Relational Structure Development Through Social Network Analysis: Case Study of Self-Disclosure Types in an Unstructured Counseling Group

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With the increasing popularity of group counseling, it becomes imperative to comprehend the development of group relational structures between leaders and members. However, there is a scarcity in research on the interaction analysis of group dynamics, This case study aimed to examine the relational structure of an unstructured counseling group using social network analysis. From seven unstructured counseling groups, the case study selected the one with the best performance based on the participants' score changes on the Adult Mental Health Scale. Through visual analysis, significant changes in the interaction structures between group leaders and two types of members were revealed. Additionally, mathematical analysis yielded patterns in the number of themes, counts of self-disclosure actions, and levels of interaction intensity. Both qualitative and quantitative findings implicitly reflected changes in group cohesion throughout the various process stages. As a result, this study offers practical implications for training group leaders on different group process issues, including the transition of authority and members' roles and functions at various group stages. Furthermore, the research provides valuable insights for the future exploration of counseling groups.

Keywords: group cohesion, group counseling, relational structure, self-disclosure, social network analysis.

The phenomenon of interpersonal relationship development has become an important topic in group counseling research (Hsu, 2011, 2013; Woo et al., 2003). As group counseling emphasizes real-time interaction, a group should be viewed as a process-as-whole; however, most prior studies examined the group process from two separate aspects: either the members or the leader. More specifically, the member aspect often focused on studying members' actions (Carter et al., 2001; Yalom, 1995) while the leader aspect examined the leaders' intention and use of techniques at different process stages (Clark, 2002; Jennings & Sawyer, 2003; Mills & McBride, 2016). Given that the entire group process cannot be fully represented by either aspect alone, the interpersonal context between group leader and members should be comprehensively studied. For example, a question raised by a group member may be interpreted as resistance to addressing his or her personal issues, but questions raised by a leader may be interpreted as an inquiring technique for group facilitation. At first glance, these potential interpretations are both adequate based on the roles of leader or member and/or the context (e.g., a certain member chooses to open up because he or she has a need to grow or to be assisted). However, these segmented interpretations cannot contribute to a holistic understanding of the relational structure of the group. The distinction between a leader's and members' actions may overlook the authenticity of the complete picture. In fact, real-world networks are rarely static; instead, the relationships can be strengthened or weakened over time due to group interactions. Traditional research methods cannot authentically study the dynamic formation of relationships in the group counseling process.

Social Network Analysis

Fortunately, social network analysis (SNA) can help researchers understand how relationships develop, what relational structures are formed from those emerging relationships, and the impact on members in the group's dynamic system (Koehly & Shivy, 1998). Two major formats are incorporated in the SNA data presentation of group participants' interactions: graphs and matrices (Hanneman & Riddle, 2005). As such, SNA can be used to study the authenticity of the interpersonal context of counseling groups. This is because a therapeutic relationship is usually bidirectional and involves a counselor's use of techniques and clients' responses and participation (Hill, 2005). An effective therapeutic

process cannot occur with only one-sided efforts or engagement. For instance, in the qualitative analysis results of Timulak (2007), client engagement and interpersonal interactions were both identified as key elements in the therapeutic process. In brief, to study changes in the group counseling process, researchers must apply valid means that can simultaneously track interactions and emergent relational structures within the context of the group.

The ability to measure and analyze dynamic networks distinguishes SNA from other research approaches that focus only on one-sided inputs. SNA also serves as a holistic means to study the development of a counseling group's cohesion among its participants. According to Yalom (1995), facilitators for enhancing group cohesion can be viewed as active ingredients in the effective therapeutic process. Research has shown that group cohesion can serve as the foundation for building effective therapeutic relationships (Burlingame et al., 2011; Gully et al., 2012; Norcross & Wampold, 2011). More recent studies also recommend further examining and understanding the changes in group cohesion through different group stages (Chapman & Kivlighan, 2019). Therefore, the process approach of SNA seems appropriate for further research on group cohesion and dynamics among group leader(s) and client members. The findings can be useful in answering practical questions and theorizing about contemporary work in the field of group counseling.

Yalom and Leszcz (2005) utilized the graph theory of SNA to explain the relational structures that develop during group process. For example, UCINET is a popular and effective software for SNA (Borgatti et al., 2002). With its visualization tool, UCINET can simultaneously track and process up to 5,000 data points (i.e., with each group member as a single point on the graph) to be analyzed in a social network. Graph theory can be applied by visually tracking ongoing connections between those data points in the group process. Moreover, network density can be quantified by calculating the frequency of interactions among group participants.

Self-Disclosure

In group counseling research, it may be difficult to identify an action (or technique) that is most beneficial for developing a desirable relationship, but self-disclosure has been frequently described as one of the most critical actions (Jennings & Deming, 2013; Yalom,

1995). Thus, self-disclosure is often more valued and promoted than avoided in the group counseling process (Bateman et al., 2011; Jacobs et al., 2006) and may be highly correlated with changes in the level of group cohesion. Hunter et al. (1996) studied the relations between these two variables using four counseling groups with 21 graduate students. The results showed that when an incident happened in a group, both self-disclosure and group cohesion were catalyzed, which demonstrated a positive correlational relationship. Therefore, when conducting a group counseling study, it is reasonable to use self-disclosure actions as a proxy indicator to estimate the level of group cohesion. SNA can help researchers track the frequency of engagement in self-disclosures and the emergent development of relationships.

Significance of the Current Study

Every group session is regarded as a process unit (Hanneman & Riddle, 2005). As mentioned earlier, most group counseling research has focused only on the leader or the member aspects. Such dichotomous perception seems to oppose the real-life principle in any social context, which would result in insufficient examination of the authenticity of group cohesion and dynamics. In fact, a counseling group member's behaviors and engagement should be analyzed as the basis of constructing interpersonal relationships with other participants. Given that a counseling group is a social network of its members' interpersonal connections, this study applied SNA methods to examine self-disclosures of group leaders and members within a holistic unit. In addition, the graph theory approach was utilized to construct the movement of relationships among the participants to understand the characteristics of a relational structure. The findings may potentially provide a theoretical foundation and practical implications for future group counseling work. The research questions were as follows:

Research Question 1: What can SNA visual analysis reveal about changes in relational structures among group leader(s) and members?

Research Question 2: What can SNA mathematical analysis reveal about changes in relational structures among group leader(s) and members?

Method

Timulak (2007) believed that compiling qualitative research findings can help increase our understanding of different phenomena in counseling processes. The present study applied a novel approach (i.e., SNA) to conduct a case study of a counseling group. According to Creswell (2013), a descriptive case study can help closely examine data within a certain context in a bounded system, such as a closed counseling group. We adopted purposive sampling with a single-case study approach because each counseling group is unique and the processes and interactions between group members may not be replicable (Yin, 2009). The participants were purposefully selected based on their characteristics (Patton, 2002).

Participants and Group

This study was approved by the Research Ethics Review Committee at the National Tsing Hua University (NTHU REC), Hsinchu, Taiwan. The study was determined to be in conformity with the ethical guidelines and legal regulations to ensure that the rights and welfare of the research participants were adequately protected. The recruiters for this study were university trainers from a psychology and counseling department that prepared professional group leaders. The approved invitation materials were distributed via social media for recruitment. The participants were those who were interested in gaining unstructured counseling group experiences from the community and the recruiters' university campus. Informed consent procedures were carefully followed during the recruitment process. The group participants were allowed to terminate at any stage in the study's group sessions.

