, social anxiety, self-monitoring, and self-esteem scales. The research showed that both scales have high internal reliability for PFS ( $\alpha = .94$ ) and CIPS ( $\alpha = .92$ ). Moreover, both scales were similar and correlated with other variables, depression, social anxiety, and self-esteem ( $r = .78$ ,  $p < .01$ ) but self-monitoring. Scales correlated negatively, and the result was not significantly different ( $r = -.33$  and  $-.25$ ).

To summarize, CIPS and PFS for identifying imposter syndrome were found to have high internal consistency, and to be similar in measuring imposter syndrome, and Chrisman et al. (1995) stated that CIPS and PFS are related to each other. However, they have found that the Clance Imposter Phenomenon Scale might be more useful because it is a shorter scale compared to PFS.

### **General Characteristics of People with Imposter Syndrome**

There is extensive literature (Clance & Imes, 1978; Cusack et al., 2013; Lane, 2015; Langford & Clance, 1993; Lawler, 1984; Lee et al., 2021) about the general characteristics of imposter syndrome. For example, according to Cusack (2013) individuals dealing with the imposter phenomenon might have anxiety issues, lack of self-confidence, depression, and frustration related to their abilities. They have

misconceptions about their abilities and intelligence; they believe they achieved to have this career or academic success by accident. That is why they consider themselves in the wrong place, suffering from a low sense of belonging. Imposters also tend to have anxiety about evaluation and failure.

Furthermore, Lawler (1984) investigated the relationship between being an imposter and Jungian personality types in the literature. Jungian personality suggests a model for individuals' character features based on four groups of variables (Jung, 1971). The first ones are E or I. "E" stands for extroverts; "I" is for introverts. Secondly, "S" is for sensors and "N" is for intuitive. Sensing is related to attention of sensory data, people with S tend to be stricter to routines whereas "N" prefers to live more spontaneously. The third group includes "T" and "F", T is for thinkers who prefer being analytic and logical, "F" is for feelers, different than thinkers, they decide things in their lives based on their feeling and personal values. Lastly, "J" and "P", J stands for judges, judges might have organizational skills and they tend to stick on their plan and routine, on the other hand, "P" is for perceivers, they could be more flexible and act more spontaneously than judges.

In the research, Lawler used four instruments: Myer-Briggs Personality test, the Impostor Scale done by Harvey, Personal Data Questionnaire, and the Concentric Circles Method. For Lawler's (1984) research, people who have severe impostor phenomenon and people with mild impostor were distinguished. After this separation, their personality types were analyzed, and finally, as one of the most significant findings, Lawler (1984) stated that people with severe impostor syndrome tend to be more introverted.

Additionally, Langford and Clance (1993) stated that impostor syndrome is defined as struggling with feeling incomplete and unsure about one's abilities.

Suffering from imposter syndrome can be "seen as a result of seeking self-esteem by trying to live up to an idealized image to compensate for feelings of insecurity and self-doubt." (p. 495). Considering the imposter scales from both Harvey and Clance, they have common features. These scales focus on high fear of failure; attribution of success to luck, error, or charm; the desire to stand out; the feeling of having given others a false impression; discounting recognition from others (Langford & Clance, 1993). Thus, these typical features might provide a conclusion for the general characteristics of people with imposter syndrome. Students with imposter syndrome could face high fear of failure in academics, feeling pressure to be uncovered by others, and caring too much about other peoples' opinions. All these factors might create severe anxiety problems.

Current research findings show that adults and students with imposter syndrome have high expectations for achieving the best and tend to demonstrate perfectionistic behaviors (Lane, 2015; Lee et al., 2021). Therefore, their motivation and their expectations are high. Parkman (2016) stated that imposters might demonstrate highly "workaholic behaviors" (p.52). The reason behind these behaviors of imposters may stem from inadequate feeling about their competence and high fear of failure as well as revealing their inabilities by others.

Based on studies these studies, the imposter phenomenon can be related to being introverted, having anxiety problems, and caring too much about others' opinions. Also, people with imposter syndrome may generally have high anxiety, depression, and feeling under pressure. That is because they might be scared of being labeled unworthy and inadequate by others.

## **Types of Imposter Syndrome and School Lives or Their Achievement**

### **Perception**

Many researchers examined the imposter syndrome, and research in the literature demonstrates different kinds of imposters. Clance and Imes (1978) stated that there are different types of imposters; Chandra et al. (2019) also suggested five imposter types. For each kind of imposter, the impact of being an imposter on students' is explained in the following paragraphs.

Clance and Imes (1978) specifically mentioned different types of people with the imposter phenomenon. The first type of people with imposter syndrome believes they are inadequate and continually fearing that other people will discover their insufficient skills. Thus, they feel that they must study more than their peers and colleagues. Therefore, their effort to hide their lack of intelligence generally results in high performance and good grades.

Another imposter type believes that their actual beliefs and values might not be as valued as other people's ideas, so they develop a strategy to hide their thoughts. They listen to others' opinions more and learn something valuable to impress others and hide their own inside beliefs. They might have low self-efficacy and a lack of self-concept.

The third type of imposter behavior is demonstrated by imposters acknowledge that they are not adequate, but at some level, they believe inside that they are creative and intelligent. These features might be uncovered in an ideal place by the right person. Therefore, they study for a person who might discover their abilities and talents.

In addition, Chandra et al. (2019) presented the common perceptions, behaviors, and implications of people with impostor syndrome. They also

demonstrate five subtypes of imposters. First of all, according to their research, impostors tend to be scared of revealing themselves to others. Others would think they are insufficient and unqualified for their current places. Additionally, imposters may have unrealistically high expectations for themselves for not showing their failure.

The first type of imposter is called a perfectionist. This imposter considers that they should work harder than everyone and provide the best outcomes. Achievement goals and educational expectations could be higher than other kinds of imposters. They might overstudy or think they should work on the task intensely because it could be seen as challenging. Therefore, they might fear accepting this challenge, and they can choose to do it later.

Chandra et al. (2019) called the second type of imposter a natural genius. These imposters show competence related to tasks. They are generally motivated into tasks unless natural genius imposters encounter a challenging task. When they face difficulty in their study, they could lose their enthusiasm and consider that they are not competent for this task.

In addition, Lee et al. (2021) found a relationship between perfectionism and being an imposter. Perfectionism may lead to procrastination, lack of effort, or even avoiding the task because they believe they must do their best. Desiring to achieve the best may cause overpreparing and anxiety. Closson and Boutilier (2017) stated that students' self-beliefs and perfectionistic approaches could stem from their family and cultural background. Moreover, they may affect their future academic development. For example, Mun and Hertzog (2019) mentioned that Asian-American women who entered college earlier than their peers struggled to adapt to

college life. They stated their struggle is related to pressure to achieve associated with their expectations and their families' expectations.

Moreover, many women in their sample suffered from their identities and self-beliefs. They pushed themselves hard to be the best student. These women believed everyone but themselves was clever; they needed to study hard to come to others' levels. They also have a high tendency to compare themselves with others. This feeling of insufficiency is explained as the big fish in a little pond effect. Comparing academic success may influence one's self-belief (Marsh & Parker, 1984). A competitive school environment means a competitive peer environment. Students in these schools might have lower academic self-beliefs in the school environment. Students might think their backgrounds are inadequate for this school when they compare themselves with their friends. They started to feel they did not belong to the environment as they tend to experience imposter syndrome (Lee, 2021).

According to Chandra et al. (2019), the third imposter type is super people (originally superwoman/superman). For super people, taking responsibility is crucial for their lives, and they might want to accomplish lots of tasks at the same time. Nevertheless, failure on a single task means failure on all assignments in life. They believe their achievements and all tasks that they succeed is meaningless; their only unsuccess leads to general failure. Hence, the fear of failure could be more seen than other imposters.

The fourth type is called an expert. These imposters are similar to the first type of imposters, perfectionists. Their competence in life depends on knowledge and abilities. Expert imposters are aware of limitless knowledge in the world and are open to learning, so their learning goals are expected to be high. Even though they

are dedicated learners, they are scared to be labeled because they lack skills or knowledge.

As a final, soloist imposters are the fifth type of imposters. These people think they have to achieve any task on their own. Achievement is only related to dealing with tasks individually. Seeking help from someone means failure and revealing their insufficient abilities and knowledge. Therefore, for soloists, imposters collaboration and group work may not be for them.

### ***Behaviors of Imposters***

To define imposters' behaviors, Lane (2015) has differentiated three common behaviors of imposters. One of them is perceived fraudulence which is the fear of uncovering is a common phobia of imposters. They suffer from anxiety, and others would find out they are not brilliant as they are seen. The second is discrediting evidence of competence about importers who tend to underestimate their effort and success. They might be disturbed to get praise from others since they believe they do not deserve the credit and achievement. The last one is self-doubt. People with the imposter phenomenon commonly struggle with inaccurate self-validation. Lane's (2015) study found that although participants had high scores, they anticipated the worst-case scenarios.

