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Therapeutic factors mediating positive Mirror effects in group counseling education

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Abstract
The group counseling approach in education helps students acquire hands-on experience through experiential learning strategies. This study employed a pretest-posttest, quasiexperimental design. The participants included 121 students enrolled in part-time undergraduate social work programs who were assigned to an experimental group or a comparison group; the experimental group ($n = 82$) rated their experiences with the group counseling teaching approach. The data from the experimental group were compared with those from the comparison group ($n = 39$), which was taught using a lecture method approach. Yalom's Therapeutic Factors Inventory, the Mirror Effect Inventory, and the Group Counseling Education Questionnaire were used to measure changes in the participants. The results showed that the group counseling teaching approach was significantly associated with positive mirror effects. The results further indicated that the positive mirror effects were attributable to the group counseling teaching approach and mediated by four therapeutic factors, namely, universality, imparting of information, catharsis, and imitative behavior. The findings of this study demonstrate that the elements of this approach facilitate and enhance the therapeutic effects of group counseling education.

Keywords Group counseling education · Experiential learning · Therapeutic factors · Mirror effects · Mirror neuron

Introduction

Prior research suggests the presence of neural circuitry in the human brain called the mirror neuron system (McGarry & Russo, 2011) that is associated with imitation ability (Heyes, 2011). Mirror neurons respond to the observation of actions and appear to mirror the response of executed behaviors (Oberman & Ramachandran, 2009). Neurophysiological research provides empirical evidence by exploring the biological bases of consciousness and mental processes to reveal how individuals perceive, learn, remember, and act (Kandel et al., 2013). Evidence of mirror neuron mechanisms in humans shows that action perception and action execution produce unilateral or bilateral brain activation (Errante & Fogassi, 2021). Thus, neurophysiological mechanisms are a vital issue in the consideration of the mental process of mirroring.

A neurophysiology study showed that mirrored actions are executed by others and that mirror neurons explain how people intuitively understand the behavior of others, which is so-called action understanding. Specifically, the mirror mechanism located in the insula may function to express mood or attitude and to understand others. This mechanism is involved in the listening and expression of speech vitality forms and allows people to express and understand the mood or attitude of others (Di Cesare, 2020). Praszkier (2016) indicated that individuals synchronize their own thoughts through empathetic relationships with others. Coon and Mitterer (2014) confirmed that mirror neurons are linked to the mirroring of the actions and words of others.

In group counseling, mirroring is aimed at fostering self-reflection, which enables people to step back and observe themselves as other people see them. Mirroring allows individuals to have access to something akin to a live equivalent of videotape playback (Corey, 2016). When individuals participate in these experiential contexts of group counseling, it is as if they can look in a psychological mirror, which generates a positive mirror effect. A "positive mirror effect" refers to an individual observing a situation where others develop an action understanding and spontaneously execute

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the learned knowledge or skills or gain insight into a subsequent life situation (Ho, 2019a). Thus, the experience of mirror effects in group counseling might be effective when mediated by other elements.

Therapeutic factors, which are transtheoretical aspects intrinsic to group therapeutic processes, mediate positive changes in group treatment and contribute to the efficacy of group psychotherapy. The literature (Bloch & Crouch, 1985; Kivlighan et al., 2010; Ozbay et al., 1993; Yalom, 1995) suggests that different therapeutic factors become more prominent at different stages in therapy. Corsini and Rosenberg (1955), tried to discern the factors that facilitate a healing effect in group therapy. After examining 300 articles and identifying 10 therapeutic elements, these factors were further grouped into three main factors (i.e., intellectual, emotional, and actional). Recent work in this area has been carried out by Dierick and Lietaer (2008). Group cohesion, interactional confirmation, cathartic self-revelation, and self-insight have been deemed important factors.

Participating in a group counseling education provides a safe, protective environment within which to conduct applied research to enable individuals to deal with adversity, enrich their self-knowledge, develop effective problem-solving skills and promote a healthy quality of life. However, Kivlighan et al. (2010) noted that research regarding therapeutic factors has not anticipated sophisticated models of interactions among the therapeutic factors or the dynamic pathways linking therapeutic factors to process variables and group member outcomes. Prior research has seldom focused on the therapeutic effect of these factors on students in group counseling education. In addition, as counseling itself is treated confidentially and as group counseling involves very personal explorations, the ability to conduct research in the counseling context is limited. Central to this study was the identification of the therapeutic factors mediating positive mirror effects in experiential group counseling education.

Literature Review

Experiential Learning Theory

Kolb (2015) proposed an experiential learning model involving the following four stages: 1) active experimentation; 2) concrete experience; 3) reflective observation; and 4) abstract conceptualization. This learning cycle first describes how individuals encounter and engage in a new experience of a situation or reinterpretation of an existing experience, followed by observation and actively reflecting on the experience. Any inconsistencies between the experience and understanding are particularly important. Then, individuals conceptualize this experience by reflecting upon and creating new ideas or modifying existing abstract concepts. Subsequently, individuals integrate these ideas with past experiences, resulting in the formulation of a new experience. This integrated process of learning allows individuals to obtain knowledge by grasping and transforming experiences. By strategic active engagement in opportunities to learn through doing, students can reflect upon, receive, and internalize information in a multitude of settings inside and outside the classroom. Grounded in Kolb's experiential learning theory, group counseling education is adapted as a learning and teaching method in which students can benefit from the generation of a positive mirror effect.

Group Counseling Education

In group counseling education, a teacher can either act as a counselor demonstrating the counseling process for students or play a video or audio clip showing the counseling process. All students, group members, clients, and counselors simultaneously experience six teaching stages: goal setting, warm-up, enactment (action), integration (closing, deroling, and debriefing), analysis, and evaluation. This teaching method was documented in Lo's (2012) book chapter entitled *Teaching Group Counseling in Hong Kong: The Experience of a Teaching Excellence Award Winner*. When clients, group members, and the counselor share the weight, torment, and distress of emotional truth and of their speech and actions, it creates a psychological mirror, similar to mirroring (Djurić et al., 2006), whereby students who are participating in the class simply as witnesses of the group counseling process generate mirror effects (Ho, 2019a). The group context is used for students to recognize the client-therapist relationship, to enter into the experiences of the client and experience their inner world, to discover alternatives and intervention strategies, and to observe the interactions among group members in helping each other to identify illogical, emotionally-driven behaviors. The application of group counseling in education mutually fulfills the need to learn group psychotherapy and to gain knowledge and skills in group counseling that will enhance lives.