This study utilized the group as an independent unit for analysis. Seven unstructured counseling groups were included in the initial stage, including a total of 14 leaders, eight observers, and 38 members. Each group contained a minimum of five members and a maximum of eight members and ran for 10 sessions. To conduct more focused SNA, the researchers chose the group with the most score changes from pre- to post-test on the outcome measure, which was participants' score changes on an adult mental health scale. Although the unselected groups were also observed to show different levels of changes in the interpersonal structure, the case study was aimed to focus on studying phenomena in counseling processes

with the highest self-reported changes in mental health status among its group members. In this way, the characteristics of within-group dynamics and interactions from the beginning to the ending stages could be presented holistically and carefully studied to provide useful and meaningful data for further analyses.

The six participants in the selected group included two college students, one government employee, one educator, one medical professional, and one technology company employee. Two participants were female; three members held master's degrees and the other three were college graduates. However, attrition occurred when one member discontinued due to health issues after attending Sessions 1 and 4. The group leader (LD) was male and the co-leader (CoLD) was female. Both LD and CoLD were trainees in a master's counseling psychology program and had been systematically trained in leading unstructured counseling groups.

The group was designed as unstructured, which established a foundation for facilitating authentic interactions between members and leaders. Although some typical group techniques (e.g., introduction, wrap-up) were used during Sessions 1 and 10, no specific discussion topics were predetermined by the leaders during the middle sessions. The majority of members showed good attendance through the 10 weekly sessions, except for one member who exited after the third session.

Measure and Procedure

The Adult Mental Health Scale (AMHS) was developed by Huang et al. (2011), who examined 87 mental health-related papers in Taiwan and conducted meta-analysis and structural equation modeling. They identified five key dimensions predicting adult mental health: AMH-SM (physiological hypochondria), AMH-AX (anxiety/irritability), AMH-SO (social distress), AMH-DE (depression), and AMH-PO (optimism). Self-perceptions of mental health were rated on a 5-point Likert scale for the 28 items. The correlation coefficients between the five subscales ranged from .18 to .56, which showed adequate discriminant validity. In addition, the internal consistency coefficients ranged from .79 to .88 for the subscales and .92 for the whole scale. The split-half reliability coefficients of the subscales were between .75 to .87 and .93 for the total. The test-retest reliability coefficients of the subscales were from .47 to .71 and .72 for the total. In sum, the psychometric evidence suggested good temporal stability and content consistency, with a higher score indicating

better self-reported mental health status. All group members completed this scale as the pre- and post-test to measure potential changes in perceptions of their mental health.

The present study was designed and carried out as an exploratory and descriptive case study, which allowed an in-depth investigation of the group counseling case from different perspectives (Yin, 2009).

Coding and Theming

As to researchers' competency training and qualifications, the first and second authors received field-based leadership model training to lead an unstructured counseling groups under doctoral-level supervision for 1 year. The researchers utilized recordings to transcribe the group sessions into text. To validate the findings, all transcripts were coded and verified to establish interrater reliability. A self-disclosure phase coding system was used to check and code each sentence of the group process text (see Table 1). The data were coded by the first researcher and then verified by the second researcher (i.e., multiple coding). Any inconsistencies between codes were discussed and agreed upon in the final process of validating the codes against the research questions (Creswell, 2013). This process reduced the potential bias of a single researcher collecting and analyzing data. Overall, the interrater reliability coefficient was .89.

Table 1

The Self-Disclosure Phase Coding System

Index of IGIPS	Time correspondence	Process action
DPo: personal affairs and experience outside the group	there-and-then	DPo-1. disclosure of former or depersonalized life experience DPo-2. disclosure of personal unfinished business and issues
SAo: personal affairs and experience outside the group	here-and-then	SAo-1. reflection on former or depersonalized life experience SAo-2. reflection on personal unfinished business and issues
DPi: personal affairs and experience that happened in the group	here-and-now	DPi. disclosure of personal experience and events that happened in the group
SAi: in-group personal affairs and experience		SAi. reflection on the experience or events that happened in the group
EA: expression of emotions	catharsis/released	EA. emotional catharsis through talking

The Individual Group Member Interpersonal Process Scale (IGIPS; Davis et al., 2000) was used to categorize members' group process actions into time correspondences: (1) here-and-now; (2) there-and-then; (3) here-and-then; and (4) overall emotional catharsis (Hsu, 2020). Seven group members' process actions, including those of the two leaders, were identified based on the IGIPS coding system. This coding tool helped the researchers to label and identify different types of self-disclosure actions to systematically analyze them. Figure 1 illustrates a conceptual framework of self-disclosures based on the coding system through the time correspondences. To generate contextual themes in each session, the data analysis consisted of analyzing nonoverlapping statements from the transcripts (Creswell, 2013). Then, reduction and analysis of specific statements were used to identify overarching themes (Simon & Goes, 2012). At the end of transcript analysis of each group session, the data reached the level of saturation (i.e., with no more nonoverlapping statements) for using a case study design (Creswell, 2013).

Adjacency Matrix

SNA mathematical analysis was conducted to shed light on important aspects of group dynamics, such as interactivity and information exchange among the participants. The researchers used the initial results generated from sentence-by-sentence self-disclosures to calculate the adjacency matrix (also called case-by-affiliation matrix) with member–member and member–leader relational data. The matrix was developed by listing members in columns and rows to show that one member and other members jointly participated in the self-disclosure actions of a specific group contextual theme. Table 2 shows whether they were connected by the same event. For example, the leader (LD) participated in four different group process issues and made self-disclosures, of which the co-leader (CoLD) made self-disclosures in two of the same issues, Member 1 (MB1) made self-disclosures in four of the same issues, and so on. Using matrices is a powerful way to store and represent SNA data.

Table 2

Example of Adjacency Matrix

Member/leader	LD	CoLD	MB1	MB2	MB3	MB4
LD	4	2	4	3	4	4
CoLD	2	2	2	2	2	2
MB1	4	2	5	4	5	4
MB2	3	2	4	4	4	5
MB3	4	2	5	4	5	4
MB4	4	2	4	3	4	4

Figure 1

Conceptual Framework of Self-Disclosures Based on Coding System Through Time Correspondences
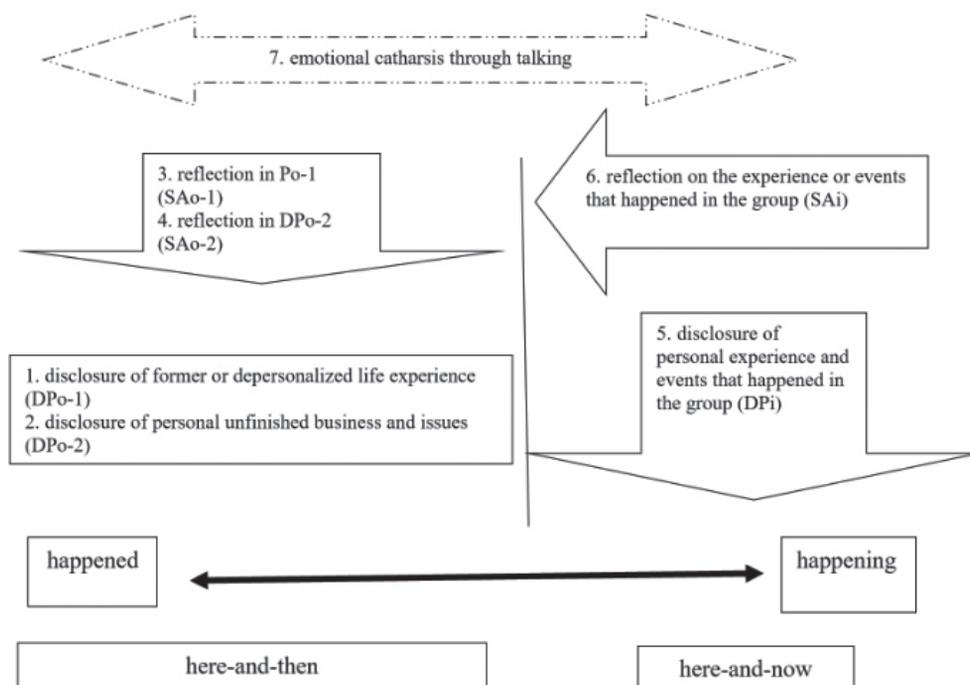
Network Density