Lane's study (2015) also showed that the imposter phenomenon could be experienced in academic and professional areas. Lack of self-efficacy and fear of failure can be seen among adolescents and adults. Those feelings are directly related to imposter syndrome. Arnett (2000) mentioned that these feelings emerge between puberty and adulthood. Experiencing being an imposter in adolescence might affect people's approaches to their professional and social lives. Dealing with the imposter

phenomenon could be challenging and stressful; however, there are many ways to prevent feelings of fraudulence.

Consequently, imposters could have unhealthy studying habits. These habits could cause both physical and psychological damage. For example, Villwock et al. (2016) found a strong relationship between imposter syndrome and burnout, which stands for exhaustion, not caring about events that expect success and work, and decreasing real-life success. Even though people who feel fraudulent are academically successful, they generally have a fixed mindset that their achievements do not represent their knowledge or abilities. Noskeau et al. (2021) revealed the role of fear of failure and goal orientation. For elaborating more on their research, 'fixed and growth mindset definitions are needed. Dweck (1999) defined these mindset definitions as a fixed mindset, which is the belief that individuals have a level of intelligence and cannot change it.

In contrast, a growth mindset is the opposite of it. Studying intelligence and ability may change. The research of Blackwell et al. (2007) conducted with students attending 7th grade showed that students with a growth mindset were more goal-oriented than students with a fixed mindset. Also, a growth mindset is related to the belief in effort, which is why having a growth or fixed mindset may affect a student's perception of their abilities and approaches to their goal orientation. Noskeau et al. (2021) research findings show a relationship between a fixed mindset and imposter syndrome associated with goal orientation and fear of failure. Imposters may not believe in their capacities, so they might have a fixed mindset. Positive feedback, their significant developments, or any evidence may not be sufficient to change their minds. Moreover, as defined by Chandra et al. (2019), soloist imposters may not

benefit from collaborative learning. They might suffer more than students without imposter syndrome in group work.

On the other hand, the effects of being an imposter are not always problematic in academic and professional lives. Lane (2014) stated that impostors might show collaborative behaviors in group work. Also, since people with imposter syndrome have a tendency to compare themselves with their peers, they might compare others' self-concepts with theirs. That is why they may be aware of their low self-efficacy in group work and social events.

### ***Imposter Syndrome Students and Their Motivational Pattern and Goal Orientation***

One of the other impacts of imposter syndrome is motivation and achievement of goals. In their study, Vaughn et al. (2020) investigated the relationship between academically successful women with imposter syndrome and their motivation. They also suggested that some females with imposter syndrome might lack self-confidence, self-doubt, and a problematic sense of belonging, whether they have a high degree or high academic achievements. According to the Self-Determination Theory (Deci & Ryan, 2000), motivation has three essentials: competence, autonomy, and a sense of belonging. There is a contradiction between imposter syndrome and these essentials because impostors tend to believe they cannot achieve. They generally care too much about others' views and do not feel that they belong in the place where they are.

Consequently, the study suggested that people with imposter syndrome have lower autonomy, competence, and relatedness than people without imposter. In addition, although impostors can be perfectionists and have high standards, their intrinsic motivation could be lower than those without impostors. Therefore, this could be critical for education.

Moreover, according to Ross et al. (2001), motivational patterns and the imposter phenomenon are related. For example, self-handicapping is one of the motivational patterns of believing achievement would boost self-worth. That is why people may feel the fear of failure who have this motivational pattern (Rhodewalt, 1990). Self-handicapping and fear of failure are the most related indicators of imposter syndrome, according to a study by Ross et al. (2001). They stated self-handicapping could be the result of feeling insufficient.

In conclusion, imposters could have some working habits and fixed mindsets about themselves. Study habits of people with imposter syndrome might not be healthy, creating more stress and physical and psychological exhaustion. Being an impostor severely affects individuals' physical, emotional, and professional lives. Impostors might face increased pressure not to encounter failure. Thus, they can feel more anxiety and high levels of stress. They might lack motivation because they might not feel competent enough compared to people who do not suffer from the imposter phenomenon.

### ***Imposter Syndrome and Peer Relationship in Learning***

Cooperation and competitiveness between peers may affect achievement and enjoyment of success, and cooperative behaviors might lead to the necessity of communication between peers and cause the feeling of acceptance (Johnson and Johnson, 1974). On the other hand, competition may create an uncomfortable environment and anxiety among learners. However, Ryckman et al. (1996) differentiated two definitions of competitive behaviors in education, hyper-competition and personal development competition. Hyper competition is defined as being better than others and focusing on winning. Hyper competition may result from the proving self and the need to boost self-worth.

Additionally, competition between peers might affect students' self-trust, motivations, and learning environment; competitiveness may create an anxious environment and increase students' self-doubt about their capabilities because of the tendency to compare themselves with their peers (Ames & Archer, 1988). In contrast, personal development competition is defined as the joy of achievement. This type of competition might be helpful for students to lead achievement.

Moreover, Canning et al. (2020) stated that imposter students at college may experience more competitive feelings than students without imposter syndrome because while overcoming fear of failure after achieving tasks, they. However, as stated in previous sections, common ideas for the competition, imposters might feel fear of revealing that is why they might feel uncomfortable in group work and activities. Also, because of the same reason, they might avoid peer competition.

### **Family Pattern and Imposter Syndrome**

Family background and family pattern is important data for imposter syndrome. They might influence the development of imposter feeling among students. The family background, parents' educational background, and expectations might affect the development of imposter syndrome (Sonnak & Towell, 2001). Based on their study, one of the strongest relationships between imposter syndrome is parental overprotection. They are strongly correlated with each other. They explained the reason of this strong relation with attachment theory. Parents and children connection might result of an addition and children may not gain their autonomy. While growing up, they might challenge when they need to decide something own their own. Self-doubt could be a consequence of the overprotection.

Clance and Imes (1978) observed imposters' family patterns to investigate why people feel like an imposter. Based on their observations, they decided to

differentiate two different family types based on their expectation. The first imposter family type has high expectations from the individual. Their child is most intelligent and performs better than everyone. Thus, the kid believes that s/he is the best at everything. However, when the individual experiences a failure, s/he starts to understand that s/he is not perfect. S/he can make mistakes and feel fooled by their family. Then, a self-doubting feeling emerges.

The second type of family of imposters defined by Clance and Imes (1978) is successful families. The imposter with this type of family has brilliant parents, siblings, and family members. Therefore, they feel inadequate and try to prove themselves to their family. The school allows them to prove themselves to different people, such as their teachers and friends. Even though they proved themselves by getting high grades, they might compare their success with their family members and peers. Whenever they fail or encounter a challenge, they may start to doubt whether their families are right or not.

Moreover, Canning et al. (2020) have researched college students. Participants were separated into two groups: first-generation and continuing-generation college students. First-generation students were the first college students in their families so they might have less family involvement in higher education. At the same time, continuing-generation students have parents or siblings with higher education degrees before them. Based on the study's results, first-generation students tend to suffer from imposter feeling more than continuing-generation students. The result of it might be related to the family types of the imposters.

### **Summary**

In conclusion, people with imposter syndrome might have common features. Based on imposter scales, imposters' fear of failure and self-doubt are distinguishing

shared characteristics for identification. After imposter syndrome scales, numerous studies were conducted to investigate the reason behind it. The results of those studies, family financial and educational background, and parental support tend to relate to imposter syndrome development. Also, research demonstrates imposters might be more introverted, which is why they may have problems making friends. They have a tendency to deal with depression too. Imposters' learning environment is affected as well. Imposters could overstudy and may show perfectionist behaviors. That is why their learning goals might be high, and their standards might be high. That is why they might dedicate themselves to work or give up easily when they encounter a problem or a challenge. The motivational pattern of an imposter could be complicated because there are different types, consequently, different types of motivational patterns. The only common idea for their motivation is that students with imposter syndrome might be uncomfortable in group work and competition because of the fear of failure and witness of others to their failure. However, competition and collaboration might be helpful for imposters to gain self-awareness that they can meet task expectations and are more capable than they believe. While doing tasks, they tend to compare themselves with their peers.

## **CHAPTER 3: METHOD**

### **Introduction**

This study aims to examine the imposter syndrome by using PISA 2018 data. The variables of PISA students with imposter syndrome and without were to be identified. This study considered math performance scores and students' questionnaire data from Türkiye to identify imposter syndrome. In this chapter, the research design is identified. Then, context, sampling, and instrumentation are described. Finally, data collection and analysis methods are explained.

### **Research Design**

This study is a descriptive, quantitative study based on the PISA 2018 data cycle. Descriptive research is used to analyze the characteristics of the population by identifying any pattern if there is one (Loeb et al., 2017). It focuses on "what" instead of "why". That is why identifying patterns and properties of the population is more significant than revealing the reasons. In this study, the goal of using a descriptive design study is to examine the relationship between student questionnaire variables and students' characteristics, whether they are imposters.

