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Louise or Ferdinand? Exploring the protagonists of *Love and Intrigue* using social network analysis

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Abstract

Love and Intrigue is an outstanding work by the German dramatist Friedrich Schiller. This work was initially titled *Louise Millerin*, which was changed to *Love and Intrigue* before its premiere. The title *Louise Millerin* indicates the importance of the female character Louise in the drama. However, is Louise the real protagonist of the drama? Existing research provided no definitive answer to this question. Scholars have not agreed on who the protagonist is in the drama and how to quantify the prominence of the character. To address these issues, this study adopts Social Network Analysis (SNA) to visualize the character network, quantify the centrality of the characters, and perform cluster analysis of the characters in *Love and Intrigue*. The results indicate that Ferdinand displays the highest prominence and has higher stability regarding centrality than Louise. We explore possible reasons behind the findings. First, the highlighting of the male character Ferdinand may reflect male dominance in the eighteenth-century Germany. Second, Schiller incorporated his personal experiences and emotional preferences into the writing of the drama, leading to his favor of Ferdinand. Third, Schiller may have also been influenced by the style of previous German playwrights. By applying SNA to literary research, this study presents a comprehensive and in-depth analysis of the characters in *Love and Intrigue* and contributes to the research on Schiller's works.

1 Introduction

Love and Intrigue (German: *Kabale und Liebe*), an important dramatic work by the German dramatist Friedrich Schiller (1759–1805), was first performed in 1784 and praised by the German theater critic Otto Brahm as 'the all-surpassing summit' (Völkl, 2004, p. 61). The distinguished German writer Theodor Fontane also complimented the drama: 'I've seen it twenty times now, but I'm always enraptured by it' (Fontane, 1879, p. 14). The work features the tragic love story between Louise (the daughter of a middle-class musician, Miller) and Ferdinand (the son of the nobleman, President von Walter), whose romantic relationship was destroyed by the President's despicable machinations. The drama *Love and Intrigue* exposes the social inequalities of the time and the vices of the aristocracy, and it reflects the sharp conflict between the bourgeoisie and the feudal aristocracy in the eighteenth-century Germany (Beutin *et al.*, 2019, p. 95).

Notably, the drama was initially titled *Louise Millerin* (Zymner, 2002, p. 46), which suggests the importance of the female character Louise in Schiller's mind. However, is Louise, who appears in this title, really the (only) protagonist of the drama? Generally, the protagonist, as the central character of a drama, is at the core of the actions and conflicts in the drama (Betti, 2015, p. 14). The emotional development and experiences of the protagonist are presented throughout the drama. Thus, the protagonist is crucial in the plot development and theme expression of the work (Pickering, 2005, pp. 49–50). In addition, the protagonist reflects the writer's stance and ideological orientation. As a result, the protagonist is often the character most heavily written about in the drama and most likely to leave the strongest impression on the reader. The identification and interpretation of the protagonist is, therefore, an important part of understanding the drama. In addition to the protagonist, dramas usually have several minor characters, who lie 'in the shadow-space between narrative position and human personality' (Woloch, 2003, p. 40). Minor characters help to highlight the protagonist's personality traits, enrich the

narrative context, and enhance the integrity and coherence of the storyline (Reed, 2019, p. 69). In a dramatic work, the complex network of relationships is built upon the interactions between the protagonist and the minor characters.

How should one determine the protagonist of a drama, and what can be used as the basis for the identification? There is no scholarly consensus on such questions. Previous research has mainly adopted qualitative approaches to identify protagonists. Schoff (1962), for example, proposed identifying the protagonist based on the analysis of the storyline and dialogs. Using this approach, he identified the character of King Lear in *King Lear* as the protagonist of the tragedy. Bowers (1982) argued that the protagonist is closely related to the climactic action of the play; thus, the protagonist can be determined by analyzing the climax of the play. He suggested that Hamlet, as the main participant in the climax of *Hamlet* and the driving force of the plot, is undoubtedly the protagonist of the play. In Hazen's (2005, p. 83) view, the protagonists of tragedies are often those who attempted to make efforts that ultimately turn out to be in vain. He identified Romeo and Juliet as the protagonists of the play *Romeo and Juliet* because they fail in the pursuit of a lifelong romance, and both die. Goswell (2021) stressed that careful scrutiny of the characterization in different textual divisions and the assigned titles helps to uncover the protagonists of the work. Goswell argued that, because the three divisions of *Esther*, a book in the third section of the *Tanakh* (the Hebrew Bible), emphasize the characters Esther, Mordecai, and Ahasuerus, respectively, the three characters should be considered the leading characters of the book. Furthermore, the book was given the alternative names of *Esther* and *Ahasuerus*. Thus, Goswell suggested that Ahasuerus could also be a candidate for the main character of the book. It can be seen that, in the above-mentioned studies, the protagonist and the title of the drama are sometimes the same, but sometimes not. Given the complexity of the relationship network in dramas, it may not be desirable to determine the protagonist solely based on the title of the drama or the subjective analysis conducted by scholars. Perhaps to address this issue, recent studies have employed Social Network Analysis (SNA) to identify protagonists in drama studies (see Voloshinov and Gozhanskaya, 2008; Moretti, 2013; Stage, 2016; Ladegaard and Kristensen-McLachlan, 2021). Such an approach combines quantitative and qualitative methods and is useful in analyzing the interaction of dramatic characters and determining the protagonists.

Few previous studies on the characters in *Love and Intrigue* have focused on the identification of the protagonist. Some researchers have attempted to summarize the characters in general terms. For instance, Wu (1998) outlined the images and ideologies of the characters. Some studies have conducted gender-based studies on the characters. For example, Stephan (1976) found that the main female characters in the drama lacked self-confidence and independence, and they relied on male protection, which may be a reflection of real-life females at that time. Other researchers have performed case analyses on certain characters. For example, Barry (1989) analyzed Louise's interactions with the male characters and found the major male characters in the drama exerted paternalist influence on Louise in different ways. Similarly, Brockelt (2009) focused on the image of Lady Milford and the character's influence on the plots of the drama.