Another mathematical analysis at the entire group level was conducted by analyzing group processes based on network density (i.e., quantitative data of relations). The density of a network is calculated as the number of observed links in a whole network divided by the total number of all possible links if every member is connected to each other. It is a global metric that simply indicates how many connections are present. The maximum network density value is 1. The larger the value, the stronger the implied group cohesion. The level of involvement by members should be considered because if the intensity of relationship remains low, it may indicate a loose group interpersonal structure and lack of cohesion or

therapeutic effectiveness (Yalom & Leszcz, 2005).

Visual Analysis

The group network data were input into the UCINET 6.596 (Borgatti et al., 2002), which is an analytical software to calculate SNA matrices and show the strength of relationships. Visualization was implemented to describe the properties of the group networks, such as the interactivity level and the contributions of the group participants. The same was performed for each of the 10 counseling group sessions with special emphases on the member–member and member–leader(s) interactions. In addition, the UCINET can create a dataset of the group participants' individual characteristics.

Results

This study examined the dynamic formation of relationships in a selected group's processes. The unstructured group format was adopted for group members to demonstrate authentic interactions and experiences. The SNA was used as an exploratory approach to map the relationships among participants and calculate the mathematical metrics of interactions. In addition, network visualization graphs were used to obtain qualitative information, which is a distinguishing feature of SNA. Our primary interest was to understand the changes in relational structures in the group process. In general, the studied counseling group showed positive effects on group participants. The aspects of group process, relational structure within the group process, position of leader, meanings of core member, meanings of border member, total counts of self-disclosure actions, amount of speech by leader, and repetitiveness of member of focus are all characteristics of graph theory in SNA. The findings are presented as follows.

Groups Measure Results

The analysis of group-level intervention outcomes is presented in Table 3. The result showed that the unstructured counseling groups had positive effects on their members' self-reported mental health state. The pre- and post-test score differences were found in all five dimensions of the Adult Mental Health Scale: physiological hypochondria, anxiety/irritability, social distress, depression, and optimism. The researchers also calculated the

mean change across each group (dividing the total change in scores by the number of participants). The scale score for each group (named from Group A to Group G) was 18.20, 5.40, 9,00, 7.43, 12.80, 8.33, and 11.86, respectively. It is evident that Group A showed the largest change in its mental health scale score and was chosen as the subject of interest for further analysis.

Table 3

Paired Sample T Test for Effect of Unstructured Group Intervention

	Before and after group test	Mean score	*SD*	*t* value
AMH-SM	Before	20.16	3.48	-3.57***
	After	22.18	4.24	
AMH-AX	Before	15.79	3.75	-6.36***
	After	19.47	3.50	
AMH-SO	Before	20.26	4.29	-4.04***
	After	22.53	4.33	
AMH-DE	Before	20.50	3.58	-3.03**
	After	22.16	2.53	
SDQS-BS	Before	21.11	3.13	-2.06*
	After	22.13	3.86	
Total scale score	Before	97.82	13.36	-5.46***
	After	108.47	13.85	

$^*p < .05$、$^{**}p < .01$、$^{***}p < .001$. (two tailed)

Qualitative Analysis Results

　　Research Question 1 asked what SNA visual analysis can reveal about changes in relational structures. Specifically, the visual relations of SNA can reveal the patterns of interactions occurring in groups and how the members and the leaders perform, which are relevant factors for the development of group cohesion. In fact, an experienced leader is recommended to pay attention to three aspects simultaneously when leading an unstructured group: intraindividual, interpersonal, and group dynamic processes (Woo, 2015). SNA can

help analyze the interpersonal interactions and group dynamic/structure changes. To demonstrate how SNA provided insightful information, we present the visualized results of three group sessions (i.e., Sessions 2, 5, and 9) at three different group stages in Figures 2, 3, and 4. The rationale for presenting the visual results of Sessions 2, 5, 9 is that they represent the initial to transition, early working, and late working stages, respectively.

Figure 2

**Visual Graph for Group Session 2**
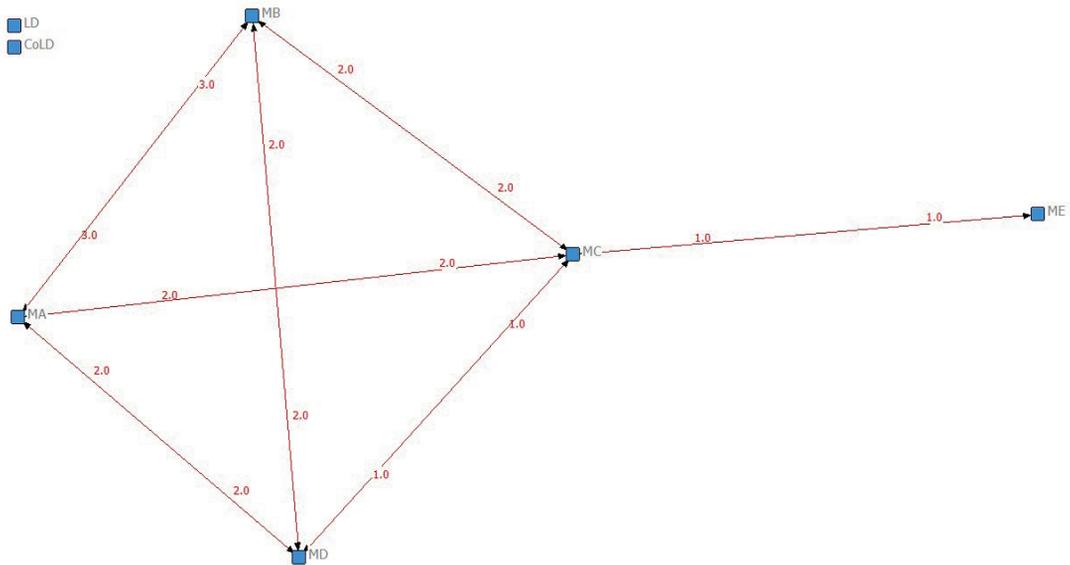
Figure 3

Visual Graph for Group Session 5
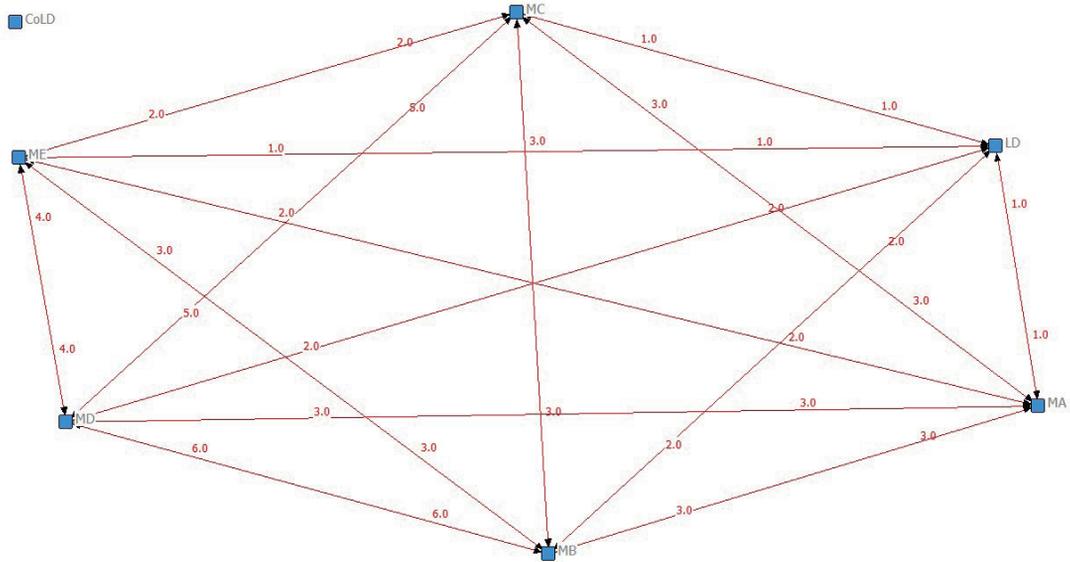
Figure 4

