

MUJERES EN GRUPOS ORGANIZADOS DE TRÁFICO DE DROGAS: UN ENFOQUE DE RED SOCIAL

WOMEN IN ORGANISED DRUG TRAFFICKING GROUPS: A SOCIAL NETWORK APPROACH

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Resumen

Los grupos del crimen organizado se entienden tradicionalmente compuestos por hombres, con una estructura jerárquica rígida y tareas bien divididas. Sin embargo, estudios recientes han venido mostrando que las redes criminales (estructura horizontal) son cada vez más comunes e incluso una alternativa a la estructura rígida típica del crimen organizado, lo que permite un grupo criminal más flexible, dinámico y adaptable. Además, las mujeres están cada vez más presentes en estos grupos, como en los grupos de narcotraficantes, y, en algunos casos, desempeñan papeles relevantes en las organizaciones criminales. En este estudio, se analizaron expedientes judiciales penales relacionados con el tráfico de drogas del crimen organizado que involucran a cien acusados mediante la aplicación de técnicas de análisis de redes criminales. El objetivo fue examinar la participación y centralidad de las mujeres en el funcionamiento de los grupos narcotraficantes. Los resultados muestran que las mujeres tienen funciones relevantes dentro de sus grupos y las medidas de centralidad evidencian que las mujeres desempeñan papeles importantes, siendo algunas de ellas protagonistas decisivas en el funcionamiento del grupo.

Palabras clave: Crimen Organizado, Narcotráfico, Género, Redes Sociales, Análisis Mixto

Abstract

Organised crime groups are traditionally understood as being composed of men, with a rigid hierarchical structure and well-divided tasks. However, recent studies have been showing that criminal networks (horizontal structure) are increasingly common and even an alternative to the typical rigid structure in organized crime, which allows for a more flexible, dynamic, and adaptive criminal group. Moreover, women are progressively present in such groups, especially in drug trafficking groups, and, in some cases, play relevant roles inside those criminal organisations. In this study, criminal court files related to trafficking organised crime groups involving one hundred defendants were analysed by applying criminal network analyses techniques. The objective was to examine the participation and centrality of women in the functioning of the drug trafficking groups. The findings show that women

have a significant presence within these networks, play important roles inside the criminal networks and enjoy of high centrality positions, being some of them decisive key players in the functioning of the group.

Keywords: Organised Crime, Drug Trafficking, Gender, Social Networks, Mixed Analysis

Introduction

Female crime has garnered progressively higher social, political, academic, and media attention during the last decades as statistics have been revealing evidence in the opposite direction to what was considered a male-dominant environment (Wang, 2021). Men used to be more associated with criminal activities than women, as men were stereotypically seen as powerful, dominant, and violent (e.g., Siegel, 2014). Women, on the contrary, used to be seen as gentle, caring, non-violent and, therefore, less likely to enter in criminal activities (Burman, 2004). Like general crime, organised crime was also seen as a type of criminality perpetrated by men, as violence is seen as its traditional feature (Viano 2010; Siegel 2014; Catino 2020). However, the last decades were significantly important for the development of the studies focused on the participation of women in organised crime groups (Marotta, 2004), either on drug trafficking groups, where women began assuming preeminent roles (e.g., Fleetwood, 2014) –, or other types of criminal activities, such as mafia groups, human trafficking or terrorist groups (e.g., Dino, 2007; Gul, 2018; Hübschle 2014; Pizzini-Gambetta, 2008, 2014; Zhang, 2008).

Despite the scarce literature on the role of gender in organised crime groups, some studies have been revealing the presence and importance of women in criminal networks, namely in positions traditionally attributed to men (e.g., Fleetwood, 2014; Hübschle 2014; Interpol, 2021; Méndez, 2020; Siegel, 2014; Wijkman & Kleemans 2019). Nonetheless, scientific knowledge about the importance of women in organised crime groups requires additional research (Britton, 2000), namely using new methodologies to explore dynamics at the core of criminal organizations. Social Network Analysis techniques have been increasingly used in criminological research (Faust & Tita, 2019), especially in studies dedicated to organised crime, responding to changes observed in their criminal structures (Bright, Brewer, & Morselli, 2021). Additionally, research on women and organized crime is absent in the Portuguese context (see Guerreiro, 2022), which makes this study even more important. Not only there is a need to explore more research on women in organised crime groups, but research focused on other geographical contexts is needed. Thus, it is crucial to consider studies in several contexts, such as Portugal, to be able to understand the phenomenon in a more comprehensive and consistent way.

