



2017-06-01

# The Group Readiness Questionnaire: A Practice-Based Evidence Measure?

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The Group Readiness Questionnaire: A Practice-Based Evidence Measure?

Mindy Judd Pearson

A dissertation submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy

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## ABSTRACT

### The Group Readiness Questionnaire: A Practice-Based Evidence Measure?

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Doctor of Philosophy

In recent decades, psychologists have increasingly turned to evidence-based practice (EBP) to guide their treatments with clients. Practice-based evidence (PBE) is one type of EBP that allows clinicians to treat their clients in a flexible, but effective way. PBE treatments are those that use information gathered about the client through measures or questionnaires to inform the clinical decisions therapists make in the process of treating the client. The use of PBE in group psychotherapy is increasing and there are many measures that can potentially be used to aid therapists by gathering client information or feedback in the areas of group selection and pre-group preparation, group process, and outcome. The Group Readiness Questionnaire (GRQ) is one measure that was created in the hopes that it could predict which potential group members would benefit from group psychotherapy. The GRQ was designed to capture a potential group member's expectations regarding the helpfulness of group therapy as well as positive and negative interpersonal skills that could affect process within the group. This study tests the ability of the GRQ to predict group process and outcome during the early, middle, and late stages of group while taking the interdependent nature of group data into account through multilevel analysis in an effort to establish the GRQ as a PBE measure. Clients who perceived themselves to be less inclined to participate actively in group settings felt less connected to their groups during the early stage of group, but began to feel more bonded to other group members during the middle stage of group. Group members who had lower expectations of group therapy being helpful to them initially felt less connected to their groups and perceived more conflict within their groups after the initial session. Group members who were less prepared in general for group therapy tended to feel more gradually connected to other group members during the middle stage of group. Group members who were less inclined to participate and self-disclose in group settings as well as ones who were overall less prepared for group tended to be experiencing greater initial distress before starting group therapy. Implications of these findings as well as directions for future research are discussed.

Keywords: group psychotherapy, Group Readiness Questionnaire, practice-based evidence, expectancy, participation, interpersonal skills, pre-group preparation, pre-group selection

## ACKNOWLEDGEMENTS

I'd like to thank all my committee members for their support, insight, and guidance during the process of completing this study. I especially appreciate Dr. Mark Beecher's understanding and patience throughout the lengthy journey my dissertation has taken. I'd also like to express special thanks to Dr. Gary Burlingame, who graciously allowed me to use data from his Feedback Study for my project, and to Dr. Joseph Olsen, whose tireless efforts to guide me through the analytic challenges this project faced helped propel me to the finish. My gratitude also extends to the many people who facilitated the gathering of data that made my project possible. I want to thank my husband, Trent, and my family, whose constant encouragement helped motivate me to persevere despite any challenges my project faced. And finally, to my children, Justice, Maddix, and Marshall, who have patiently and enthusiastically cheered me on as I've worked to complete this final chapter of my doctoral experience.

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## DESCRIPTION OF DISSERTATION STRUCTURE AND CONTENT

This dissertation is structured to represent the format a manuscript would follow for publication. Following the title of the paper, the first portion of the dissertation provides a brief summary of relevant research and then goes on to present the statement of the problem and research questions. A methods section comes next, which elaborates on how the data were gathered and analyzed. Next, the results section presents the findings from the data analyses while the concluding discussion section summarizes the significant findings of the study, discusses potential limitations to the study, and presents suggests to implement the findings in clinical practice. The literature review, which provides more detailed descriptions of previous research and is typically included in traditionally structured dissertations, is presented in Appendix B of this work.

## **The Group Readiness Questionnaire: A Practice-Based Evidence Measure?**

### **Introduction**

In the last few decades and in an effort to more efficiently treat patients, reduce costs, and streamline mental healthcare services, insurance companies and psychologists have increasingly turned to evidence-based practice (EBP). This paradigm shift to EBP has become a worldwide phenomenon in countries that utilize insurance companies or socialized medicine, and clinicians and researchers have diligently worked to establish practices that could be considered *evidence-based*. Over the last two decades three predominant models of EBP have emerged: empirically supported treatments (ESTs), practice guidelines, and practice-based evidence (Burlingame & Beecher, 2008). Although the first two are grounded in solid research, only the third model offers clinicians the chance to treat their clients in a flexible, emergent way.

Practice-based evidence (PBE) is guided by the response of a particular patient to treatment. In PBE treatment, information about the patient is gathered through measures or questionnaires and clinicians use this data to inform the clinical decisions they make in the process of treating the patient. Thus, these clinical decisions are grounded in the experience of the patient rather than in what the clinician presumes will be beneficial. In other words, the PBE model asks the critical question, “Is this treatment working for this client?” If the treatment is not working for the client, this model assumes that this information will show up in the outcome measure and the clinician can make appropriate changes to the interventions. Evidence from randomized clinical trials has shown that feedback during therapy regarding the status of patient’s symptoms improves final outcomes and yields more cost-effective treatment (Harmon, et al., 2007; Slade, Lambert, Harmon, Smart, & Bailey, 2008).

While the field of psychotherapy in general has found ways to apply PBE strategies, this trend has lagged within the area of group psychotherapy. More recently, however, the American Group Psychotherapy Association (AGPA) assigned a task force to revise a tool kit named the CORE-R (Clinical Outcome Results Standardized Measures - Revised) in order to assist group therapists as they evaluate the effectiveness of their interventions and gain greater insight into the processes occurring within their groups (Strauss, Burlingame, & Bormann, 2008). Among the measures included in the updated CORE-R are those that deal with three areas of group work, namely: group selection and pre-group preparation, process, and outcome. The CORE-R authors' hope was that therapists would use the measures in these areas to assist them in selecting/preparing members for group and in tracking member improvement or deterioration across the life of the group (Burlingame, et al., 2006). Thus, all three of these areas have the potential of being useful within the field of PBE. For example, in a PBE approach, therapists can seek to use the measures from the CORE-R to help them specifically focus on patient characteristics that will enable them to select and appropriately prepare patients for the group. Once in the group, therapists can use measures to elicit ongoing feedback regarding the group processes that are occurring in their groups. Finally, therapists can use measures to gather information regarding client progress or deterioration as outcomes of group treatment.

From a conceptual standpoint, what occurs in each of these three areas of group—selection and pre-group preparation, group process, and outcome—can potentially affect the other two areas. For instance, selecting potential members who display certain characteristics, like openness or willingness to participate, could affect the cohesion among group members. Increased cohesion can then facilitate better outcomes for individual group members. Some studies have already generated evidence that suggests that the area of group selection is related to

group process and outcome (Burlingame, Cox, Davies, Layne, & Gleave, 2011; Burlingame, McClendon, & Alonso, 2011; Cox et al., 2004). Research has shown that client characteristics and relational variables can potentially be used to predict group outcomes (Piper, Joyce, Azim, & Rosie, 1994; Piper & McCallum, 1994). Members' expectancies regarding the helpfulness of group as well as interpersonal behaviors, such as willingness to self-disclose to others, tendency toward introversion or shyness, and social skills can affect the course of work and outcome for individual members and the group as a whole (Burlingame, MacKenzie, & Strauss, 2004; Kivlighan & Angelone, 1992; Kivlighan, Marsh-Angelone, & Angelone, 1994; Piper, et al., 1994; Piper & McCallum, 1994; Yalom & Leszcz, 2005).

Various researchers have tried to use these findings to create measures that can adequately predict who will benefit from participation in group therapy. The Group Readiness Questionnaire (GRQ; previously called the Group Selection Questionnaire) is one such measure that was created during the late 90s by a team of group therapists who set out to work with Bosnian youth who had been exposed to trauma from a recent war. The GRQ was initially designed with the intent to quickly and efficiently predict which Bosnian youth would benefit most from group therapy and a series of studies was conducted in order to establish the usefulness of the GRQ as a screening tool to determine whether potential group members could possibly benefit from group therapy. The original Group Selection Questionnaire (GSQ) consisted of 14 items that were designed to tap into three constructs: Expectancy, Ability to Participate, and Deviant Social Skills (Burlingame, Cox, et al., 2011). Questions from the Expectancy subscale of the GSQ assessed the group members' attitudes and expectations about whether participating in group would help them while questions from the Ability to Participate subscale assessed group members' perceptions of their ability to participate openly and actively



in the group. The Deviant Social Skills subscale assessed the likelihood that group members would engage in behaviors, such as domineering actions or inappropriate disclosure that could lead to the group member being rejected by the group. Further studies eventually refined the GSQ to include 19 items. These items were broken down into the two subscales, Expectancy and Participation, and Critical Items, which were taken from the Deviant Social Skills subscale of the previous version of the questionnaire and included three questions that assessed deviant social behaviors that could occur in group (Burlingame, Cox, et al., 2011). Eventually the name of the GSQ was changed to the Group Readiness Questionnaire (GRQ) in order to emphasize its potential use by clinicians to screen and prepare prospective group members to participate in group psychotherapy.

Several studies have shown that the GSQ, or GRQ, is predictive of attrition, group process, and outcome (Burlingame, Cox, et al., 2011; Cox, 2008; Cox, et al., 2004; Davies, Burlingame, & Layne, 2006; Krogel, Beecher, Presnell, Burlingame, & Simonsen, 2009; Löffler, Bormann, Burlingame, & Strauß, 2007). Three of these studies in particular assessed the power of the GRQ to predict group process and outcome during early, middle, and late stages of group. The earliest study (Burlingame, Cox, et al., 2011; Phase I) was conducted with Bosnian high school students who were participating in psychotherapy groups designed to treat war-related trauma and associated posttraumatic stress symptoms, depression symptoms, and grief reactions. Burlingame, Cox, et al. (2011) found that group members' scores from questions assessing participation styles negatively predicted levels of catharsis during the early (post-Session 7), middle (post-Session 15), and late (post-Session 20) stages of group as well as conflict during the middle and late stages of group and engagement and cohesion during the late stage of group. They also found that members' scores from the Expectancy subscale negatively predicted

satisfaction with group experiences during the middle stage of group and insight during the late stage of group. Burlingame, Cox, et al. also found that questions assessing group members' tendencies to be participatory in group settings negatively predicted changes in outcome, with less participatory members reporting less change in symptoms during the late stage of group. Group members with lower expectations that group would be helpful to them were also found to have more social problems as rated by their teachers (Burlingame, Cox, et al., 2011). Finally, it was found that group members' Total Score on the GRQ negatively predicted change in some symptoms during the early and late stages of group with group members who were more prepared for group seeing a greater change in symptoms than group members who were less prepared for group (Burlingame, Cox, et al., 2011).

A second study (Phase II) was conducted to further test the GRQ's ability to predict group process and outcome during the early (post-Session 4), middle (post-Session 8), and late (post-Session 12) stages of group therapy in 13 groups of college students (Burlingame, Cox, et al., 2011). Burlingame, Cox, et al. (2011) found that group members' scores on the Participation subscale positively predicted conflict during the early stage of group and levels of cohesion and reduction of symptoms during the late stage of group. They also found that group members' scores on the Expectancy subscale negatively predicted cohesion, catharsis, insight, and engagement during the early and middle stages of group while positively predicting conflict during the early stage of group. Total score on the GRQ was also found to negatively predict cohesion, catharsis, insight, and engagement during the early stage of group while positively predicting conflict during the early stage of group. Total Score also predicted symptom reduction during the late stage of group as well as overall symptom reduction from the beginning to the end of group with group members who were less prepared for group having less symptom

reduction than group members who were more prepared for group (Burlingame, Cox, et al., 2011).

A third study conducted by Cox (2008) attempted to replicate the findings of the two previous studies by examining whether the GRQ could predict group process and outcome during the different stages of group. Cox used data from several college counseling centers and found that group members' who expected group to be helpful to them experienced more cohesion and catharsis during the middle stage of group and more catharsis at the late stage of group therapy. As with the previous two studies, Cox also found that Expectancy scores were not significantly associated with changes in outcome. Different from the two studies he was trying to replicate, he surprisingly found that Participation scores among group members did not predict group process or outcome.

