Gender differences in chess: comparative effect of age and country of origin among chess players by gender

Diferencias de género en el ajedrez: efecto comparativo de la edad y el país de origen entre ajedrecistas según su género

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Abstract. Historically, it has been accepted as statistical evidence that women have a lower chess performance than men. Multiple theories have been proposed to support this assumption: the lower participation of women in chess relative to men, the different cognitive abilities according to gender, the lower number of games played by women when leaving this discipline earlier than men, the lower participation of women in deliberate practice activities, or by age and the number of games played in a given period. This article analyzes the effect of the difference between female and male elo from 2012 to 2023, the chess performance gap between men and women by country, and the variation in the average performance of chess players by gender and age. It is shown that the variables of the chess player's place of residence and age have an effect on the average performance of chess players, far greater than that traditionally associated with gender. In fact, in this article it has been determined that there is an age period (between 34 and 42 years old) in which women play chess better than men, on average.
Keywords: Expertise, Chess performance, Sex differences, participation rates, chess, intellectual activities.

Resumen. Históricamente, se ha aceptado como evidencia estadística que las mujeres tienen un rendimiento ajedrecístico inferior al de los hombres. Múltiples teorías se han propuesto para apoyar esta suposición: la menor participación de las mujeres en el ajedrez en relación con los hombres, las diferentes capacidades cognitivas según el género, el menor número de partidas jugadas por las mujeres al abandonar esta disciplina antes que los hombres, la menor participación de las mujeres en actividades de práctica deliberada, o por la edad y el número de partidas jugadas en un periodo determinado. En este artículo se analiza la diferencia entre el rendimiento ajedrecístico femenino y masculino de 2012 a 2023, la brecha de

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rendimiento ajedrecístico entre hombres y mujeres por países, y la variación del rendimiento medio de los ajedrecistas por género y edad. Se comprueba que las variables del lugar de residencia del ajedrecista y la edad tienen un efecto sobre el rendimiento medio de los ajedrecistas muy superior al que tradicionalmente se asocia al género. De hecho, en este artículo se ha determinado que existe un periodo de edad (entre los 34 y los 42 años) en el que las mujeres juegan al ajedrez mejor que los hombres, por término medio.

Palabras clave: rendimiento ajedrecístico, sesgo de género, ajedrez, porcentajes de participación, actividades intelectuales.

1. Introduction

Chess, a game of deep strategy and intensive cognitive skills, has been the subject of study in various fields, from psychology to education and, recently, in the field of economics and business management. This study aims to explore the correlations between chess skills and performance and productivity in the business environment, paying particular attention to the variables of age, gender and nationality. Previous research has shown that chess not only improves cognitive skills such as memory, problem-solving ability and logical thinking, but also fosters qualities such as patience and perseverance (Aciego, R., et al., 2012). These skills are highly transferable and could positively influence work productivity (Burgoyne, A. P., et al., 2016).

Research on the impact of gender on chess performance has indicated significant differences, which may also be reflected in work environments. For example, studies have found that although there are fewer women in elite chess, those who participate tend to perform comparatively highly, suggesting the existence of barriers to entry and the need for greater support (Bilalic, M., et al., 2009). In terms of age, the literature suggests that chess performance peaks around the age of 30-35 and then declines; however, experience and accumulated wisdom may compensate for the decline of certain cognitive skills in professional settings (Roring, R. W., & Charness, N., 2007). Finally, nationality and cultural contexts also play a crucial role, influencing both chess playing style and management approaches in companies, which could suggest differentiated skill development and talent management strategies based on cultural diversity (Kwak, Y., 2016).