To fill the identified gap in the literature, this article aims to analyse the participation of women in the functioning of the drug trafficking groups, taking into account the roles assumed and the tasks assigned within the group. It also explores how much they are central in the connections inside the group, with impact on the effectiveness of the illegal activities performed. By using social network analysis techniques, data included in four court files related to personal characteristics of one hundred defendants and about their role and tasks performed in the criminal network were examined. This makes this study innovative, not only for the use of social network analysis techniques to the participation of women in organised crime, but also for being the first of this kind in Portugal.

The article is divided into four main sections. The first section reviews the presence and parti-

cipation of women in organized criminal groups, especially in cases of drug trafficking. The second section focuses on studies about the criminal network structure of the criminal groups, suggesting ideas for its analysis using social network techniques and identifying the main needed measures. Then, the third section presents the empirical study, in which data from four Portuguese court decisions on criminal association involving one hundred accused individuals is subject to statistical analysis, by making use of social network techniques. Finally, the last section provides a discussion about the main findings of the study, compared to the known international literature on network analysis and particularly about their participation in drug trafficking criminal groups. Limitations of the study as well as ideas for future research are also provided.

Women in organised crime groups

Criminality has been for several decades identified mainly as a male world (e.g., [Cossins, 2013](#); [Lauritsen et al., 2009](#)), following the traditional image of social crime studies (see [Cohen 1955](#); [Sutherland & Cressey 1974](#)). Within the scope of organised crime, even though the first studies were gender-blinded ([Enfield, 2019](#)) which implicitly had a male composition, the male presence in criminal networks still seems to be the norm since it is a type of crime linked with violent operations ([Gomes & Granja, 2015](#); [Siegel, 2014](#)). This trend is confirmed by studies developed by [Kleemans and De Poot \(2008\)](#), [Van Koppen et al. \(2010\)](#), and [Francis et al. \(2013\)](#) who stated that, in most cases, organised crime offenders are men.

For a long time, female criminality in organised crime was not a topic of scientific and academic debate ([Ekmekçioğlu, 2013](#); [Newburn, 2007](#); [Siegel, 2014](#); [Siegel & Nelen, 2008](#)). Authors such as [Allum \(2007\)](#), [Beare \(2010\)](#), [Dino \(2004; 2007\)](#), [Fiandaca \(2007\)](#), [Fleetwood \(2014\)](#), [Kemp et al. \(2020\)](#), [Marotta \(2004\)](#), [Pizzini-Gambetta \(2014\)](#), [Selmini \(2020\)](#) or [Siegel \(2014\)](#) are important references in this field and have largely contributed to uncovering the presence of women in organized crime groups. According to [Siegel \(2014, p. 57\)](#), “today, organized crime is increasingly transnational, and the role of women must be analysed specifically in relation to transnational flows, new markets, products and customers, and international migrations”.

There is no consensus about the role of women in organised crime groups, as perspectives change according to the type of crime and the socio-cultural context ([Guerreiro, 2022](#); [Guerreiro, Gomes & Sousa, 2022](#); [Selmini, 2020](#)). Factors such as poverty, educational level, unemployment, and family history are indicators that co-influence criminal involvement (e.g., [Cunha, 2002; 2005](#); [Fleetwood, 2014](#); [Fleetwood & Leban, 2022](#); [Gomes, 2014](#); [Moore, 2007](#)). Theoretical knowledge balances between two main visions: on one hand, the understanding that women play less central roles than men and perform less important activities within the criminal group ([Diviák et al., 2020](#); [Selmini, 2020](#)), being labelled as collaborators and never as the brains of operations ([Selmini, 2020](#)). On the other hand, perspectives advanced by [Siegel \(2014\)](#), [Fleetwood \(2014\)](#); [Fleetwood & Leban, 2022](#)) or [Interpol \(2021\)](#) show women occupying very important roles in criminal networks, even without a male rear-guard, especially because they can be of great value to the criminal group for not being easily targeted by law enforcement agencies.

Literature on women and organised crime focus essentially on mafia groups, especially the Italian mafias ([Arsovska & Allum, 2014](#); [Enfield, 2019](#)), human trafficking (e.g., [Siegel, 2014](#)), and drug trafficking (e.g., [Beare, 2010](#); [Fleetwood, 2014, 2017](#)). In all studies, it seems consensual that the roles assumed

by women within these criminal groups vary according to their type of criminal activity.

Focusing on women in the organised drug trafficking groups, the main focus of this article, it is possible to observe that only from the later 20th century began a particular concern about women's involvement in drug trafficking, when it became a flourishing business in the 1990s (Galanaki, 2018). This, despite women's involvement in drug crimes being deeply subjected to public debate before then (Carey, 2014; Fleetwood & Leban, 2022), and being one of the most developed topics from a gender perspective (Galanaki, 2018).