Thus, the GRQ's track record in predicting outcome in these studies suggests that it has the potential to be used as a practice-based measure to provide information that allows clinicians to determine how to select and prepare potential group members so that they can maximize outcome. Yet, it can be argued that further study of this measure is necessary to securely establish its predictive power. For instance, previous studies of the GRQ failed to take into account the fact that data gathered in group research is ultimately affected by the interdependent nature of the group experience. Since group members share the same group environment, this shared environment can cause the data collected from these group members to be similar, which introduces the possibility of statistical bias into the data (Baldwin, Stice, & Rohde, 2008). According to Baldwin, Stice, and Rohde (2008), when data from groups is being analyzed, steps need to be taken to control for within-group dependence and the fact that group members "share a common environment that can homogenize response to the intervention" (p. 365). To

demonstrate the importance of this point, Baldwin, et al. reanalyzed data from two projects and added a variable to control for the interdependent nature of the group data. When comparing their results to those of the original analysis, they found that adding the control variable increased  $p$  values for the tests of the intervention effects in some cases. They also found that changes in the  $p$  values depended on the magnitude of the statistical dependence and available degrees of freedom. They concluded that the rate of Type I errors can potentially be inflated if statistical measures are not taken to control for the potentially dependent nature of group data.

In that previous GSQ/GRQ studies have not controlled for the potential error that can occur when the interdependent nature of group is not taken into account, further study of the GRQ needs to be done while taking this bias into account in order to more effectively establish the proven usefulness of the measure. The current study will incorporate controls for this issue when the data is analyzed. Specifically, it will attempt to control for the type of error described by Baldwin, et al. (2008) by using multilevel analysis to examine the predictive power of the GRQ on both the individual and group levels.

### **Statement of the Problem**

In summary, PBE is an EST that allows clinicians to better understand the experiences of their clients and then tailor treatments according to these experiences. The GRQ is one measure that can be used in a PBE approach to inform clinicians about characteristics of potential group members (i.e., expectancy and style of participation) that could affect both how they interact with the group and the outcomes that result. Although the GRQ has been shown to adequately capture client characteristics and group processes, further study is needed to more firmly establish its ability to predict outcome. This study will attempt to add to the body of literature regarding the usability of the GRQ as a PBE approach by replicating previous studies examining

the ability of the GRQ to predict group process and outcome while controlling for the type of error described by Baldwin, et al. (2008) through use of multilevel analysis.

### **Research Questions**

This study will address the following research hypotheses:

1. Process. The Expectancy and Participation subscale scores and the Total Score of the GRQ will be significantly negatively correlated with positive group processes and significantly positively correlated with negative group processes during the early, middle, and late stages of group, as measured by the GQ, over the course of group therapy.
2. Outcome. The Expectancy and Participation subscale scores and the Total Score of the GRQ will be significantly negatively correlated with client improvement during the early, middle, and late stages of group, as measured by the OQ-45, over the course of group.

### **Method**

In this section, the recruitment of participants, the settings of the research, and the procedures for gathering data for the study will be described. Data for the process and outcome variables in this study came from a randomized clinical trial conducted by Burlingame and Beecher, which tested the potential effects of feedback given to group leaders from process and outcome measures. Prior to collecting any data, the current research study and that of Burlingame and Beecher were reviewed by the Human Subjects Institutional Review Board (IRB) in order to ensure that ethical practices would be followed. The study received approval from the IRBs at Brigham Young University (BYU) as well as Southern Utah University (SUU) and Utah State University (USU).

## **Groups and Participants**

Participants for both the current study and that of Burlingame and Beecher were recruited from clients who voluntarily presented themselves for treatment at the three university counseling centers noted above. Participants who volunteered to be in the studies agreed to participate in group psychotherapy at their respective counseling centers as their primary means of therapeutic treatment. Group leaders allowed the assignment of new group members up to four weeks after the start of the group and then became closed to new members. The exception to this general rule was at the start of a new semester, when new group members could be added over the course of another four week period after which it became closed again to new members. Groups that carried over from the previous semester were classified as a new group if the proportion of new group members to returning group members was more than 50%. Groups that had a proportion of new group members to returning group members of less than 50% were classified as being the same group and were marked as a group that continued over the course of two or more semesters.

Groups had a mixture of formats with some being general process, in which the primary form of intervention was member-to-member interactions, while other groups followed a more structured format, in which group leaders used a more didactic style of leading the group and deemphasized member-to-member interactions. Groups were typically co-led by one licensed psychologist and typically one trainee or intern. Group leaders held a variety of primary theoretical orientations including existential, interpersonal, Acceptance and Commitment Therapy, integrative, Yalom-esque, modern Gestalt, psychodynamic, humanistic, and Cognitive-Behavioral Therapy. Approximately half of the groups were randomly selected to have their

group leaders receive weekly feedback regarding their group members' process and outcome scores on the questionnaires administered in the study.

Data were collected from a total of 58 groups. Only groups that spanned the course of one semester were included in the final data set in order to more closely mirror previous studies that the current study was seeking to replicate. Based on this requirement, nine groups were eliminated from this study's sample. An additional 16 groups of the remaining 49 failed to gather GRQ data from their group members, which resulted in a final data set of 33 groups. Of the 25 groups that were excluded from the data set, four groups followed a more structured format while 21 of those groups followed a general process format. Twelve of the excluded groups had group leaders who received process and outcome feedback while 13 of the excluded groups had leaders who did not receive feedback.

A total of 253 group members, assigned to the 33 groups were included in the final sample. Four of these groups had a structured format while the remaining 29 had a general process format. Group leaders of 18 of the groups received process and outcome feedback regarding their members, while groups leaders of the remaining 15 groups did not. The groups typically had between five to 12 members, with a mean of approximately seven to eight members per group (mean = 7.66). Typically one to two members (mean=1.42) dropped out of each group during the course of the study. The demographic breakdown of the group members in the sample is shown in Table 1.

Table 1  
*Demographic Variables for Entire Sample*

Variable	%	N		%	N
Age Range			Race		
18-21	40.2	102	Caucasian/White	77.9	197
22-25	41.9	106	Hispanic	2.4	6
26-30	8.8	22	American Indian or Alaskan Native	.4	1
31-35	1.6	4	Asian	1.6	4
36-40	2.4	6	Multi-racial	4.7	12
41 or older	.4	1	Black	.8	2
Gender			Religion		
Female	54.2	229	LDS/Mormon	81.0	205
Male	40.7	103	Christian	2.0	5
			Agnostic	2.8	7
			Atheist	.8	2
Class Standing			No preference	2.0	5
Freshman	10.7	27	Marital Status		
Sophomore	14.2	36	Single	75.9	192
Junior	44.7	113	Seriously dating	2.0	5
Senior	16.6	42	Married	9.1	23
Other/5 <sup>th</sup> year	.8	2	Divorced	1.2	3
Graduate Student	8.7	22			

*Note.* Percentages are estimates calculated from total number of participants. \*Percentages do not equal 100% because some participants did not disclose their age, gender, class standing, race, religion, and marital status.

The average age of group members was 22.77 years old, with a range in ages of 18 to 42 years old, and approximately 82% were between the ages of 18 to 25. Approximately 54% of the group members who participated in the study were female. The majority, approximately 61%, were upper class students and an additional eight percent were graduate students. Approximately 78% of group members reported that they were Caucasian while approximately 81% reported being members of the Church of Jesus Christ of Latter-day Saints. Approximately three-fourths of the participants were single.

The majority of the full sample, approximately 83%, came from one of the three universities in the study and this university is affiliated with a conservative religion. Due to this characteristic, possible differences in demographics, presenting concerns, and initial scores on



the measures used as dependent variables in the study were assessed to determine if site needed to be controlled for while running the analyses to test the hypotheses. The demographics by site are shown in Table 2.

Table 2

*Demographic Variables of Sample by Site*

Variable	BYU % (N)	SUU % (N)	USU % (N)	Variable	BYU % (N)	SUU % (N)	USU % (N)
Age Range				Race			
18-21	42.8 (88)	71.5 (10)	19.0 (4)	Caucasian/White	83.8 (165)	92.9 (13)	86.4 (19)
22-25	45.7 (94)	28.5 (4)	38.1 (8)	Hispanic	1.6 (3)	7.1 (1)	9.1 (2)
26-30	9.2 (19)	0 (0)	14.3 (3)	American Indian or Alaskan Native	.5 (1)	0 (0)	0 (0)
31-35	.5 (1)	0 (0)	14.3 (3)	Asian	2.2 (4)	0 (0)	0 (0)
36-40	1.5 (3)	0 (0)	14.3 (3)	Multi-racial	5.9 (11)	0 (0)	4.5 (1)
41 or older	.5 (1)	0 (0)	0 (0)	Black	1.1 (2)	0 (0)	0 (0)
Gender				Religion			
Female	58.5 (120)	64.3 (9)	38.1 (8)	LDS/Mormon	99.5 (187)	42.9 (6)	54.5 (12)
Male	41.5 (85)	35.7 (5)	61.9 (13)	Christian	.5 (1)	7.1 (1)	13.6 (3)
				Agnostic	0 (0)	50.0 (7)	0 (0)
				Atheist	0 (0)	0 (0)	9.1 (2)
Class Standing				No preference	0 (0)	0 (0)	22.7 (5)
Freshman	10.7 (22)	14.3 (2)	13.6 (3)	Marital Status			
Sophomore	15.5 (32)	14.3 (2)	9.1 (2)	Single	88.3 (166)	78.6 (11)	71.4 (15)
Junior	51.5 (106)	7.1 (1)	27.3 (6)	Seriously dating	0 (0)	21.4 (3)	9.5 (2)
Senior	12.6 (26)	64.3 (9)	31.8 (7)	Married	11.2 (21)	0 (0)	9.5 (2)
Other/5 <sup>th</sup> year	1.0 (2)	0 (0)	0 (0)	Divorced	.5 (1)	0 (0)	9.5 (2)
Graduate Student	8.7 (18)	0 (0)	18.2 (4)				

*Note.* Percentages are estimates calculated from total number of participants who reported their age, gender, class standing, race, religion, and marital status.

Chi-square tests indicated that there were significant differences between sites in terms of most of their demographic characteristics. Gender identity and race were the only demographic attributes that participants in the study in which there were no significant differences, according to site. Although not shown in the table, chi-square tests showed that group members also varied significantly according to site in terms of their presenting problems when they sought services at the university counseling centers. Possible categories of presenting concerns were: relationship problems, anxiety, depression, self-esteem, adjustment, impulse control, stress, substance abuse,

social skills, eating disorder, self-mutilation, pornography, and trauma. Due to the sparseness of data and the large imbalance and small number of cases in some of the specific categories, presenting problems were not able to be included in the analyses in order to determine their effect on outcome.

Although descriptions of the measures used in this study will be presented shortly, additional evaluations using ANOVA with post-hoc tests were performed in order to determine if group members from the different sites differed in their initial scores on the measures used in the study as dependent variables. In terms of initial GQ Positive Bonding Relationship subscale scores, there were no significant differences between group members according to site, suggesting that on average, group members from all three sites tended to rate their initial perception of Positive Bonding with their groups at equal levels. In terms of initial GQ Positive Working Relationship subscale scores, group members from BYU had scores that were 7.53 points lower than group members from SUU ( $p < 0.05$ ). There was no significant difference in initial Positive Working Relationship subscale scores between group members from USU and SUU. This suggests that, on average, group members from BYU tended to rate their initial perception of positive work being accomplished in their groups significantly lower than group members from SUU. In terms of initial GQ Negative Relationship subscale scores, there were no significant differences between group members for any of the sites, suggesting that on average, group members from the three sites were roughly equal in their ratings of their initial perception of negative conflict in their respective groups. There were also no significant differences in initial OQ-45 scores according to site, which indicates that group members across the three sites reported experiencing equal levels of initial distress at the start of the study.