Visual Graph for Group Session 9
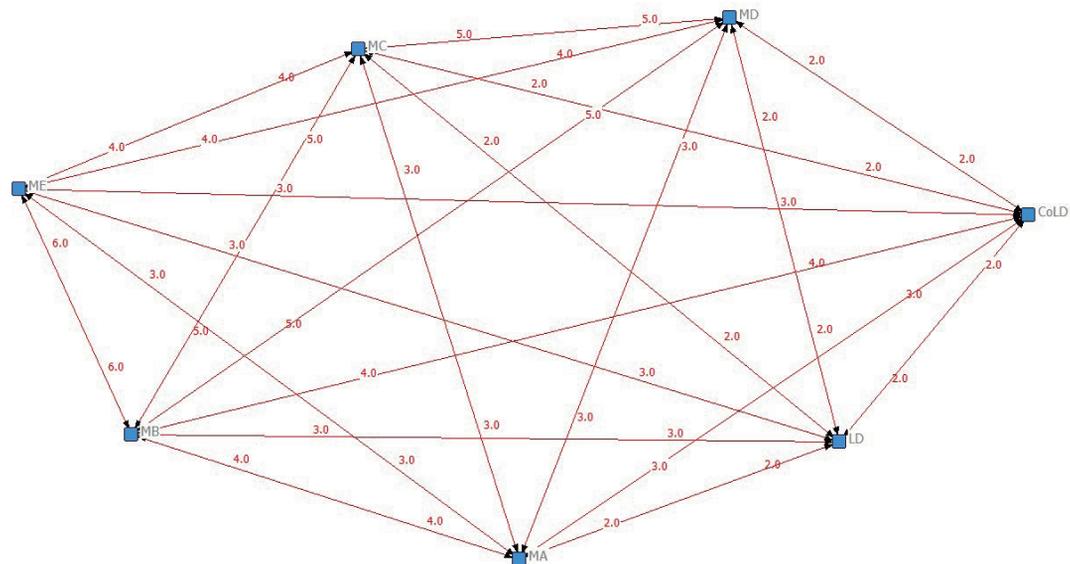
Overall, the shapes of the network graphs evolved and enlarged across the group sessions. For instance, Session 2 as displayed in Figure 2 shows a rectangular relational structure at the initial stage and then evolves to a more complex polygonal shape during the initial working stage (e.g., Session 5). At the late working stage (e.g., Session 9), all leaders and members were more involved with increased interactions between each of them, which implies increased group cohesion. As demonstrated in the interaction frequencies in these visual graphs, there was a trend across group sessions in which the interactions became more evenly distributed rather than only one or two core members showing high interaction frequencies.

Taking a closer look at the changes in relational structures across the group process, the leaders during the initial stage did not participate in any group discussion and no leader self-disclosures were noted. Physically, the leader was located separately from the members at that time but gradually assimilated with the members in the same areas later on. After proceeding to the early working stage, the leader increased his self-disclosure behaviors (e.g., Session 5). In addition, the co-leader was increasingly involved in the group discussion. She sat side-by-side with the leader to collaborate and facilitate the group. At the same time, the participation level of the group members, especially of the border members, was increasing. They were more engaged in meaningful interactions in the group. For instance, in Session 2, ME was a border member who connected to another member only once while MB was a member of focus. During Session 5, they were both well engaged in interactions with other group members. Another interesting finding was that the core members often repeated themselves during the initial sessions; however, during the working stages, each member had opportunities to be the member of focus with increased levels of self-disclosures in the group.

Table 4 summarizes the findings based on SNA visual analysis, including (1) group process (theme): total counts of theme in the group process; (2) relational structure within the group process: SNA relational structure and function; (3) position of leader: the role of leader in the group process; (4) meaning of core member: features of core member, the role in SNA relational structure and function; (5) meaning of border member: features of core member, amount of speech, self-disclosure action, the role previous sessions; (6) total counts of self-disclosure actions: self-disclosure of total sentence counts; (7) amount of speech by leader: amount of leader speech; and (8) repetitiveness of core member: core member repetitiveness

in the group process.

Table 4

Characteristics of Group Stages

	Initial to transition stage	Early working stage	Late working stage
Group process (theme)	Low	High	Average
Relational structure within the group process	Singular (triangular or rectangular) relational structure	Complex (triangular or rectangular) with function	Singular (rectangular) relational structure with no apparent function
Position of leader	Excluded from extreme points or located at border position	Excluded from extreme points or located at non-border position	
Meaning of core member	Linking the group, protagonist of major events	Member of focus at the same time	Not apparent
Meaning of border member	1. High amount of speech but low self-disclosure action. 2. Was the member of focus in previous sessions.	Not apparent	1. High amount of speech but low self-disclosure action. 2. The border member in previous sessions.
Total counts of self-disclosure actions	Low	Average	Low then high
Amount of speech by leader	More than members	Less than the member of focus	
Repetitiveness of core member	High	No repetition	Not apparent

Quantitative Analysis Results

The mathematical analysis (Research Question 2) was used to quantify the interactions and demonstrate their utility. The quantitative findings can be compared to and interpreted with the visual analysis results. In terms of theme coding, the number of generated themes gradually increased from the initial stage (i.e., 7, 10, 7) to the highest level at the early working stage (i.e., 11, 15, 9). Then, the number of themes started decreasing (i.e., 7, 8) as the group approached the end (see Figure 5).

Figure 5

Group Process (Themes)
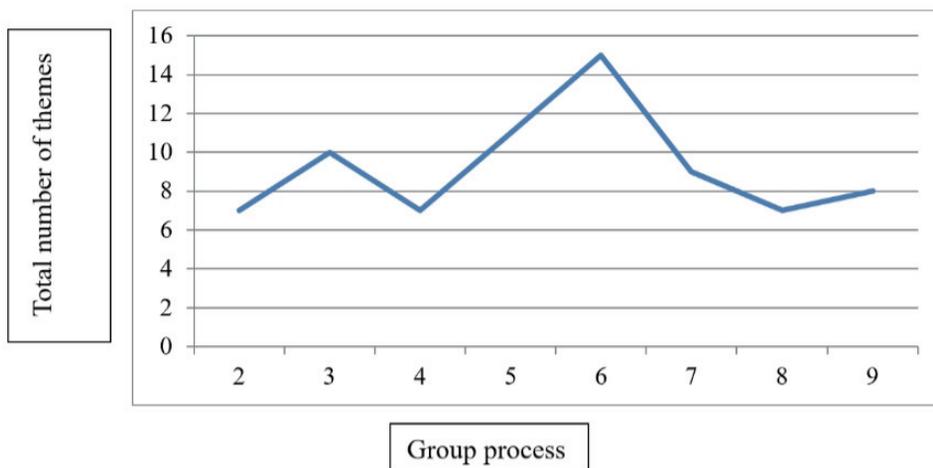
As shown in Table 5, the total transcribed interaction sentences throughout the group sessions ranged from 147 to 365. Among them, the counts of self-disclosure actions based on the self-disclosure phase coding system ranged from 52 to 165, increasing from the initial stage ($M = 64$) to the early working stage ($M = 91$) , and continuing into the late working stage ($M = 119$). The counts of DPo-1 (i.e., disclosure of former life experience) were always the highest among the seven coded self-disclosure behaviors, especially during the initial working stage. The disaggregated data presented in Figure 6 indicate that, during Session 4,