Drug trafficking is the most common type of crime in female incarceration internationally (e.g., Almeda, 2003; Fleetwood, 2011, 2014; Gomes, 2014, 2018; Matos & Cunha, 2020; UNODC, 2019), affecting females in an unparalleled way. The first studies about their involvement and, particularly, about the roles assumed by them inside the criminal group consider them with a marginalized and minor status (e.g., Boyd, 2006; Broad, 2015; Sommers, Baskin, & Fagan, 1996; Tickner et al., 2020), mainly playing the role of mule as a way to make money faster (the so-called feminization of poverty). In fact, studies show that most foreign women serving prison time were caught as mules (Matos, 2007; Gomes, 2018). Profits from drug markets provide many women an opportunity to earn money quickly (Longrigg 1998 cit. in Siegel, 2014). However, this is extremely risky work, especially when compared to the income they earn, which is pursued not with the intention of reaching the level of wealth, but rather as survival (Fleetwood & Leban, 2022; Kruttschnitt, 2013; Gomes, 2018). Factors such as early widowhood, social exclusion, unemployment, and lower salary levels seem to be associated with higher vulnerability, which drive women to seek alternative, and often illegal, income solutions (Sá, 2015). Additionally, coercion is also a factor pointed out for the entry of women in drug trafficking groups, highlighting a male-dominant world (Fleetwood & Leban, 2022).

This vulnerable discourse about women's involvement is changing, and attention is also being put on their own will to enter in the business, occupying important, autonomous, and independent roles in criminal organisations, and assuming leading positions (Anderson, 2005; Broad, 2015; Fleetwood, 2011, 2014; Fleetwood & Leban, 2022; Siegel, 2014; Tickner et al., 2020; UNODC, 2018; 2019). Inside drug trafficking groups, women began to take part in the cultivation process of cocaine, cannabis, and opium, undertaking the manual labour (planting or transferring seeds), but also working on the chemical transformation process. In addition, they recruit others as mules, take care of them, and also serve as "guards" or assume the operational and financial management of the networks (Fleetwood, 2014; Fleetwood & Leban, 2022; Gomes, 2014; Hübschle, 2014). That said, it is important to acknowledge that women's role in organised drug trafficking groups is ambivalent and complex, and conveying a single story of women as just vulnerable should be demystified (Duarte & Gomes, 2015). Women can play very distinct roles within the criminal group and more in-depth research is needed to shed light on this complexity.

In crimes such as human trafficking this complexity is also recognized. Women's entrance seems to be related to factors such as kinship (Guerreiro, Gomes, & Sousa 2021; 2022), socio-economic conditions (Viuhko, 2018) and to escape from violence (Batchelor, 2005; 2007). This is a very delicate issue that highlights the blurred line between being an offender and a victim (e.g., Batchelor 2005; Daly & Maher 1998). A wide range of roles is associated to women inside human trafficking organizations, mainly with an invisible image (Siegel & DeBlank, 2010; Wijkman & Kleemans, 2019). Zhang (2008), for example, regarding the phenomenon in China, states that the participation of women occurs in all phases of trafficking, with particular emphasis on the recruitment process, due to the greater confidence that they can convey to new victims (Diviák et al., 2020; Kienast et al., 2014). However, women

do not seem to hold places of leadership, although they can sometimes appear as brothel owners (Roe-Sepowitz et al., 2015; Selmini, 2020; UNODC, 2016).

In mafia groups, a male-dominated world, women only undertake more autonomous participation when the man is arrested, run away, or dies (Campbell & Wilan, 1999). Their position inside the groups varies according to the context and type of group. For example, there are groups that formally exclude women, assuming a more invisible role (Pizzini-Gambetta, 2014), but there are others who attribute an added value to females and see women as crucial for the maintenance of the reputation of men and family (Pizzini-Gambetta, 1999). Most of the time, in mafia groups, women assume the role of transmitting good practices to the descendants, namely, the value of silence (*omertà*), the feeling of solidarity, financial management, as well the insurance that the descendant becomes dangerous and following the values of the groups (Dino, 2004; 2007; Marotta, 2004).

Organised crime as a criminal network

Criminal network analysis is an adaptation of the concepts and quantitative techniques originally developed inside the Graph Theory and now commonly used in the exploration and analyses of social networks (Morselli, 2009) to the illicit context. It aims to identify the number of members of the group, to examine the direction and the intensity of the links established among them, and based on this information, determine a set of quantitative indicators that characterise the network in itself and the centrality power of the members (Sousa, 2019; Sousa & Guerreiro, 2021).