In summary, there were significant differences between group members from the three different sites in terms of some of their demographic characteristics, presenting concerns, and initial scores on the process measure. It could be argued that since there were not significant differences in the initial scores for the majority of the dependent variables according to site, controlling the data for the effects of site may not be necessary. Additionally, since over 80% of the sample came from one university, running multilevel statistical analyses while comparing the results by site would be extremely difficult. So while it is acknowledged that combining all the data together regardless of site may not be warranted due to the demographic differences and differences in presenting concerns, the limitations in statistical analysis dictate that analyses by site not be performed. Thus, site was not included as a group level variable in any of the analyses.

## **Measures**

This study used three separate questionnaires—the Group Readiness Questionnaire (GRQ), the Group Questionnaire (GQ), and the Outcome Questionnaire (OQ-45).

**Group Readiness Questionnaire.** The GRQ is a 19-item self-report questionnaire that is designed to measure the outcome expectancy and participation style of members within group therapy. Items are scored on a 5-point Likert scale ranging from *never* (1) to *always* (5). Item scores are compiled to produce two subscale scores: Expectancy and Participation. Higher scores are indicative of lower expectancy and a less participative style of behavior in groups. The GRQ subscales of Expectancy and Participation have been shown to have strong convergent validity with the Group Therapy Questionnaire (GTQ) subscales of Expectations About Group and Interpersonal Problems (Baker, Burlingame, Cox, Beecher, & Gleave, 2013), respectively,

suggesting that the GRQ is indeed capturing group members' expectations about the helpfulness of group and interpersonal behaviors that could affect cohesion.

**Group Questionnaire.** The GQ is also a self-report questionnaire and contains 30 items. It measures the quality of the therapeutic relationships present in group therapy from the perspective of the individual member. Items are scored on a 7-point Likert scale and responses range from *not at all true* (1) to *very true* (7). Three subscale scores are produced from item scoring: Positive Bonding Relationship, Positive Working Relationship, and Negative Relationship. Positive Bonding Relationship (Positive Bond) captures how bonded or connected the group member feels toward other group members, the group leaders, and the group as a whole. Positive Working Relationship (Positive Work) measures the individual group member's perception that the group members and leaders are establishing a strong working alliance to address therapeutic goals in group sessions. Negative Relationship captures the group member's perception of the presence of unproductive or detrimental conflict, hostility, or empathic failures within the group. Higher scores indicate higher Positive Bond with the group, higher perceived Positive Work during group sessions, and a higher level of Negative Relationship. Based on a previous sample (Krogel, et al., 2013), the reliability estimates (Cronbach's alpha) of the three subscales are .93 for Positive Bonding Relationship, .90 for Positive Working Relationship, and .84 for Negative Relationship. The GQ has been found to have strong criterion-validity when correlated with other surveys purported to measure similar constructs, suggesting that the GQ is a valid measure of the quality of the group therapeutic relationship (Thayer, 2012; Thayer & Burlingame, 2014).

**Outcome Questionnaire.** The Outcome Questionnaire (OQ-45) is a 45-item, self-report instrument that is designed to measure three different areas of outcome. It was designed

according to a tri-dimensional model of outcome assessment (Lambert et al., 1996), and measures an individual's subjective discomfort (the way a person feels inside), interpersonal relationships (how a person interacts with significant others), and social role performance (how a person is functioning in life tasks, i.e., at work or in school). It is considered to be a good indication of clients' symptom status, as well as their outcome in therapy (Burlingame, Lambert, Reisinger, Neff, & Mosier, 1995). The OQ-45 is scored by summing subscale scores to produce a total score. Lower scores indicate lower levels of psychological distress.

In describing the estimates of test-retest reliability in student populations, Lambert, Gregersen, and Burlingame (2004) reported that the range of the estimates was between 0.78 to 0.84 for scale scores within the OQ-45. Because the estimates of test-retest reliability are high, this suggests that significant changes in the OQ-45 are more likely to reflect considerable, actual improvement rather than measurement error. In addition to the high estimates of test-retest reliability, the OQ-45 has also been shown to have good concurrent validity and internal consistency (Lambert, et al., 2004).

## **Procedure**

Participants who presented themselves at their university counseling center and requested to participate in group psychotherapy met with group leaders who discussed the details of the study and invited them to participate. Consent to participate in the study was not mandatory for group members seeking services. Clients at two of the universities who consented to participate were administered the GRQ prior to starting their initial session with the group. Clients at the third university previously completed the GRQ at the time of their initial intake into the center and those clients who consented to allow their responses to the GRQ to be used in the study were invited to participate in completing the other measures during the course of the group. Clients

were informed that they would be compensated to complete the OQ-45 prior to each group session and the GQ after each group session. They were also informed that their group leaders would be randomly selected to receive feedback about their GQ and OQ-45 scores. The study was naturalistic in that clients were not randomly assigned to groups, but rather were enrolled in groups that met their needs in terms of scheduling and desired group topic or focus.

### **Data Analysis**

As described previously, prior studies of the GRQ and GQ did not control for the interdependent nature of group data in their analyses. Because of the potential error that can occur when the interdependent nature of group is not taken into account (Baldwin, et al., 2008), this study controlled for the interdependence of the group data by using multilevel analysis to examine the predictive power of the GRQ subscales to predict group process and outcome scores on both the individual and group levels. Multilevel analysis partitions variation in an outcome into its within- and between-group components (Heck, Thomas, & Tabata, 2010). This type of analysis is important to use when studying data from groups because part of the variation in an outcome, or a dependent variable, could be due to differences between individuals and also differences between groups. Thus, a statistical model must account for the differences between individuals on an outcome that could be due to their individual characteristics while taking into account group level influences that could also be affecting the outcome. Multilevel analysis does just this by recognizing the nesting of individual observations or data points within higher-level groups and then analyzing differences in the outcome variables both between individuals and between groups.

Structural Equation Modeling (SEM) was conducted to analyze the data and test hypotheses using MPLUS. In the SEM approach to examining data, a smaller number of latent,

or unobserved, factors is hypothesized to account for the specific pattern of variation and covariation present in a set of observed variables. In this study, SEM was used to analyze latent growth components describing the initial status and change over time in the relevant study variables. The hypotheses for this study were tested through a series of nested models that allowed focused statistical tests to be performed, which determined whether the amount of variance explained by the independent variables was significantly different than zero. These focused tests allow specific relationships between variables to be assessed and are key to confirming or disproving the hypotheses. In addition to these focused tests, the goodness of fit for each of the models was calculated to allow for overall comparison between the models. These fit statistics represent a type of omnibus test, which evaluate and compare how well the data fit different models when additional variables are added. The fit statistics determine whether adding additional variables improve the fit of the model. However, these omnibus tests are limited in that they do not provide “guidance to the source of poor fit when the null hypothesis is rejected” (Reiser, 2008, p. 331). If some of the variables, which are added to the model in a stepwise progression, are not significant, then this can decrease the fit of the model to the data even if other independent variables do have a significant relationship with the dependent variable as suggested by the focused statistical tests. They do not specify which variable is causing the poor fit, but instead look at the combined fit of all the variables in the model. Thus, the omnibus fit tests do not provide enough specificity to test the hypotheses of this study, which are looking at specific relationships between the independent variables and the dependent variables. Due to this concern, primary emphasis will be on the results of the focused statistical tests, although omnibus fit statistics are presented as well.

Maximum Likelihood (ML) estimation was used in order to facilitate comparison between the models. It is assumed that models that are consistent with the data will produce stronger evidence of fit. In order to evaluate how well models fit the data, Chi-square tests were used to compare more constrained models with fewer parameters being estimated to the less restricted models that included estimations of the individual- and group-level variables. When using ML estimation it is common to use -2 times the log of the likelihood (-2LL), or the Deviance, as a measure of model fit to the data (Heck, et al., 2010). Models with good fit will result in a higher likelihood of obtaining the observed estimates and this higher likelihood corresponds to a small value for -2LL, or Deviance. Chi-square tests were conducted by obtaining the difference in the -2LL between the fuller models and more constricted models and then evaluating the difference for significance using a Chi-square distribution. The Akaike information criterion (AIC) and Bayesian information criterion (BIC) were also examined to help with comparing models in terms of their fit. The AIC and BIC provide information about the number of parameters to include in a model and the model with the number of parameters that produced the smallest AIC or BIC is typically the best fitting model.

Due to limited sample size, analyses were carried out that estimated the effects of the various GRQ independent variables (Participation and/or Expectancy, or Total Score) on one dependent variable at a time (e.g. Positive Bond, Positive Work, Negative Relationship, or OQ-45 scores). As an example, Figure 1 depicts the initial model of the outcome data for one of the group process variables, in this case Positive Bonding, and represents the overarching model used to analyze the data. The figure shows a two-level model that assesses the latent variables of Positive Bond intercept and the slope for changes in Positive Bond scores during the early, middle, and late stages of group through observations of data gathered from group members'



responses to the GQ at 12 different points in time (Sessions 1-12). The effects of the independent variables of Participation, Expectancy, Feedback, and Group Type on Positive Bonding are included in the model despite being constrained to zero. Including them in this baseline model allows for a stepwise progression of analyses to test the hypotheses of the study.

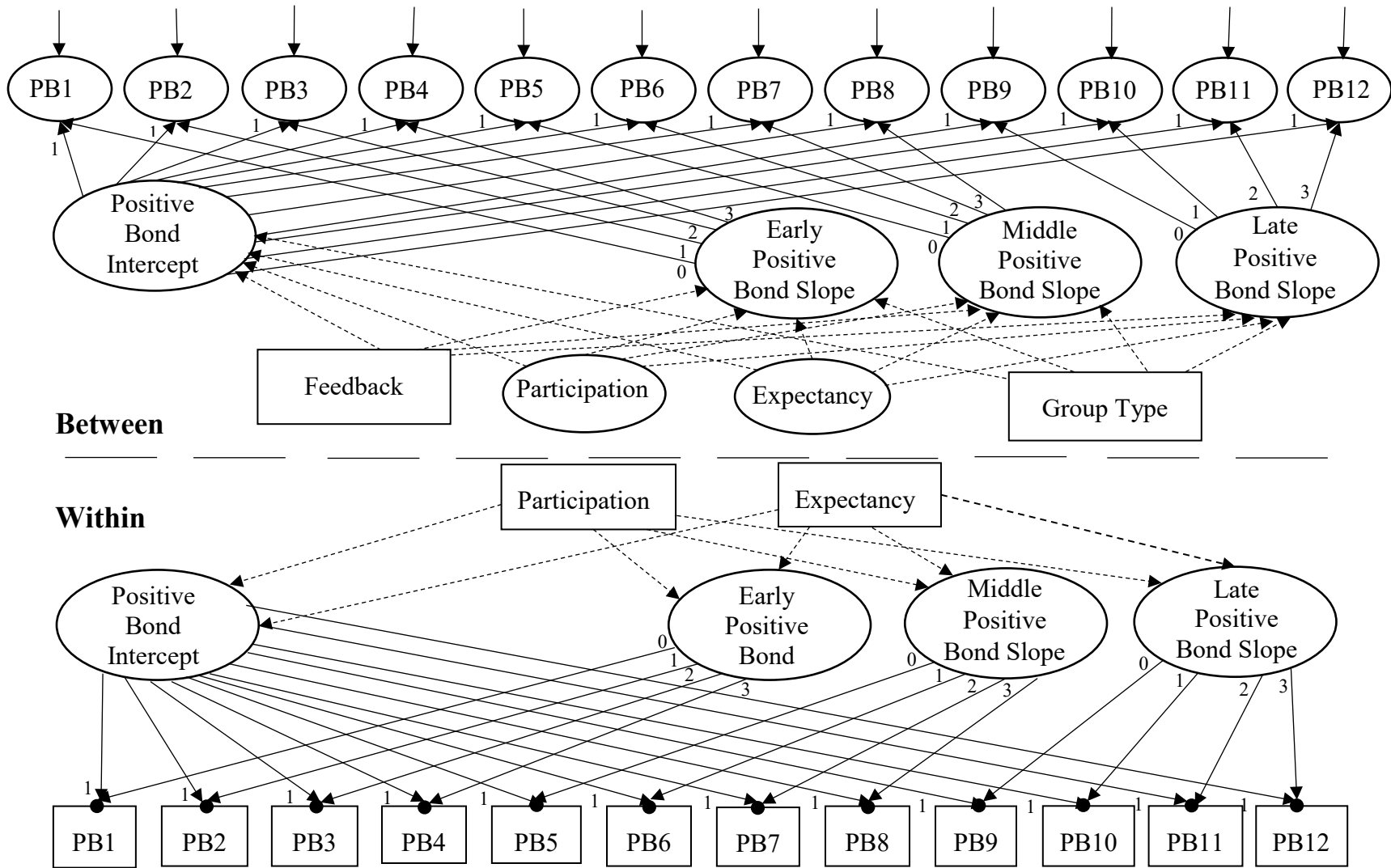


Figure 1. SEM model of multilevel analysis with the effects of Participation, Expectancy, Feedback, and Group Type on Positive Bond constrained to zero.