The literature (Gershoni, 2003) suggests that group counseling can enhance both the academic learning and personal development of students. It inspires self-understanding, the resolution of loss and traumatic experiences, the overcoming of fears, the improvement of social and intimate relationships, the expression of suppressed feelings and thoughts, the learning of new skills, the gaining of insights, and the acquisition of new behaviors. The incorporation of group counseling as a learning and teaching method throughout the entire curriculum in education can engage students in deep understanding and higher-order thinking, and learning becomes holistic and experiential rather than cognitive (O'Toole & O'Mara, 2007).

Mirror Effects in Group Counseling Education

Through the application of group counseling as an approach in learning and teaching, students can delve into a psychological mirror, undergo the process of group counseling education, and experience mirror effects. The literature (Moreno & Moreno, 1969) showing the role of group counseling in education is particularly relevant. A positive mirror effect (Ho, 2019a) refers to a psychological process that is generated through mirroring. When people look at their reflections in this "looking glass", they develop self-consciousness.

Mirroring, a technique commonly used in group counseling, allows individuals to consciously and unconsciously mimic another person's verbal and nonverbal behaviors in the group. Through observing the interactions among the counselor, client, and group members, individuals may re-experience and review the past or experience something that has never happened before, resulting in a better understanding of themselves and others. This mirroring scene reflects inner truths and realities that individuals may or may not have known. Members in the group may experience this healing power or turn it into a healing agent for others. Observers of the group who are stimulated to communicate more effectively within this process of reciprocal reflection can better manage themselves (Berger, 2015). In addition, group members may develop deep sympathy, empathy, and caring for each other, which can profoundly influence their feelings, attitudes, and behaviors toward their lives.

The speech and actions of the client and each group member, and even the counselor of the group, can function as a mirror to enable other participants to observe different modes of relating (Ho, 2019b). The actual mode of sharing, which is different for each person, may liberate the group members from their hardships and suffering (Karp, 2003). In other words, this safe venue provides an opportunity for individuals to hear other opinions and to experiment with a variety of ways of solving problems and interacting with others. Participating in group counselling is somewhat analogous to observational learning or imitative behavior (Bandura, 1977). The difference is that with group counseling, the learned behaviors are more sophisticated and are learned through an inner mental process.

Everyone involved in group counseling may benefit from the mirror effects. The journey provided by group counseling is uniformly described as exceptional and is universally appreciated by people who have participated in it. Students involved in the group counseling process may experience a wide range of curative experiences, such as venting, gaining support, learning skills, and gaining action insight. Thus, simply listening or watching counseling in this learning environment has positive impacts on students.

Students participate in making sense of and using knowledge in group counseling, so they are not intentionally selected to be target clients. Thus, everyone who joins in or observes the group process can participate in the group counseling education and may experience mirror effects. Most importantly, in the group counseling process, students are not required to disclose personal information or relinquish any privacy. Some students may automatically reap the benefits of group counseling treatment just through witnessing the counseling process. Although group counseling education may produce mirror effects, in the worst case, students may experience analogous adversity, what Moreno (1965) called "surplus reality", and their emotions may be triggered causing them to dwell on negative emotions without experiencing any therapeutic effects and action understanding; in this case, teachers must take steps to minimize the possible negative impact on students.

In group counseling, the counselor assesses the clients' responses carefully throughout therapy and heals them in a protective environment. In fact, the ideological realm of the participants is widely stimulated throughout witnessing group counseling. During the group counseling education process, students may replace negative thoughts with more positive ones or learn to cope with past experiences and behaviors. Alternatively, students may merely recall past memories connected to the associated event, which may trigger negative thoughts and emotions. Escalating emotional outbursts in groups may lead to escalation of the ripple effect, whereupon a certain degree of beneficial or adverse effects may arise consciously and unconsciously. Nevertheless, the teacher may or may not be aware of the responses of the students.

Even though mirror effects may automatically heal participants in group counseling education, they may also arouse different levels of emotion in the participants. The impact of this arousal of emotion on participants is still uncertain, with most research being focused mainly on the impact of group counseling on clients. As a result, the effects of experiencing mirroring are not yet clear. The responses of participants (i.e., the clients, group members, and students) provides valuable insight for research on group counseling education and therapy and its impact on participants and are highly worthy of exploration. To enhance the positive effects of group counseling education, the examination of the concept of mirror effects should consider the impact of therapeutic factors, that is, facilitating outcomes in the group and in people within the group.

Therapeutic Factors in Group Settings

Yalom and Leszcz (2005) suggested that therapeutic change is a highly complicated process that arises through an intricate interplay of the experiences of human beings. A therapeutic factor is defined as a component of group therapy that helps to alleviate and improve a client's condition and is a

function of the actions of the therapist, the group members, and the client him or herself (Bloch & Crouch, 1985, p.4). Yalom and Leszcz (2008) identified 12 therapeutic factors (i.e., altruism; group cohesiveness; universality; interpersonal learning, including both input and output; imparting of information; catharsis; imitative behavior; the corrective recapitulation of the primary family group; self-understanding; instillation of hope; and existential factors) as specific elements that mediate positive changes in group treatment and characterize groups. These significant therapeutic factors are intertwined in various combinations and enrich each other.

Some studies (Corder et al., 1981; Yalom, 1985) found that interpersonal learning, catharsis, and insight were most highly valued in outpatient groups. Another study (Ozbay et al., 1993) found that only insight was scored as one of the categories most highly valued by adolescents. Yalom (1975) revealed that the factors that rank among its most valuable are interpersonal learning, catharsis, cohesiveness, and insight. Kellermann (1992) also found in two studies that insight, catharsis, and interpersonal relations were important therapeutic factors central to group psychotherapy. A qualitative study (Ho, 2019b, c) found that universality, imparting of information, catharsis, and imitative behavior were the curative factors that facilitated mirror effects in group counseling education. According to Yalom and Leszcz (2005), the interplay and differential importance can vary widely from group to group.