Different from the aforementioned studies, which mainly used qualitative approaches, the present study employs SNA and combines quantitative and qualitative methods to explore the protagonist of *Love and Intrigue*. The rest of this article is organized as follows: Section 2 reviews relevant research on SNA and centrality. Data extraction, measurements, and analytical strategy are described in Section 3. Section 4 reports on our results regarding character network, clique analysis, weighted centrality measures, and cluster analyzes of all the characters in *Love and Intrigue*. In Section 5, we conclude the major findings, explore the underlying reasons contributing to the results, and analyze some characters based on the findings about centrality. Finally, Section 6 discusses the significance and limitations of our study and its implications for future research.

2 Method: SNA and centrality
2.1 SNA
As an interdisciplinary approach, SNA has continuously absorbed and integrated insights and research methods from various disciplines since its inception. Specifically, SNA not only incorporates the perspectives of anthropology, sociology, psychology, geography, and communication but also draws upon the analytical methods of graph theory, statistics, and probability theory. Jacob Moreno, who initiated sociometry, is widely regarded by academics as the founder of SNA. He was the first to use sociograms in network analysis. He notes that individuals are strongly influenced by social networks, and the position of individuals in the network can be used to explain their behaviors (Moreno, 1934). Since then, many scholars have published extensively on the theories, methodologies, applications, and case studies of SNA (see Granovetter, 1973; Wasserman and Faust, 1994; Burt, 1995; Lin, 2001; Knoke and Yang, 2020).

From the perspective of SNA research, the relationships between actors are more important than the attributes of individual actors (Freeman, 2004, p. 2).

Therefore, scholars have often explored the patterns of relationships implicit in the networks at the individual, group, and network levels and have analyzed the interactions between individuals, between the individuals and the networks, and between the networks. This approach is designed to improve the understanding and interpretation of the structure and the evolutionary processes of the social network. Today, SNA has a relatively stable research paradigm: Researchers begin by considering actors as nodes, and the relationships between actors as edges. Then, researchers use nodes and edges to model social networks and explore interpersonal connections and communication patterns within social groups, especially the interactions between actors and other actors in their social environment (Abraham *et al.*, 2010, p. 27). In such analysis, SNA incorporates both quantitative and qualitative research approaches (Scott and Carrington, 2011, p. 22). That is, while scholars use qualitative interpretative strategies to analyze network structure and its contributing factors, they would select appropriate mathematical models and statistical methods for quantifying network characteristics, clustering subgroups, and identifying important actors.

The SNA approach has broad applications in sociology (Lamertz and Aquino, 2004), education (De Laat *et al.*, 2007), economics (Di Pietro and Pantano, 2012), politics (Beyers and Donas, 2014), medicine (Ostovari *et al.*, 2019), agronomy (Pincot *et al.*, 2021), etc. The interdisciplinary application of SNA has led to new findings in various disciplines and contributed to the development of SNA by drawing upon the cutting-edge research perspectives and analytical methods of these disciplines. In addition to the above-mentioned fields, some scholars have applied the SNA approach to literary studies. For example, Stiller *et al.* (2003) used the SNA approach to examine ten of Shakespeare's plays and found that the cliques and groups portrayed in them correspond closely to those observed in spontaneous human interaction. Agarwal *et al.* (2012) proposed a dynamic network analysis in their study of the literary text of *Alice in Wonderland*. The researchers built new character networks based on different types of social events to gain insights into the roles of the characters in the story. Kubis (2021) adopted corpus-based methods to analyze the structural properties of character networks in Polish novels from the 1800s to the 1950s. The results reveal that novels in the early 20th century have more dialog and focus on fewer characters than those from the 19th century. The study concludes there are significant differences in the structure of character networks between the two periods. These studies show great potential of SNA in the field of literary studies. To be specific, the SNA approach, complemented by close reading, helps provide new insights for

literary studies, reveals plot details and social schematics in texts (Algee-Hewitt, 2017, p. 758), and draws attention to issues that previous studies have overlooked (Pikkanen, 2019, p. 335).

From a genre-based perspective, it is clear that dramas are more suitable for the SNA approach because they feature a specific narrative form that emphasizes dialog and interaction between different characters. Thus, it is easier to extract a complete character network from dramas than from novels or poems. By transforming dramatic texts into an intuitive network structure, SNA helps researchers to understand complex character relationships and uncover in-depth narrative structures. Therefore, this study employs the SNA approach to analyze the dramatic text of *Love and Intrigue*.

2.2 Centrality

Centrality is one of the most important and commonly used indicators for the analysis of the internal structure of social networks and the communication patterns of network members (Carrington *et al.*, 2005, p. 57). The concept of centrality was proposed by Alex Bavelas (1948) and Harold Leavitt (1951), both of whom hypothesized that the structural centrality of nodes is related to their influence on the group. Subsequently, academia has reached a consensus on the important role of centrality: 'Actors who are more 'central' to social structures are more likely to be influential or powerful' (Scott and Carrington, 2011, p. 363). Centrality not only describes the position of a node in a network, showing the 'structural power' (O'Malley and Marsden, 2008, p. 230) that a node has within the network, but also can 'summarize a node's involvement in or contribution to the cohesiveness of the network' (Borgatti and Everett, 2006, p. 466). Therefore, researchers often use centrality to measure the 'importance' (Wasserman and Faust, 1994, p. 169) or 'prominence' (Knoke and Burt, 1983, p. 195) of nodes in social networks and to determine the 'interaction potentials' (Bonacich, 1972, p. 113) of nodes. In general, a higher value of centrality means a node has a higher central position in the network.

In order to improve the accuracy and validity of centrality measures, various algorithms have been proposed by different scholars (see Sabidussi, 1966; Nieminen, 1974; Freeman, 1977; Bonacich, 1987), among which degree centrality, closeness centrality, and betweenness centrality have become the most common indicators in empirical studies (see Wang *et al.*, 2011; El-Khatib *et al.*, 2015; Badar *et al.*, 2016). These three indicators each have their own focus when analyzing characters in a dramatic network.