The model in Figure 1 is specified at the “within”-level, which examines the variance of the dependent variable between individuals in a group, and the “between”-level, which examines the variance of the dependent variable between groups. Solid lines represent parameters that are freely estimated or that are constrained to a non-zero value (as shown) while dashed lines represent parameters that are constrained to be zero. The model in Figure 1 represents the most constrained model in the series of nested models used to test the first hypothesis in the study. Arrows depicting the covariances between factors were estimated in the model but have been excluded from the figure in order to minimize clutter. Although the effects of Participation and Expectancy were not estimated in the model, their variances were included as model parameters in MPlus in order to apply FIML missing data treatment to the two predictors as well as other variables in the model.

After the initial model of the outcome data was established, additional relationships between the variables in the model were then added in a stepwise fashion to test the first hypothesis of this study. An example of one of these nested models used to test the hypothesis is provided in Figure 2, which depicts an analysis of a two-level model that also assesses the effects of Expectancy and Participation on the latent variables of Positive Bond intercept and the slopes for Positive Bond during each of the three stages of group. Again solid lines represent parameters that are being freely estimated or constrained to a non-zero value (as shown) while dashed lines represent parameters that are constrained to zero, and arrows depicting the residual covariances between factors were excluded from the figure in order to minimize clutter. Although Expectancy and Participation were measured on the individual level, it is possible that there is aggregate group-level variation for Expectancy and Participation and level-two regression coefficients for these two variables were added to the model in order to capture the

possible effects of this variation. The group-level variables of Feedback and Group Type, on the other hand, are constrained to zero, and this second model represents one of the intermediate steps used in testing the hypotheses.

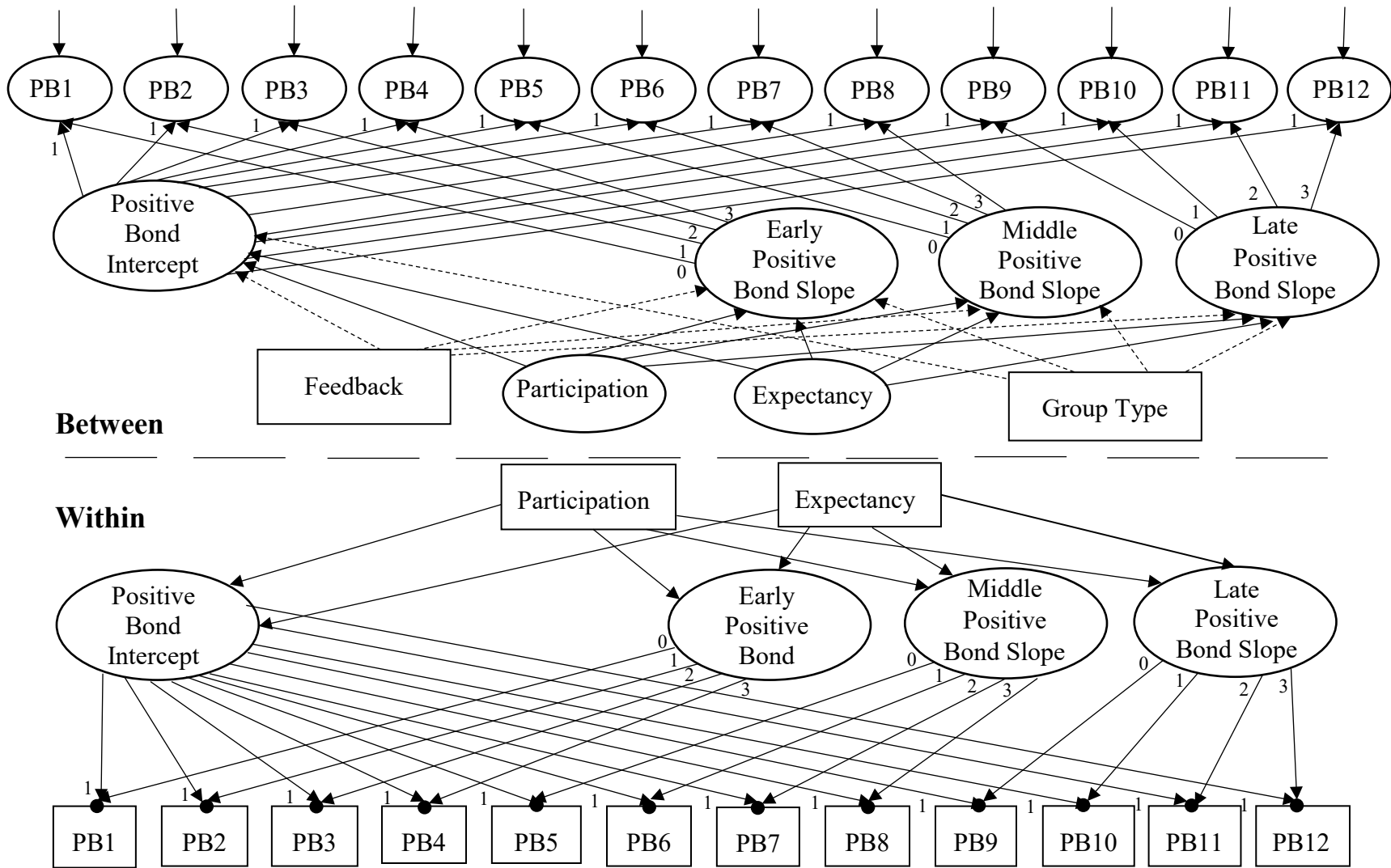


Figure 2. SEM model of multilevel analysis with the effects of Participation and Expectancy on Positive Bond freely estimated while the effects of Feedback and Group Type on Positive Bond are constrained to zero.

As a final example of the SEM models used to analyze the data, Figure 3 shows the least constrained model used to test the hypotheses of this study. It accounts for the effects of the group level predictors of Feedback Condition and Group Type while determining how much of the variation in the outcome is determined by the individual level variables of Participation and Expectancy. As can be seen in the model, there are no dashed lines, which indicates that the effects of all of the independent variables are being freely estimated.

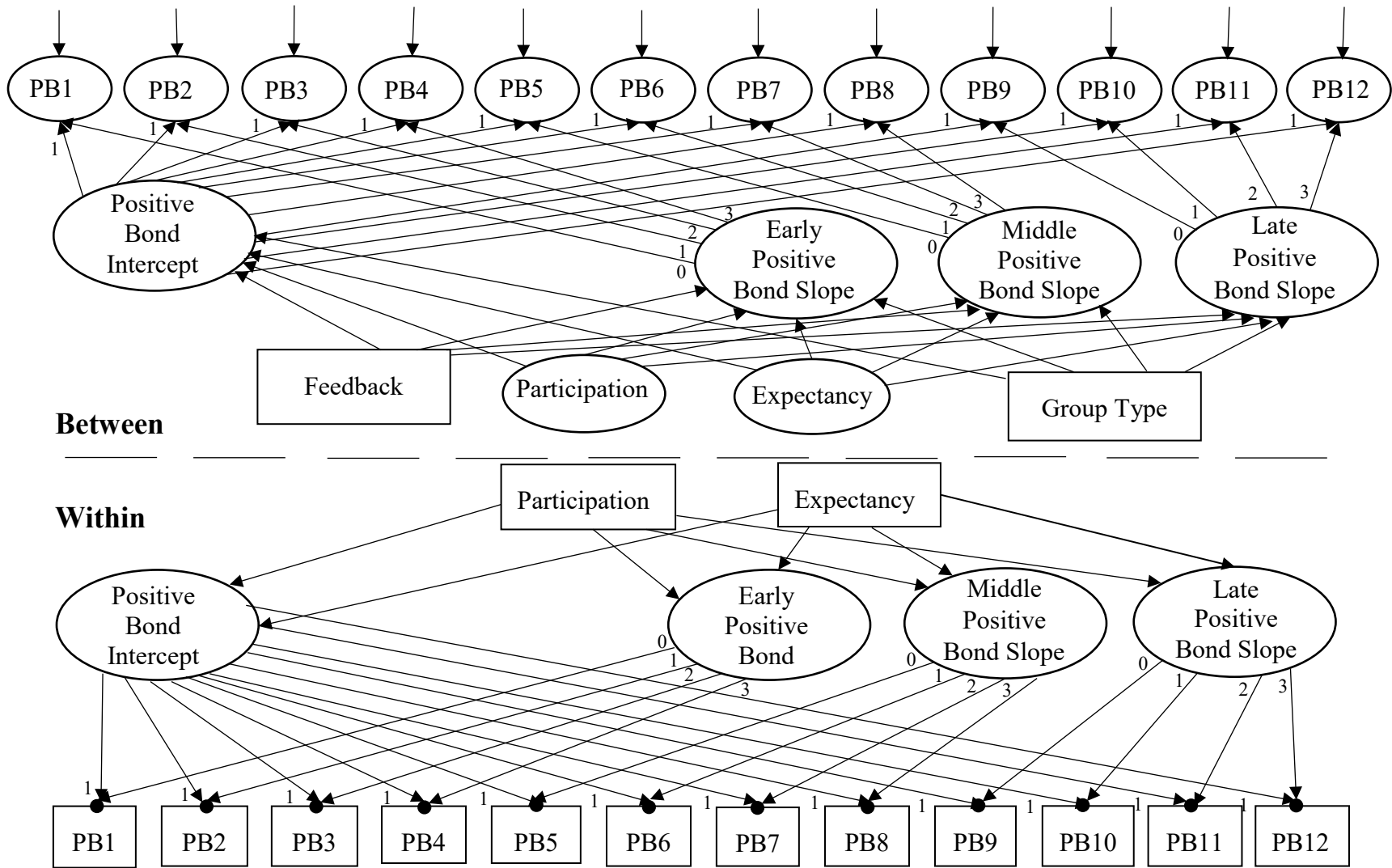


Figure 3. SEM model of multilevel analysis with the effects of Participation, Expectancy, Feedback and Group Type on Positive Bond freely estimated.

The nested models from the three previous examples demonstrate the analysis of data from all 12 sessions of group in order to determine whether Participation and Expectancy can predict Positive Bond scores during the early, middle, and late stage of group. These same nested models and the stepwise process of testing variables were used for the remaining analyses that tested the effects of the Participation and Expectancy variables on the group process variables of Positive Bond, Positive Work, and Negative Relationship scores and the outcome variable of OQ-45 scores. The nested models were also used to test the relationship between GRQ Total Score and the dependent process and outcome variables, but the variable of GRQ Total Score replaced both Participation and Expectancy in these models.

## **Results**

This study tested the ability of the Participation and Expectancy subscale scores and the Total Score of the GRQ to predict group process, as measured by the GQ, and outcome, as measured by the OQ-45, while taking the interdependent nature of the group data into account. Results from the multilevel analyses testing the two hypotheses are presented next.

### **Hypothesis 1: Process**

Descriptive statistics were examined prior to running multilevel models. Table 3 presents the means, standard deviations (S.D.), number of observations (N), and intraclass correlations (ICC) for Positive Bonding Relationship, Positive Working Relationship, and Negative Relationship during the 12 sessions of group.