### **Context**

In Türkiye, there are different types of schools. Türkiye's educational system has been developed for years because of modernization, including many educational reforms. When the formal educational system of Türkiye is considered, it can be seen that 12-year compulsory education is centralized by the Ministry of National Education (MoNE), including three stages of education. The first stage is elementary, the second stage is middle school, and the last part is high school (MoNE, 2022a). For taking high school education, students might take the high school entrance

exams prepared and implemented by MoNE, or they can be placed to a high school in their neighborhood not requiring high school entrance exam scores (MoNE, 2022b).

PISA aims to examine 15-year-old students' profiles. The reason for investigating the age of 15-year-old students is most Organization for Economic Co-operation and Development (OECD) countries' compulsory education systems end when students are around 15-year-old to obtain the broadest knowledge and abilities (OECD, 2019b). In Türkiye, most 15-year-old students enroll in high schools. There might be a small number of 15-year-old students who continue middle school. High school types in Türkiye are three parts: general high schools, technical and vocational schools, and open educational schools, and these schools provide distance education. Anatolian, science, art, and sports high schools are included in general high schools. Also, there are some religious-based high schools in the technical and vocational school types (MoNE, 2022a). The curriculum and school expectations might differ from school to school. For example, vocational and technical schools provide all core topics, but for receiving Vocational Qualification Certificate, students need to take extra exams like computer hardware. On the other hand, Anatolian high schools require extended subject topics like Mathematics, Science (Kitchen et al., 2019). However, at the end of high school education, students might take university entrance exams to get higher education in Türkiye.

### **Sampling**

The target population of PISA is 15-year-old students who are enrolled in schools. The types of schools do not matter; they could be vocational, national, or foreign. There are many schools from various countries which apply different curricula. That is why students' levels and, according to those levels' students' age

might differ from country to country. To handle these differences, PISA consists of age, 15-year-old students, regardless of their grade levels (OECD, 2019a).

Two-stage stratified sampling is used in PISA. Firstly, PISA selects schools. Then, students are selected for the assessment (OECD, 2019a). In PISA 2018, there were around 600,000 students who participated PISA questionnaire. For Türkiye, 1 218 693 15-year-old students in total and 1 038 993 students enrolled in PISA. The total school level exclusion, 43 928 students, were excluded, and school exclusion and before the within-school exclusion, 995 065 students were excluded. The number of students who participated in Türkiye is 6890 (PISA, 2020). According to this study, students were separated into three different groups, which are Students with Imposter Feeling (IF), Students with Imposter Syndrome (IS), and Students without Imposter Syndrome (Non-Imposter Syndrome) (NIS).

Students with imposter feeling is a group defined by researcher. This group was used for investigating the characteristics of potential students with imposter syndrome. Students with imposter feeling and imposter syndrome have a high fear of failure and low self-efficacy. The only difference between IF and IS is mathematical achievement in PISA 2018. IS students have at least 500 points which is 11 points above OECD mathematical international average (OECD, 2022). The third group is students without imposter syndrome; they are successful but do not have imposter feelings.

In PISA, there is no index measuring imposter feeling or imposter syndrome. Consequently, based on the literature review, composite variables are fear of failure (defined as GFOFAIL in the dataset) and self-efficacy (defined as RESILIENCE in the dataset) were considered to identify imposters by using those variables.

The questions for examining the general fear of failure are;

"When I am failing, I worry about what others think of me";

"When I am failing, I am afraid that I might not have enough talent".

"When I am failing, this makes me doubt my plans for the future" (OECD, 2019c, p.189).

While defining imposter feeling for this study, students in the upper 4<sup>th</sup> quartile of the GFOFAIL's included, so students' GFOFAIL scores were higher than 0.82 are placed in the students with imposter feeling.

Additionally, the questions for investigating self-efficacy; "I usually manage one way or another";

"I feel proud that I have accomplished things";

"I feel that I can handle many things at a time";

"My belief in myself gets me through hard times";

"When I'm in a difficult situation, I can usually find my way out of it."

(OECD, 2019c, p.189).

Students with imposter syndrome lack self-efficacy, so it is deemed appropriate to take the first quartile of RESILINCE, so students with imposter feeling' RESILINCE scores were less than -0.35. To define imposter feeling, it should be taken both circumstances together.

Similarly, identifying imposter syndrome, the same GFOFAIL, and RESILIENCE circumstances were used. Differently students with at least 500 points from the Mathematical performance test were differentiated, 500 point is international average of PISA (OECD, 2019a).

To establish students without imposter group, students with low fear of failure and high self-efficacy were used. Therefore, non-imposter students' GFOFAIL scores were less than 0.82, and RESILINCE were higher than -0.35. What

is more, non-imposters were defined as successful students. Their mathematic scores were greater than 500 like imposter syndrome students’.

The sample size of students with imposter feelings is 221, students with imposter syndrome is 128. There were 1839 successful non-imposter syndrome students in data set. However, the sample sizes of students may be different with respect to nine variables. Table 1 presents sample sizes of three groups with respect to variables.

**Table 1**

*Samples Sizes of Three Groups with Respect to Variables*

Variable	Variable Names	IF	IS	NIS
ATTLNACT	Attitudes towards value of school	217	126	1834
BELONG	Sense of belonging	219	128	1836
COMPETE	Attitudes towards competition	219	128	1831
EMOSUPS	Parents’ emotional support	217	126	1817
ESCS	Index of economic, social and cultural status	221	128	1838
MASTGOAL	Learning goals	217	127	1826
PERCOMP	Student competition	212	126	1809
PERCOOP	Student co-operation	209	125	1800
WORKMAST	Motivation to master tasks	219	126	1825

### **Instrumentation**

The PISA, established by Organization for Economic Co-operation and Development (OECD) in 1997, is an international assessment that many countries attend (PISA, 2020). It was first administrated in 2000. It does not only focus on students' literacy performance based on science, reading, and mathematical

knowledge and skills related to real-life scenarios but also a student questionnaire collecting information about students' perceptions of the school, life, and demographics. PISA survey is provided every three years to 15-year-old students. The survey includes student performance literacy tests, reading, mathematics, and science domains.

PISA measures how students can connect and apply their reading, mathematics, and science skills and knowledge to their daily lives. PISA is conducted every three years, and every time there is a focus on one of the subject areas. The word literacy means process, understanding, and application of knowledge into various situations (OECD, 2019a).

In the PISA Mathematic test, four levels measure different mathematical abilities. Level 1 is based on mathematical definitions and concepts. The second level is related to mathematical applications like identifying and using basic mathematical formulas. The third level is about mathematical reasoning, like converting and making connections with the relation between ratio, proportions, equivalent fractions, and percentages. The last level is interpreting and creating mathematical assumptions using current mathematic skills (OECD, 2019a).

PISA Mathematical Literacy test measures how students adopt basic Mathematics rules, applications, and reasoning in their daily lives. Students ought to understand how mathematical knowledge and reasoning might help to create 'well-founded judgments.

PISA provides a student questionnaire to get information about students' lives and their backgrounds (OECD, 2019c). The goal of the student questionnaire is to understand students' perspectives about their schools and themselves, like attitudes toward the school, sense of belonging to the school, bullying issues in the school,

their study habits, and their families' backgrounds like their socioeconomic status and so on. The student questionnaire includes multiple-choice, open-ended questions like literacy tests. Additionally, Likert-type scale items are included to measure students' background, the value of school, and students' well-being. Student questionnaires might help researchers to understand the relationship between student academic achievement and their personal experiences and backgrounds. For example, students' fear of failure and self-efficacy are variables deriving from students' questionnaires, and imposter syndrome feelings can be identified by measuring those variables. Students who performed well on PISA testing and those with imposter feelings can be merged to define imposter syndrome. Consequently, the relationship between other variables in student questionnaires, like attitudes towards school, sense of belonging, students' cooperation, and collaboration, can be revealed.

This study compared student questionnaire component variables based on student groups. These variables, as they appear in the data set, are ESCS, MASTGOAL, COMPETE, ATTLNACT, PERCOMP, PERCOOP, EMOSUPS, WORKMAST, and BELONG.

ESCS (Economic, social, and cultural status) component variable representing the family index of economic, social, and cultural status. In PISA 2018, there are three indices associated with family background: PARED, which is parents' highest level of education, HISEI is the parents' highest occupational status; and HOMEPOS standing for home possessions OECD, 2019c).

MASTGOAL (Mastery of Goal) is an index for students' learning goals. There are three questions to determine MASTGOAL score of students.

“My goal is to learn as much as possible”;

“My goal is to completely master the material presented in my classes”; and  
 “My goal is to understand the content of my classes as thoroughly as possible” (OECD, 2019c, p. 214).