Degree centrality focuses on the local influence of a node. This measure only considers the number of other

nodes directly connected to the node, not the indirect connections between a node and other nodes (Freeman, 1978, p. 219). Degree centrality reflects the level of involvement of a character in a drama, with higher values indicating more characters directly adjacent to that character. This indicator is applicable to most types of networks and is useful for uncovering characters with the largest sphere of direct influence in the network (Aggrawal and Anand, 2022, p. 54).

Closeness centrality concerns the independence of a node from other nodes in the network and the efficiency of the node in information transfer (Freeman, 1978, p. 226). The shorter the geodesic distance between a node and other nodes in the network, the higher the closeness centrality of the node (Wasserman and Faust, 1994, p. 184). When applied to dramatic character analysis, closeness centrality reflects the degree of proximity of a character to other characters. A high value of closeness centrality indicates that the character can reach other characters more quickly and is closer to the center of the character network. Different from degree centrality, closeness centrality is based on a global perspective and helps to identify characters that are at the core of the network and can readily influence the whole network. Betweenness centrality reflects the potential of a node to control the communication activities in a network (Freeman, 1978, p. 224). By measuring the frequency of a node on the shortest path between other nodes in the network, this indicator reflects the control relationship between a character and other characters. A higher value of betweenness centrality indicates a character's greater ability to regulate and mediate in the character network. This indicator is based on the concept of 'local dependency' (Scott, 2000, p. 87) and is useful for identifying the brokers and mediators that influence the communication of other characters in the network.

Degree centrality and closeness centrality reflect the character's contribution to enhancing cohesion within the network, whereas betweenness centrality focuses on the character's function of connecting various parts of the network. The three centrality indicators, though based on different measurements and calculation methods, were all designed to analyze the prominence of characters in different aspects. By combining the three centrality indicators in our study, we expected to produce multifaceted quantitative results that would enable a comprehensive and systematic analysis of the centrality of dramatic characters.

3 Data extraction, measurements, and analytical strategy

Drama is 'essentially organizations of aesthetically pleasing talk' (Boulton, 2013, p. 127), in which characters primarily rely on dialog to express their thoughts, demonstrate their personalities, and relate to other characters. Without dialog, there would be no diversified characters in dramas. Dialog, as 'all the language of a play' (Watson, 1983, p. 13), plays an indispensable role in characterization. Therefore, in our study, we analyzed dialog to determine the protagonists of the drama. The specific steps are illustrated in Fig. 1 and described as follows. First, we selected the original German version of Love and Intrigue (Schiller, 1784) as the text. Second, a Python script was written to recode the original text according to the 'who-talked-after-whom' heuristic (Moon et al., 2006). The 'who-talked-after-whom' heuristic is based on conversation sequences that reflect the characters' involvement in the dialog and is therefore well suited for analyzing dialog-dominated dramatic works. The 'who-talked-after-whom' heuristic has been used by previous studies to extract social networks from plays (see Masías et al., 2017). Third, we manually checked the results automatically generated by the Python script to improve the accuracy of the extraction results. Last, we constructed the communication network between the characters based on the extraction results.

In the data analysis, we first used Gephi and Ucinet to conduct a visual analysis and a clique analysis of the character network of Love and Intrigue. Then, we calculated the centrality of each character in the drama. When calculating a character's centrality, it is insufficient to use only the presence or absence of the characters in the dialog as the sole criterion for determining the protagonists of the drama, because the number of conversation partners and the intensity of interaction between the characters both have an impact on the centrality of the characters. Specifically, the number of conversation partners refers to the number of characters with whom a character has conversation exchanges. This factor was also referred to as 'the number of ties' in previous studies (Opsahl et al., 2010). The other factor, the intensity of interaction, also defined as 'tie weight', signifies the frequency of conversation exchanges between characters. When the intensity of interaction between a pair of characters is given a higher value, it means that the two characters have more frequent conversation exchanges and their contact is of higher importance in the character network. There has been a consensus in academia regarding analyzing characters' centrality by combining both of these factors (see Opsahl et al., 2010; Masías et al., 2017; Ladegaard and Kristensen-McLachlan, 2021). Opsahl et al. (2010) proposed ω-weighted centrality measures, taking into account both the number of conversation partners and the intensity of interaction. Opsahl et al. (2010) set the weight of the intensity of interaction at different levels to analyze Freeman's the Electronic
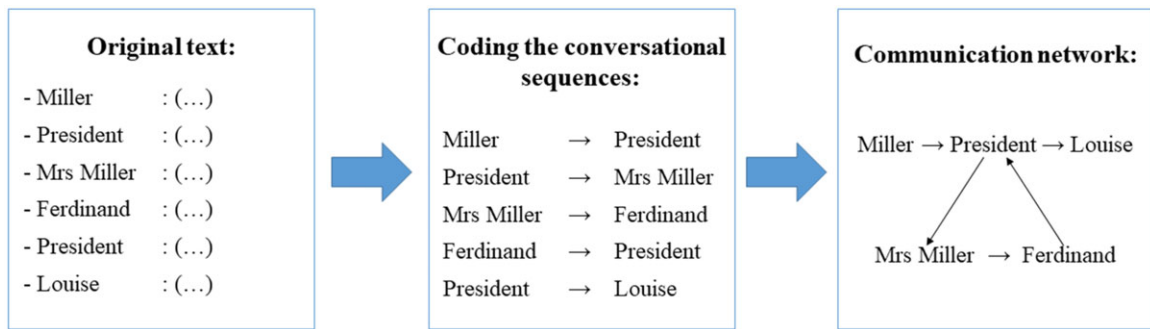
Figure 1. Constructing the character network based on the original literary text according to the 'who-talked-after-whom' heuristic.