Table 3

*Means, Standard Deviations, Number of Observations, and Intraclass Correlations: Positive Bond, Positive Work, and Negative Relationship*

Occ.	Positive Bond				Positive Work				Negative Relationship			
	Mean	S.D.	N	ICC	Mean	S.D.	N	ICC	Mean	S.D.	N	ICC
1	73.03	10.32	150	.110	38.21	9.97	150	.134	19.06	6.92	150	.125
2	74.73	10.04	165	.099	38.89	8.77	165	.076	19.35	7.55	165	.186
3	72.06	12.29	181	.238	38.32	9.63	180	.151	20.76	7.95	180	.295
4	75.05	12.66	178	.192	39.83	10.47	178	.115	18.81	7.72	178	.170
5	76.48	12.27	184	.252	41.39	9.39	184	.193	18.44	7.71	184	.308
6	77.22	12.41	175	.182	41.27	10.47	175	.102	18.03	8.26	175	.145
7	78.09	11.44	169	.288	41.30	10.97	169	.176	18.01	8.67	169	.220
8	76.65	12.82	169	.172	41.23	11.44	169	.149	19.42	9.71	169	.241
9	75.44	15.12	159	.515	40.74	11.75	159	.268	20.11	11.19	159	.586
10	78.98	11.53	131	.261	42.79	10.48	131	.152	18.05	8.93	131	.231
11	79.64	10.92	103	.264	42.13	10.41	103	.102	17.41	8.13	103	.162
12	79.50	12.32	52	.176	41.79	10.67	52	.210	16.48	9.00	52	.201

Column four of Table 3 shows that the intraclass correlations for Positive Bond range from .099 to .515, which suggests that roughly 10% to 52% of differences in Positive Bond scores are associated with group membership. The intraclass correlations for Positive Work, shown in column eight, range from .076 to .268, suggesting that roughly 8% to 27% of the differences in Positive Work scores exists at the group level. The intraclass correlations for Negative Relationship are shown in the twelfth column and range from .125 to .586, indicating that approximately 13% to 59% of the differences in Negative Relationship scores are associated with groups.

**Positive bond with expectancy and participation as predictors.** Next, a multilevel piecewise linear growth curve model for initial outcome during the early, middle, and late stages of group for Positive Bond was estimated. Parameter estimates from this model for the intercept and slopes of the three time periods are shown in Table 4 along with the variances around the intercept and slopes for Positive Bond.

Table 4

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Positive Bonding*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
PB Intercept	74.92 (1.06)**	18.84 (9.30)*	45.53 (11.24)**
Early PB Slope	-.76 (.39)*	.42 (1.54)	3.50 (1.51)*
Middle PB Slope	.33 (.38)	1.32 (1.31)	2.05 (.84)*
Late PB Slope	2.06 (.60)**	-.92 (2.92) <sup>a</sup>	4.78 (2.28)*

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable

Columns one through three of Table 4 show the estimates of the means with their standard errors and  $p$ -values. Initial Positive Bond scores were 74.92 points on average and Positive Bond scores decreased by .76 points ( $p < .05$ ) at each subsequent administration of the GQ during the early stage of group. Positive Bond scores did not change significantly during the middle stage of group, but they increased by 2.06 ( $p < .01$ ) points at each subsequent administration during the late stage of group. Columns four through six show the variances between groups around the intercept and the slopes for the three stages of group. Only the intercept had significant between-groups variance. Columns seven through nine show that there is significant individual-level variation within groups for the intercept ( $p < .01$ ) and the slopes ( $p < .05$ ) for the early, middle, and late stages of group.

Table 5 shows the estimates for the residual variances at the individual-level (within) and group-level (between) for the initial outcome model with Positive Bonding as the dependent variable.

Table 5

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, Variances*

Occ.	Between	Within
	Est. (S.E.)	Est. (S.E.)
1	14.22 (9.55)	48.98 (10.63)**
2	5.39 (5.00)	49.53 (7.43)**
3	20.92 (9.57)*	67.04 (8.78)**
4	21.43 (12.92)	46.49 (7.48)**
5	10.45 (8.06)	44.76 (6.71)**
6	5.38 (4.60)	33.08 (4.98)**
7	15.15 (7.87)	32.05 (4.97)**
8	3.81 (8.62)	45.62 (7.39)**
9	41.05 (15.22)**	49.05 (7.56)**
10	2.91 (5.56)	35.38 (6.47)**
11	17.00 (10.60)	37.56 (8.24)**
12	12.95 (24.36)	53.40 (18.26)**

The majority of the variances shown in column one, which shows the occasion-specific variances for Positive Bonding at the between-level, are not significant. Only the between-level variances for the third and ninth sessions were significant ( $p < .01$  and  $p < .05$ , respectively), suggesting that there is significant variance in scores between groups on the Positive Bonding subscale during these two sessions after time has been accounted for. Column two shows the variances at the individual- or within- level for Positive Bonding for each of the 12 occasions of group. All of these variances are significant at the  $p < 0.01$  level, indicating that there is still unexplained variance at the individual level after accounting for time in the model.

Next, additional analyses were done in order to test the effects of Participation and Expectancy subscale scores on Positive Bonding during the early, middle, and late stages of group. The first multilevel piecewise linear growth curve model tested the effects of Participation while the effects of Expectancy, Feedback Condition, and Group Type were constrained to be zero. The second multilevel piecewise linear growth curve model tested the

effects of Expectancy while the effects of Participation, Feedback Condition, and Group Type were constrained to zero. Selected parameter estimates for these two models are shown in Appendix A Tables A1 and A2, but the significant findings from these models will be discussed next.

In summary, Participation at the group level was not significantly associated with initial Positive Bonding scores nor was it associated with changes in these variables as the groups progressed. Participation as a predictor at the individual level did not significantly predict initial Positive Bonding scores nor did it predict changes in Positive Bonding scores during the early and late stages of group. However, the effects of Participation on Positive Bonding slope during the middle stage of group were significant, suggesting that for every additional point on the Participation subscale, Positive Bonding scores increased by .06 points at each subsequent administration of the GQ during the middle stage of group. Thus, individuals who endorsed having a low participatory style of engagement in groups (high Participation score) tended to have increasing Positive Bonding scores during Session 5 through Session 8. Expectancy as a predictor at the group level was not significantly associated with initial Positive Bonding scores nor did it significantly predict changes in Positive Bonding scores during the course of the group. At the individual level, Expectancy significantly predicted initial Positive Bonding scores, with initial Positive Bonding scores decreasing by .77 points ( $p < .01$ ) for each additional point on the Expectancy subscale. Thus, individuals who had low expectancy that participating in group would be beneficial to them (high Expectancy scores) tended to have lower initial Positive Bond scores the first time they took the GQ. Expectancy at the individual level was not significantly associated with changes in Positive Bonding scores during any of the stages of group. In other

words, individual's expectations regarding the potential helpfulness of group did not predict changes in Positive Bond scores during the early, middle, or late stages of group.

Following the testing of models that included either Participation or Expectancy subscale scores, a multilevel piecewise linear growth curve model was run that estimated the effects of both these variables together on Positive Bonding while the group level effects of Feedback Condition and Group Type were constrained to be zero. Table 6 shows select estimates from this model for all three stages of group.

Table 6

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Participation and Expectancy as Predictors*

Variable	Estimates Between			Estimates Within	
	Means	Participation	Expectancy	Participation	Expectancy
PB Intercept	79.77 (6.26)**	-1.24 (2.09)	-.65 (1.46)	.04 (.09)	-.79 (.29)**
Early PB Slope	-1.01 (1.77)	-.06 (.58)	.27 (.50)	-.07 (.03)*	.16 (.11)
Middle PB Slope	1.67 (1.96)	-.43 (.64)	-.01 (.48)	.06 (.03)*	-.01 (.08)
Late PB Slope	3.16 (1.75)	.12 (.56)	-.78 (.52)	.00 (.05)	-.23 (.15)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 6 shows that the expected initial Positive Bonding score was 79.77 points and that Positive Bonding scores did not change significantly over time when controlling for both Participation and Expectancy as covariates in the model. However, the slope for Positive Bonding during the late stage of group approached significance ( $p = .07$ ), suggesting that Positive Bonding scores tended to increase by 3.16 points at each subsequent administration of the GQ during the last four sessions of group. Columns two and three show that at the group level, neither Participation nor Expectancy predicted initial scores for Positive Bonding nor changes in the scores on this variable over time. Column four shows that Participation at the individual level predicted changes in Positive Bonding scores during the early and middle stages

of group, with Positive Bonding scores decreasing by .07 points ( $p < .05$ ) during the early stage of group and increasing by .06 points ( $p < .05$ ) during the middle stage of group for each additional point on the Participation subscale. This suggests that individuals who had a tendency to be less participatory in group settings (high Participation scores) also tended to have Positive Bonding scores that decreased over the course of the first four sessions of group, but that increased during the middle four sessions of group. Column five shows that at the individual level, Expectancy predicted initial Positive Bonding scores during the first session of group. For a one point difference on the Expectancy subscale, initial Positive Bonding scores were expected to be .79 points ( $p$ -value  $< .05$ ) lower. Due to scoring and scaling of the GRQ, this suggests that individuals who had lower expectations that group would be helpful to them (high Expectancy scores) tended to have lower initial Positive Bonding scores at the start of group. Expectancy scores at the individual level were not associated with changes in Positive Bonding during any of the stages of group.

Although the previous models tested the effects of both Participation and Expectancy on Positive Bonding, none of these models controlled for group level variables that could also affect scores on this variable. Additional models were then analyzed that controlled for the effects of two group-level variables—Feedback Condition and Group Type. The first of these subsequent models added Feedback Condition at the between-level while also estimating the effects of both Participation and Expectancy. The second of these subsequent models added Group Type at the between-level while including Participation and Expectancy as predictors at the individual level. Selected parameter estimates for both of these models can be seen in Appendix Tables A3 and A4; however, relevant findings from these two analyses are presented next.

In summary, neither Feedback Condition nor Group Type were significantly associated with initial scores for Positive Bonding nor changes in Positive Bonding scores over time for any of the stages of group. Neither Participation nor Expectancy at the group level predicted initial Positive Bonding scores or changes in these scores over time. At the individual level, Participation continued to predict changes in Positive Bonding scores during the early and middle stages of group after controlling for either group level variable. Positive Bonding scores were expected to decrease by .07 points ( $p < .05$ ) during the early stage of group and increase by .05 points ( $p < .05$ ) during the middle stage of group for every one-point difference on the Participation subscale. Again, this suggests that individuals who had a tendency to be less participatory in group settings (high Participation scores) also tended to have Positive Bonding scores that decreased over the course of the first four sessions of group, but that increased during the middle four sessions of group. Expectancy at the individual level continued to predict initial Positive Bonding scores during the first session of group, with initial Positive Bonding scores being expected to be .79 points ( $p$ -value  $< .05$ ) lower for every point increase on the Expectancy subscale. This suggests that individuals who had lower expectations that group would be helpful to them (high Expectancy scores) tended to have lower initial Positive Bonding scores at the start of group. Expectancy at the individual level continued to not significantly predict changes in Positive Bonding scores during the early, middle, or late stages of group.

Finally, a multilevel piecewise linear growth curve model with Participation and Expectancy subscales as predictors at the individual level and both Feedback Condition and Group Type as predictors at the group level was run. Selected estimates for this model can be seen in Table 7.