The criminal network analysis starts with the collection and organization of data about the interactions among members that may come, for instance, from wiretapping, written messages, and emails. After the network has been graphically visualised, the analysis focused on: i) the network dimension and density (Diviák et al., 2020; Iwanski & Frank, 2014; Morselli & Tremblay, 2004; McGloin & Piquero, 2009); ii) the importance of each member in the network, and iii) the existence of overlapped roles. Whenever possible, the analysis also makes use of qualitative data about individual characteristics of the members and the role and functions they occupy in the functioning of the network (Sousa & Guerreiro, 2021).

The examination of the individual importance of the members is carried out fundamentally by resorting to the concept of centrality (Sparrow, 1991) and commonly, four quantitative indicators of centrality are considered: i) degree centrality; ii) closeness centrality; iii) betweenness centrality; and iv) eigenvector centrality. Degree centrality is measured by the number of direct contacts or connections a member has with other members of the group (Morselli, 2010). With a high degree of centrality, a member works as a major channel of information in a network and becomes extremely exposed to external control. Closeness centrality is measured by the length of paths to other members. Thus, the smaller the number of contacts between a member and his/her peers, the greater the proximity between them. Presenting a higher closeness centrality, a member contributes to the rapid diffusion of the information and strategies. Betweenness centrality is measured by counting the number of times an individual intermediates the main connections between other members, allowing the identification of who assumes the position of broker or bridge (Sousa, 2019). This means that if a geodesic path between two members with a high level of betweenness is removed, communication or connection between individuals will be much more difficult. The eigenvector centrality aims to assess to what extent a member is connected to the most well-connected members within the network

(Sousa, 2019). According to this indicator, the success of the network's criminal activity depends on the connection that the group members establish with individuals with a higher degree of centrality.

A study developed by Morselli (2010) about the Quebec Hells Angels (Canada) motorcycle criminal group known for mass murders, which considered the electronic surveillance data obtained during police investigations of the well-known Operation Springtime, showed that members with a high degree of centrality are more likely to be arrested, compared to those with a high degree of betweenness centrality. This result was also confirmed by Calderoni (2012) and Morselli et al. (2013) who, when analysing the penalties assigned to offenders with a more central position in the network, concluded that the higher is the degree and betweenness centrality, the greater is the punishment. The importance of being a greater broker inside a criminal network has also been demonstrated in studies on drug trafficking (e.g., Desroches, 2005; Natarajan, 2006; Pearson & Hobbs, 2001; Zaitch, 2002) and human trafficking (e.g., Kleemans & Van de Bunt, 2003; Zhang, 2008; Zhang & Chin, 2002). The analysis of an organized crime group with criminal network techniques may render crucial information for tracking, controlling, and neutralising the activity of organised crime groups by police authorities and by the justice system (Burcher & Whelan, 2017; Duijn et al., 2014).

Empirical study

Aims and hypotheses

This study aims (i) to examine the participation of women in the functioning of drug trafficking groups, taking into account the roles assumed and the tasks assigned within the group, and (ii) to explore how much they are central in the activities performed by the groups. Thus, two hypotheses are established: Women do take part in criminal organised groups (H1), but men remain enjoying of better centrality positions than women adopted inside the group (H2).

Method

Procedure and sample

This is a quantitative study, which considers (qualitative and quantitative) data collected in court files of drug trafficking organized groups. In response to a request for data access, formal authorization was obtained to access a set of thirty-six court files (450 defendants), randomly selected by the larger Portuguese courts of first instance (Lisbon and Porto) for the period between 2007 and 2019. Criminal network analysis required data about the interactions between group members identified in wiretapping, which was only found in four court decisions. Therefore, the sample for this study is comprised of four court decisions of organized crime groups dedicated to drug trafficking, involving 100 defendants (Table 1).

Group 1 was comprised of 31 individuals, 13 (41.9%) of which were females; group 2 was also composed of 31 members, of which 8 (25.8%) were women; group 3 also had 31 members but had even less women on the group – 4 (12.9%); and, finally, group 4 was composed of 7 members, with 3 females (42.9%). These groups have members with different types of relationships, but most are people known to each other, with family and intimate relationships (Guerreiro, Gomes, & Sousa 2021; Guerreiro, Sousa, & Gomes, 2022).