However, Yalom and Leszcz (2005) had not formulated any theories and models concerning the interrelationships among the therapeutic factors (Kivlighan et al., 2010). In addition, Roy et al. (2005) found that most studies asked group participants to rate therapeutic factors based on the importance of their group experiences, and few studies (e.g., Crowe & Grenyer, 2008; Joyce et al., 2007) examined the relationship between therapeutic factors and outcomes for group members. In group counseling, these factors constitute significant efforts to connect with participants and generate wide-ranging psychotherapeutic experiences (Kellermann, 1992). The significance of mirror effects is supported by the analysis and interpretation of quantitative data that take into account the mediating role of therapeutic factors in the use of learning and teaching approaches.

The Present Study

By employing experiential learning theory as the theoretical foundation, this study seeks to expand the existing base of psychological knowledge regarding the mirroring and mirror effects (Ho, 2019a, b, c) for which various therapeutic factors have been found to be predictive of therapeutic effects in group counseling. Additionally, in terms of the learning and teaching approach, students benefit from the generation of positive mirror effects, so it would be valuable to identify the factors that facilitate positive mirror effects. Previous studies (Yalom, 1975; Yalom, 1985, 1995) have shown that catharsis, action insight, tele, as-if, and acting out are important therapeutic factors affecting the efficacy of group counseling. Thus, this study aims to investigate the relationships among group counseling education, therapeutic factors, and positive mirror effects in group counseling education among students and to identify the therapeutic factors that mediate positive mirror effects, which in turn facilitates the effectiveness of group counseling education.

The research interest was inspired by the mirror effects observed in group counseling. The process of group counseling has unique learning advantages (Corey, 2016). In addition, counseling must be conducted confidentially. In view of the above, it was not possible to access other organizations to collect data. Eventually, the sample of students was chosen by purposive sampling of the students at a university where group counseling education was conducted by a professor using group counseling as a teaching strategy (Lo, 2012). Certainly, it is detrimental to the sectors of education and helping professionals that group counseling is excluded from these fields. As evident from the review of the current situation in relation to the use of group counseling in education, its application in counseling education is valuable.

Methodology

Participants

Students studying in the part-time social work bachelor's degree program at a university in Hong Kong and working in social work settings at the time of the study were purposively selected. All students were Chinese and registered as social workers.

In the experimental group, 91.9% of the students ($n = 82$, aged 21–50, 76.7% female) were studying in year 2 and were enrolled in a counseling course using a group counseling teaching approach. All students in this group signed consent forms and participated in this study.

In the comparison group, 94.3% of the students ($n = 39$, aged 21–35, 65.7% female) were studying in year 1 and were enrolled in a counseling course using the lecture method, which is a teacher-controlled, information-centered approach. However, only 61.25% of the students in this group signed consent statements and were willing to participate.

All students were asked to provide their demographic information. The information is presented in Table 1. A chi-square test of independence was performed to examine the relation of each demographic factor between the two groups. The relations between all these variables were nonsignificant. Thus, any resulting differences between the two groups were attributable to the teaching approach.

Table 1 Sample demographic characteristics in the quantitative study ($n = 100$)

	Experimental ($n = 63$)	Comparison ($n = 37$)	Test*
Sex			$\chi^2 = 1.34$
Male	23.3%	34.3%	
Female	76.7%	65.7%	
Age			$\chi^2 = 3.37$
21–25	27.4%	32.3%	
26–30	32.3%	41.2%	
31–35	24.2%	20.6%	
36–40	9.7%	5.9%	
41–45	4.8%	–	
46–50	1.6%	–	
51–55			
Educational Attainment			$\chi^2 = .90$
Tertiary Education	50%	60%	
University	50%	40%	
Occupation			$\chi^2 = 2.04$
Administration	1.6%	–	
Counseling	1.6%	–	
Social Service	91.9%	94.3%	
Full-time Student	3.3%	5.7%	
Other	1.6%	–	

*None of the statistical findings were significant at $p < .05$.

^*Remark: Demographic data were only collected in the pretest but not in the posttest. The total number of students was counted on the pretest.*

Measures

Group Counseling Education Questionnaire

The Group Counseling Education Questionnaire is a self-constructed inventory that was used to measure the students' experiences of the group counseling education. The questions are separated into the following five subscales: teaching methods (e.g., The teacher uses case demonstrations through audio/video recordings effectively to advance my learning), course content (e.g., case study), course arrangement (e.g., Allocation of class time), student involvement/engagement (e.g., I am improving my potential in this course.), and learning atmosphere (e.g., Group cohesion facilitates a positive learning atmosphere for group projects/discussions). The scale consists of 27 items rated on 5-point Likert scales (1 = *strongly disagree*, 5 = *strongly agree* and 1 = *not satisfied*, 5 = *extremely satisfied*). A higher score reflects the greater agreeableness of the education and students' higher satisfaction with their experiences of group counseling education. The Cronbach's alpha coefficients ranged from .70 to 0.94 for the subscales, and the total scale had a high degree of internal consistency, with a Cronbach's alpha of .95 (see Table 2).

Therapeutic Factors Inventory

The Therapeutic Factors Inventory (Yalom, 1975, 1985, 1995) is used to determine the perceived presence or absence of therapeutic factors in a particular group. The revised version has 60 items (e.g., Helping others has increased my self-respect) across 12 therapeutic factors, and each item is scored on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The Cronbach's alpha coefficients ranged from .94 to .95 for the subscales, and the total scale had a high degree of internal consistency, with a Cronbach's alpha of .94 (see Table 3).