Table 7

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Participation, Expectancy, Feedback Condition, and Group Type as Predictors*

Variable	Means	Estimates Between			
		Participation	Expectancy	Condition	Group Type
PB Intercept	77.74 (5.18)**	-1.09 (1.67)	-.79 (1.48)	1.56 (2.00)	1.18 (3.01)
Early PB Slope	-.25 (1.51)	.00 (.47)	.49 (.50)	-.37 (.68)	-1.43 (1.07)
Middle PB Slope	.65 (1.53)	-.30 (.46)	-.11 (.47)	-.16 (.67)	1.21 (1.03)
Late PB Slope	2.25 (1.63)	.09 (.43)	-.62 (.53)	1.12 (.83)	.25 (1.47)

Variable	Estimates Within	
	Participation	Expectancy
PB Intercept	.04 (.09)	-.79 (.29)**
Early PB Slope	-.07 (.03)*	.16 (.11)
Middle PB Slope	.05 (.03)*	-.02 (.08)
Late PB Slope	.00 (.05)	-.22 (.15)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 7 shows that the average initial Positive Bonding score was 77.74 points and that there were no significant changes in Positive Bonding during any of the three stages of group when both Feedback Condition and Group Type were controlled for in the model. Columns two and three of Table 7, depicting the estimates between groups, show that Participation and Expectancy at the group level did not significantly predict initial Positive Bonding scores or changes in this variable during the course of the group. Columns four and five of the between estimates portion of the table show that Feedback Condition and Group Type at the group level also did not significantly predict initial scores or changes in the scores of Positive Bonding during the early, middle, or late stages of group. The third column displaying the estimates within show that Participation predicted changes in Positive Bonding scores during the early and middle stages of group. Positive Bonding scores decreased by .07 points ( $p < .05$ ) during the early stage of group and increased by .05 points ( $p < .05$ ) during the middle stage of group at each subsequent administration of the GQ for each additional point on the Participation



subscale. Expectancy scores predicted initial Positive Bonding, with Positive Bonding scores decreasing by .79 points ( $p < .05$ ) for every additional point increase on the Expectancy subscale after controlling for Feedback Condition and Group Type. Again Expectancy at the individual level was not significantly associated with changes in Positive Bonding over the course of group.

**Summary of model fit.** Table 8 presents the -2 log likelihood, AIC, and BIC for each of the seven models testing the effects of Participation and Expectancy on Positive Bonding scores during all three stages of group.

Table 8

*Comparison of Fit Statistics for Models Testing the Effects of Participation and Expectancy on Positive Bonding*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	54	16005.62	16113.62	16304.00
Participation Only	62	15994.64	16118.64	16337.22
Expectancy Only	62	15989.17	16113.17	16331.75
Participation and Expectancy	70	15979.32	16119.32	16366.10
Participation, Expectancy, and Feedback Condition	74	15975.23	16123.23	16384.12
Participation, Expectancy, and Group Type	74	15969.21	16117.21	16378.09
Participation, Expectancy, Feedback Condition, and Group Type	78	15964.97	16120.97	16395.96

Chi-square tests of significance were used to test whether the models containing Participation and/or Expectancy without the group level variables offered a significantly better fit than the baseline model. Only the model testing the effects of Expectancy while constraining the effects of Participation to be zero offered a significantly better fit. Additional chi-square tests of significance were then used to test whether the models containing the group level variables of Feedback Condition and Group Type offered a significantly better fit than the model testing the effects of both Participation and Expectancy. Results from the chi-square tests of significance

indicate that adding the group level variables did not improve the fit of the models. Although the BIC for the initial model is the lowest, when looking at the AIC, the model that tested the effects of Expectancy on Positive Bonding appears to have the lowest estimate, suggesting that the data fit this model the best.

**Positive bond with total score as predictor.** Next, multilevel piecewise linear growth curve models that tested the effects of the GRQ Total Score in place of the GRQ Expectancy and Participation subscores on Positive Bonding across the three stages of group were estimated. An initial outcome model constrained the effects of Total Score, Feedback Condition, and Group Type, to zero. Table 9 presents selected parameter estimates from this initial outcome model for Positive Bonding.

Table 9

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Positive Bonding*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
PB Intercept	74.92 (1.06)**	18.86 (9.31)*	45.52 (11.24)**
Early PB Slope	-.76 (.39)*	.42 (1.55)	3.49 (1.51)*
Middle PB Slope	.34 (.38)	1.32 (1.31)	2.05 (.84)*
Late PB Slope	2.06 (.60)**	-.89 (2.94) <sup>a</sup>	4.79 (2.28)*

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable

Column one of Table 9 shows the estimates for the means for the Positive Bonding intercept and Positive Bonding slopes as well as the standard errors and significant  $p$ -values for these estimates during the early, middle, and late stages of group. The average initial Positive Bonding score was 77.92 points and Positive Bonding scores change significantly during the early and late stages of group. Positive Bonding scores tended to decrease by .76 points ( $p < .05$ ) during the early stage of group and increased by 2.06 points ( $p < .01$ ) during the late stage of

group at each subsequent administration of the GQ across those time periods. Column two shows the variances between groups around the intercept and slopes for the three stages of group. Only the intercept had significant variance. Column three shows that there is significant variance between individuals around the intercept ( $p < .01$ ) and slopes ( $p < .05$ ) for the early, middle, and late stages of group.

Estimates for the residual variances after time has been taken into account at both the individual level (within) and group level (between) for this initial outcome model with Positive Bonding as the dependent variable are shown in table 10.

Table 10

*Multilevel Piecewise Linear Growth Curve Model  
for Positive Bonding, Variances*

Occ.	<u>Between</u>	<u>Within</u>
	Est. (S.E.)	Est. (S.E.)
1	14.23 (9.56)	48.99 (10.63)**
2	5.41 (5.01)	49.53 (7.43)**
3	20.92 (9.58)*	67.05 (8.78)**
4	21.41 (12.93)	46.49 (7.49)**
5	10.42 (8.07)	44.76 (6.71)**
6	5.40 (4.62)	33.08 (4.98)**
7	15.13 (7.88)	32.05 (4.97)**
8	3.83 (8.62)	45.61 (7.39)**
9	41.04 (15.22)**	49.05 (7.56)**
10	2.91 (5.56)	35.38 (6.46)**
11	16.90 (10.57)	37.55 (8.24)**
12	12.94 (24.51)	53.42 (18.27)**

Column one shows the occasion-specific variances for Positive Bonding at the between-level. The majority of these variances were not significant, indicating that there is not significant variance at the group level after time has been accounted for. Only the between-level variances for the third and ninth sessions were significant ( $p < .01$  and  $p < .05$ , respectively), suggesting that there is significant variance in scores between groups on the Positive Bonding subscale

during these two sessions after accounting for time. Column two shows the variances at the individual- or within- level for Positive Bonding for each of the 12 occasions of group. All of these variances were significant at the  $p < 0.01$  level, indicating that there is still unexplained variance at the individual level after accounting for time in the model.

The next model allowed Total Score to be estimated freely while the effects of Feedback Condition and Group Type were constrained to be zero. Selected parameter estimates for this multilevel piecewise linear growth curve model are presented in Table 11.

Table 11

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Total Score as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Total Score	Total Score
PB Intercept	75.29 (1.19)**	-.92 (1.21)	-.08 (.08)
Early PB Slope	-.78 (.41)	.03 (.33)	-.03 (.03)
Middle PB Slope	.42 (.45)	-.27 (.33)	.05 (.02)*
Late PB Slope	2.13 (.95)*	-.16 (.57)	-.04 (.05)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 11 shows the means for the Positive Bonding intercept and slopes across the early, middle, and late stages of group after the effects of Total Score have been estimated in the model. The average initial Positive Bonding score after the first session of group was 75.29 points and Positive Bonding scores increased significantly by 2.13 points ( $p < .05$ ) during the last stage of group at each subsequent administration of the GQ. There were no significant changes to Positive Bonding scores during the early and middle stages of group after adding Total Score into the model. Column two of Table 11 shows the estimates at the between-level for the effects of the GRQ Total Score on Positive Bonding intercept and each of the slopes for the three stages of group and none of these estimates were significant. Column three of Table

11 shows the estimates at the individual-level for the effects of the GRQ Total Score on Positive Bonding. The Total Score did not significantly predict initial Positive Bonding scores or changes in its slope during the early and late stages of group. However, the Total Score significantly predicted changes in Positive Bonding scores during the middle stage of group, with Positive Bonding scores increasing by .05 points ( $p < .05$ ) for each additional point on the GRQ Total Score scale. This suggests that individual group members who were less prepared to participate in group tended to have Positive Bonding scores that increased more during the middle stage of group.

The next multilevel piecewise linear growth curve models that were run tested the effects of the group-level variables of Feedback Condition and Group Type. The first of these models allowed Feedback Condition to be freely estimated along with Total Score while Group Type was constrained to zero. The second model allowed Group Type and Total Score to be freely estimated while constraining Feedback Condition to zero. Selected parameter estimates for these two models are presented in Appendix Tables A5 and A6, but the significant findings from these two analyses will be presented next.

The effects of Total Score at the group level were not significantly associated with initial Positive Bonding scores or changes in Positive Bonding scores during any of the stages of group. The effects of either Feedback Condition or Group Type at the group level also were not significantly associated with initial Positive Bonding scores or changes in this variable over the course of group. At the individual level after controlling for the effects of Feedback Condition, the effects of Total Score were significantly associated with changes in Positive Bond scores during the middle stage of group with positive Bond scores increasing by 0.05 points ( $p < .05$ ) for each additional point on the Total Score scale. This suggests that regardless of whether or

not group leaders received weekly feedback regarding their group members' GQ scores, individual group members who were less prepared to participate in group (high Total Score) tended to have Positive Bonding scores that increased during the middle stage of group. In the model that controlled for the effects of Group Type; however, Total Score no longer was significantly associated with changes in Positive Bonding scores during the middle stage of group.

Finally, a multilevel piecewise linear growth curve model that tested the effects of Total Score, Feedback Condition, and Group Type all simultaneously in the same model on Positive Bonding was run. Table 12 shows selected parameter estimates for this model.

Table 12

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Total Score and Feedback Condition as Predictors*

Variable	Means	Estimates Between			Estimates Within
		Total Score	Condition	Group Type	Total Score
PB Intercept	73.86 (4.64)**	-.83 (4.00)	1.28 (2.05)	.85 (7.27)	-.08 (.09)
Early PB Slope	.34 (1.09)	.09 (.71)	-.38 (1.05)	-1.18 (1.68)	-.03 (.04)
Middle PB Slope	-.43 (1.88)	-.26 (.65)	-.12 (.91)	1.23 (3.00)	.05 (.03)
Late PB Slope	1.86 (4.17)	-.08 (2.26)	1.27 (1.09)	-.38 (7.32)	-.03 (.04)

Note: : PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 12 shows the means for the Positive Bonding intercept and slopes across the early, middle, and late stages of group after the effects of Total Score, Feedback Condition, and Group Type have been estimated in the model. The average initial Positive Bonding score after the first session of group was 73.86 points and Positive Bonding scores did not significantly change during any of the stages once these variables were controlled for in the model. Column two of Table 12 shows the estimates at the between-level for the effects of Total Score on Positive Bonding intercept and each of the slopes for the three stages of group. None

of these estimates were significant. Column three and four of Table 12 shows the estimates for the effects of Feedback Condition and Group Type at the group level. As can be seen, neither Feedback Condition nor Group Type were significantly associated with initial Positive Bonding scores or changes in Positive Bonding during any of the stages of group. Column five of Table 12 shows the estimates at the individual-level for the effects of Total Score on Positive Bonding. After controlling for the effects of both Feedback Condition and Group Type, Total Score did not significantly predict initial Positive Bonding scores or changes in Positive Bonding scores during any of the three stages of group.

**Summary of model fit.** Table 13 presents the -2 log likelihood, AIC, and BIC for each of the five models that were run to test the effects of Total Score on Positive Bonding scores during all three stages of group.

Table 13

*Comparison of Fit Statistics for Models Testing the Effects of Total Score on Positive Bonding*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	51	14879.16	14981.16	15160.96
Total Score Only	59	14867.45	14985.45	15193.45
Total Score and Feedback Condition	63	14862.65	14988.65	15210.75
Total Score and Group Type	63	14857.79	14983.79	15205.90
Total Score, Feedback Condition, and Group Type	67	14853.33	14987.33	15223.53

Using the -2 log likelihood estimates for the various models, chi-square tests of significance were conducted to determine which model provided the best fit. A chi-square test was calculated to determine if the model estimating total score offered a significantly better fit

than the initial outcome model. This test revealed that the data did not fit the model estimating the effects of total score significantly better than the initial outcome model. Additional chi-square tests of significance were then calculated to determine if the models estimating the effects of feedback condition and group type offered a better fit than the model estimating the effects of only the total score. These chi-square tests of significance also revealed that none of these models provided a better fit to the data. When looking at columns two and three, which present the AIC and BIC for each of the models, the initial outcome model appears to have the lowest estimates for AIC and BIC. This suggests that the data fit the initial outcome model the best.