Table 1

Organised crime groups

Group	Members (defendants)		
	Totals	Males	Females
1	31	18 (58.1%)	13 (41.9%)
2	31	23 (74.2%)	8 (25.8%)
3	31	27 (87.1%)	4 (12.9%)
4	7	4 (57.1%)	3 (42.9%)
Totals	100	72 (72.0%)	28 (28.0%)

Quantitative data were collected from the court files, using two different collection grids. The first grid was prepared to collect data captured into wiretapping about all the interactions between members – who contacted whom, the direction and the number of contacts. That data was subject to proper criminal network analysis using the software Social Network Visualizer (SocNetV, v2.5) and the main centrality measures (degree, closeness, between, and eigenvector centrality) were computed. Sociodemographics and criminal data about defendants (presumed offenders) – sex, age, nationality, civil status, education level, labour situation, previous criminal record – and data related to their participation inside the organized crime group – role within the group and tasks assigned – were collected with the second grid. These data were organized and examined using the IBM SPSS Statistics V28.01. Besides descriptive statistics (means, standard deviations, proportions), non-parametric tests (Mann-Whitney U test, Chi-Square test, and Fisher-Freeman-Halton Exact test) were performed discriminating between males and females.

Findings

Seventy-two per cent of the sample is comprised of males. With an average age of 34.6 years old ($SD=12.80$), five per cent were foreigners, more than two-thirds were single (71.7%), 94.2% completed only the basic school level (≤ 9 years), more than half were unemployed (60.8%), and 29% had a criminal record (besides drug trafficking, theft, possession of prohibited weapons, and money laundering). No significant differences were identified between males and females in terms of these characteristics, except for age: women ($M=40.3$ years old, $SD=14.21$) were significantly older than men ($M=32.4$ years old, $SD=11.59$) ($U=627.500$, $p=.011$) (Table 2).

Regarding the role played inside the criminal groups, 93.5% of the defendants were regular members inside the group, acting the remainder as leader or founder and leader. Taking into account the known data in the court files, almost three quarters of the members assumed operational tasks (Table 3).

In addition to the role within the group and to the tasks undertaken inside the group, it is also important to examine the extent to which women contribute, in an outstanding way, to bridging the gap between the various members of the network, and strongly contribute to the efficacy of the illegal operations of the organized group. This assessment is carried out using criminal network analysis and, namely, by computing centrality measures for each member inside each group.

Focusing the attention separately on each group, we observe that in group 1 women occupy top positions in terms of centrality. The individuals with the most direct contacts with other members and, therefore, more exposed to control by peers and authorities, are women (ID1 and ID17). One of them (ID1) was the founder of the group together with a man (ID2). Both occupied important

(between centrality) positions in intermediating the illicit activities developed by the group. Moreover, women contribute strongly to the centrality positions of men. Men appeared with higher eigenvector centrality values exactly because they are linked to women with the most important connections within the group (Table 4 and Figure 1).

Table 2

Sociodemographics (N=100)

	Total	Males N=72 (72.0 %)	Females N=28 (28.0 %)	Significance
Age	17-69 years old M=34.6 (SD=12.80)	17-61 years old M=32.4 (SD=11.59)	19-69 years old M=40.3 (SD=14.21)	U=627.500, Z=2.557, p=.011(a)
Nationality				
- Portuguese	95 (95.0 %)	67 (93.1 %)	28 (100.0 %)	$\chi^2(2)=2.047$ p=.318 (b)
- Foreigners	5 (5.0 %)	5 (6.9 %)	0 (0 %)	
Civil status				
- Singles	66 (71.7 %)	52 (78.8 %)	14 (56.0 %)	$\chi^2(2)=4.480$ p=.110 (c)
- Married or equivalent	13 (14.1 %)	7 (10.4 %)	6 (24.0 %)	
- Divorced or equivalent	13 (14.1 %)	8 (11.9 %)	5 (20.0 %)	
- Missing info	8 (8.0 %)	5 (6.9 %)	3 (10.7 %)	
Education				
- Basic school (≤ 9 years)	65 (94.2 %)	45 (95.7 %)	20 (90.9 %)	$\chi^2(2)=2.209$ p=.484 (c)
- Secondary school (12 y)	3 (4.3 %)	1 (2.1 %)	2 (9.1 %)	
- University	1 (1.4 %)	1 (2.1 %)	0 (0 %)	
- Missing info	31 (31.0 %)	25 (34.7 %)	6 (21.4 %)	
Professional situation				
- Employed	29 (36.7 %)	24 (39.3 %)	5 (27.8 %)	$\chi^2(2)=5.499$ p=.062 (c)
- Unemployed	48 (60.8 %)	37 (60.7 %)	11 (61.1 %)	
- Retired	2 (2.5 %)	0 (2.0 %)	2 (11.1 %)	
- Missing info	21 (21.0 %)	11 (15.3 %)	10 (35.7 %)	
Previous criminal record	29 (29.0 %)	24 (33.3 %)	5 (17.9 %)	$\chi^2(2)=2.345$ p=.126 (b)

(a) Mann-Whitney U test, (b) Chi-square test, (c) Fisher-Freeman-Halton Exact test.