COMPETE (Attitudes towards competition) is another index that represents students’ perception of whether they have positive feelings toward competition. In the student questionnaire, questions for the index are;

“I enjoy working in situations involving competition with others”

“It is important for me to perform better than other people on a task”;

“I try harder when I’m in competition with other people” (OECD, 2019c, p. 213).

ATTLNACT (Attitudes towards school value) index for determining students’ ideas about how school, and how their effort for school might influence their lives the questions are;

“Trying hard at school will help me get a good job “

“Trying hard at school will help me get into a good <college>”

“Trying hard at school is important” (OECD, 2019c, p. 216).

PERCOMP (Student competition) shows the perceptions of students towards to competition between their peers. There are four questions for the PERCOMP index which are;

“Students seem to value competition”.

“It seems that students are competing with each other”.

“Students seem to share the feeling that competing with each other is important”;

“Students feel that they are being compared with others” (OECD, 2019c, p.120)

PERCOOP (Student co-operation) demonstrates students' views about group work, collaboration, and cooperation, and to get a score for this index, there are four questions in the student questionnaire.

“Students seem to value co-operation”

“It seems that students are co-operating with each other”;

“Students seem to share the feeling that co-operating with each other is important”;

“Students feel that they are encouraged to cooperate with others” (OECD, 2019c, p.120).

EMOSUPS (Parents' emotional support perceived by students) is about students' perspectives about parental support, and whether their families provide enough support to their academic lives or not.

“My parents support my educational efforts and achievements”;

“My parents support me when I am facing difficulties at school”;

“My parents encourage me to be confident” (OECD, 2019c, p.215).

WORKMAST (Motivation to master tasks) variable is the motivation mastery tasks of students. The questions give ideas about students' persistence and enjoyment of competence and achievement.

“I find satisfaction in working as hard as I can”;

“Once I start a task, I persist until it is finished”;

“Part of the enjoyment I get from doing things is when I improve on my past performance”;

and  
 “If I am not good at something, I would rather keep struggling to master it than move on to something I may be good at” (OECD, 2019c, p.214).

As a final index, BELONG (Sense of belonging at school) index is related to students' sense of belonging at school, and relationships with their peers. The questions are;

“I feel like an outsider (or left out of things) at school”;

“I make friends easily at school”;

“I feel like I belong at school”;

“I feel awkward and out of place in my school”;

“Other students seem to like me”;

“I feel lonely at school” (OECD, 2019c, p.130).

Table 1 shows the variable used in this research for identifying imposter syndrome and describing each student group's characteristics. For each variable, higher score indicators mean higher level of trait.

### **Method of Data Collection**

PISA provides a measurement of 15-year-old students' performance in three domains. PISA tests were only paper-based until 2012. This year, PISA introduced computer-based assessments. However, some countries prefer to give PISA assessments the traditional way because of the lack of access to technology. Similarly, PISA 2018 assessment was available as a computer-based assessment for many countries (National Center for Education Statistics, 2020). Also, it was available through paper-based assessment for countries that might not provide suitable environments for computer-based testing. PISA tests took two-hour, and every assessment included multiple-choice questions and open-ended questions (for both short-response answers and extended-response questions). 60% to 65 % of the questions were multiple choice, and the rest were open-ended questions for each domain (OECD, 2019a).

The PISA assessment also includes a student questionnaire which takes 30 minutes, inquiring about students' background information, attitudes, and experiences. In addition, PISA aims to measure and obtain data from schools' structures and environments. That is why PISA provides a 45-minute questionnaire for principals of every school that participates in collecting information about schools and backgrounds. Moreover, PISA distributes a 30-minute teacher questionnaire for 25 teachers from each participant school to understand the teachers' attitudes and their teaching policies and learning environment.

### **Methods of Data Analysis**

First, imposter syndrome was defined by looking at PISA data indicators for the data analysis. The indicators are available on the student questionnaire. The variables for defining imposter syndrome are self-efficacy and fear of failure. To define imposter syndrome among students who participated PISA 2018, cases were selected based on the imposter syndrome definition.

Student-level scale indices were used for comparison between three groups of students. Students' index of the economic, social and cultural status (ESCS), parental support (EMOSUPS), attitudes toward competition (COMPETE), and motivation to master tasks (WORKMAST), students' learning goals (MASTGOAL), students' perceptions for peer co-operation (PERCOMP) and collaboration (PERCOOP), students' attitudes towards school values (ATTLNACT), and sense of belonging at school (BELONG) were compared to investigate the differences between the student with imposter feeling, student with and without imposter syndrome. Means and range were examined within each group first. Then groups were compared.

Since this is an explorative study, groups are examined and compared without intention to generalization. Thus, no inferential analyses were conducted.

## CHAPTER 4: RESULTS

### Introduction

This chapter presented the differences between students' sense of belonging at school, their index of economic, social and cultural status, students' attitudes towards school values, students' attitudes towards competition, students' learning goals, students' motivation to mastery tasks, students' perceptions about peer cooperation, and peer co-operation and parental support perceived by students across three student groups. PISA 2018 cycle was used to compare students' variables mean of different student groups.

Students were divided into three groups based on student questionnaire and their mathematics literacy scores from PISA 2018 Turkish dataset. Then, the means of nine variables selected from student questionnaire were compared with respect to three student groups' which are students with imposter feeling (IF), students with imposter syndrome (IS), and students without imposter syndrome (NIS).

Table 2 shows descriptives for all students in PISA 2018 Türkiye dataset with respect to the variables for the whole group (N=6890). For all variables, higher scores indicate higher level of trait.

**Table 2**

*Statistics of Türkiye Data with Respect to Variables*

Variable	Min	Max	<i>M</i>	<i>SD</i>
ESCS	-4.75	2.76	-1.15	1.18
MASTGOAL	-2.53	1.85	-0.05	1.13
COMPETE	-2.35	2.01	0.33	1.21

**Table 2 (cont'd)***Statistics of Türkiye Data with Respect to Variables*

Variable	Min	Max	<i>M</i>	<i>SD</i>
ATTLNACT	-2.54	1.08	-0.11	1.07
PERCOMP	-1.99	2.04	0.34	1.10
PERCOOP	-2.14	1.68	-0.01	1.15
EMOSUPS	-2.45	1.03	0.02	1.07
WORKMAST	-2.74	1.82	-0.02	1.09
BELONG	-3.26	2.76	-0.14	1.03

Table 2 demonstrates the Türkiye representations in terms of related variables for imposter syndrome. From all variables ESCS has the lowest variable ( $M_{ESCS/TD} = -1.15$ ,  $SD=1.18$ ), the greatest means are COMPETE ( $M_{COMPETE/TD} = 0.33$ ,  $SD=1.21$ ) and PERCOMP ( $M_{PERCOMP/TD} = 0.34$ ,  $SD=1.10$ ) variables.

### **Students with Imposter Feeling (IF)**

Students with imposter feeling account for 3.25% of whole PISA sample size ( $n=221$ ). Table 3 represents descriptives for IF.

**Table 3***Statistics of IF Data with Respect to Variables*

Variable	Min	Max	<i>M</i>	<i>SD</i>
ESCS	-3.62	1.63	-1.38	1.15
MASTGOAL	-2.52	1.85	-0.23	1.05
COMPETE	-2.34	1.85	0.23	1.14
ATTLNACT	-2.53	1.85	-0.26	1.17
PERCOMP	-1.98	1.85	0.23	1.12

**Table 3 (cont'd)***Statistics of IF Data with Respect to Variables*

Variable	Min	Max	M	SD
PERCOOP	-2.14	1.85	-0.32	1.21
EMOSUPS	-2.44	1.85	-0.37	1.17
WORKMAST	-2.73	1.85	-0.22	1.02
BELONG	-3.23	1.85	-0.62	.80

According to Table 3, the mean of all variables of IF are lower than all student data. The biggest difference between means of variables is mean of BELONG variable with 0.48 difference ( $M_{\text{BELONG/IF}} = -0.62$ ,  $SD=0.80$ ;  $M_{\text{BELONG/TD}}=-0.14$ ,  $SD=1.03$ ). Additionally, the BELONG data values IF students have smaller values compared to students in Türkiye. The mean of EMOSUPS index is the second discriminated data between IF and all students ( $M_{\text{EMOSUPS/IF}} = -0.37$ ,  $SD=1.17$ ;  $M_{\text{EMOSUPS/TD}}=0.02$ ,  $SD=1.07$ ). With the difference 0.31 of two groups' means, PERCOOP index has the third discriminating data ( $M_{\text{PERCOOP/IF}} = -0.32$ ,  $SD=1.21$ ;  $M_{\text{PERCOOP/TD}}=-0.01$ ,  $SD= 1.15$ )

The other variables' mean's differences are between 0.25 and 0.11 ( $M_{\text{ESCS / IF}} = -1.38$ ,  $SD=1.15$ ;  $M_{\text{ESCS / TD}}=-1.15$ ,  $SD= 1.18$ ; the difference is 0.23;  $M_{\text{MASTGOAL/IF}} = -0.23$ ,  $SD=1.05$ ;  $M_{\text{MASTGOAL/TD}}=-0.05$ ,  $SD=1.13$ ; the difference is 0.18;  $M_{\text{ATTLNACT/IF}} = -0.26$ ,  $SD=1.17$ ;  $M_{\text{ATTLNACT/TD}} =-0.11$ ,  $SD=1.07$ ; the difference is 0.31;  $M_{\text{WORKMAST/IF}} = -0.22$ ,  $SD= 1.02$ ;  $M_{\text{WORKMAST/TD}}=0.02$ ,  $SD= 1.09$ ; the difference is 0.24).