**Positive work with expectancy and participation as predictors.** Next, a series of multilevel piecewise linear growth curve models that tested the effects of Expectancy and Participation on Positive Working Relationship (Positive Work) across the three stages of group were estimated. The first model was a multilevel piecewise linear growth curve model that for initial outcome, that tested the effects of time, during the early, middle, and late stages of group for Positive Work. Parameter estimates from this model for the intercept and slopes of the three time periods are shown in Table 14 along with the variances around the intercept and slopes for Positive Work.

Table 14

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Positive Work*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
PW Intercept	39.87 (.82)**	10.65 (5.07)*	53.61 (9.75)**
Early PW Slope	-.53 (.21)*	-.22 (.48) <sup>a</sup>	3.39 (1.19)**
Middle PW Slope	-.22 (.27)	.66 (.66)	3.30 (.77)**
Late PW Slope	1.17 (.45)*	1.13 (1.23)	6.24 (1.96)**

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable



Columns one through three of Table 14 show the estimates of the means with their standard errors and  $p$ -values. Initial Positive Work scores were 39.87 points on average and Positive Work scores decreased by .53 points ( $p < .05$ ) at each subsequent administration of the GQ during the early stage of group. Positive Work scores did not change significantly during the middle stage of group, but they increased by 1.17 ( $p < .05$ ) points at each subsequent administration of the GQ during the late stage of group. Columns four through six of Table 14 show the variances between groups around the intercept and slopes for the three stages of group. Only the intercept had significant variance. Columns seven through nine of Table 14 show that there is significant variance between individuals around the intercept ( $p < .01$ ) and slopes ( $p < .01$ ) for the early, middle, and late stages of group.

Table 15 shows the estimates for the residual variances at the individual level (within) and group level (between) for Positive Work.

Table 15

*Multilevel Piecewise Linear Growth Curve  
Model for Positive Work, Variances*

Occ.	<u>Between</u>	<u>Within</u>
	Est. (S.E.)	Est. (S.E.)
1	4.53 (4.82)	30.42 (7.70)**
2	2.23 (3.62)	35.70 (5.74)**
3	4.58 (4.26)	44.27 (6.14)**
4	6.35 (4.28)	33.98 (5.00)**
5	.93 (2.24)	24.05 (3.82)**
6	.61 (2.03)	28.96 (4.14)**
7	1.93 (3.45)	35.53 (5.18)**
8	4.42 (4.40)	25.07 (4.82)**
9	8.02 (5.61)	34.81 (5.78)**
10	.07 (4.55)	25.75 (4.46)**
11	2.83 (4.84)	39.74 (7.68)**
12	5.48 (8.42)	30.42 (7.70)**

Column one of Table 15 shows the variances at the between- or group-level for Positive Work for each of the 12 occasions of group. All of the variances shown were not significant. This suggests that there is not significant variance in scores between groups on the Positive Work subscale during any of the sessions after time has been accounted for. On the other hand, Column two of Table 15 shows the variances at the individual- or within- level for Positive Work for each of the 12 occasions of group. All of these variances are significant at the  $p < .01$  level, indicating that there is still unexplained variance at the individual level after accounting for time in the model.

Next, additional analyses were done in order to start testing the effects of Participation and Expectancy subscale scores on Positive Work during the early, middle, and late stages of group. The first multilevel piecewise linear growth curve model that was run tested the effects of Participation while the effects of Expectancy, Feedback Condition, and Group Type were constrained to be zero. The second multilevel piecewise linear growth curve model that was run

tested the effects of Expectancy while the effects of Participation, Feedback Condition, and Group Type were constrained to be zero. Select parameter estimates for these two models are shown in Tables 7 and 8 in Appendix A and a brief description of significant findings from these two models is presented next.

Positive Work scores did not significantly change during the three stages of group when Participation was freely estimated. Participation at the group level was not significantly associated with initial Positive Work scores nor was it associated with changes in these variables as the groups progressed. Participation as a predictor at the individual level did not significantly predict initial Positive Work scores nor did it predict changes in Positive Work scores during the early, middle, and late stages of group. On the other hand, Positive Work scores significantly decreased by 1.10 ( $p < .05$ ) points during the early stage of group and increased by 2.14 points ( $p < .05$ ) during the late stage of group at each subsequent administration of the GQ when Expectancy was freely estimated in the model. However, Expectancy as a predictor at the group level was not significantly associated with initial Positive Work scores nor did it significantly predict changes in Positive Work scores during the course of the group. Expectancy as a predictor at the individual level also did not significantly predict initial Positive Work scores nor was it significantly associated with changes in Positive Work scores during any of the stages of group.

Following the testing of models that included either Participation or Expectancy subscale scores, a model was run that estimated the effects of both these variables while the group level effects of Feedback Condition and Group Type were constrained to be zero. Table 16 shows selected estimates from this model for all three stages of group.

Table 16

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Participation and Expectancy as Predictors*

Variable	Estimates Between			Estimates Within	
	Means	Participation	Expectancy	Participation	Expectancy
PW Intercept	44.62 (3.22)**	-1.66 (1.01)	-.02 (.98)	-.02 (.08)	-.24 (.28)
Early PW Slope	-1.53 (.63)*	.20 (.21)	.24 (.25)	.02 (.03)	-.10 (.10)
Middle PW Slope	-.22 (1.02)	.01 (.37)	-.01 (.38)	-.02 (.03)	-.07 (.08)
Late PW Slope	1.70 (1.51)	.21 (.49)	-.65 (.62)	.01 (.04)	.05 (.14)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 16 shows that the average initial Positive Work score was 44.62. It also shows that Positive Work scores significantly decreased by 1.53 points ( $p < .05$ ) at each subsequent administration of the GQ during the early stage of group, but that they did not change significantly during either the middle or late stages of group when both the effects of Participation and Expectancy were estimated as predictors in the model. Columns two and three of Table 16 show that at the group level, neither Participation nor Expectancy predicted initial scores for Positive Work nor changes in the scores on this variable over time. Column four and five of Table 16 show that at the individual level, neither Participation nor Expectancy predicted initial Positive Work scores or changes in Positive Work scores during any of the stages of group

Next, additional models were analyzed that controlled for the effects of the group-level variables of Feedback Condition and Group Type. The first of these subsequent models estimated the effects of Feedback Condition at the between-level while both Participation and Expectancy were estimated in the model as well. The second of these models constrained Feedback Condition to be zero while freely estimating the effects of Group Type at the between-level and Participation and Expectancy at the within-level. Selected estimates for these two

models are presented in Appendix A in Tables A9 and A10, and relevant findings are briefly summarized next.

When Feedback was added to the model, Positive Work scores did not change significantly over time during the three stages of group. At the between-group level, Participation, Expectancy, and Feedback Condition were not significantly associated with initial scores for Positive Work nor changes in the scores for Positive Work over time for any of the stages of group. Neither Participation nor Expectancy at the individual level predicted initial Positive Work scores or changes in this variable over the course of the group when Feedback Condition was controlled for at the group level. When Group Type was added to the model at the group level, Positive Work scores significantly decreased by 1.41 points ( $p < .05$ ) at each subsequent administration of the GQ during the early stage of group. However, Positive Work scores did not change significantly during the middle or late stages of group. Group Type did not significantly predict initial Positive Work scores or changes in Positive Work scores over the course of the group. Neither Participation nor Expectancy at either the group- or individual-level was associated with initial Positive Work scores or changes in Positive Work scores during any of the stages of group when Group Type was controlled for.

Finally, a multilevel piecewise linear growth curve model with Participation and Expectancy subscales as predictors at the individual level and both Feedback Condition and Group Type as predictors at the group level was run. Selected estimates for this model can be seen in Table 17.

Table 17

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Participation, Expectancy, Feedback Condition, and Group Type as Predictors*

Variable	Means	Estimates Between			
		Participation	Expectancy	Condition	Group Type
PW Intercept	43.57 (3.35)**	-1.61 (.97)	-.31 (1.02)	-.08 (1.46)	1.82 (2.12)
Early PW Slope	-1.30 (.71)	.20 (.19)	.25 (.27)	-.30 (.40)	-.11 (.61)
Middle PW Slope	-.50 (1.06)	-.01 (.35)	-.07 (.40)	.02 (.52)	.53 (.80)
Late PW Slope	1.28 (1.33)	.14 (.39)	-.38 (.52)	1.19 (.65)	-.64 (1.18)

Variable	Estimates Within	
	Participation	Expectancy
PW Intercept	-.02 (.08)	-.23 (.28)
Early PW Slope	.02 (.03)	-.10 (.10)
Middle PW Slope	-.02 (.03)	-.08 (.08)
Late PW Slope	.01 (.04)	.04 (.13)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 17 show that the average initial Positive Work score was 43.57 when both Feedback Condition and Group Type were included in the model and that there were no significant changes in Positive Work scores during any of the three stage of group. Columns two and three of Table 17 depicting the estimates between groups show that Participation and Expectancy at the group level did not significantly predict initial Positive Work scores or changes in this variable during the course of the group. Columns four and five of Table 17 of the between estimates portion of the table show that Feedback Condition and Group Type at the group level also did not significantly predict initial Positive Work scores or changes in the scores of Positive Work during the early, middle, or late stages of group. The third and fourth columns of Table 17, displaying the estimates within, show that Participation and Expectancy did not predict initial Positive Work scores or changes in Positive Work scores during any of the stage of group after controlling for Feedback Condition and Group Type at the group level.

**Summary of model fit.** Table 18 presents the -2 log likelihood, AIC, and BIC estimates for each of the seven models that tested the effects of Participation and Expectancy on Positive Work scores during all three stages of group.

Table 18

*Comparison of Fit Statistics for Models Testing the Effects of Participation and Expectancy on Positive Work*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	54	15386.63	15494.63	15685.00
Participation Only	62	15376.66	15500.66	15719.24
Expectancy Only	62	15372.41	15496.41	15714.99
Participation and Expectancy	70	15979.32	16119.32	16366.10
Participation, Expectancy, and Feedback Condition	74	15975.23	16123.23	16384.12
Participation, Expectancy, and Group Type	74	15969.21	16117.21	16378.09
Participation, Expectancy, Feedback Condition, and Group Type	78	15964.97	16120.97	16395.96

Using the -2 log likelihood estimates (column two of Table 18), chi-square tests can be calculated to evaluate how well each of the models fit in a comparative fashion. The models including either Participation as a predictor or Expectancy as a predictor did not fit significantly better than the initial outcome model. The model that included both Participation and Expectancy was found to fit significantly worse than the initial outcome model. Finally, the models that included Feedback Condition and/or Group Type did not fit significantly better than the model that included Participation and Expectancy. When looking at the AIC and BIC estimates that are shown in columns three and four of Table 18, the lowest AIC is that of the initial outcome model while the lowest BIC is that of the model including only Expectancy as a predictor. Thus, the data appears to fit these two models the best.

**Positive work with total score as predictor.** Next, multilevel piecewise linear growth curve models that tested the effects of GRQ Total Score on Positive Working Relationship (Positive Work) across the three stages of group were estimated. An initial outcome model that constrained the effects of the GRQ Total Score, Feedback Condition, and Group Type, to be zero was the first of the subsequent models to be run. Table 19 presents selected parameter estimates from this initial outcome model for Positive Working Relationship.

Table 19

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Positive Working Relationship*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
PW Intercept	39.87 (.82)**	10.65 (5.07)*	53.61 (9.75)**
Early PW Slope	-.53 (.21)*	-.22 (.48) <sup>a</sup>	3.39 (1.19)**
Middle PW Slope	-.22 (.27)	.66 (.66)	3.30 (.77)**
Late PW Slope	1.17 (.45)*	1.13 (1.23)	6.24 (1.96)**

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable

Columns one through three of Table 19 show the means for the Positive Work intercept and Positive Work slopes as well as the standard errors and  $p$ -values for these estimates during the early, middle, and late stages of group. The average initial Positive Work score was 39.87 points and Positive Work scores change significantly during the early and late stages of group. Positive Work scores tended to decrease by .53 points ( $p < .05$ ) during the early stage of group and increase by 1.17 points ( $p < .05$ ) during the late stage of group at each subsequent administration of the GQ. Columns four through six of Table 19 show the variances between groups around the intercept and slopes for the three stages of group. Only the intercept had significant between-groups variance. Columns seven through nine of Table 19 show that there is



significant variance between individuals around the intercept ( $p < .01$ ) and slopes ( $p < .01$ ) for the early, middle, and late stages of group.