Table 3

Roles and tasks within the group (N=100)

	Total	Males N=72 (72.0 %)	Females N=28 (28.0 %)	Significance
Role within the group				
- Founder and leader	2 (2.2 %)	1 (1.5 %)	1 (4.0 %)	$\chi^2(2)=1.098$ p=.772 (a)
- Leader	4 (4.3 %)	3 (4.4 %)	1 (4.0 %)	
- Regular member	87 (93.5 %)	64 (94.1 %)	23 (92.0 %)	
- Missing info	7 (7.0 %)	5 (6.9 %)	3 (10.7 %)	
Tasks within the group				
- Leadership	6 (13.0 %)	4 (11.8 %)	2 (16.7 %)	$\chi^2(2)=1.918$ p=.484 (a)
- Intermediary responsible	7 (15.2 %)	4 (11.8 %)	3 (25.0 %)	
- Operational member	33 (71.7 %)	26 (76.5 %)	7 (58.3 %)	
- Missing info	54 (54.0 %)	38 (52.8 %)	16 (57.1 %)	

(a) Fisher-Freeman-Halton Exact test.

The roles assumed as well as the tasks assigned in the group are not associated with sex (Table 3). Although it varies within organised crime groups, women are active at the foundation of the group, in leadership positions and as regular members. At the time of the foundation of the group, in cases where they are present, women appear next to the male figure. As regular or operational members, women take on very diverse roles in terms of managing illicit activities, and the depth to which they engage in illicit practices varies, as they do in the interactions within the group. Besides, according to the court files (see Guerreiro, 2022), women usually acted on their own free will and in active collaboration with men, not being identified situations of submission or subalterns of women in relation to men.

Table 4

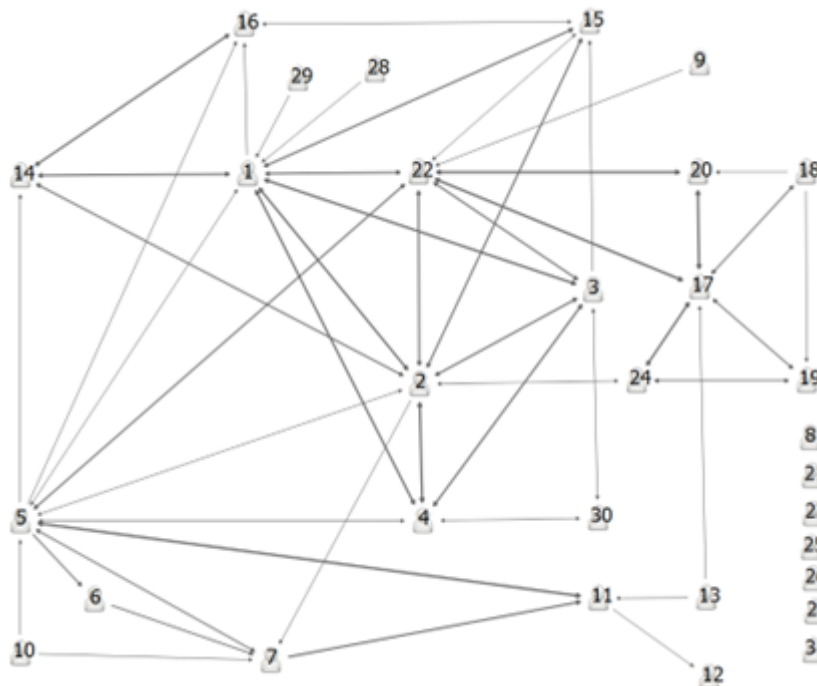
Centrality measures for the most important members of group 1

ID	Sex (F/M)	DC	CC	BC	EVC
17	F	0.1338	1.8303	1.1458	0.0464
1	F	0.1290	2.1079	3.2086	0.6700
4	M	0.1192	2.1589	0.7736	0.6088
5	M	0.1144	1.7426	0.3770	1.0000
2	M	0.1119	1.8515	4.8345	0.8753
22	M	0.1022	1.7533	1.0582	0.6927
20	F	0.0803	1.7779	0.0000	0.0166
3	F	0.0657	1.7130	1.1772	0.6556
14	F	0.0341	1.7930	0.1724	0.2144
7	M	0.0170	0.7897	0.0552	0.3812

DC - Degree centrality, CC - Closeness centrality, BC - Betweenness centrality, EVC - Eigenvector centrality.

Figure 1

Group 1 network



Similar results were obtained within group 2. All women were connected to someone within the network. Despite lower records in terms of degree and closeness centrality, two women (ID2 and ID15) were relatively central as brokers, making important bridges between other members of the same organized crime group, which likely will strongly contribute to the effectiveness of the illegal activities performed by the group (Table 5).