the counts of the seven self-disclosure behaviors were more similar due to a significant decrease in DPo-1. In addition, the counts of DPo-2, SAo-1, and SA0-2 gradually increased throughout the sessions. Furthermore, DPi (i.e., disclosure of personal experience and events in the group) dramatically increased during the late working stages. Finally, the counts of EA (i.e., expression of emotions) increased until Session 6 and remained steady while the counts of SAi (i.e., reflection on the experience or events in the group) continuously decreased from the very early stage and then showed a jump in Session 9.

Table 5

**Number of Transcribed Interaction Sentences and Other Group Behaviors Based on Self-Disclosure Phase Coding System**

Stage	Session	Sentence counts	*SD* counts	DPo-1	DPo-2	SAo-1	SAo-2	DPi	SAi	EA
Initial to transition stage	2	147	52	20(38%)	6(12%)	12(23%)	6(12%)	2(4%)	1(2%)	5(10%)
	3	306	83	39(47%)	2(2%)	18(22%)	4(5%)	1(1%)	6(7%)	13(16%)
	4	200	57	16(28%)	5(9%)	15(26%)	5(9%)	2(4%)	3(5%)	11(19%)
	Sum		192	75(39%)	13(7%)	4(23%)	15(8%)	5(3%)	10(5%)	29(15%)
Early working stage	5	281	91	56(62%)	5(5%)	11(12%)	2(2%)	4(4%)	10(11%)	3(3%)
	6	365	102	39(38%)	11(11%)	9(9%)	11(11%)	0(0%)	19(19%)	13(13%)
	7	282	81	29(36%)	7(9%)	11(14%)	13(16%)	7(9%)	6(7%)	8(10%)
	Sum		274	124(45%)	23(8%)	31(11%)	26(9%)	11(4%)	35(13%)	24(9%)
Late working stage	8	280	72	27(38%)	15(21%)	3(4%)	11(15%)	0(0%)	11(15%)	5(7%)
	9	227	165	50(30%)	24(15%)	29(18%)	22(13%)	23(14%)	12(7%)	5(3%)
	Sum		237	77(32%)	39(16%)	32(14%)	33(14%)	23(10%)	23(10%)	10(4%)

Figure 6

Frequencies of Self-Disclosure Based on Self-Disclosure Phase Coding System
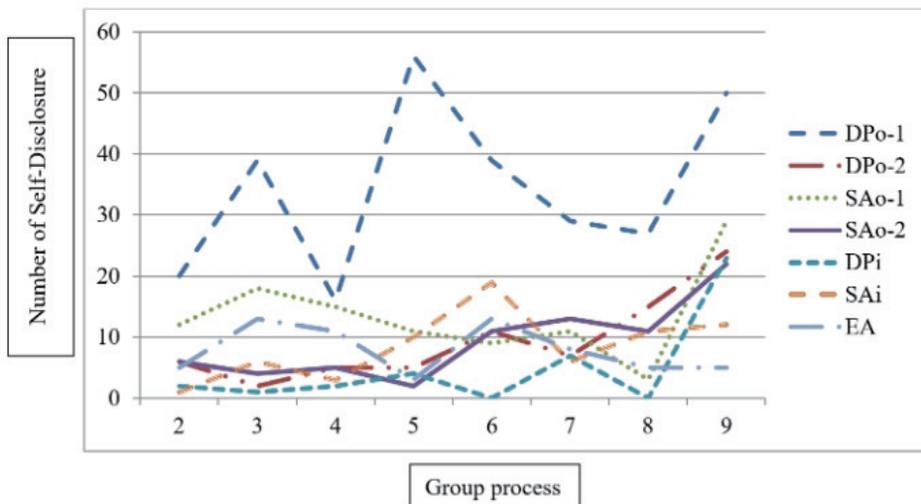
Based on the percentages of self-disclosure behavior (see Figure 7), DPo-1 showed the highest level, especially during the first half of the group process. The usage level of DPo-2 and SAo-2 remained consistent across the sessions with a slight increase during the ending stage. SAo-1 started at a relatively higher level in the initial stage, dropped when entering the working stage, and recovered at the end. The usage level of DPi stayed low during the first half of the group process but increased during the second half. SAi showed an increasing trend throughout the group process with a peak in the early working stage. EA, on the contrary, demonstrated a gradually decreasing trajectory throughout the group process.

Figure 7

Percentage of Self-Disclosure Behavior Based on Self-Disclosure Phase Coding System
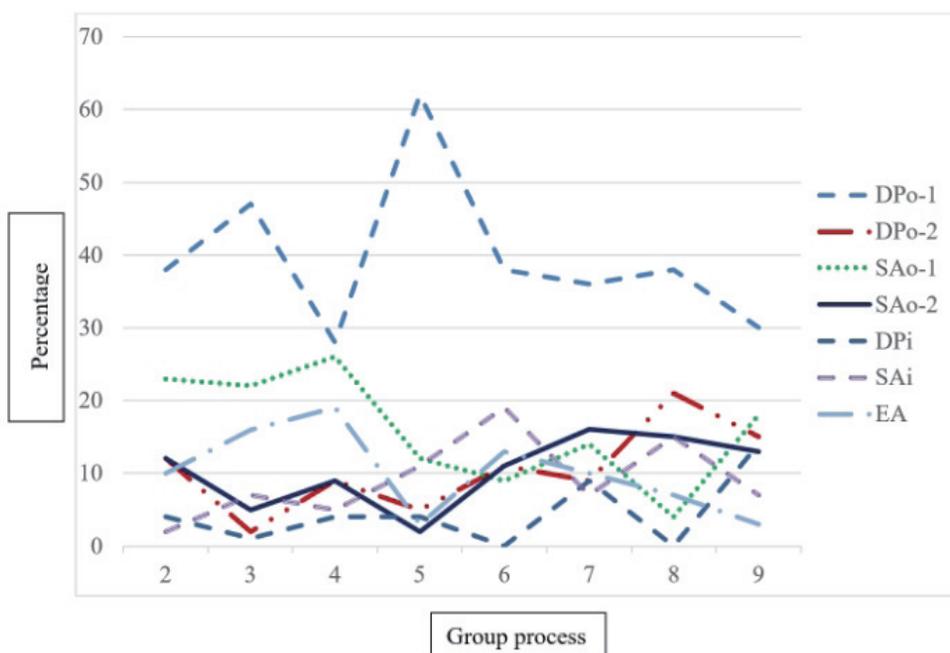
Network density was measured to show the participants' interconnectedness. It was determined by dividing the observed interpersonal connections by the total number of linkages that were possible. The density data of each group session determined how intensively the participants were connected so that the researchers were able to obtain a general impression of the roles they played (i.e., member of focus, border member). Although it was unlikely that the role and function(s) of each participant would remain static throughout the entire group process, the observed changes in density measures were useful for group dynamics analysis. According to the observed levels of density (Table 6), Session 5 was found to have a density of .71, meaning that the group leaders and members reportedly participated in 71% of the possible linkages that could exist in the network. Moreover, the number of connections among the participants increased from the initial to the working stage. However, the numbers slightly decreased after entering the working stage (i.e., Sessions 6 and 7) and

then increased again at the ending stage (i.e., Session 9). This may reflect the changes in group cohesion across the different group stages.