Information Exchange System dataset and found that the ranks of some characters change considerably when using different values of the intensity of interaction. Masías *et al.* (2017) explored the centrality of characters in *Romeo and Juliet* based on Opsahl *et al.*'s algorithm and found that Juliet's centrality fluctuated with the intensity of interaction, demonstrating that the intensity of interaction does affect the centrality of characters. The study by Masías *et al.* (2017) validated the applicability of Opsahl *et al.*'s algorithm for dramatic character network analysis. Ladegaard and Kristensen-McLachlan (2021) analyzed the portrayal of prodigal heirs in twenty English plays dating from 1590 to 1640 and found that the importance of some connections is more prone to the influence of dialog frequency than other connections. Hence, the researchers conclude that it is necessary to apply weighted centrality measures when analyzing the centrality of dramatic characters.

The studies mentioned above demonstrate the importance of considering both the number of conversation partners and the intensity of interaction for the analysis of characters' centrality. Therefore, we adopted the ω-weighted centrality measures proposed by Opsahl *et al.* (2010) to calculate the centrality of the characters in *Love and Intrigue*, using the parameter to denote the weight of the intensity of interaction. Then, we utilized the R package *tnet* to calculate all characters' ω-weighted degree, ω-weighted closeness, and ω-weighted betweenness centrality and ranked the characters accordingly. Following previous studies (Masías *et al.*, 2017), we set the value of at three levels (0.0, 0.5, and 1.0) to calculate each of the three centrality indicators. When $= 0.0$, only the number of conversation partners is considered in the calculation of degree, closeness, and betweenness centrality measures. That is, the intensity of interaction between characters is not considered when $= 0.0$. When $= 1.0$, the calculation of centrality measures is solely based on the intensity of interaction, while the number of conversation partners is disregarded. When $= 0.5$, both the number of conversation

partners and the intensity of interaction are considered in the calculation of degree, closeness, and betweenness centrality measures. Then, we recorded the ω-weighted values of the three centrality indicators at each level of . Based on these results, we used the *K*-means algorithm (Wu *et al.*, 2008) to cluster the characters in the drama and divided them into three groups: high centrality group, medium centrality group, and low centrality group. Finally, we attempted to analyze the reasons that affect the centrality of the drama's characters based on the results of the data processing.

4 Results

In this section, the results of the statistical analysis are presented. First, we present the character network for *Love and Intrigue* in Section 4.1. Then, we report the results of the weighted centrality measures for all the characters at different levels in Section 4.2. Finally, we describe the results of the cluster analysis in Section 4.3.

4.1 Character network

In this section, we attempt to visualize the character network for *Love and Intrigue*. We present an unweighted directed network in Fig. 2, and a weighted undirected network in Fig. 3. That is, when plotting Fig. 2, we did not consider the repeated connections between characters but only focus on the existence/absence of connections between characters. As illustrated in Fig. 2, the characters of *Love and Intrigue* are interconnected by highly complex relationships, with Ferdinand, the President, and Louise at the central positions of the network. Furthermore, Ferdinand and the President have the largest number of direct connections with other characters (7), followed by Louise (6) and Lady (6), and Miller (5) and Chamberlain (5).

We also conducted a clique analysis of the character network in Fig. 2. According to Luce and Perry (1949, p. 97), a clique 'consists of three or more members each in the symmetric relation to each other member of the
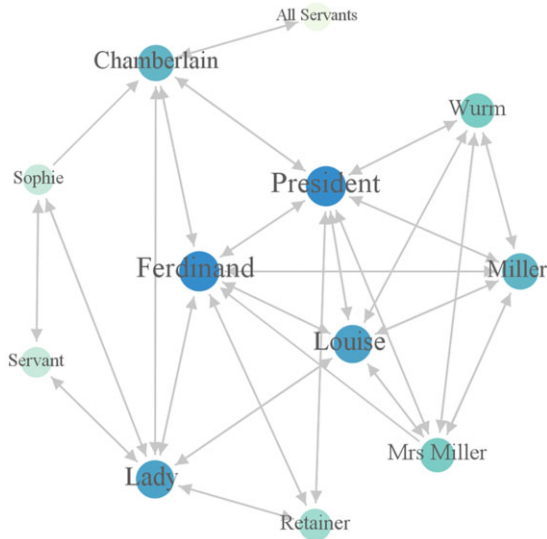
Figure 2. Character network diagram of *Love and Intrigue* based on binary directed data (the size and color of the nodes reflect the interconnectedness of the characters, with larger nodes and darker colors indicating more-connected characters.)
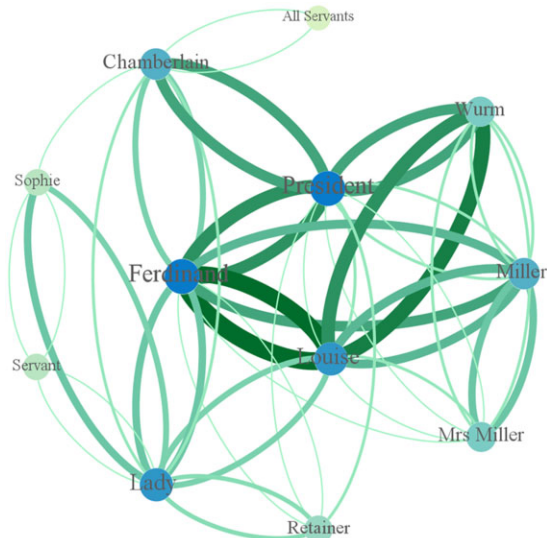

Figure 3. Character network diagram of *Love and Intrigue* based on valued directed data.

subset' and 'there can be found no element outside the subset that is in the symmetric relation to each of the elements of the subset'. Cliques in undirected graphs are regarded as weak cliques, whereas those in directed graphs are considered as strong cliques. The members of strong cliques tend to establish close, positive, and direct reciprocal connections. Based on the analytical results of Ucinet, we found that twelve

Table 1. Strong cliques in the character network of *Love and Intrigue*

Clique	Member
1	Louise, President, Miller, Mrs Miller, Wurm
2	Ferdinand, Louise, President, Miller
3	Ferdinand, President, Chamberlain
4	Ferdinand, President, Retainer
5	Ferdinand, Louise, Lady
6	Ferdinand, Lady, Chamberlain
7	Ferdinand, Lady, Retainer
8	Lady, Sophie, Servant

characters in *Love and Intrigue* construct eight strong cliques (Table 1), which reveals the drama's character network is highly interactive and reciprocal as a whole. In addition, some characters are classified into more than one clique. For example, Ferdinand appears in six cliques, and Louise in three. This outcome demonstrates that Ferdinand establishes closer relationships with other characters than Louise and plays a more important role in the information transfer in *Love and Intrigue*.