For group 3 there is evidence of contacts between only four individuals (including a woman, ID2). The leader (ID1) had contacts with all the members but there were no contacts amongst the members, except with the leader (Table 6).

Table 5

Centrality measures for the most important members of group 2

ID	Sex	DC	CC	BC	EVC
4	M	0.2242	1.7177	2.6244	0.5206
7	M	0.1300	1.5432	0.0000	0.1413
1	M	0.1121	1.5272	1.7686	0.7630
14	M	0.0897	1.1614	2.8138	1.0000
3	M	0.0807	1.2859	0.3171	0.7663
5	F	0.0650	1.1230	0.0000	0.3934
2	F	0.0538	1.2303	1.3835	0.6782
15	F	0.0471	0.6418	2.5923	0.4662
9	M	0.0381	0.8711	0.1063	0.2869
6	M	0.0291	1.0809	0.0000	0.3753

DC - Degree centrality, CC - Closeness centrality, BC - Betweenness centrality, EVC - Eigenvector centrality.

Table 6

Centrality measures for the most important members of group 3

ID	Sex	DC	CC	BC	EVC
1	M	0.7931	14.8837	0.01035	1.0000
2	F	0.1264	12.6923	0.0000	0.0895
10	M	0.0690	13.7470	0.0000	0.1641
8	M	0.0115	5.4391	0.0000	0.9846

DC - Degree centrality, CC - Closeness centrality, BC - Betweenness centrality, EVC - Eigenvector centrality.

Lastly, in group 4 women and men share degree and closeness centrality positions, and a man (ID1) and a woman (ID3) were responsible for making the connections between other members who otherwise would not have contact with each other, which could produce clear damage to the illicit activity (Table 7).

Taking into account centrality measures computed by applying the techniques of criminal network analysis and considering all the four groups together, it is possible to achieve two important conclusions: firstly, women are active members inside the four groups and occupy relevant positions in terms of centrality; secondly, when compared to men, women register significantly higher degree and eigenvector centralities, and significantly lower closeness centrality, not being identified any significant difference between men and women regarding betweenness centrality, that is, in the capacity of being the bridge between all the members (Table 8).

Table 7

Centrality measures for the most important members of group 4

ID	Sex	DC	CC	BC	EVC
3	F	0.4167	2.5714	0.1667	0.9021
1	M	0.2500	2.0000	0.2000	1.0000
5	F	0.1667	0.7500	0.0000	0.8322
4	M	0.0833	0.8571	0.0000	0.8322
2	F	0.0833	1.3846	0.0000	0.7507

DC - Degree centrality, CC - Closeness centrality, BC - Betweenness centrality, EVC - Eigenvector centrality.

Table 8

Centrality measures and gender

Centrality measures	Males		Females		Significance (a)
	M	SD	M	SD	
DC	0.035010	0.103728	0.052831	0.086680	U=665.000, Z=-2.730, p=.006
CC	1.752422	5.387193	1.360373	2.326417	U=689.000, Z=-2.538, p=.011
BC	0.263929	0.803449	0.364949	0.818646	U=956.000, Z=-.518, p=.605
EVC	0.038201	0.081542	0.044626	0.059853	U=741.000, Z=-2.136, p=.033

DC - Degree centrality, CC - Closeness centrality, BC - Betweenness centrality, EVC - Eigenvector centrality. (a) Mann-Whitney U test.

Therefore, women have a significantly higher number of direct connections with other members in the network (degree centrality), are closer to others (closeness centrality) and are especially more related to well-connected members of the group (eigenvector centrality). Women are not weakened in relation to men, by equally intermediating in the most important connections kept inside the group (betweenness centrality) during the planning and the execution of the illicit activities. They are not in a subordinate position either, as no significant relationship between roles and tasks performed inside criminal networks and gender emerged in this study (Table 2).

Discussion and conclusion

Four court decisions of organised crime that involved a hundred individuals accused of being active in the criminal association dedicated to drug trafficking, randomly selected at the largest Portuguese Courts of First Instance for the period between 2007 and 2019 were analysed, making use of social network analysis techniques adapted to the criminal context.