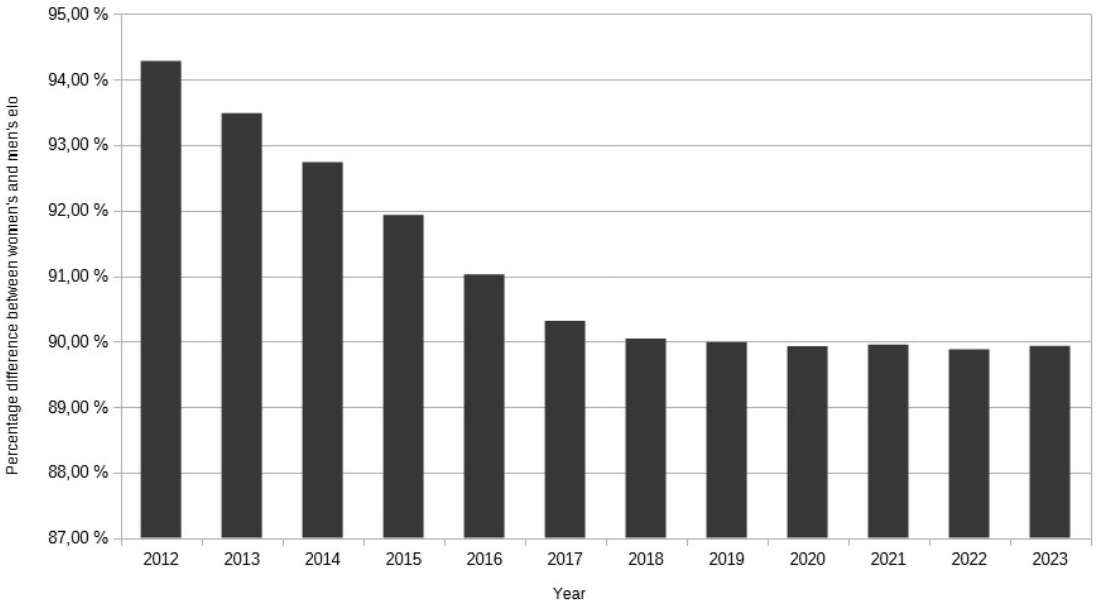
It is an accepted statistical fact that women play worse chess on average than men, as reflected in their average skill ratings (called elo, Elo, 1978; Glickman, 1995). Historically, there have been several explanations for this: women's lower participation in chess relative to men (Bilalic, Smallbone, McLeod, & Gobet, 2009; Charness &Gerchak, 1996); different cognitive skills according to gender (Howard, 2005, 2014a, 2014b), fewer games played by women when leaving this discipline earlier than men (Howard, 2005, 2014b), lower participation of women in deliberate practice activities (de Bruin, Smits, Rikers, & Schmidt, 2008), or by age and the number of games played in a given period (Blanch, Aluja, & Cornadó, 2015).

This article will analyse what effect the comparative place of origin and age have on the average performance of women and men who compete in chess, in order to establish whether the above explanations are compatible with the available statistical data.

1.1 The present study

According to the average number of federated chess players in the International Chess Federation (FIDE), in January 2023 there were 405,511 chess players. If we analyse the average elo of men and women, from 2012 to 2023 (in the month of January), the difference in average chess performance between men and women has widened over time, stabilising from 2018 to the present at around 90% of the average elo of men (Graph 1).

Graph 1. *Difference in percentage between women's and men's elo from 2012 to 2023 (January) (elo women/ elo men)*



Source: Own elaboration based on data provided by FIDE.

2. Results

In this section, the average performance of the chess players will be analysed comparatively according to their sex, taking into account two variables, country of origin and age, in order to assess whether these variables are relevant to explain the existing differences between men and women.

2.1 Variation in the average performance of chess players by country

Below is the difference in average rating by gender and country, for all countries where there are FIDE-federated chess players (Graph 2).

According to these data, the variations between the average ability of men and women in chess show marked differences according to the country in which the players reside, with the following standing out:

Graph 2. *Chess performance gap between men and women by country.*

Source: elaboration based on data provided by FIDE (January 2023).

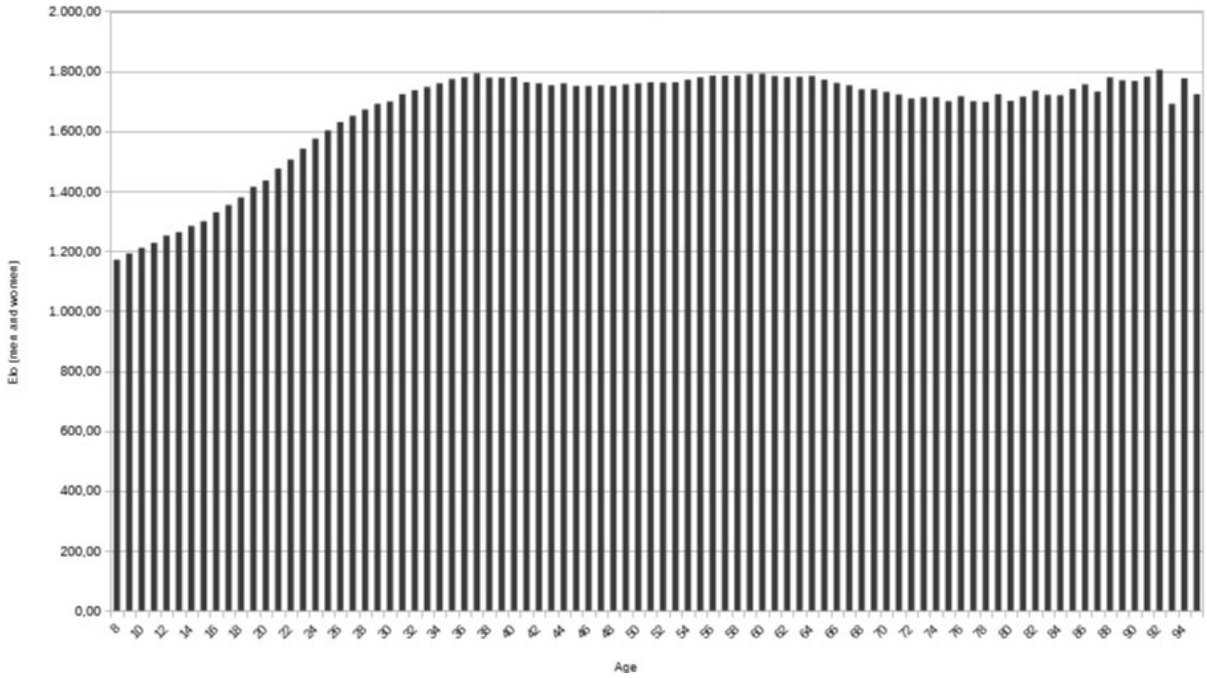
- In three countries the average average female chess player is higher than the average male chess player (Guernsey, Saudi Arabia and Georgia).
- In 29 countries, the average difference between women and men is less than 100 elo points.
- In 111 countries, the average difference between women and men is in the range of 101 to 299 points.
- In 35 countries, the average difference between women and men is more than 300 elo points.
- There are 20 countries where there are no women competing in regulated chess competitions (mostly in Africa).