Mirror Effect Inventory

The Mirror Effect Inventory is a self-constructive inventory that was used to collect the students' *perceptions regarding mirror effects* after participating in the counseling education. This inventory aims to assess participants' perceptions using the following

Table 2 Reliability of the Scales (Group Counseling Education Questionnaire)

Scale	No. of Items	N	Mean	Standard Deviation	Cronbach's Alpha
Teaching					
Teaching Methods[1]	5	121	20.52	2.65	.89
Course Content[2]	12	121	44.21	7.96	.94
Course Arrangement[2]	3	121	10.13	2.50	.77
Learning					
Student Involvement/Engagement[1]	4	121	16.12	2.10	.76
Learning Atmosphere[1]	3	121	12.57	1.54	.70
Total	**27**	**121**	**103.55**	**14.22**	**.95**

[1]5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree)

[2]5-point Likert scale (1 = Not Satisfied, 2 = Slightly Satisfied, 3 = Somewhat Satisfied, 4 = Very Satisfied and 5 = Extremely Satisfied)

Table 3 Reliability of the Scales (Therapeutic Factors Inventory)

Scale	No. of Items	N	Mean	Standard Deviation	Cronbach's Alpha
Altruism	5	120	26.56	2.89	.94
Group cohesiveness	5	120	26.13	3.40	.94
Universality	5	120	26.86	3.48	.94
Interpersonal learning (input)	5	120	24.08	3.26	.94
Interpersonal learning (output)	5	120	26.53	3.00	.94
Imparting or sharing of information	5	120	26.93	2.99	.94
Catharsis	5	120	25.64	3.46	.94
Modeling	5	120	25.17	3.76	.94
Corrective emotional experience -family	5	120	25.33	3.36	.95
Self-understanding	5	120	26.23	3.20	.94
Instillation of hope	5	120	26.57	3.71	.94
Sharing of existential issues	5	120	27.70	3.53	.94
Total	**60**	**120**	**313.73**	**31.59**	**.94**

7-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, and 7 = Strongly Agree)

Table 4 Reliability of the Scales (Mirror Effects)

Scale	No. of Items	N	Mean	Standard Deviation	Cronbach's Alpha
General	7	121	27.43	2.65	.73
Positive	16	121	60.50	5.46	.85
Negative	14	120	50.05	10.39	.95
Total	**37**	**120**	**137.98**	**13.56**	**.91**

5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree)

three subscales: general (e.g., recall past event), positive (e.g., feel in control of my problem), and negative (e.g., indulge in problematic situations and/or imagery). The inventory consists of 37 items rated on a 5-point Likert scale (1 = *strongly disagree,* 5 = *strongly agree*). Higher scores reflect a greater presence of mirror effects. The Cronbach's alpha coefficients ranged from .73 to .95 for the subscale. The total scale showed a high degree of internal consistency, with a Cronbach's alpha of .91 (see Table 4).

Procedures

The design of this research was approved by the university's College Research Ethics Sub-Committee. An informed consent document with a declaration of the nature of study participation was included with the questionnaires and distributed to every participant to sign prior to the commencement of this study.

The students were required to complete the self-administered questionnaires with paper and pencil in class at the first and last lectures. There was no random assignment of students or questionnaires. Participation in the data collection was totally voluntary. All students were given a fair explanation of the purpose and procedures of this research and were assured that their responses were anonymous and would be kept confidential. The students' demographic information provided in the questionnaires was disguised using identification numbers. The students' information has been kept private, and it will not be made available publicly. The information was documented in such a manner that students could not be recognized, either directly or indirectly through identifiers associated with the students. The analysis shows only the consolidated results, without any information that could identify any person individually.

A declaration was made to ensure that students understood that their participation would not affect their academic results. A volunteer was instructed to collect the completed questionnaires, put them in a sealed envelope, and return them to the research team.

Data Analyses

A quantitative approach was used to explore whether therapeutic factors could mediate the association between mirror effects and group counseling education. There was one case with missing data on the Therapeutic Factors Inventory. The

Table 5 Means, standard deviations, and correlations among the variables

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Altruism	26.56	2.90													
2	Group cohesiveness	26.13	3.39	.71***												
3	Universality	26.86	3.47	.59***	.70***											
4	Interpersonal learning (Input)	24.10	3.26	.63***	.68***	.57***										
5	Interpersonal learning (Output)	26.52	3.00	.75***	.79***	.67***	.74***									
6	Imparting of information	26.94	2.98	.68***	.70***	.68***	.62***	.71***								
7	Catharsis	25.65	3.44	.63***	.77***	.63***	.63***	.73***	.73***							
8	Imitative behavior	25.17	3.75	.66***	.65***	.57***	.55***	.69***	.74***	.64***						
9	Corrective recapitulation of the primary family group	25.34	3.34	.42***	.44***	.39***	.44***	.49***	.51***	.45***	.50***					
10	Self-understanding	26.23	3.19	.63***	.55***	.59***	.45***	.62***	.56***	.50***	.53***	.54***				
11	Instillation of hope	26.56	3.69	.66***	.57***	.68***	.54***	.61***	.68***	.59***	.64***	.53***	.67***			
12	Existential factors	27.70	3.51	.56***	.49***	.59***	.39***	.50***	.50***	.41***	.51***	.35***	.57***	.51***		
13	Positive mirror effect	60.50	5.50	.54***	.50***	.51***	.46***	.60***	.56***	.51***	.52***	.40***	.44***	.59***	.42***	
14	Group counseling education	.68	.47	.14	.10	.20*	−.07	.07	.24**	.25**	.30***	.05	.07	.18	.12	.20*

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

extent of the missing data problem was not serious. Davey and Savia (2010) stated that if missing values are reasonably random and if the extent of the problem is not large, the mean substitution method can be used, which involves calculating a mean based on the valid cases and replacing the missing values. To validate the self-constructed questionnaire, confirmatory factor analysis was conducted on the group counseling education and mirror effects measures within the scales. Since it was not the goal of this study to construct a tool and since the sample size was too small, the results of the factor analysis are not presented.

Descriptive statistics were computed, and Pearson's product-moment correlation analysis was performed to examine the relationships between group counseling education, therapeutic factors, and mirror effects. Descriptive statistics and the intercorrelations between variables are presented in Table 5. Multiple regression, in accordance with the Baron and Kenny Method (1986), was used to examine the zero-order relationship between group counseling education, therapeutic factors, and mirror effects to identify the mediators facilitating positive mirror effects. In this study, the mediators were therapeutic factors, the predictor was group counseling education, and the outcome variable or criterion was mirror effects. Through the use of mediation analysis instead of moderation analysis, the criteria defining mediators and moderators could be considered. Mediators establish "how" or "why" a variable predicts or causes an outcome variable (Frazier et al., 2004). The results show the strength and significance of the relationships. Using Sobel testing, this mediation analysis aimed to test the indirect effects of latent variables and associations (Baron & Kenny, 1986). The confidence level of this quantitative study was 95% for all tests.