The mean of COMPETE variables is the most similar data compared to other variables, the difference of two groups of their mean is 0.1 ( $M_{\text{COMPETE/IF}} = 0.23$ ,  $SD=$

1.14;  $M_{\text{COMPETE/TD}} = 0.33$ ,  $SD = 1.21$ ). Secondly, the values of PERCOMP are close to each other ( $M_{\text{PERCOMP/IF}} = 0.23$ ,  $SD = 1.12$ ;  $M_{\text{PERCOMP/TD}} = -0.34$ ,  $SD = 1.1$ ; the difference is 0.11).

### Students with Imposter Syndrome (IS)

Students with imposter syndrome (IS) group is defined as high achievers with same traits with IF. Thus, their mathematical performance test is higher than the PISA test average, which is 500. This group's sample size is the smallest among all student groups ( $n = 128$ ); students with imposter syndrome are 1.88% of all Türkiye data. Table 4 shows the descriptives of IS for the variables.

**Table 4**

*Statistics of Students with Imposter Syndrome Data with Respect to Variables*

Variable	Min	Max	$M$	$SD$
ESCS	-3.21	1.55	-0.43	1.24
MASTGOAL	-2.53	1.85	-0.49	0.94
COMPETE	-2.35	1.85	0.01	1.08
ATTLNACT	-2.54	1.08	-0.27	1.09
PERCOMP	-1.99	2.04	0.47	1.16
PERCOOP	-2.14	1.68	-0.24	1.08
EMOSUPS	-2.45	1.03	-0.09	1.11
WORKMAST	-2.74	1.85	-0.30	0.83
BELONG	-3.24	2.47	-0.67	0.85

According to Table 4, For the comparison of the means of the variables, only the mean of ESCS and PERCOMP variables of IS are higher than Türkiye data, the data value of other variables, Türkiye data are higher than IS data  $M_{\text{ESCS/IS}} = -0.43$ ,  $SD = 1.24$ ;  $M_{\text{ESCS/TD}} = -1.15$ ,  $SD = 1.18$ ;  $M_{\text{MASTGOAL/IS}} = -0.49$ ,  $SD = 0.94$ ;

$M_{MASTGOAL/TD} = -0.05$ ,  $SD = 1.13$ ;  $M_{COMPETE/IS} = -0.01$ ,  $SD = 1.08$ ;  $M_{COMPETE/TD} = -0.33$ ,  
 $SD = 1.21$ ;  $M_{ATTLNACT/IS} = -0.27$ ,  $SD = 1.09$ ;  $M_{ATTLNACT/TD} = -0.11$ ,  $SD = 1.07$ ;  
 $M_{PERCOMP/IS} = 0.47$ ,  $SD = 1.16$ ;  $M_{PERCOMP/TD} = 0.34$ ,  $SD = 1.1$ ;  $M_{PERCOOP/IS} = -0.24$   $SD =$   
 $1.08$ ;  $M_{PERCOOP/TD} = -0.01$ ,  $SD = 1.15$ ;  $M_{EMOSUPS/IS} = -0.09$ ,  $SD = 1.11$ ;  
 $M_{EMOSUPS/TD} = 0.02$ ,  $SD = 1.07$ ;  $M_{WORKMAST/IS} = -0.30$ ,  $SD = 0.83$ ;  
 $M_{WORKMAST/TD} = 0.02$ ,  $SD = 1.09$ ;  $M_{BELONG/IS} = -0.67$ ,  $SD = 0.85$ ;  $M_{BELONG/TD} = -0.14$ ,  
 $SD = 1.03$ ).

Moreover, the greatest difference between among respected variables IS and Türkiye data is ESCS variable, the difference is 0.72. Similarly, with the IF, the second biggest difference is BELONG with 0.53. Also, for the MASTGOAL variable, the Türkiye data is .44 higher than IS. The mean of the COMPETE of Türkiye data is 0.34 is bigger than IS leading variables' differences are smaller than 0.34. EMOSUPS variables for Türkiye data and IS are most similar, the difference between two groups is 0.11.

### **Students without Imposter Syndrome (NIS)**

The final students without imposter syndrome, and this group includes high achievers with at least 500 points from PISA 2018 Mathematic performance test like imposter syndrome student group. However, students involved in this group should not show the symptoms of imposter syndrome to be defined as students without imposter syndrome.

In short, the NIS group is the opposite of IF. Also, this student group is the most crowded group among the three groups. The sample size of the group is 27.07% of all Türkiye data (n=1839).

Table 5 shows the statistics of students without imposter syndrome concerning the variables.

**Table 5**

*Statistics of Students without Imposter Syndrome Data with Respect to Variables*

Variable	Min	Max	<i>M</i>	<i>SD</i>
ESCS	-3.80	2.76	-0.61	1.24
MASTGOAL	-2.53	1.85	-0.17	1.10
COMPETE	-2.35	2.01	0.41	1.15
ATTLNACT	-2.54	1.08	-0.19	1.02
PERCOMP	-1.99	2.04	0.49	1.09
PERCOOP	-2.14	1.68	0.14	1.10
EMOSUPS	-2.45	1.03	-0.19	0.99
WORKMAST	-2.74	1.82	0.07	0.96
BELONG	-3.24	2.76	-0.06	0.99

According to Table 5, ESCS, COMPLETE, PERCOMP, PERCOOP, WORKMAST and BELONG variables' means of NIS are greater than all students' mean of those variables. On the other hand, for MASTGOAL and ATTLNACT and EMOSUPS variables of NIS's variables are smaller than attending students in Türkiye PISA 2018. Similarly, with IS, the difference of ESCS's mean for NIS and Türkiye data has the highest difference mean. The difference is 0.54 ( $M_{ESCS/NIS} = -0.61$ ,  $SD=1.24$ ;  $M_{ESCS/TD}=-1.15$ ,  $SD=1.18$ ). Secondly, the most different variable among the means of other variables is EMOSUPS ( $M_{EMOSUPS/NIS} = 0.19$ ,  $SD=0.99$ ;  $M_{EMOSUPS/TD}=0.02$ ,  $SD=1.07$ ). Other variables' means are similar with each other with difference at most 0.15 ( $M_{MASTGOAL/NIS} = -0.17$ ,  $SD= 1.10$ ;  $M_{MASTGOAL/TD}=-0.05$ ,  $SD=1.13$ ;  $M_{COMPETE/NIS} = 0.41$ ,  $SD=1.15$ ;  $M_{COMPETE/TD}=0.33$ ,  $SD=1.21$ ;  $M_{ATTLNACT/NIS} = -0.19$ ,  $SD=1.02$ ;  $M_{ATTLNACT/TD}=-0.11$ ,  $SD=1.07$ ;  $M_{PERCOMP/NIS} =$

0.49, SD=1.09  $M_{\text{PERCOMP/TD}}=0.34$ , SD=1.10;  $M_{\text{PERCOOP/NIS}}=1.14$ , SD= 1.10;  $M_{\text{PERCOOP/TD}}=-0.01$ , SD=1.15;  $M_{\text{WORKMAST/NIS}}=0.07$ , SD=0.96;  $M_{\text{WORKMAST/TD}}=0.05$ , SD=1.09;  $M_{\text{BELONG/NIS}}=-0.06$ , SD= 0.99;  $M_{\text{BELONG/TD}}=-0.14$ , SD=1.03). Based on the finding, the least discriminating data of students without imposter syndrome and whole data are ATTLNACT, COMPETE and BELONG indices with the same differences of means 0.08.