According to these data, the average elo of women varies according to the country of origin between a maximum of 1,846 (Guernsey) and a minimum of 1,145 (Burundi), while that of men varies between 1,961 (Cuba) and 1,267 (Antigua and Barbuda). Accordingly, the place of origin of the player seems to be as relevant to his or her chess ability as his or her gender (and even to the opportunity to compete in chess, as shown by the fact that in 20 countries there are no women in the federation). It is worth noting that, for example, the average elo of a Cuban female player is higher than the average elo of men in 162 countries, and only lower than in 36 countries.

2.2. Variation in the average performance of chess players by gender and age

Predictably, the average performance of chess players (male and female), as measured by elo, is strongly dependent on age when they are in training, as shown in the graph below:

Graph 3. *Evolution of the elo of players (men and women) according to age (from 8 to 95 years old).*

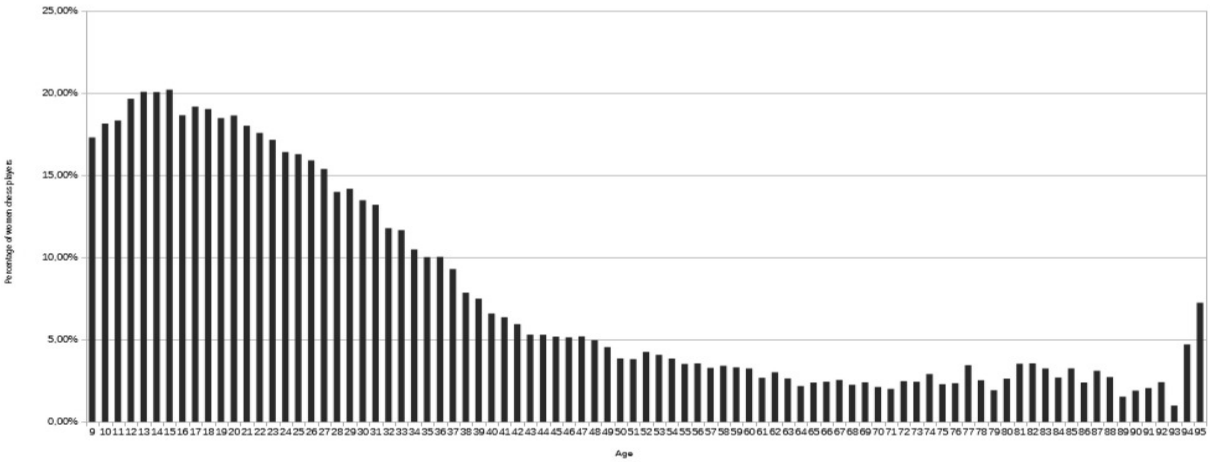


Source: Own elaboration from FIDE data of the elo of federated players worldwide (January 2023). Players over 95 years of age have not been considered (385 players in total), as the number of players per year and sex is very small, especially in the case of women (18 women over 96 years of age), which could distort the average elo of the aforementioned years of age.)

Graph 3 shows that the elo grows steadily from the age of 8 until the age of 40, when it reaches its maximum (1,781 elo on average), remaining relatively stable until the age of 65, falling slightly, with a limited upturn from the age of 80 to the age of 88.