The above analysis was conducted based on the unweighted directed network data. In addition, we assigned values to the network data according to the repeated connections between characters, and we used Gephi to draw a character network diagram of *Love and Intrigue* based on the weighted undirected network (Fig. 3). In Fig. 3, thicker edges and darker colors indicate more frequent connections between characters. Figure 3 shows that the most frequent connections in the drama are between Ferdinand and Louise, followed by Louise and Wurm, and Ferdinand and the President.

Table 2 reports the total number of connections between each character in *Love and Intrigue*. It can be seen that Ferdinand has the highest number of connections (186), followed by Louise (164) and the President (130). Table 3 illustrates the specific number of connections that Ferdinand, Louise, and the President have with other characters. As can be seen from Table 3, both Ferdinand and the President are connected to seven characters. However, Ferdinand maintains at least fifteen connections with five characters, indicating he has established closer relationships with the other characters, which enhances his centrality. In contrast, the President maintains more than fifteen contacts with only three characters and fewer than five contacts with four characters, indicating he has relatively weaker connections with certain characters, which weakens his centrality. In comparison with the two male characters mentioned above, Louise is connected to only six characters, but she maintains more than fifteen contacts with four of them, which enhances her centrality. In order to determine the centrality of each character more

Table 2. Total number of connections for all characters in *Love and Intrigue*

Character	Number of connections	Character	Number of connections
Ferdinand	186	Chamberlain	58
Louise	164	Mrs Miller	34
President	130	Sophie	22
Miller	95	Retainer	15
Wurm	93	Servant	3
Lady	78	All Servants	1

Table 3. Ferdinand, Louise and the President's connections

Character who talks first	Character who talks afterwards	Number of connections
Louise	Ferdinand	64
President	Ferdinand	40
Miller	Ferdinand	37
Lady	Ferdinand	24
Chamberlain	Ferdinand	16
Mrs Miller	Ferdinand	3
Retainer	Ferdinand	2
Ferdinand	Louise	61
Wurm	Louise	50
Miller	Louise	30
Lady	Louise	16
President	Louise	5
Mrs Miller	Louise	2
Ferdinand	President	48
Chamberlain	President	37
Wurm	President	35
Miller	President	5
Retainer	President	3
Mrs Miller	President	1
Louise	President	1

Table 4. Ranking of characters by ω-weighted degree scores with different values of ω

Character	$=0.0$	Character	$=0.5$	Character	$=1.0$
Ferdinand	7.0	Ferdinand	36.1	Ferdinand	186.0
President	7.0	Louise	31.4	Louise	164.0
Louise	6.0	President	30.2	President	130.0
Lady	6.0	Miller	21.8	Miller	95.0
Miller	5.0	Lady	21.6	Wurm	93.0
Chamberlain	5.0	Wurm	19.3	Lady	78.0
Wurm	4.0	Chamberlain	17.0	Chamberlain	58.0
Mrs Miller	4.0	Mrs Miller	11.7	Mrs Miller	34.0
Retainer	3.0	Retainer	6.7	Sophie	22.0
Sophie	2.0	Sophie	6.6	Retainer	15.0
Servant	2.0	Servant	2.4	Servant	3.0
All Servants	1.0	All Servants	1.0	All Servants	1.0

and the President occupy the first three places, with Louise in fourth and Ferdinand in fifth. However, as increases to 0.5, Ferdinand's ranking rises to first, whereas Louise drops to fifth. As the value of increases to 1.0, Ferdinand remains at the top and Louise continues to fall to sixth. These results indicate that Ferdinand's weighted centrality ranks first in most cases, with higher values than Louise, and that the leading position of Ferdinand's centrality is more stable than that of Louise.

4.3 Cluster analysis report

Figure 4 illustrates the results of the cluster analysis based on the values of ω-weighted degree centrality, ω-weighted closeness centrality, and ω-weighted betweenness centrality at different levels. The first cluster analysis is based on the three weighted centrality values for $=0.0$; the second on $=0.5$; and the third on $=1.0$. In each cluster analysis, all the characters were divided into three groups: the red group indicates characters with high centrality, the blue group medium centrality, and the green group low centrality. When $=0.0$, Ferdinand and Louise are in the high centrality group with Lady, Chamberlain, and the President. When $=0.5$, only Ferdinand and Lady are in the high centrality group, whereas Louise is in the medium centrality group. When $=1.0$, Ferdinand and Louise are clustered into the high centrality group with the President and Lady. In the three cluster analyses, the clustering result for Ferdinand remains unchanged in the high centrality group. However, Louise's clustering result changes with the value of , and she is clustered either in the high centrality group or in the medium centrality group. The above results also corroborate Ferdinand's higher centrality and stability, as mentioned in Section 4.2, whereas Louise's centrality is sensitive to the weight of the intensity of interaction.

precisely, we applied weighted centrality measures to the characters based on the character network diagram, and the results are presented in the next subsection.