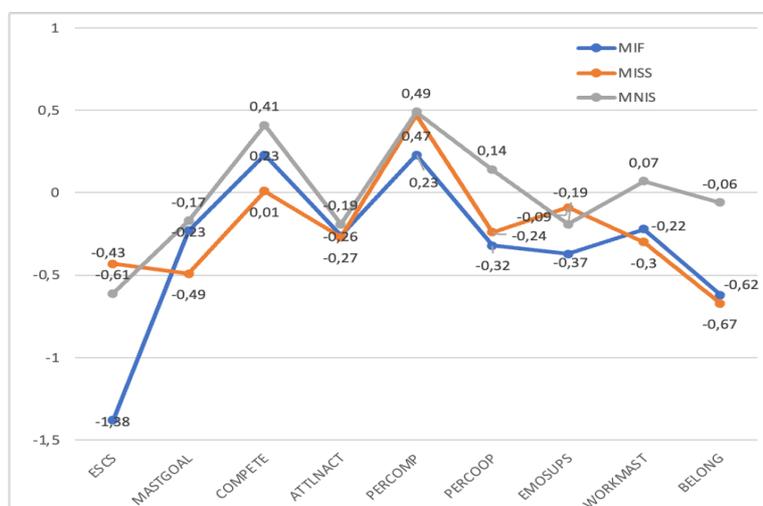
As a consequent, the highest difference between means for all variables of NIS group and Türkiye's data is ESCS, the difference of both groups means is 0.54, ESCS variable of NIS is higher than all students attending PISA 2018 from Türkiye. Second discriminating variable is EMOSUPS. Türkiye's mean is 0.21 higher than NIS group.

### Comparison of Groups

This part compares three different student groups' means. First, IF and IS were considered, then IF and NIS were compared. Lastly, a comparison of IS and NIS was considered to compare. Figure 1 demonstrates the mean of IF, IS, and NIS groups.

**Figure 1**

*Means of IF, IS and NIS with Respect to Variables*



### Comparison of Students with Imposter Feeling (IF) and Students with Imposter Syndrome (IS)

Based on Figure 1, the value of ESCS mean's is the most different variable compared to other variables' differences of their mean values for IF and IS groups. ESCS variable's mean for IS is 0.95 greater than IF groups. ( $M_{ESCS/IF}=-1.38$ ,  $SD=1.15$ ;  $M_{ESCS/IS}=-0.43$ ,  $SD=1.24$ ). Like ESCS variable, for the mean of EMOSUPS of IS, students have a greater mean than IF ( $M_{EMOSUPS/IF}=-0.37$ ,  $SD=1.17$ ;  $M_{EMOSUPS/IS}=-0.09$ ,  $SD=1.11$ ). The mean of MASTGOAL of IF groups is -0.23 ( $SD=1.05$ ), for IS group this mean value is -0.49 ( $SD=0.94$ ), so IF group has higher mean than IS group by 0.26. Like MASTGOAL variable, mean of COMPETE variable of IF is higher than IS value by 0.24 ( $M_{COMPETE/IF}=0.23$ ,  $SD=1.14$ ,  $M_{COMPETE/IS}=-0.01$ ,  $SD=1.08$ ). For the comparison of the mean of PERCOMP variable, the difference is 0.24, the IF's PERCOMP variable is lower ( $M_{PERCOMP/IF}=0.23$ ,  $SD=1.12$ ;  $M_{PERCOMP/IS}=0.47$ ,  $SD=1.16$ ). The differences in the mean of the other variables are smaller than 0.09, but the difference in their means is higher than 0.01 ( $M_{PERCOOP/IF}=-0.32$ ,  $SD=1.21$ ;  $M_{PERCOOP/IS}=-0.24$ ,  $SD=1.08$ ;  $M_{WORKMAST/IF}=-0.22$ ,  $SD=1.02$ ;  $M_{WORKMAST/IS}=-0.30$ ,  $SD=0.83$ ;  $M_{BELONG/IF}=-0.62$ ,  $SD=0.80$ ;  $M_{BELONG/IS}=-0.67$ ,  $SD=0.85$ ). Finally, the mean of ATTLNACT variable for IS and IF group are similar with a difference 0.01 ( $M_{ATTLNACT/IF}=-0.26$ ,  $SD=1.17$ ;  $M_{ATTLNACT/IS}=-0.27$ ,  $SD=1.09$ ).

To summarize, the highest difference variable for IF group and IS means is ESCS with the difference 0.95. The ESCS variable for IS has a greater mean value than IF's mean. EMOSUPS variable's mean difference is the second highest, with 0.28 points. On the other hand, the ATTLNACT mean is the most similar variable to the other eight variables, with the least 0.01 difference between the two groups.

### **Comparison of Students with Imposter Syndrome (IS) and Students without Syndrome Students (NIS)**

Except for ESCS variable, the mean of all variables of NIS has higher mean values than IS. NIS's BELONG variable's mean is 0.61 point higher than IS ( $M_{\text{BELONG/IS}}=-0.67$ ,  $SD=0.85$ ;  $M_{\text{BELONG/NIS}}=-0.06$ ,  $SD=0.99$ ), among the other variables BELONG mean is the most discriminated variable between these two student groups. Secondly, the mean of COMPETE variable data value of NIS is also greater than IS with the difference of 0.42 ( $M_{\text{COMPETE/IS}}=-0.01$ ,  $SD=1.08$ ;  $M_{\text{COMPETE/NIS}}=0.41$ ,  $SD=1.15$ ). There is 0.38 difference between PERCOOP mean of IS and NIS ( $M_{\text{PERCOOP/IS}}=-0.24$ ,  $SD=1.08$ ;  $M_{\text{PERCOOP/NIS}}=0.14$ ,  $SD=1.10$ ). Similar to PERCOOP variable, WORKMAST mean's difference between the two groups of students is 0.37 ( $M_{\text{WORKMAST/IS}}=-0.30$ ,  $SD=0.83$ ;  $M_{\text{WORKMAST/NIS}}=0.07$ ,  $SD=0.96$ ). For EMOSUPS variable of IS is -0.09 ( $SD=1.11$ ), whereas the mean of NIS EMOSUPS is 0.19 ( $SD=0.99$ ). Therefore, the difference between EMOSUPS of the groups is 0.28. The last two variables whose NIS data values are higher than IS are ATTLNACT and PERCOMP. The mean of the ATTLNACT variable of IS is -0.27 ( $SD=1.09$ ), on the other hand NIS has -0.19 point for ATTLNACT ( $SD=1.02$ ). PERCOMP variable's data values of both group is the closest values regarded to other variables' data values, for IS PERCOMP is 0.47 ( $SD=1.16$ ); for NIS the mean of PERCOMP is 0.49 ( $SD=1.09$ ). Consequently, the difference between them is 0.02.

ESCS data values of IS have a greater mean compared to mean of NIS, their data difference is 0.18 ( $M_{\text{ESCS/IS}}=-0.43$ ,  $SD=1.24$ ;  $M_{\text{ESCS/NIS}}=-0.61$ ,  $SD=1.24$ ).

In short, the most different variable when looking at the mean of two students is BELONG, with the difference of -0.61. Therefore, BELONG variable measuring the sense of belonging of students at school might be taken as the most discriminated

data for IS and NIS. After BELONG variable, COMPETE data has the highest difference between these groups' mean values. The difference between the means is 0.40. However, ATTLACT variable's means have the slightest difference for IS and NIS. Considering all the mean of the variables, the mean of IS' ESCS variable is higher than NIS groups' ESCS.

### **Comparison of Imposter Feeling Students (IF) and Students without Imposter Syndrome (NIS)**

When the IF group and NIS' means were considered, all means of variables for IF's had smaller means than NIS' means. The greatest mean difference among all variables is ESCS with 0.77 points ( $M_{ESCS/IF}=-1.38$ ,  $SD=1.15$ ;  $M_{ESCS/NIS}=-0.61$ ,  $SD=1.24$ ). Besides, the mean of BELONG of IF is -0.62 ( $SD=0.80$ ), and for NIS BELONG mean is -0.06 ( $SD=0.99$ ), after ESCS variable BELONG has the greatest difference, which is 0.56 point. According to Figure 1 the third variable having the highest mean difference is PERCOOP. The difference between the mean of the two groups is 0.46 ( $M_{PERCOOP/IF}=-0.32$ ,  $SD=1.21$ ;  $M_{PERCOOP/NIS}=0.14$ ,  $SD=1.10$ ). Also, WORKMAST variable for IF is 0.29 point smaller than NIS mean ( $M_{WORKMAST/IF}=-0.22$ ,  $SD=1.02$ ;  $M_{WORKMAST/NIS}=0.07$ ,  $SD=0.96$ ). The differences of other means are lower than 0.27 point ( $M_{PERCOMP/IF}=0.23$ ,  $SD=1.12$ ;  $M_{PERCOMP/NIS}=0.49$ ,  $SD=1.09$ ;  $M_{EMOSUPS/IF}=-.37$ ,  $SD=1.17$ ;  $M_{EMOSUPS/NIS}=-0.19$ ,  $SD=0.99$ ;  $M_{COMPETE/IF}=0.23$ ,  $SD=1.14$ ;  $M_{COMPETE/NIS}=-0.41$ ,  $SD=1.15$ ;  $M_{ATTLNACT/IF}=-0.26$ ,  $SD=1.17$ ;  $M_{ATTLNACT/NIS}=-0.19$ ,  $SD=1.02$ ;  $M_{MASTGOAL/IF}=-0.23$ ,  $SD=1.05$ ;  $M_{MASTGOAL/NIS}=-0.17$ ,  $SD=1.10$ ).