The mediation analyses were performed within the framework of regression modeling. Estimating the proportion of an independent-dependent variable relationship mediated by a third variable was often unstable; thus, the confidence level of the quantitative study was 95%. Harris (1985) suggested that the number of participants should be greater than the number of predictors by at least 50. Green (1991) formulated the eq. $N > 50 + m$ (where m is the number of IVs). There was only one predictor in this study, and therefore, the sample size ($n = 100$) provided adequate power for testing the mediation effect.

Results

Significance of the Multiple Regression of Positive Mirror Effects

Multiple regression analyses were performed to test positive mirror effects resulting from the teaching approach

and the 12 therapeutic factors. In Step 1, it was found that group counseling education and positive mirror effects accounted for a total of 3.9% of the variance in positive mirror effects (F (1, 119) = 4.83, $p < .05$, $R^2 = .04$, $R^2_{Adjusted} = .03$). The regression results indicated that group counseling education significantly predicted positive mirror effects, $\beta = .20$, t (119) = 2.20, $p < .05$. Group counseling education also explained a significant proportion of the variance in positive mirror effects.

Using the enter method to test the group counseling education and each therapeutic factor (path a) in Step 2, it was found that group counseling education significantly predicted universality ($\beta = .20$, t (119) = 2.26, $p < .05$), imparting of information ($\beta = .24$, t (119) = 2.66, $p < .01$), catharsis ($\beta = .24$, t (119) = 2.75, $p < .01$), and imitative behavior ($\beta = .30$, t (119) = 3.38, $p = .001$).

In Step 3, positive mirror effects were regressed on group counseling education and the 12 therapeutic factors. The results of the final regression indicated that two predictors explained 47% of the variance (F (13, 106) = 7.19, $p < .001$). It was found that group counseling education and altruism ($\beta = .53$, t (119) = 6.79, $p < .001$), group cohesiveness ($\beta = .48$, t (119) = 6.13, $p < .001$), universality ($\beta = .49$, t (119) = 6.14, $p < .001$), interpersonal learning (input) ($\beta = .48$, t (119) = 6.02, $p < .001$), interpersonal learning (output) ($\beta = .59$, t (119) = 8.16, $p < .001$), imparting of information ($\beta = .55$, t (119) = 6.97, $p < .001$), catharsis ($\beta = .49$, t (119) = 5.99, $p < .001$), imitative behavior ($\beta = .51$, t (119) = 6.16, $p < .001$), corrective recapitulation of the primary family group ($\beta = .40$, t (119) = 4.77, $p < .001$), self-understanding ($\beta = .43$, t (119) = 5.24, $p < .001$), instillation of hope ($\beta = .57$, t (119) = 7.60, $p < .001$), and existential factors ($\beta = .40$, t (119) = 4.80, $p < .001$) significantly predicted positive mirror effects. The effect of group counseling education on positive mirror effects (path c) was significant.

The effects of the group counseling education on four therapeutic factors, i.e., universality, imparting of information, catharsis, and imitative behavior, were found to be significant in Step 2 and to significantly predict positive mirror effects in Step 3. The results indicated that these four therapeutic factors fully mediated the effect of the group counseling education on positive mirror effects, as path c' was nonsignificant.

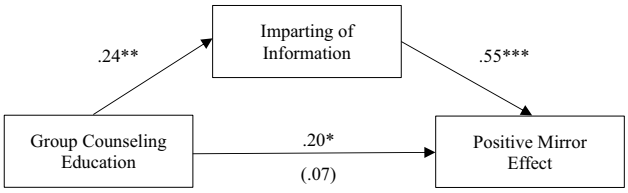

Fig. 2 Mediation model for group counseling education, imparting of information, and the positive mirror effect. The effects of other therapeutic factors are controlled for. * $p < .05$, ** $p < .01$, *** $p < .001$

Significance of the Mediating Effect on Positive Mirror Effects

In Step 4, to test the indirect effects, the Sobel test was carried out for group counseling education, each of the 12 therapeutic factors and positive mirror effects. Eight of the therapeutic factors, including altruism ($z = 1.51$, $p > .05$), group cohesiveness ($z = 1.03$, $p > .05$), interpersonal learning (input) ($z = -.78$, $p > .05$), interpersonal learning (output) ($z = .80$, $p > .05$), corrective recapitulation of the primary family group ($z = .59$, $p > .05$), self-understanding ($z = .79$, $p > .05$), instillation of hope ($z = 1.91$, $p > .01$), and existential factors ($z = 1.31$, $p > .05$), did not function as significant mediators. Four of the therapeutic factors, including universality ($z = 2.13$, $p < .05$), imparting of information ($z = 2.49$, $p < .05$), catharsis ($z = 2.51$, $p < .01$), and imitative behavior ($z = 2.98$, $p < .01$), were significant predictors. It was concluded that this model demonstrated complete mediation. The results of the mediation analysis are summarized in Figs. 1, 2, 3 and 4.

In summary, the above analysis showed that this model demonstrated complete mediation of positive mirror effects. Significant mediation occurred between the teaching approach and positive mirror effects through the therapeutic factors of universality, imparting of information, catharsis, and imitative behavior. None of the other therapeutic factors mediated the effect of the teaching approach on positive mirror effects. Baron and Kenny (1986) stated

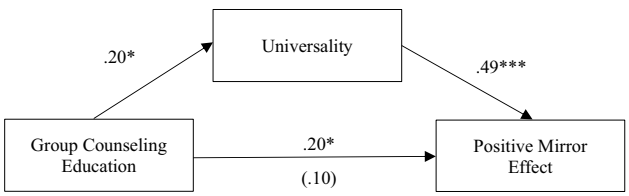

Fig. 1 Mediation model for group counseling education, universality, and the positive mirror effect. The effects of other therapeutic factors are controlled for. * $p < .05$, ** $p < .01$, *** $p < .001$