Table 6

Density Levels Across Group Sessions

Group session	2	3	4	5	6	7	8	9
Density levels	0.33	0.57	0.64	0.71	0.62	0.54	0.62	0.71

Discussion

Studies based on interaction analysis of group dynamics are scarce in the current literature. Our study was conducted to evaluate how SNA can be used to examine the changes in relational structures through a group process. We used visual analysis and examined quantitative interaction statistics to offer insights into future group counseling practice and research and to better our understanding of the dynamics of intragroup interactions.

Changes in Relational Structures

Competition Issues Among Members of Focus

Moving from the transition to the working stage, group leader(s) should establish a secure atmosphere and support members' engagement in self-disclosures (Jacobs et al., 2006). In addition, self-disclosures of more here-and-now experiences and feelings that happen in the group (e.g., DPi, SAi) should be encouraged. Some members may compete for group authority or resources, such as speaking time (Yalom & Leszcz, 2005). In this study, rather than starting a new topic to become a member of focus, the members increased their number of here-and-now self-disclosures related to ongoing group topics. They tried to interact with others, which resulted in the highest level of interactions around Session 5. However, this phenomenon decreased and then gradually disappeared through the working stage. In other words, those members who competed for group authority actually interacted and collaborated with each other by actively participating in group discussion only during the early sessions.

Additionally, the meaning of a core member could vary according to the group stages. For instance, during the initial stage, a core member acted as a protagonist of major

transformation events as well as a link to connect other members. During the transition stage, the function of a core member could be sharing some there-and-then prior experiences to elicit more self-disclosures from others. After entering the working stage, the members of focus never repeated but rotated. This is quite different from the observed repetitions during the previous sessions. The amount of time each core member utilized varied from session to session, but all members had opportunities to talk about and work on their issues. This phenomenon is commensurate with findings of Yalom and Leszcz (2005) in which members of focus often rotated and demonstrated here-and-now self-disclosures after entering the working stage.

Furthermore, the current group members started engaging in self-disclosures after their perceived contributions to the group by sharing of their prior experiences. Hsu et al. (2014) suggested that Chinese-speaking group members' demonstration of self-disclosure can usually be viewed as an indicator of more engaged group climate and increased group cohesion. When the boundary of self is expanded to other significant group members, the behavior of helping others to achieve a more balanced give and take relationship may be observed in the members' interactions after more self-disclosure and increased cohesion. One possible interpretation for this phenomenon is the impact of the Confucian value system in which an individual is seen as embedded in a particular social network and the boundary of the self may be extended to include significant others (Hwang, 2001). In such cultures, the social exchange process emphasizes that an individual is expected to reciprocate by offering a favor in return with an equal amount of money, time, or service (Hwang, 2011). Therefore, each group member would have time and opportunity to share and/or work on their issues throughout the entire group processes.

Group Leaders and Border Members

The role analysis performed in our study added another dimension to the utility of SNA. Identifying and distinguishing the roles and who played them at the different group stages enabled the researchers to better understand the dynamics of the group process. From the initial to the transition stage, border members (including leaders) were those with the lowest amount of speech and self-disclosure counts. As the group proceeded, the leaders gradually participated in the group and started to disclose themselves. These changes in the role and

functions of the group leaders may be attributed to two possible reasons. From the aspect of power hierarchy, the members accepted the participation of their leaders and interacted with them as if they were members. From the viewpoint of leadership capacity, the leaders became more familiar with the group and were aware of when to utilize self-disclosures to facilitate interactions with the members. This outcome suggests a breakdown of the "leader" and the "member" role identities, which resolved the issue of authority imbalance during the initial sessions. Subsequently, the members actively shared or self-disclosed issues of interest. The group then interacted as a whole with higher frequencies of intragroup interactions (see Table 4). This result seemed to be consistent with Mau and Jepson's (1988) finding that, in the initial stage, Asian American group members tend to view the group leader as an authority figure so they do not automatically participate until being verbally invited. Also, the group leader is often expected to play an advisor's role in guiding the group process. In other words, an unstructured counseling group that consists of Asian members may often experience and address issues related to authority (Chen, 1995). However, as the group process proceeds, such authority issues can usually be resolved. The interactions then become more natural and bi-directional, and conversations consist with more members' self-disclosure of their topics of interest. The cohesion of the group increases and, as a result, usually leads to the best therapeutic outcome for its members.

A border member may exhibit high speech counts but a low number of self-disclosures during the initial sessions. Or, on some occasions, he or she may have already acted as a core member in the previous session(s) and purposefully chose not to continue being a core member. Using Session 2 as an example, a core member, MB, showed the highest speech counts (24) while a border member, ME, had 22 counts. However, they executed very different behavior patterns in their group participation. MB was very active with self-disclosures (i.e., 19 times) while ME took a more conservative approach with only six self-disclosure actions. This phenomenon was reversed in the next session in which ME self-disclosed 19 times as the second highest amongst the members, indicating a change in strategy use as well as in members' roles. In short, SNA results can highlight not only the quantity of interaction parameters (e.g., network density) but also the quality of roles and functions of the group participants. This scenario may reflect the characteristics of individuals who do not want to dominate or be in the spotlight for too long, but prefer to share the

attention and resources with others. Thus, in this study, there seemed to be an unspoken rule reflected in the rotation of members of focus in the group. As the group proceeded with increasing interpersonal interactions, the uniqueness of the initial members of focus gradually diminished (as seen in the visual graphs) and group cohesion generally increased as reflected by the amount of self-disclosures.

Intensity of Interpersonal Structure

In the visual analysis, an interpersonal structural model can represent the extreme points (participants) of self-disclosures during a specific session. If some participants show stronger interactions, they will form a higher intensity of interpersonal structure. In this study, such structure was more dominant during the transition to the working stage. After entering the working stage, there were more complex relational structures, which served as functional linkages connecting members of different positions in the group. For instance, in Session 2 (Figure 2), there were at most four connections (i.e., MC), but in Session 5 (Figure 3), there were five connections for each point (participant). This complex interpersonal structure remained until the ending stage (e.g., demonstrated in Figure 4). In addition to the changes in the visual structures, the levels of interaction density kept increasing as the group proceeded except for Sessions 6 and 7. The literature indicates that self-disclosures among group participants is one of the proxy indicators predicting group cohesion as well as therapeutic effectiveness (Jennings & Deming, 2013; Yalom, 1995). Thus, the social network metrics used in this study authentically identified the active participants and interactions' density and quality (i.e., speech counts vs. self-disclosures) throughout the group sessions.

Implications for Practice

SNA appears to be a promising tool for studying group phenomenon and a practical monitoring method for making timely adjustments to achieve better group outcomes. The visual and quantitative analysis data, such as changes in group relational structures, can help track group dynamics across sessions. Our study findings revealed intragroup changes from the beginning to the end. It is critical to maintain group cohesion during the working stage, or at least avoid a dramatic drop, in order to achieve shared goals by its members. To do so, it is recommended that group leaders should learn how to effectively facilitate self-disclosure actions among the members as a proxy indicator of group cohesion.