Based on the findings, the means of NIS group have greater means for all variables compared above than IF's mean values. ESCS discriminates between IF and NIS. The difference between ESCS means is 0.77. Hence, the ESCS mean

representing the index of the economic, social, and cultural status of NIS may be different than IF students' ESCS. The closest difference between the means of the groups is MASTGOAL with 0.06 difference. It is the least discriminating variable for NIS and IF. Therefore, the learning goals of both groups might not differ much.

### **Summary of the Results**

In conclusion, from comparison of imposter related student groups, the most discriminating variables were revealed. From the comparison of the group means and Türkiye's data; the comparison between variables of each group IF- IS, IF-NIS and IS-NIS were investigated.

### **Comparison of Groups and Türkiye Data**

#### ***IF and Türkiye Data***

A comparison of IF and all students demonstrate for all variables, the mean values of Türkiye data have greater scores than IF group. Based on the findings, the differences in the sense of belonging to school of all students' mean and IF mean is the highest among other mean differences. In contrast, students' attitude towards competition has the smallest difference between IF and Türkiye data.

#### ***IS and Türkiye Data***

The mean of ESCS and COMPETE variables of IS is greater than Türkiye's data. IS's mean values of other variables have lower scores than Türkiye data.

The ESCS variable of IS and Türkiye's is variable with the most different mean values. However, as a result of the comparison of means, there is the least different variable is EMOSUPS. Furthermore, for other means of variables, Türkiye data has higher mean values than IS. Secondly, for IF group, BELONG has lower point than whole data. While considering EMOSUPS Türkiye data and IS, EMOSUPS is the closest variable among other variables.

### ***NIS and Türkiye Data***

Based on Table 2 and Table 5, the mean MASTGOAL, ATTLNACT, and EMOSUPS variables have smaller means for NIS compared to Türkiye data.

Likewise, IS, for the comparison of NIS and Türkiye data, ESCS is different.

Other the highest mean difference of NIS and Türkiye's data is EMOSUPS. Hence, the second variable with highest difference for these two EMOSUPS variable's score. In addition, are minor mean differences between PERCOMP, ATTLNACT and BELONG of Türkiye data and NIS groups.

### **Comparison of Groups**

#### ***IF and IS***

IS' ESCS, PERCOMP and PERCOOP, and EMOSUPS have higher mean values than IF. According to Figure 1 Like comparison of Türkiye and IS; Türkiye and NIS, ESCS variable has the highest difference between means of values. IS' ESCS has greater than IF.

Furthermore, EMOSUPS's mean of IS is greater than the mean of EMOSUPS of IF. Apart from this, with 0.28-point difference, EMOSUPS by students is the other which has greatest difference between group means.

Based on Figure 1, variable of ATTLNACT has the least difference between IF and IS.

#### ***IS and NIS***

According to Figure 1, there are two variables which are ESCS and EMOSUPS have greater mean of IS than NIS. Other variables have lower mean values for IS. While comparing all mean differences, IS has 0.61 smaller score for BELONG compared to NIS. What is more, COMPETE variable is the second highest

difference between IS and NIS. Also, Figure 1 shows ATTLNACT is the variable is the most similar means for IS and NIS.

### ***IF and NIS***

Figure 1 shows that considering IS and NIS' means, NIS' means of all variables have higher than IS's means. Like, IF and IS comparison; Türkiye data and IS, Türkiye data and NIS the highest difference of IF and NIS means of variables is ESCS. What is more, like comparison of Türkiye data and IS; Türkiye data and IF; IS and NIS students Figure 1 demonstrates BELONG is one of the most different variables among other variables of IF and NIS. Figure 1 presents for MASTGOAL, there is little difference between IF and NIS groups compared to other variables.

## **CHAPTER 5: DISCUSSION**

### **Introduction**

This chapter aims to present overview of the study and the major findings of the study based on previous studies. The results of the study the index of economic, social and cultural status, students' sense of belonging at school, parental support perceived by students and their attitudes towards competition were potential differences of imposter related student groups. In addition to that, the results showed academic achievement can be related to economic, social and cultural status; fear of failure and self-efficacy might be associated with sense of belonging at school.

After summary of the key points is demonstrated in this chapter, how results would be beneficial for practice and future were discussed. Finally, during the research, there were some limitations, at the end of this chapter they were included.

### **Overview of the Study**

In this study, the differences between the three student groups were examined based on PISA dataset. Firstly, student groups were determined based on their self-efficacy, fear of failure, mathematical literacy scores, group separation variables, PISA 2018 student questionnaire, and academic performance test. As an outcome, there were three student groups: students with imposter feeling, students with imposter syndrome, and students without imposter syndrome.

Descriptive analyses were used for the study. Each group was examined individually and means of all groups were compared with respect to the variables selected because of their relationships with being imposter or having imposter feeling. The variables the economic, social and cultural status of students and their families, sense of belonging to school, attitudes toward school and competition,

parental support perceived by students, students' learning goals and motivational patterns, peer cooperation, and competition.

According to findings of the study, students' economic, social, and cultural status, sense of belongings at school, and parental support and attitudes towards competition might be related variables with imposter feeling and imposter syndrome.

### **Discussion of Major Findings**

Based on the findings, while comparing Türkiye data and each student group, Table 3 and Figure 1 show all the means of Türkiye's values have a higher mean than students with imposter feeling's mean. In other words, students with imposter feeling have lower scores in all variables considered. Also, while comparing groups, means of variables for students with imposter feeling had the lowest scores, students with imposter syndrome variables' means were at the middle and students without imposter syndrome had the highest score for almost all variables.

Furthermore, Table 2 presents all students' data values, and Table 4 describes students with imposter syndrome. For comparing the means of two groups of students, for the students with imposter syndrome' means for the index of economic, social, and cultural status, and students' perceptions for peer competition, measuring the peer competition, variables' have greater values than all students' mean. Also, the index of economic variable has the highest difference between the two groups, with 0.72 points.

Similarly, the difference between the means of the groups was examined in comparing the variables. The first groups to be compared within the group were students with imposter syndrome and students with imposter feelings. Figure 1 were considered when comparing these two groups' mean values. According to Figure 1, the variables in which students with imposter syndrome were higher; the index of

economic, social and cultural status standing for index of economic, social, and cultural status, students' perceptions for peer competition and students' attitudes towards peer competition and cooperation, and students' perception for parental support. The mean of the most different mean the index of economic, social and cultural status variable between the students with imposter syndrome' group and students with imposter feeling' groups.

Similarly, students without imposter syndrome compared to all students' data. According to Figure 1, students without imposter syndrome' index of economic, social, and cultural status, student competition, peer competition, and collaboration, students' motivation to master task variables have a higher score than Türkiye data. Yet, students without imposter syndrome have lower mean values for students' learning goals, attitudes towards school, and parental support compared to all students attending PISA 2018 from Türkiye. More, the comparison of all mean differences for students without imposter syndromes and all students in Türkiye. The index of economic, social, and cultural status might discriminate between the students without imposter syndrome group and the Türkiye student group; the index of economic, social and cultural status' difference between the two groups is 0.54 points.

The index of economic, social and cultural status variable of students with imposter feeling is a discriminating variable for students with imposter feeling and students without imposter syndrome, as it has the highest mean difference between all variables with 0.77 points. That is why, to determine the characteristics of students with imposter feeling from comparison of groups, it can be said students with imposter feeling has lower index of economic, social and cultural status.

The reason of it can be associated with low achievement. Associated with low achievement. According to Şirin (2005), economic, social and cultural and students' success do not have direct link, however, lack of opportunities to access to the educational resources due to economical inequalities, families' educational background, migration status of families can affect it. Especially, the economic inequalities are handicaps for students who have lack of educational resources.

On the other hand, the results of the study demonstrated that students with imposter syndrome have greater index of economic, social and cultural status than all students in Türkiye. However, for comparison students with imposter syndrome and without the index of economic, social and cultural status is not discriminating data for their means' values. This result contradicts with Canning et al. (2020) suggestion. In their study, they investigated the number of imposter syndrome who are first generation college students is greater than imposters who are continuing generation college students. Educational background of the family is related with the index of economic, social and cultural, that is why, the expected result would be the higher difference of means between students with imposter syndrome and students without imposter syndrome. Besides, Sonnak & Towell (2001) investigated the relationship between family background and imposter feeling. They have found imposter syndrome is a related concept to parental educational background, and their social status. Similar to Canning et al. (2020), their research supports opposite idea to the results of the research.

Moreover, students' sense of belonging at school is a discriminating variable between students with imposter feelings and all students attending PISA 2018 with a difference of 0.48. Like students with imposter feeling, sense of belonging at school discriminates students with imposter syndrome and Türkiye's data with 0.53-point

difference. Similarly, the second highest difference of all mean values' distinction for students with imposter syndrome student group and all students from Türkiye. Thus, the sense of belonging of students at school, can be described as a discriminating variable for students with imposter syndrome. What is more, according to the results of Figure 1, the sense of belonging at school and students' attitudes towards competition variables discriminate between students with imposter syndrome and students without imposter syndrome. The sense of belonging at school of students has a higher score than the sense of belonging of imposter students by a margin of 0.61.