4.2 Nodal centrality report

Table 4 contains the results of the ω-weighted degree centrality of each character at different levels of . We found that Ferdinand's weighted degree centrality is the highest at all levels of . As increases from 0.0 to 0.5 and 1.0, the ranking of Louise's degree centrality rises from third place to second. Table 5 illustrates the ω-weighted closeness centrality of each character at different levels of . Similar to the weighted degree centrality, Ferdinand's weighted closeness centrality is the highest in all cases, while Louise's ranking rises as increases. Table 6 contains the results of the ω-weighted betweenness centrality of each character at different levels of . When $=0.0$, Lady, Chamberlain,

Table 5. Ranking of characters by $\square\omega$-weighted closeness scores (10^{-3}) with different values of $\square$

Character	= 0.0	Character	= 0.5	Character	= 1.0
Ferdinand	6.25	Ferdinand	5.76	Ferdinand	2.75
Lady	6.25	Louise	5.28	Louise	2.64
Louise	5.88	President	5.09	President	2.60
President	5.88	Lady	5.07	Lady	2.55
Chamberlain	5.56	Wurm	4.75	Miller	2.53
Mrs Miller	5.00	Miller	4.73	Wurm	2.51
Retainer	5.00	Chamberlain	4.54	Chamberlain	2.37
Miller	5.00	Sophie	3.77	Mrs Miller	2.14
Wurm	4.76	Mrs Miller	3.55	Sophie	2.13
Sophie	4.55	Retainer	3.35	Retainer	1.84
Servant	4.00	Servant	2.28	Servant	0.81

Table 6. Ranking of characters by $\square\omega$-weighted betweenness scores with different values of $\square$

Character	= 0.0	Character	= 0.5	Character	= 1.0
Lady	33.1	Ferdinand	46.0	Ferdinand	74.0
Chamberlain	24.4	Lady	46.0	Lady	53.0
President	19.0	Chamberlain	20.0	President	36.0
Louise	14.4	Miller	18.0	Chamberlain	20.0
Ferdinand	13.5	Louise	11.0	Miller	20.0
Retainer	1.2	Sophie	10.0	Louise	14.0
Sophie	1.2	President	9.0	Sophie	10.0
Miller	0.9	All Servants	0.0	All Servants	0.0
Mrs Miller	0.3	Servant	0.0	Servant	0.0
All Servants	0.0	Mrs Miller	0.0	Mrs Miller	0.0
Servant	0.0	Retainer	0.0	Retainer	0.0
Wurm	0.0	Wurm	0.0	Wurm	0.0

5 Discussion

This study found that both Ferdinand and Louise are at the core of the character network of *Love and Intrigue*, and both characters have a high level of centrality. However, Ferdinand's centrality is higher and more stable than Louise's. Although Schiller initially titled the drama *Louise Millerin*, Ferdinand appears to be the real protagonist of the drama from the perspective of SNA.

Such results may be explained by the social reality of the time, the personal experiences of the author, and the style of German drama writing. First, social realities such as censorship and gender inequality may have influenced Schiller's work. In the eighteenth century, most German states had established extremely strict theater censorship. A play had to undergo censorship from both book censors and theater censors from publication to staging. Moreover, the censorship standards were particularly strict about the femininity and female behavior in scripts and on stage, and there were even censorship laws targeted at women (Kord, 1997, pp. 359–360). To pass the theater censorship, Schiller may have to focus more on the description of the male

character Ferdinand and reduce the space for female characters, including Louise. In addition, dramas are often imitations and reflections of real life (Boulton, 2013, p. 80). In the eighteenth-century Germany, the educated middle class was influenced by the enlightenment idea that all people are created equal and reflected on the unfair treatment of females and the privilege of males, which stemmed partly from patriarchy. Gradually, the educated middle class came to recognize the important role of women in human development (Proske, 2001; Knott and Taylor, 2005). As a result, the social and domestic status of women increased significantly in the eighteenth-century Germany. However, compared with males, who enjoyed political influence and economic power, women still suffered from limited opportunities regarding political participation and excessive financial dependence on their husbands or fathers (Von Felden, 2001, p. 26). The roles of women were confined to mother, homemaker, and caregiver, with few social activities and simple social relations. In contrast, men were the main participants in various social activities and complex networks of social relationships. As shown by the results of the clique analysis in Section 4.1, Ferdinand falls into more cliques and establishes closer social relationships with more characters than Louise. In the drama, most dialogs of Louise took place in her own home, with only one exception in Act IV, Scene VII, in which she is invited to Lady's house for a conversation. In comparison, the contexts of Ferdinand's dialogs are far more diverse than Louise's. To be specific, Ferdinand exceeds Louise both in terms of the number of associated characters and the total frequency of dialogs. Thus, it is clear that Schiller's work reflects the male-dominated social reality of the eighteenth-century Germany.