Findings show that women do participate in organised drug trafficking groups, do play roles and tasks like men, and are in significantly higher centrality positions than men within the network. Therefore, the likelihood of being subordinated to men is expected to be relatively low. On the contrary, it seems they have had conditions to act by their own will. Works developed by [Anderson \(2005\)](#), [Ingrasci \(2007\)](#) and [Siegel \(2014\)](#) have also confirmed this, even though more in logistical and network support tasks. Moreover, the results show that the roles and tasks performed by members are not associated with gender and both (men and women) can participate in all the levels of the criminal group, which rejects traditional literature about the roles assumed by men and women in crime (e.g., [Cossins, 2013](#)). This outcome tends to be consistent with what [Beare \(2010\)](#), [Dino \(2007\)](#) and [Fleetwood \(2014\)](#) pointed out about the presence of women at all stages of the organisation, mainly in leadership. Nonetheless, the collaboration between women and men in the foundation of a group is an outcome of this research that cannot be neglected. [Wijkman & Kleemans \(2019\)](#) and [Selmini](#)

(2020), for example, already highlighted this result, considering that the role of women is not, for the most part, isolated from collaboration with other co-offenders. Despite focused on human trafficking, rather than drug trafficking, the study developed by [Wijkman & Kleemans \(2019\)](#) concluded that about 95 % of female offenders of trafficking in persons for the purpose of sexual exploitation were in collaboration with other persons, mostly with male offenders (75.3 %).

Regarding the connections inside the group, important for committing illicit activities, the criminal network analysis metrics show that women occupy significantly better degree and closeness centrality positions than men and, in one case, a woman has been the broker within the network, reaffirming those important roles assumed by them. This somewhat contradicts [Diviák et al. \(2020\)](#), who concluded that women, when present in organized crime groups, occupy more peripheral and potentially disadvantageous positions, with men assuming the higher values for betweenness centrality. Nonetheless, we need to be careful with this finding, as depending on the illicit activity performed by the group, we might achieve different results in terms of women's centrality in the criminal groups (e.g., [Baika & Campana, 2020](#); [Bichler et al., 2017](#); [Calderoni, 2012](#); [Guerreiro, 2022](#); [Varese, 2013](#)), which might explain the difference in this study and the study from [Diviák et al \(2020\)](#). It could also be an outcome dependent on geographical differences, issue to be explored in further research.

From the results obtained, we can confirm the complexity of both studying organised crime and the presence and role performed by women inside organised crime groups, where they are very often invisibles ([UNODC, 2019](#)). As in other types of illicit activities, there are different perspectives about women's presence and involvement in the drug trades that question the traditional image of female submission. On the one hand, women in organised drug trafficking often assume minor status positions, working as mules ([Boyd, 2006](#); [Broad, 2015](#)). This perspective is directly related to the limiting women's opportunities because of their social status. However, an increasing number of studies show some women performing active roles in drug trafficking and acquiring crucial positions for the pursuit of the criminal activity (e.g., [Anderson, 2005](#); [Broad, 2015](#); [Fleetwood & Leban, 2022](#)), as we could observe in this study. This is also consistent with the perspective of [Tickner et al. \(2020, p. 26\)](#) about drug trafficking trades when they state that "the participation of women in organized crime economies is not exceptional and does not occur only in minor labour or subordinate positions.

Overall, this study, focused exclusively on drug trafficking, points out that women do belong to organised crime groups (confirmation of H1) in which they play similar roles and tasks as the men do, being at better centrality positions inside the network regarding the number of direct, close, and more relevant contacts (partially denying H2), contributing positively to the development of the illegal activity, despite being extremely exposed to formal monitoring control.

This study was done with a relatively small sample size, which can limit the external validity of the conclusions. Further work should extend the sample size by collecting a larger set of court files related to organised crime groups dedicated to drug trafficking but also to other type of illicit activities. Integrating and comparing organized groups across different geographical contexts could also control these results for what might be specific to certain cultural and social contexts and what might be more transversal to the phenomenon. Moreover, it would be useful to complement the use of the centrality metrics with other methods, namely qualitative methods and other analyses that can provide a more in-depth understanding of the dynamics operating within the organised crime groups.

Nonetheless, this study provides crucial information to understand the preeminent role women play within drug trafficking groups and the centrality positions enjoyed by them inside the networks.

Moreover, this article shows the usefulness of an exhaustively examination of data about the position each member has inside the network, applying social network analysis techniques to the criminal context. This examination device can be used to inform public policy in different ways: first, police authorities and justice system professionals could profit of exploring this type of research outcomes to tackle drug trafficking; second, this analysis makes possible to understand the contribution of each member to the functioning of the network, which is an added value from the point of view of criminal investigation, allowing to improve and speed up the investigation and, ultimately, to improve crime prevention. Moreover, this method of analysis can be extended to other types of criminal activities in networks such as human trafficking, and financial crime.

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Declaration of authorship

All the authors had contributed equally for the design, theoretical revision, data analysis, discussion, and conclusions, and for the the writing of the manuscript. Author 1 was particularly engaged with the data collection.