In terms of forming a conducive group structure, especially during the initial stage, group leader(s) should avoid giving any group member too much time and resources. For instance, the leader(s) should not focus too much on an individual member's personal issue(s) during the initial group process or allow two individual members to engage in a long conversation. Instead, the leader(s) should invite all members to join here-and-now discussion on relevant topics, which can result in more functional relations and move the process smoothly through the working stage. SNA methods can be used to closely monitor the visual connections as well as the density and quality of interpersonal interactions throughout group sessions.

As pointed out by Masur (2017), there are potential benefits to engaging in self-disclosures through group sessions. Adequate self-disclosure is found to be correlated with an individual's overall mental health quality. Contrarily, always concealing oneself may impede the development of group cohesion and the member's mental growth. As such, adequate self-disclosure is encouraged and valued (Jacobs et al., 2006), and a leader is expected to facilitate group members' self-disclosures (Bateman et al., 2011). It is paramount that a leader be open to and gradually engage in here-and-now self-disclosures as the group proceeds. In our study, we found that such gradually increased use of modeling of self-disclosure may assist in breaking the power structure between leader and members, which results in enhanced group cohesion. Therefore, in future training, group leaders not only need to learn group leading techniques but also be given sufficient opportunities for self-exploration of any personal issues that may interfere with self-disclosures. It is believed that sufficient self-awareness can help create healthier and more power-equal dynamics in their future group facilitation.

Limitations and Future Directions

Given the exploratory nature of this preliminary study, several limitations warrant additional exploration and further research. Although the case study method with SNA methods facilitated an in-depth investigation of various group phenomena within the real-life context, the current findings should not be automatically generalized to other populations due to limitations in external validity (Yin, 2009). Also, the present study examined an unstructured group to explore changes in structure and dynamics. In future research, SNA methods can be considered for investigating those qualitative patterns using graph theory and

quantitative outcomes (e.g., counts of self-disclosures and interactions) in more structured groups for replication. Further, although the current study was focused on examining different qualitative and quantitative characteristics across the group counseling process, there were several thought-provoking findings regarding the group participants' interactions and behaviors that may be interpreted in a cross-cultural context (e.g., Confucian interdependent social relationship, authority role in Asian group leadership). These potential cultural differences should be taken into consideration in future research, especially when adopting Western theories (e.g., social exchange theory; Emerson, 1976) to interpret study findings in a different culture.

In addition, although the use of SNA methods in counseling group research is still in its infancy and is rarely seen in cross-cultural studies, the present study offered a demonstration of the potentials of SNA as a tool for interaction analysis of counseling group processes. With modern techniques of analysis, it is possible to accurately identify and efficiently describe the differences in relational structures as well as the development of group cohesion across different cultures. The findings would be meaningful and helpful for the formation of contemporary group theory and could offer practical suggestions. Moreover, although there is no consensus in theory on how to differentiate group stages during a therapeutic process, SNA methods may help collect useful and meaningful data for further research, such as learning more about different structural changes among group members. All of these potential directions would open a door for enriching diversity work and enhancing conversation in the field. Finally, virtual mental health service provision, such as through synchronous interaction mode, has received more attention during the Covid-19 pandemic (Weinberg, 2020). This shift in service modality could provide more timely and cost-efficient support (Fischer et al., 2017). With increasing advancement and readiness in technology, a similar approach using SNA methods may be extended to study synchronous group processes to increase our understanding on its feasibility and validity. Similar to face-to-face groups, how online group cohesion is established and changing can be measured and monitored by SNA. It is our hope that the findings of this study can kindle more discussions in this research line and future research can examine, replicate, and improve our work.

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自我揭露行為在非結構團體諮商歷程的社會網絡關係發展之個案研究

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鑒於團體諮商工作模式於華人心理健康的協助逐漸受到重視，本研究聚焦在探索團體現象，藉由非結構諮商團體歷程的社會網絡分析，理解團體歷程領導者與成員的關係結構，從人際結構促進未來團體諮商工作介入之參考。本研究採個案研究法，對於一個非結構團體的歷程進行質性與量化的分析。本研究由七個非結構諮商團體呈現的結果，透過團體成員在成人心理健康量表前後測的改變程度，篩選最具效果的團體進行深度的個案研究分析；團體歷程的脈絡主題編碼、參與者自我揭露行為編碼，將團體歷程的數據進行社會網絡分析與討論。研究結果發現非結構諮商團體的介入對團體成員具有正向的效果，在「團體歷程脈絡主題」、「領導者位置」、「核心成員意義」、「邊陲成員意義」、「整體自我揭露行為」、「領導者的發話量」、「焦點成員重複性」等面向皆存在社會網絡分析的圖論特性。本研究對團體歷程的權力議題、關係結構進行分析與討論，並針對諮商團體後續研究、領導者培育、團體實務能力進行建議。

關鍵詞：自我揭露、社會網絡分析、團體凝聚力、團體諮商、關係結構。

Appendix

Session 3

This session can be divided into two parts: (1) CoLD formed one part and sat at the border of the graph theory with little connection with other members; and (2) the members formed the other part of the graph theory making a clear distinction between the group leader and members.
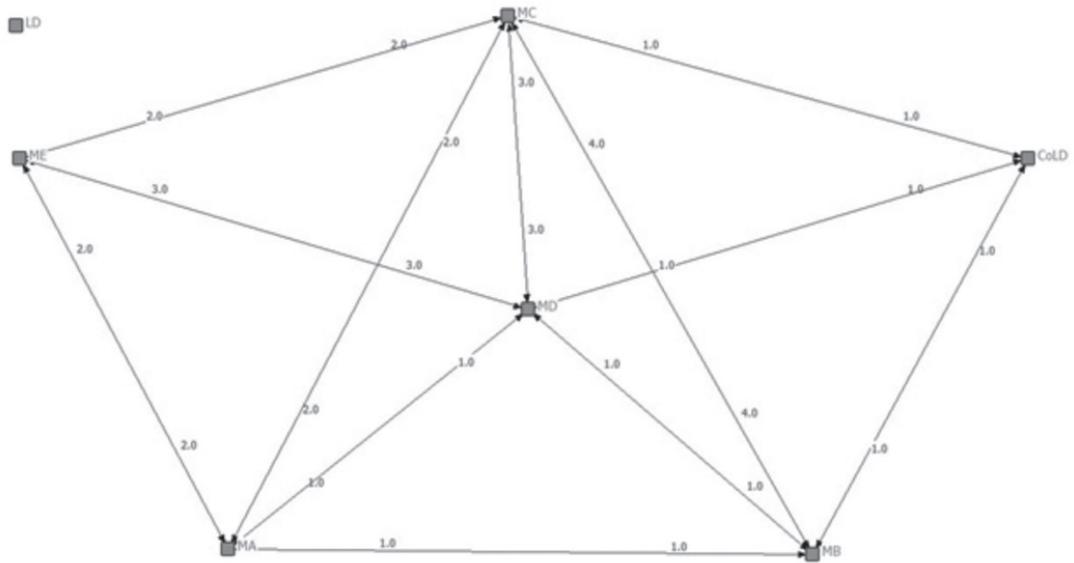
Session 4