When the index of economic, social and cultural status variable, is compared to both imposter syndrome and imposter feeling groups. When imposter feeling students and students without imposter syndrome compared the index of economic, social and cultural status value, it was seen that the index of economic, social and cultural status was discriminating in both comparisons. Again, when the imposter feeling and students without imposter syndrome groups are compared the sense of belonging at school variable, is distinctive. Likewise, the students' sense of belonging at school also discriminates against imposter syndrome and students without imposter syndrome. In comparing all three groups, students without imposter syndrome score higher on sense of belonging at school variable than other groups. Differently, sense of belonging at school variable is one the least discriminating variables with a 0.05 difference for comparison of students with imposter syndrome and imposter feeling.

That is why, sense of belonging can be related to feeling imposter and imposter syndrome. In short, based on results, sense of belonging has the highest difference between students with imposter syndrome and without imposter syndrome

and students with imposter syndrome and Türkiye comparison. Apart from it, students with imposter feeling and syndrome has a common discriminating data which is sense of belonging. In previous research provides the meaning of sense of belonging for imposters as imposters do not belong this place because they believe they do not deserve their current place. They think they are inadequate for their position. However, in PISA, sense of belonging at school is about students' peer relationship. In both ways, the result of the study for it is not surprising. As Clance and Imes (1978) claimed imposters might suffer from sense of belonging or feel weird with others, so it is normal for students with imposter feeling and syndromes not to prefer to communicate much with others. Another supporting idea for the result is fear of revealing. According to Chandra et al. (2019) imposters might feel their point of views are irrelevant, for explaining their thought others would be understand how they are insufficient and their lack of intelligence. so, they tend to avoid open themselves to others, prefer to be silent. Moreover, as Lawler (1984) stated imposters might be more introvert, so it is not surprising that sense of belonging at school has lower score for students with imposter feeling and syndrome because it measures also students' loneliness at school. Finally, imposters feeling might be related bearing with lack of friendship and lack of sense of belonging. Vilwock et al. (2016) added imposters tend to feel lonely and depression. That is why, sense of belonging at school variable can be related with imposter syndrome and feeling.

Furthermore, Figure 1 shows that parental support perceived by students is the second discriminating variable while comparing students with imposter feeling and students with imposter syndrome. Additionally, parental support is another significant variable for comparison of students with imposter feeling and Türkiye;

students without imposter syndrome and Türkiye; and students with imposter feeling-students with imposter syndrome groups. As it mentioned in results section, the mean of all students' parental support variable has higher mean than students with imposter feeling. On the contrary, students without imposter syndrome's mean have greater mean than Türkiye data. Therefore, imposter feeling may relate to family approaches and support and it is not discriminating for students with imposter syndrome and without imposter syndrome. Like the index of economic, social and cultural status, parental support can be related with low achievement which is the only different trait between two student groups.

Parents' emotional support might be significant for academic lives of children. Based on the study of Lara and Saracosti (2019), low achiever students stated that they feel less supported by their families. Students with imposter feeling are dealing with anxiety of failure and self-doubt.

For students with imposter syndrome, the parental support perceived by student's variable's mean's contrast with Türkiye's data with a 0.39 difference. That is why parental support may be different than other variables when considered with Türkiye data. According to Bussotti (1990) stated, family structure, expectations and relationship with children is crucial for development of those feeling emerging. Especially, negative feeling about individuals about themselves may be seen during the adolescence Based on their study, imposter students are more likely to have less supportive and less helpful families than those of students without imposter syndrome. What is more, for family expectations may create a pressure on students like Mun and Hertzog (2016) demonstrated on their research conducted with Asian college students. They mentioned about stereotypical Asian families who are more focused on academical achievement, then they have found that Asian students might

encounter with imposter syndrome compared to non-Asian students. Similarly, Sonnak and Towell (2001) parental care, protection and support might be affect imposter syndrome. For example, imposters' families might be more overprotected, however, less caring, less supported families can cause emerging or increasing imposter feelings. Also, two types of parents were introduced, first one is to be overestimating the students' abilities and success. The other family type believes their child is the most talented person in the world, so they flatter their children (Clance & Imes, 1978). In short, moderate level of family support is necessary for imposter syndrome.

In addition, when the means of students with imposter syndrome and without imposter syndrome groups were compared, the attitudes towards the competition variable of students without imposter syndrome were 0.40 higher than those with imposter syndrome. parental support perceived by students, students' attitudes towards school, and students' perceptions for peer competition are the variables with the least difference in mean values compared to other variables. According to the results, the parental support values of students with imposter syndrome were 0.1 points higher than the parental support values of students without imposter syndrome. Students' attitudes towards school values and students' perceptions for peer competition, so peer competition are variables in which the mean differences between the two groups are more diminutive.

Additionally, for students with imposter syndrome and students without imposter syndrome groups comparison is attitudes towards competition. Students without imposter syndrome have greater mean for this variable. Langford and Clance (1993) said because of the feeling of incompetence, imposters have tendency to avoid competition. Similarly, imposters could worry about their intelligence level.

Therefore, they might not prefer competition because they fear revealing their lack of ability and intelligence.

As the one of the results when students with imposter syndrome and students without imposter syndrome, the difference between the students' perception about peer co-operation variable is 0.46 points. Students without imposter syndrome has greater mean than students with imposter feeling. Meanwhile, students' learning goals, can be called the imposter feeling and the least distinctive variable for the students without imposter syndrome student groups. Looking at the mean difference of all variables, the students' learning goals mean the difference between the two groups is 0.06 points.

### **Implications for Practice**

The results of the study presented that there are significant variables varying across imposter feeling, imposter syndrome and students without imposter syndrome students. These variables are sense of belonging, students' attitudes towards competition, family background and parental support perceived by students from comparison between three student groups. These results could be beneficial for school counselors and families. Since students with imposter feeling and students with imposter syndrome might suffer from lack of sense of belonging at school, the results of study might lead schools be more cautious about imposter feeling and students with imposter syndrome to prevent depression.

Low ESCS families' children might have more possibility to encounter with students with imposter feeling and syndrome compared to students without imposter students. That is why the result might be used for new policymaking and developing some programs for families. The more educated parents would lead more confident students in their academic/school lives. Also, for families may benefit of such

programs about their expectations from their children and they might give enough support their children without creating pressure on them. According to Closson and Boutilier (2017) mentioned that with the help of the family approach, students may develop their self-belief and working behaviors. Therefore, parent educational programs may be essential for overcoming imposter feelings and syndrome.

Another implication for practice is about creating self-awareness programs for imposter feeling and imposter students. Both groups suffer from lack of self-efficacy. Schools may organize some workshops for students to decrease their fear of failure and to increase their self-efficacy. Johnson and Johnson (1974) highlighted the benefits of the competition during learning. However, imposters might not willingly attend competition while learning because they feel exposed by their peers and their high fear of failure. On the other hand, peer learning included competition might be useful for students to increase their self-awareness because they might win the competition, and this could boost their self-efficacy (Ames & Archer, 1988). Hence, teachers should be careful while providing group activities and know their students.

### **Implications for Further Research**

This study focused on comparing three student groups, and only mathematical literacy test is considered among other literacy tests. However, academic achievement should not define based on only a single subject. For further research, science and reading literacy performance should be added for comparison of these student groups.

What is more, previous research compared only students with imposter groups and without. Imposter feeling students have the same mental challenges as imposter students like low self-efficacy and high fear of failure, their academic

achievement levels are not equal. Therefore, the differences might be examined more to overcome academic handicaps of students with imposter feeling as well as comparison of three groups is necessary for indicate the differences between them. Additionally, PISA provides many variables but imposter syndrome. Imposter syndrome could be defined as one of the variables in next PISA cycles.

### **Limitations**

PISA results were analyzed to explore relationships among academic achievement, self-efficacy, and fear of failure. Although the examination does not directly measure imposter syndrome, some indicators defined by PISA could be directly related to imposter syndrome. In this study, imposter syndrome is defined by using those variables, in PISA there is no index measuring imposter syndrome, that is why it is a limitation for this study.

While groups were divided into three, the sample size of each student group was different. The number of students with imposter feeling was 221, sample size of imposter syndrome was 128, whereas students without imposter syndrome group was the most crowded student group with 1839 students. Also, in Chapter 4, three groups were compared with Türkiye data with 6890 sample sizes. Thus, the difference of sample sizes is a limitation of the study.

This study is based on students' responses which may be biased and/or inconsistent. Nevertheless, self-reporting variables are used widely in the literature based on the assumption that self-reporting a valid source of information.

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