Second, writers often express their thoughts, feelings, and ideas related to their individual experiences through dramatic works (Betti, 2015, p. 5). Schiller also incorporated his personal experiences and emotional preferences in the writing of *Love and Intrigue*. In 1782, Schiller traveled to Mannheim for the premiere of *Die Räuber* (*The Robbers*) without the permission of Charles Eugene, Duke of Württemberg (1728–1793). Consequently, he was kept in confinement for 14 days and forbidden from literary activities as a punishment by the Duke. According to Schiller, it was during these 14 days he conceived the outline and several scenes of *Love and Intrigue* (Safranski, 2004, p. 170). In September 1782, Schiller resigned from the position of military doctor and left Stuttgart to rid himself of the Duke's control to pursue literary writing. Against this background, Schiller completed the writing of *Love and Intrigue*. Similar to Schiller himself, who struggled to escape the control of the Duke, Ferdinand is also a fighter who vigorously rebels against feudal society and
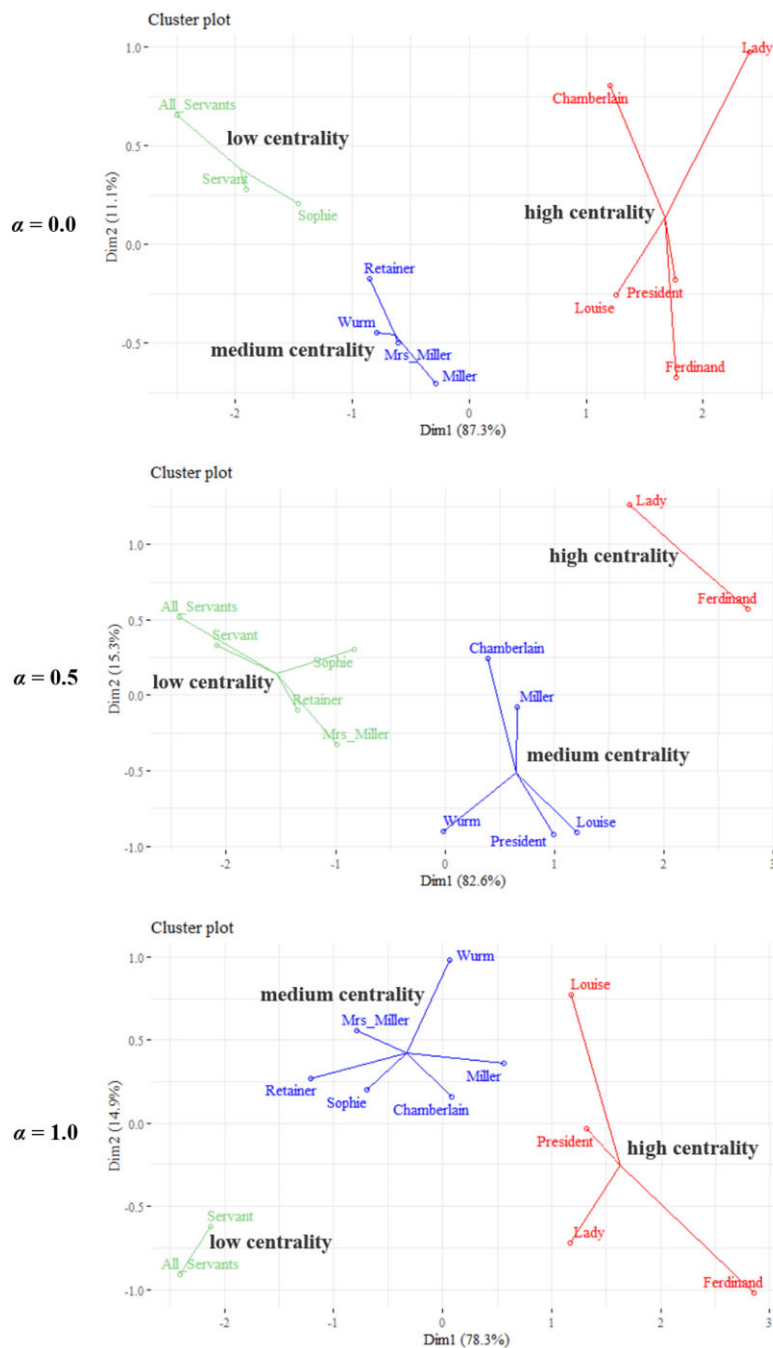
Figure 4. Cluster analysis (*K* = 3) results by α value.

defies the hierarchical system. Such a spirit of the pursuit of freedom and defiance of tyranny is exactly what Schiller wanted to convey to the readers and highlight in the drama.

Third, the style of previous German dramatists may have influenced Schiller. Prior to Schiller's bourgeois tragedy *Love and Intrigue*, Gotthold Ephraim Lessing (1729–1781) pioneered German bourgeois tragedy with two dramas, *Emilia Galotti* and *Miss Sara Sampson*, both of which were named after a female character. In previous studies of Schiller, scholars have analyzed the similarities in writing styles and language

expression between *Emilia Galotti* and *Love and Intrigue*, suggesting that Schiller was probably influenced by Lessing ([Dvoretzky, 1966](#), p. 318). Schiller was likely inspired by Lessing during the conceptual stage of *Love and Intrigue*, so he first used the name of the female character Louise Miller as the title of the drama. However, in the process of writing, Schiller differed from the Enlightenment playwright Lessing in that he incorporated the essence of the Sturm und Drang into *Love and Intrigue*. Sturm und Drang advocated pursuing the free expression of emotions and passions as the norm in all actions, self-realization, fulfillment, and rebellion against traditional institutions. Schiller's Ferdinand is a typical character who fits the spirit of Sturm und Drang because he devotes himself to pursuing freedom, equality, true love, and self-fulfillment. The successful portrayal of such a character also made *Love and Intrigue* a masterpiece of the Sturm und Drang movement ([Hill, 2003](#), p. 137). Perhaps due to the three factors mentioned above, Schiller highlights the male character Ferdinand in the drama, leading to the relatively high centrality of the character.

Different from Ferdinand, Louise falls into the medium centrality group in the cluster analysis when $= 0.5$ and is classified in the high centrality group only when $= 0.0$ and 1.0. In *Love and Intrigue*, Louise is depicted as the embodiment of bourgeois values, with a pure, innocent, and pious image. The character Louise is two dimensional. On the one hand, Louise adheres to bourgeois morality and despises the wealth and power of the aristocratic class. She would rather give up her relationship with Ferdinand to protect her family. On the other hand, although Louise is a member of the bourgeoisie, she has been more strongly influenced by feudalism than Ferdinand. Faced with the gap in social status, she is too timid to pursue true love with Ferdinand. In addition, she lacks the courage to tell the truth and expose the President's intrigue after being forced to swear to God. It is evident that part of the image of Louise reveals the weakness of the bourgeoisie, that is lack of resolution to rebel and fight ([Yu, 1991](#), p. 157). The submissiveness of Louise is one reason for her tragic love with Ferdinand. Although Louise's name was initially used as the title of the drama, Schiller might have, in the process of writing, unconsciously favored Ferdinand (who is brave enough to pursue freedom and love) over Louise (whose submissiveness and timidity lead to repression of freedom and love).

The results of the weighted centrality measures show that, in addition to Ferdinand and Louise, several other characters also have high or medium centrality, such as Lady, the President, Chamberlain, and Miller. This finding confirms that drama usually consists of major characters and minor characters ([Boulton, 2013](#), p. 92). The presence of various minor characters helps to complete the drama and facilitates plot development. In *Love and Intrigue*, the portrayal and plots of the minor characters (Lady, the President, Chamberlain, and Miller) are closely related to the central character Ferdinand.