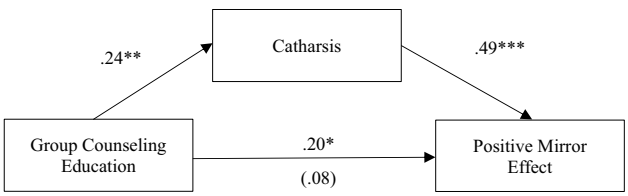

Fig. 3 Mediation model for group counseling education, catharsis, and the positive mirror effect. The effects of other therapeutic factors are controlled for. * $p < .05$, ** $p < .01$, *** $p < .001$

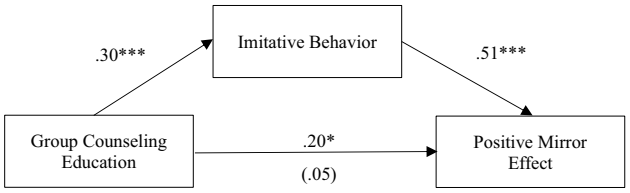

Fig. 4 Mediation model for group counseling education, imitative behavior, and the positive mirror effect. The effects of other therapeutic factors are controlled for. * $p < .05$, ** $p < .01$, *** $p < .001$

that "perfect mediation holds if the independent variables have no effect when the mediator is controlled" (p. 1177); however, in the field of psychology, variables may have multiple causes (Jose, 2013). The results of the multiple regression and mediation analysis are tabulated in Tables 6 to 7, respectively.

In summary, the results of Step 1 showed that group counseling education was significantly related to positive mirror effects, which suggested that group counseling education had a direct effect on positive mirror effects. In Step 2, the results demonstrated that group counseling education was significantly related to universality, imparting of information, catharsis, and imitative behavior. The results partially supported the hypothesis that group counseling education has a direct effect on the twelve therapeutic factors. Next, the results of Step 3 indicated that all 12 therapeutic factors were significantly related to positive mirror effects with adjustment for group counseling education. The results fully supported the hypothesis that the twelve therapeutic factors have a direct effect on positive mirror effects. In Step 4, four therapeutic factors, including universality, imparting of information, catharsis, and imitative behavior, functioned as significant mediators of positive mirror effects, significantly predicting positive mirror effects. This result partially supported the hypothesis that the twelve therapeutic factors mediate the effect of group counseling education on positive mirror effects.

Regression Analyses

Bootstrapping was conducted to test the significance of the indirect effect of the group counseling approach. Bias-corrected 95% confidence intervals (BC 95% CIs) with 1000 bootstrap resamples were calculated. The indirect effect of group counseling education on positive mirror effects via the 4 therapeutic factors yielded significant results: universality (BC 95% CI [.02, .21]), imparting of information (BC 95% CI [.04, .23]), catharsis (BC 95% CI [.04, .23]), and imitative behavior (BC 95% CI [.06, .26]). These results showing that these 4 therapeutic factors mediated the effect of group counseling education on positive mirror effects supported the outcome of the Sobel test. The positive mirror effects were attributable to the group counseling approach and mediated by 4 therapeutic factors, namely, universality, imparting of information, catharsis, and imitative behavior.

Discussion

In a group counseling education context, the teacher handles a real case of a client's problem in a live demonstration or through video or audio case recordings. Group counseling, particularly therapeutic elements, facilitates the process of developing empathic understanding. For students, listening to or watching the scene automatically promotes their recollection of past emotional memories and enables them to identify with one or more roles (i.e., client, counselor, group member, and/or audience).

Through imagination, visualization, or mental rehearsal (Singh & Kaur, 2021), students seem to be able to relive previous positive and negative experiences and/or gain a new perspective in the present. Undergoing emotional and active cognitive processing, students experience therapeutic effects. The role model's action is interpreted and becomes meaningful in their lives, and students gain action insight and prepare themselves mentally for performance in the future.

The importance of mirror effects and therapeutic factors for counseling education relates to the drawing together of theory and practice, the value of mirror effects, and the further application of group counseling education for educators and helping professionals. Drawing mainly on the concept of mirroring in group counseling education, the study of the mirror neuron system in the human brain, and mirror reactions in group analysis, this study confirms the finding that group counseling education is associated with positive mirror effects. This finding implies that group counseling education has an impact on students' experiences of positive mirror effects. Through multiple regression and mediation analysis, the results identified four therapeutic factors – universality, imparting of information, catharsis, and imitative behavior – that mediate the relationship between group counseling education and positive mirror effects.

In addition, Gazzola et al. (2006) provided more direct support for the auditory mirror system, showing that people can understand the actions of other individuals if they only hear them. This finding is consistent with the result of this study. Without looking at others' actions, the participating students could merely listen to the audio recordings and experience mirror effects. This study adds value to the field of observational learning, showing that greater observation learning occurs when verbalizations are induced.

Table 6 Results of multiple regression using the mirror effects as the criterion (*N* = *121*)

Step	Variables entered	*B*	β	*t*	R^2 change	*F* change	R^2 Adjusted
1	DV: Mirror effects						
	Constant (Positive mirror effect)	58.95			.04	4.83*	.03
	Group counseling education	2.30	.20	2.20*			
2	DV: Therapeutic factors						
	Constant (Atrium)	25.97			.02	2.39	.01
	Group counseling education	.87	.14	1.55			
	Constant (Group cohesiveness)	25.67			.01	1.09	.00
	Group counseling education	.69	.10	1.04			
	Constant (Universality)	25.85			.04	5.10*	.03
	Group counseling education	1.50	.20	2.26*			
	Constant (Interpersonal learning (input))	24.44			.01	.61	−.00
	Group counseling education	−.50	−.07	−.78			
	Constant (Interpersonal learning (output))	26.21			.01	.64	−.00
	Group counseling education	.47	.07	.80			
	Constant (Imparting of information)	25.92			.06	7.05**	.05
	Group counseling education	1.50	.24	2.66**			
	Constant (Catharsis)	24.44			.06	7.58**	.05
	Group counseling education	1.80	.24	2.75**			
	Constant (Imitative behavior)	23.56			.09	11.42***	.08
	Group counseling education	2.36	.30	3.38***			
	Constant (Corrective recapitulation of the primary family group)	25.08			.00	.35	−.01
	Group counseling education	.39	.05	.59			
	Constant (Self-understanding)	25.9			.01	.63	−.00
	Group counseling education	.49	.07	.79			
	Constant (Instillation of hope)	25.62			.03	3.88	.02
	Group counseling education	1.40	.18	1.97			
	Constant (Existential factors)	27.08			.02	1.84	.01
	Group counseling education	.92	.12	1.36			
3	DV: Mirror effects						
	Constant (Positive mirror effect)	33.03			.31	26.32***	.30
	Group counseling education	1.41	.12	1.56			
	Altruism	.10	.53	6.79***			
	Constant (Positive mirror effect)	38.93			.27	21.96***	.26
	Group counseling education	1.76	.15	1.92			
	Group cohesiveness	.78	.48	6.13***			
	Constant (Positive mirror effect)	38.90			.27	22.04***	.26
	Group counseling education	1.14	.10	1.22			
	Universality	.78	.49	6.14***			
	Constant (Positive mirror effect)	39.47			.27	21.25***	.25
	Group counseling education	2.69	.23	2.93**			
	Interpersonal learning (input)	.80	.48	6.02***			
	Constant (Positive mirror effect)	30.77			.39	37.03***	.38
	Group counseling education	1.80	.15	2.13*			
	Interpersonal learning (output)	1.08	.59	8.16***			
	Constant (Positive mirror effect)	33.14			.32	27.64***	.31
	Group counseling education	.80	.07	.88			
	Imparting of information	1.00	.55	6.97***			
	Constant (Positive mirror effect)	40.05			.26	21.09***	.25
	Group counseling education	.91	.08	.96			
	Catharsis	.77	.49	5.99***			