According to the analysis of the total graph theory and the intensity of interaction relationships, Session 4 can be divided into two parts. Similar to Session 3, Session 4 continued to show a clear distinction between the group members and leaders. (1) LD formed a separate part of the graph that is regarded as the border area of this session, and (2) other members formed another part of the graph theory showing stronger relational intensity than the previous session. Looking at the two parts of the graph theory, there still existed a difference in interaction between the members and the leaders.
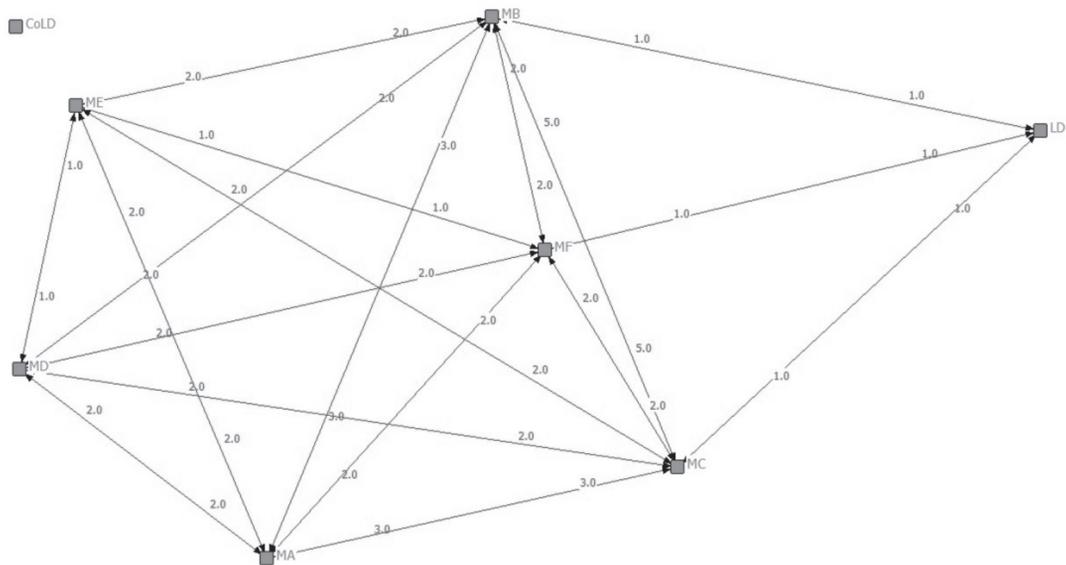
Session 6

By examining the total graph theory and the intensity of interaction relationships, Session 6 can be divided into three parts: (1) CoLD was located at the right hand side forming the border area of this session with relatively low relational intensity; (2) members MA, MB, and ME formed a high-relationship intensity area with distinctive triangular structure linking participants of the left and right; this is the first relational structure with relatively clear points of connection and graph theory meaning; and (3) members MC and MD were located at the left of the graph theory with a moderate level of relationship intensity.
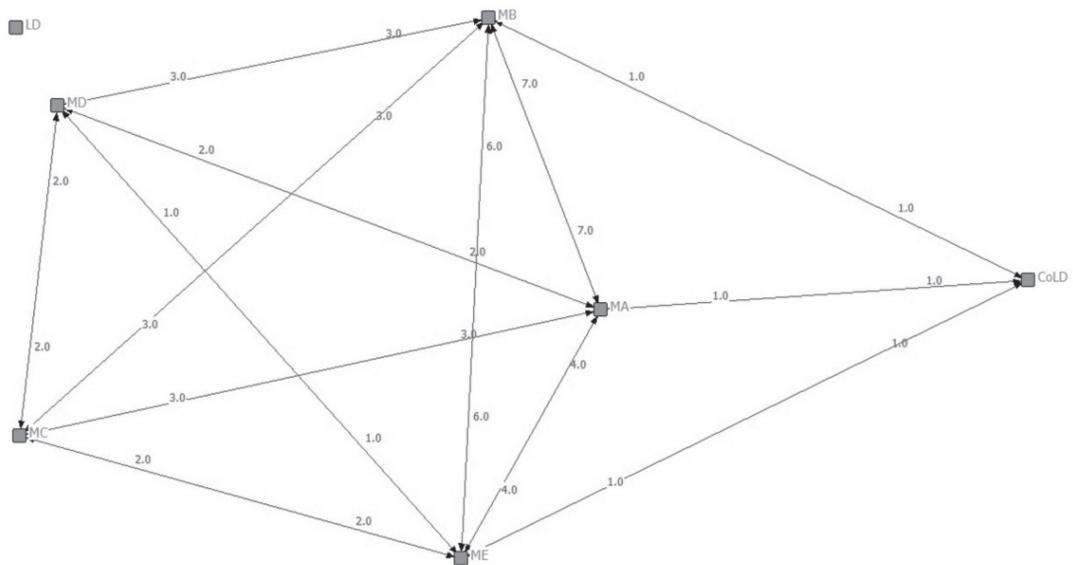
Session 7

Session 7 can be divided into three parts: (1) members MD, ME, and CoLD formed an area in the left portion of the graph with relatively low relationship intensity, of which ME was even located at the further border position; (2) at the center of the graph, members MA, MB, and MC formed a high-relationship intensity relational structure. These three members had all been members of focus in previous sessions: member MA was the member of focus in Session 6; member MB was the member of focus in Sessions 2, 4, and 5; and member MC was the member of focus in Session 3 as well as in the current session. This triangular relational structure also served as a connection for the participants between the left and right portions; and (3) LD occupied the right side of the graph. This was the first time that LD and CoLD both participated in self-disclosure actions, even though the two leaders were located in different areas of the graph.
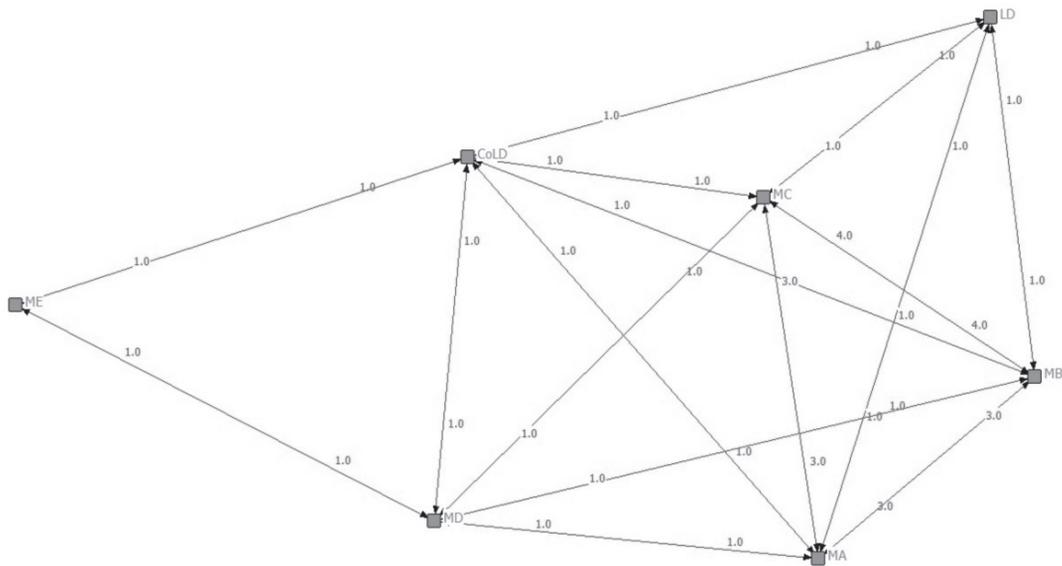
Session 8

By examining the total graph theory and the intensity of interaction relationships, this session can be divided into three parts: (1) member MA formed an area in the left portion of the graph with relatively weak relationship connection; (2) at the center of the graph, members MB, MC, and ME formed a high-intensity relational structure of which MB and ME showed the strongest connection in this graph of relationship intensity. This triangular structure also acted as a connection for linking the participants in the left and right areas of the graph; and (3) members MD and LD were located in the right portion of the graph with low-interaction relationship intensity.