These data can be analysed by sex, and the large sample size referred to above, of which 10.70% are women, guarantees the representativeness of the conclusions that can be drawn from it. The evolution of the percentage of women by age with respect to the total number of federated chess players is as follows (Graph 4):

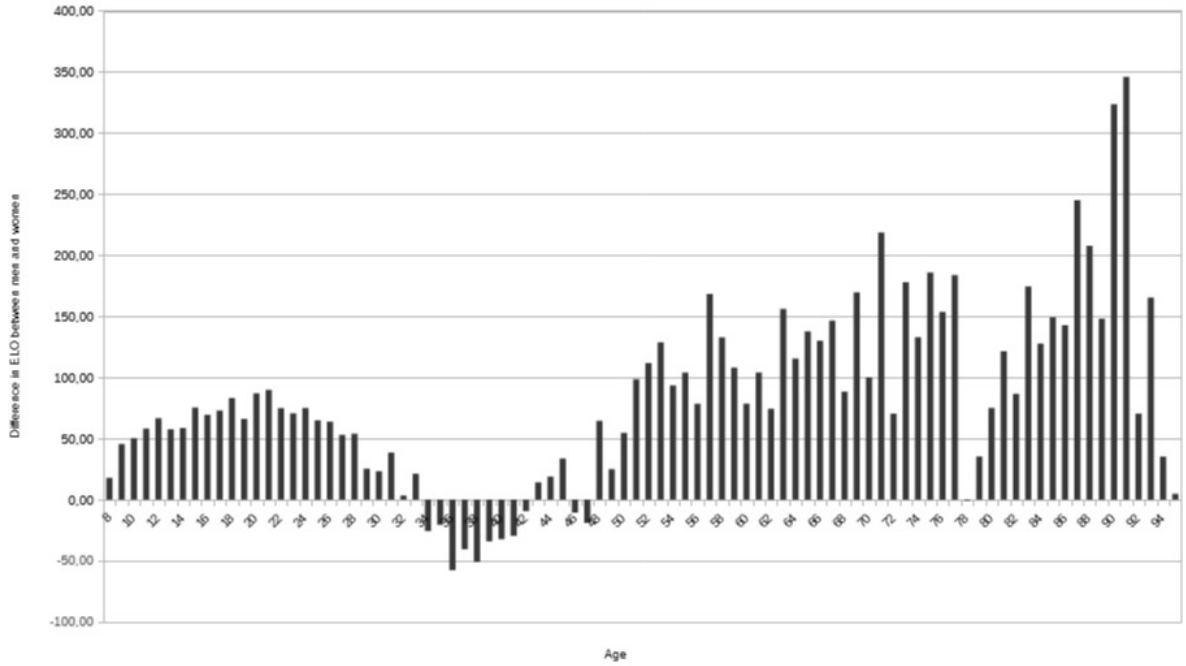
Graph 4.



Source: Own elaboration based on data provided by FIDE (January 2023).

According to these data, the percentage of women chess players is increasing until the age of 15, after which there is a sharp decline; at the age of 40, 6.59% of women play competitive chess, and at the age of 80, only 2.63%. There is a relative attenuation in the rate of decline in the percentage of women playing chess; whereas at the age of 42, 6.37% of women compete in chess, at the age of 80 only 2.63% do so. Even the effect of the longer average life span of women does not translate into a higher percentage of women competing in chess, except above the age of 94, where the data are not very representative due to the small sample (at 94 or 95 there are 19 women chess players and 310 men). To see whether age has an effect on the performance of the chess players according to their sex, we have analysed the difference in the elo of men and women of the same age, and the following graph shows the difference in the elo of women and men (Graph 5):

Graph 5. *Evolution of the difference between the elo of men and women according to their age (positive value when the elo of men is higher than that of women).*



Source: Own elaboration based on data provided by FIDE (January 2023). Players over 95 years of age have not been considered.

- Accordingly, several age ranges with different characteristics are noticeable:
- From the age of 8 to 33, men play on average better than women, but in this age range there is an increasing difference in their chess performance from the age of 8 to 21 in favour of men, and decreasing from the age of 22 to 33.
- From the age of 34 to 42, women play on average better than men.
- From the age of 43 onwards, men play on average better than men, with an increasing trend (except for isolated years, 46, 47 and 78, when women play better chess on average).

Conclusions

Although the statistical data seem to indicate that women play worse chess on average than men, and different theories have been postulated to justify this, there is no evidence from the statistical results accompanying this article to state this conclusively. According to the data provided, a player's ability seems to be more related to the country of origin than to his or her gender.

Likewise, with regard to the evolution of the level of chess skill according to the age of the player, it is noted that there is an age bracket in which women play better chess on average than men (from 34 to 42 years of age), so that the differences in the average level seem to depend on other reasons not linked to gender, but to the gender bias that exists in chess.

It remains to be determined with greater precision what aspects cause the differences in the evolution of the level of chess skill according to age and gender mentioned above.

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