Table 6 (continued)

Step	Variables entered	*B*	β	*t*	R^2 change	*F* change	R^2 Adjusted
	Constant (Positive mirror effect)	41.59			.27	22.13***	.26
	Group counseling education	.55	.05	.58			
	Imitative behavior	.74	.51	6.16***			
	Constant (Positive mirror effect)	42.80			.19	14.22***	.18
	Group counseling education	2.05	.18	2.13*			
	Corrective recapitulation of the primary family group	.64	.40	4.77***			
	Constant (Positive mirror effect)	40.03			.22	16.65***	.21
	Group counseling education	1.94	.17	2.04*			
	Self-understanding	.73	.43	5.24***			
	Constant (Positive mirror effect)	37.32			.36	32.47***	.34
	Group counseling education	1.12	.10	1.28			
	Instillation of hope	.84	.57	7.60***			
	Constant (Positive mirror effect)	42.16			.20	14.37***	.18
	Group counseling education	1.72	.15	1.78			
	Existential factors	.62	.40	4.80***			

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Implications for Future Research, Education, and Professional Practice

Group counseling education expands students' self-understanding, teaches them new skills, builds their confidence, affirms their decision-making, and offers action insight. By merely observing the actions of others in the counseling process, students can increase their spontaneity, imagine, enact and be exposed to different roles, and experience other cultural perspectives. The research has three implications with regard to contributions to research, education, and professional practice, which are described as follows.

First, the research suggests that mirror neurons are linked not only to mirroring and imitation but also to empathy and emotions. Gazzola et al. (2006) revealed that that the mirror neuron system for hand actions was linked to empathy. Jabbi et al. (2007) studied the mirror neuron system for emotions and showed the relationship of mirror neurons, emotions, and empathy. Some researchers have observed that the human mirror neuron system is influenced by the mindset of the observer rather than passively responding to the observation of actions (Molenberghs et al., 2012). Future research may consider other process/outcome variables, such as empathy and emotions.

Second, quantitative measurements of the efficiency of group counseling education, such as performance and productivity measurements, can be considered (Klumpp, 2014). To assess productivity, researchers usually measure the relation between an output indicator and an input indicator. In this study, the input was the group counseling approach; one of the core outputs may be student performance, such as the success rate of case termination, the use of the learned skill, and students' self-esteem or self-confidence. Further research could be more specific and include the addition of related questions to the questionnaire, such as those involving the use of real cases, the nature of the cases, selection of local cases, teachers' first-hand counseling materials, and writing reflective journals.

Third, some students may be confused about achieving action insight through counseling. People undergoing therapy do not necessarily have real psychological problems; rather, therapy can be designed to learn about different experiences in a real-life context. People come from different backgrounds, upbringings, and cultures and have different knowledge, social influences, and experiences. They have different perspectives and understandings through which they view the world, and they develop a certain degree of labeling, bias, and prejudice. Everybody goes through the same basic life cycle. At the most basic level, all people have lives that are similar to those of everyone else. Every one of us faces our own unresolved problems just as the clients do. Our past remains; it is left in our "recycling bin" (Lo, 2012) and is not yet deleted. Moreno called this a "surplus reality … which we carry within our psyches as personal history, which affects the whole of who we are and how we relate" (Hoey, 2005, p. 49). For educators and clinical practitioners, solving unresolved problems may be challenging and sentimental. However, this does not necessarily mean that all negative experiences must always be bad, and these experiences may be accompanied by something positive in the end. Mehrani (2015) stated that engaging teachers in research might be a potential alternative form of professional development providing meta-cognitive knowledge regarding the process

Table 7 Indirect effects of group counseling education on the positive mirror effect through therapeutic factors

Path	Standardized β	*SE*	Sobel test (z value)	*p* value
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Atrium ➔ Positive mirror effect (DV)	.12	.08		
Indirect effect = (c-c')	.07	.05	1.51	.13
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Group cohesiveness ➔ Positive mirror effect (DV)	.15	.08		
Indirect effect = (c-c')	.05	.04	1.03	.30
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Universality ➔ Positive mirror effect (DV)	.10	.08		
Indirect effect = (c-c')	.10	.05	2.13	.03*
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Interpersonal learning (input) ➔ Positive mirror effect (DV)	.23	.08		
Indirect effect = (c-c')	−.03	.04	−.78	.44
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Interpersonal learning (output) ➔ Positive mirror effect (DV)	.15	.07		
Indirect effect = (c-c')	.04	.05	.80	.43
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Imparting of information ➔ Positive mirror effect (DV)	.07	.08		
Indirect effect = (c-c')	.13	.05	2.49	.013*
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Catharsis ➔ Positive mirror effect (DV)	.08	.08		
Indirect effect = (c-c')	.12	.05	2.51	.01**
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Imitative behavior ➔ Positive mirror effect (DV)	.05	.08		
Indirect effect = (c-c')	.15	.05	2.98	.00**
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Corrective recapitulation of the primary family group ➔ Positive mirror effect (DV)	.18	.08		
Indirect effect = (c-c')	.02	.04	.59	.55
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Self-understanding ➔ Positive mirror effect (DV)	.17	.08		
Indirect effect = (c-c')	.03	.04	.79	.43
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Instillation of hope ➔ Positive mirror effect (DV)	.10	.08		
Indirect effect = (c-c')	.10	.05	1.91	.06
(c) Group counseling education (IV) ➔ Positive mirror effect (DV)	.20	.09		
(c') Group counseling education (IV) | Existential factors ➔ Positive mirror effect (DV)	.15	.08		
Indirect effect = (c-c')	.05	.04	1.31	.19