Unlike Louise, a bourgeois female, Lady is the only aristocratic female in the drama. The two females correspond to two narrative models of female characters in the eighteenth-century dramas ([Huyssen, 1977](#)): The first model is represented by Lady, who is from a noble family and becomes the lover of the Prince; the second model is represented by Louise, who is from a middle-class background and adheres to bourgeois morality. In contrast to Louise, who represses her love and emotions, Lady is enthusiastic when planning for the marriage with Ferdinand and uses every means to gain his affection. Following a conversation with Louise, Lady is touched by Louise's purity and integrity, so she eventually discards the luxurious aristocratic life and flees from the Prince. In Schiller's writing, Lady is transformed from a mistress living a parasitic life into a rebel who defies feudalism. Such a transformation conveys Schiller's call for the pursuit of freedom and dignity. In addition, the results of the weighted centrality measures reveal that Lady's weighted betweenness centrality is the highest when $= 0.0$. Moreover, the cluster analyses indicate that Lady is consistently in the high centrality group at all three levels. Thus, Lady has a higher degree of stability in centrality than Louise. This finding breaks a stereotype in drama research of identifying major male and female characters based on romantic relationships. That is, using SNA may generate new findings from the perspective of character networks, which may not be revealed by the traditional approach in dramatic literature that prioritizes the romantic relationships between male and female characters.

In addition to the two female characters mentioned above, the President also falls into the high centrality group in the cluster analyses when $= 0.0$ and $= 1.0$. As the greatest villain in the drama, the President is Ferdinand's main opponent in the struggle against oppression and the quest for freedom. To secure political power, the President uses Ferdinand's marriage as a bargaining chip to curry favor with the Prince, even to the extent of devising an intrigue to destroy the love between Ferdinand and Louise. The image of the President not only symbolizes the corrupt and decadent feudal power but also embodies the patriarchy of the eighteenth-century aristocracy. As the person with the highest authority in the family, the President regards Ferdinand as his own possession and interferes with his son's private life in the name of parental love ([Grill and](#)

Hanna, 2018, p. 351). Such repugnant paternalistic action was heavily criticized by Schiller.

Furthermore, our findings reveal that Chamberlain's centrality is influenced by the intensity of interaction. As the value of increases, Chamberlain drops from the high centrality group to the medium centrality group. A major contributory factor to Chamberlain's high centrality is his status as a cut point in the character network of *Love and Intrigue*. In other words, he is the only character in the network that connects All Servants. Thus, Chamberlain's presence is crucial for maintaining the connectivity of the entire network (see Fig. 3 in Section 4.1). In the drama, Chamberlain's function is mainly to convey information, move the plot forward, and complement the image of the protagonist. He takes orders from the President, pretending to be the lover of Louise to deceive Ferdinand. Chamberlain forsakes certain merits, such as integrity and honesty, and acts as a tool of the evildoer to maintain his interests and position. The character of Chamberlain stands in stark contrast with Ferdinand, who defies those in power and remains true to his heart.

It is also worth mentioning that the character Miller is classified into the medium centrality group in the cluster analyses at all levels, indicating his status as a companion character in the drama. Schiller employs this character to illustrate the life and mentality of the bourgeoisie at that time. Miller, as Louise's father, is extremely possessive of Louise and strongly opposed to his daughter's love with Ferdinand. Miller's emotional manipulation of his daughter and his brutal treatment of his wife also demonstrate he is essentially a representative of bourgeois patriarchy. Such an image echoes that of the President, the representative of aristocratic patriarchy. However, as a member of the bourgeoisie, Miller's mentality and thoughts are progressive in certain aspects. In his view, the emerging bourgeoisie is morally superior to the decadent aristocracy. Therefore, when confronted with the President's power, Miller is able to demonstrate the qualities of confidence, determination, independence, and fearlessness.

6 Conclusion

This study has at least three significant aspects. First, we applied the SNA approach to the study of characters in Schiller's *Love and Intrigue* and conducted quantitative and statistical analyses of the characters from multiple perspectives. By so doing, we provided a comprehensive interpretation and analysis of the drama by combining quantitative analysis with traditional qualitative approaches such as close reading. Second, instead of limiting the analysis to the attributes of the characters, we focused on the analysis of character relationships. By analyzing the connections between

characters, we reconstructed the dramatic network and attempted to understand its structure. Finally, we blended quantitative, qualitative, and visualization methods to produce figurative and visualized results that vividly present the character structure and relationship patterns in *Love and Intrigue*. These methods complement previous studies on Schiller, most of which are qualitative.

There are some limitations to this study. The primary limitation is that certain characters with long soliloquies and characters without dialog may be neglected due to the coding sequence of the 'who-talked-after-whom' heuristic. Soliloquies in *Love and Intrigue* are often used as a device to enable characters to express aloud their inner thoughts or feelings and convey such thoughts and feelings to the audience. In addition to the soliloquies, some characters without dialog in the drama also have important positions (e.g. the supreme Prince). Although the Prince is not directly involved in any conversations in the drama, the dialog between other characters shows that his royal life, marriage plans, and political moves do have an impact on other characters. Given this limitation, we will continue to optimize the SNA approach based on the weighted centrality measures in future research by, for example, considering characters with soliloquies and those without dialog in the network analysis to further explore the potential of centrality measures in identifying the protagonists of literary works. In particular, the 'who-mentioned-whom' heuristics (Wang *et al.*, 2013) may be applied to literary research in future studies. In addition, compared with a large number of studies on English dramas, there is still much room for research on German dramatic works and writers. Future research may consider investigating many other German dramas named after female characters, such as *Maria Stuart* (by Schiller), *Emilia Galotti* and *Miss Sara Sampson* (by Lessing), *Stella* and *Iphigenie auf Tauris* (by Johann Wolfgang von Goethe), and *Penthesilea* (by Heinrich von Kleist). The methods and theories used in this study are highly replicable and could be applied to explore more German dramas to analyze the importance of the dramatic characters and uncover underlying influencing factors.

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Authors' contributions

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