Note. Sobel's test of indirect effects (z) was performed for each mediator to determine whether the previously significant association between the positive mirror effect and the 12 therapeutic factors of group counseling education was significantly reduced. * $p < .05$, ** $p < .01$, *** $p < .001$

of teaching. Therefore, linking teaching and research can benefit both teachers and students.

Limitations and Recommendations for Further Research

Despite the achievements, a major limitation of this approach should be noted. In group counseling, an open environment is necessary not only to promote trust but also to maintain privacy and confidentiality. To prepare each person for the disclosure of their uncertainties, constraints, problems, and unresolved issues in front of group members, whether they are clients, students, or the professor, no personal issues must be disclosed outside the classroom.

Innovation entails certain risks, but they are worthwhile. Similar to watching a TV drama, group counseling education

can generate mirror effects. These effects may have some influence on recalling past memories, associating with past emotional experiences and reviewing the self, albeit for the same reason that "affect" plays a significant role in the learning process, together with cognition, behavior, and the learning environment (Schutz & Lanehart, 2002). Students may experience process-related emotions while engaging in the counseling process. However, some students may feel excluded due to having different attitudes toward disclosure, interaction, and affective expression. Some students may not express their emotions readily or may be influenced but have delayed emotional responses. To avoid students dwelling on negative thoughts, a debriefing session in group counseling is very important and should not be rushed. At that point, students can not only clarify their uncertainty openly and honestly but also share the experience of mirror effects. Focusing on ethical considerations, the teacher should identify students who may need additional assistance and support, which may include a referral for psychotherapy.

Another concern is that the exposure and experiences naturally suggest the importance of therapeutic factors as supportive elements that strengthen the learning and teaching processes. The presence of therapeutic factors is valued not only in this study but also in previous studies. Although this study identified four therapeutic factors as significant mediators of positive mirror effects at the final stage of the course, the therapeutic effects were not measured throughout the process. During the beginning and middle stage of the course, other factors may have more intense effects. It is recommended that future studies should more specifically measure therapeutic factors in different stages.

Therapeutic change involves complex and uneven trajectories in clinical practice (Evans, 2013). This study supports the idea that audio case recordings, video case recordings, and real case live demonstrations are all very helpful for learning counseling. Technically, this study did not collect any related quantitative data to be able to compare the differences in these three teaching aids and the therapeutic effects specified by the teacher in a statistical analysis. As mentioned, however, audio stimuli or video stimuli must be able to convince participants. In this group counseling education, the teacher used audio case recordings, video case recordings, role play, real case life demonstration, etc. For a statistical analysis, future studies may measure the degree of influence that different teaching aids have on mirror effects. Alternatively, researchers may also modify the group counseling education and further explore other independent variables, such as live counseling with real clients, students' self-demonstration, and reading of counseling articles, to determine whether they influence students' experiences. Furthermore, Khalizadeh and Khodi (2021) revealed that personality traits, especially teachers' conscientiousness, are linked to motivation and had a positive impact on students' intrinsic motivation knowledge. This study also provided valuable insight for teaching practices. Therefore, further research may also consider personality traits.

In addition, based on the quasiexperimental design, there was no random allocation to groups, which may represent a sampling bias that harmed the internal validity. The sample voluntarily participated and was drawn through purposive sampling. The students were all social workers with at least minimal experience in counseling. However, the students could not be randomly allocated to the two groups. The experimental group comprised year 2 social work students, and the comparison group comprised year 1 social work students. Due to these inherent criteria, the unique participant characteristics of the students could not be equally distributed across the two groups, which posed a threat to the internal validity. Based on purposive sampling, this non-probability sampling has limitations in terms of generalization and was not intended to be representative of a population. In addition, the gender ratio has a slightly higher proportion of women than men. The results are subject to auto-selection bias, and the findings might have limited generalizability.

All year 2 students were taking other counseling courses during the study period and had taken such courses during their first year. The students might have participated in role play or case demonstrations or already had some knowledge, such as on empathy or reflection. In fact, this situation could not be avoided in this study. Similar situations in future studies may necessitate a follow-up qualitative study. History effects may have been present. Therefore, the effects produced in the group counseling education group might have been due to the students' knowledge and experiences that they had already acquired. The use of random assignment could reduce error variance and increase internal validity by evenly distributing individual differences across groups, and future studies may consider the drawback of a lack of random assignment.

Conclusions

To conclude, the findings of this study reveal the generation of positive mirror effects via therapeutic factors in group counseling education. The study achieved its aim of providing an overview of a group counseling education approach to identify relationships between the group counseling education, therapeutic change, and positive mirror effects. In addition, there were four therapeutic factors, including universality, imparting of information, catharsis, and imitative behavior, that mediated between group counseling education and positive mirror effects.

This study investigated therapeutic factors in the group counseling approach, using social work education as an

example, and illustrated that each discipline might have distinctive factors affecting groups of learners.

Data, Materials and/or Code Availability Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

Declarations

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Conflict of Interest The authors declare that there is no conflict of interests.

Ethics Approval All procedures performed in studies involving human participants were in accordance with the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association (2017), as well as considering Moreno's (1957) "Code of Ethics for Group Psychotherapy and Psychodrama". The study was approved by the University's College Research Ethics Sub-Committee of the City University of Hong Kong.

Consent Informed consent was obtained from all individual participants included in the study.

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