Estimates for the occasion-specific variances at both the individual level (within) and group level (between) for this initial outcome model with Positive Work as the dependent variable are shown in Table 20.

Table 20

*Multilevel Piecewise Linear Growth Curve  
Model for Positive Working Relationship,  
Variances*

Occ.	<u>Between</u> Est. (S.E.)	<u>Within</u> Est. (S.E.)
1	4.53 (4.82)	30.42 (7.70)**
2	2.23 (3.62)	35.70 (5.74)**
3	4.58 (4.26)	44.27 (6.14)**
4	6.35 (4.28)	33.98 (5.00)**
5	.93 (2.24)	24.05 (3.82)**
6	.61 (2.03)	28.95 (4.14)**
7	1.93 (3.45)	35.53 (5.18)**
8	4.42 (4.40)	25.07 (4.82)**
9	8.03 (5.61)	34.81 (5.78)**
10	.08 (4.56)	25.75 (4.46)**
11	2.83 (4.84)	39.74 (7.68)**
12	5.48 (8.42)	20.29 (10.05)**

Column one of Table 20 shows the variances at the group- or between-level for Positive Work for each of the 12 occasions of group. None of these variances are significant at the  $p < 0.01$  level, indicating that there is no unexplained variance at the individual level after accounting for time in the model. All of the individual- or within-level variances were significant. This indicates that there is significant variance in scores between groups on the Positive Work subscale after time has been accounted for.

The next model estimated the effects of the GRQ Total Score while the effects of Feedback Condition and Group Type were constrained to zero. Selected parameter estimates for this multilevel piecewise linear growth curve model are presented in Table 21.

Table 21

*Multilevel Piecewise Linear Growth Curve Model for Positive Working Relationship, With Total Score as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Total Score	Total Score
PW Intercept	40.28 (1.03)**	-1.23 (.78)	-.06 (.08)
Early PW Slope	-.59 (.25)*	.20 (.25)	.01 (.03)
Middle PW Slope	-.21 (.29)	-.02 (.27)	-.03 (.02)
Late PW Slope	1.16 (.48)*	.02 (.39)	.01 (.04)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 21 shows the means for the Positive Work intercept and slopes across the early, middle, and late stages of group after the effects of Total Score have been estimated in the model. The average initial Positive Work score after the first session of group was 40.28 points and Positive Work scores decreased by .59 points ( $p < .05$ ) during the early stage of group and increased significantly by 1.16 points ( $p < .05$ ) during the last stage of group at each subsequent administration of the GQ. There were no significant changes to Positive Work scores during the middle stage of group after controlling for the effects of Total Score. Column two of Table 21 shows the estimates at the between-level for the effects of the GRQ Total Score on Positive Work intercept and each of the slopes for the three stages of group. None of these estimates were significant. Column three of Table 21 shows the estimates at the individual-level for the effects of Total Score on Positive Work. Total Score did not significantly predict initial Positive Work scores or changes in its slope during any of the stages of group.

The next multilevel piecewise linear growth curve models tested the effects of the group-level variables of Feedback Condition and Group Type. The first of these models allowed the effect of Feedback Condition to be freely estimated along with the effect of the GRQ Total Score while the effect of Group Type was constrained to zero. The second model allowed Group Type and Total Score to be freely estimated while constraining Feedback Condition to zero. Selected parameter estimates for these two models are presented in Tables A11 and A12 in Appendix A, but the findings from these two analyses will be presented next.

The GRQ Total Score at the group level was not significantly associated with initial Positive Work scores or changes in Positive Work scores during any of the stages of group. The effects of either Feedback Condition or Group Type at the group level also were not significantly associated with initial Positive Work scores or changes in this variable over the course of group. At the individual level, after controlling for the effects of Feedback Condition or Group Type, the effects of Total Score continued to not be significantly associated with initial Positive Work scores or changes in Positive Work scores over time.

Finally, a multilevel piecewise linear growth curve model testing the effects of Total Score, Feedback Condition, and Group Type simultaneously on Positive Work was conducted. Table 22 shows selected parameter estimates for this model.

Table 22

*Multilevel Piecewise Linear Growth Curve Model for Positive Working Relationship, With Total Score and Feedback Condition as Predictors*

Variable	Estimates Between				Estimates Within
	Means	Total Score	Condition	Group Type	Total Score
PW Intercept	38.90 (2.17)**	-1.28 (.81)	-.25 (1.50)	1.91 (2.21)	-.06 (.08)
Early PW Slope	-.45 (.62)	.19 (.41)	-.26 (.42)	.01 (.99)	.01 (.03)
Middle PW Slope	-.66 (1.08)	-.06 (.48)	.03 (.55)	.53 (1.13)	-.03 (.02)
Late PW Slope	1.37 (2.18)	.08 (.92)	1.27 (1.23)	-1.18 (1.41)	.01 (.06)

Note: : PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 22 shows the means for the Positive Work intercept and slopes across the early, middle, and late stages of group after the effects of Total Score, Feedback Condition, and Group Type have been estimated in the model. The average initial Positive Work score after the first session of group was 38.90 points and Positive Work scores did not significantly change during any of the stages once these group-level variables were controlled for in the model. Column two of Table 22 shows the estimates at the between-level for the effects of Total Score on Positive Work intercept and each of the slopes for the three stages of group. None of these estimates were significant. Column three and four of Table 22 shows the estimates for the effects of Feedback Condition and Group Type at the group level. Neither Feedback Condition nor Group Type were significantly associated with initial Positive Work scores or changes in Positive Work during any of the stages of group. Column five of Table 22 shows the estimates at the individual-level for the effects of Total Score on Positive Work. After controlling for the effects of both Feedback Condition and Group Type, Total Score continued to not be significantly associated with initial Positive Work scores or changes in Positive Work scores during any of the three stages of group.

**Summary of model fit.** Table 23 presents the -2 log likelihood, AIC, and BIC for each of the five models that were run to test the effects of Total Score on Positive Work scores during the early, middle, and late stages of group.

Table 23

*Comparison of Fit Statistics for Models Testing the Effects of Total Score on Positive Work*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	51	14260.17	14362.17	14541.97
Total Score Only	59	14247.83	14365.83	14573.83
Total Score and Feedback Condition	63	14242.71	14368.71	14590.82
Total Score and Group Type	63	14244.36	14370.37	14592.47
Total Score, Feedback Condition, and Group Type	67	14238.76	14372.76	14608.97

Column two of Table 23 shows the -2 log likelihood estimates for each of the five models that was used to test the effects of Total Score on positive work during all three stages of group. Using these estimates, chi-square tests were computed in order to determine if the models were significantly different from each other. The first chi-square significance test compared the model that tested only the effects of Total Score on positive work and the initial outcome model. It was found that there was no significant difference between these two models. Subsequent chi-square tests of significance compared the models that estimated the effects of the group level variables of Feedback Condition and/or Group Type with the model that only estimated the effects of Total Score. There was no significant difference between any of these models. When looking at columns two and three of Table 23, which showed the estimates for the AIC and BIC for each of the five models, the AIC and BIC of the initial outcome model are the lowest, which suggests that the data fit this model best.

**Negative relationship with expectancy and participation as predictors.** The next series of multilevel piecewise linear growth curve models focused on testing the effects of Participation and Expectancy on the Negative Relationship subscale of the GQ. First, a

multilevel piecewise linear growth model for Negative Relationship during the early, middle, and late stages of group was estimated. Parameter estimates from this model for the intercept and slopes of the three time periods are shown in Table 24 along with the variances around the intercept and slopes for Negative Relationship.

Table 24

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Negative Relationship*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
NR Intercept	18.99 (.65)**	7.23 (3.36)*	30.48 (5.59)**
Early NR Slope	.40 (.27)	.26 (.53)	1.90 (.68)**
Middle NR Slope	-.10 (.22)	-.57 (.53) <sup>a</sup>	.49 (.40)
Late NR Slope	-1.02 (.34)**	-.45 (1.40)	.58 (1.04)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable

Columns one through three of Table 24 show the estimates of the means with their standard errors and  $p$ -values. Average initial Negative Relationship scores were 18.99 points and Negative Relationship scores did not significantly change during the early and middle stages of group. However, they tended to significantly decrease by an average of 1.02 points ( $p < .01$ ) at each subsequent administration of the GQ during the late stage of group. Columns four through six of Table 24 show the variances between groups around the intercept and slopes for the three stages of group. Only the intercept had significant variance. Columns seven through nine of Table 24 show that there was significant variance between individuals around the intercept ( $p < .01$ ) and slope ( $p < .01$ ) for the early stage of group.

Table 25 shows the estimates for the residual variances at the individual level (within) and group level (between) for Negative Relationship across all 12 occasions of group.

Table 25

*Multilevel Piecewise Linear Growth Curve  
Model for Negative Relationship, Variances*

Occ.	Between	Within
	Est. (S.E.)	Est. (S.E.)
1	2.93 (2.47)	11.74 (4.25)**
2	4.69 (2.90)	24.27 (3.60)**
3	5.14 (4.29)	30.31 (4.12)**
4	8.13 (6.37)	25.87 (3.72)**
5	5.77 (2.77)*	17.24 (2.68)**
6	3.39 (2.95)	30.47 (4.08)**
7	5.59 (4.45)	33.87 (4.69)**
8	11.61 (6.77)	30.08 (4.55)**
9	37.17 (11.16)**	28.93 (4.36)**
10	7.52 (3.88)	23.49 (4.13)**
11	9.06 (5.43)	16.72 (4.30)**
12	11.72 (16.63)	27.95 (8.61)**

As can be seen in column one of Table 25, which presents the variances at the group- or between-level for Negative Relationship for each of the 12 occasions of group, most of these variances are not significant. Only the between-level variances for the fifth and ninth sessions were significant ( $p < .05$  and  $p < .01$ , respectively), suggesting that there is significant variance in scores between groups on the Negative Relationship subscale during these two sessions after time has been accounted for. However, for the rest of the occasions, there is no significant variance between groups on Negative Relationship scores once time has been taken into account. On the other hand, all of the variances shown in column two, which shows the occasion-specific variances for Negative Relationship at the individual- or within-level, are significant. This indicates that there is still unexplained variance at the individual level after accounting for time in the model.

Next, additional analyses were done testing the effects of Participation and Expectancy subscale scores on Negative Relationship during the early, middle, and late stages of group. The

first multilevel piecewise linear growth curve model tested the effects of Participation while the effects of Expectancy, Feedback Condition, and Group Type were constrained to zero. The second multilevel piecewise linear growth curve model tested the effects of Expectancy while the effects of Participation, Feedback Condition, and Group Type were constrained to be zero. Select parameter estimates for these two models are shown in Appendix A in Tables A13 and A14. The significant results of these two models are summarized next.

Negative Relationship scores did not significantly change during the three stages of group when the effect of Participation was freely estimated. Participation at the group level was not significantly associated with initial Negative Relationship scores nor was it associated with changes in this variables as the groups progressed. Participation did not significantly predict initial Negative Relationship scores nor did it predict changes in Negative Relationship scores during any of the three stages of group. Expectancy at the group level was not significantly associated with initial Negative Relationship scores nor did it significantly predict changes in Negative Relationship scores during the course of the group. However, Expectancy as a predictor at the individual level was significantly associated with initial Negative Relationship scores, with initial scores tending to increase by .51 points ( $p < .01$ ) for each additional point on the Expectancy subscale. Thus, individuals who had low expectancy that participating in group would be beneficial to them tended to have higher initial Negative Relationship scores after the first session of group. Expectancy at the individual level was not significantly associated with changes in Negative Relationship scores during any of the stages of group.

Following the testing of models that included either Participation or Expectancy subscale scores, a model was estimated including the effects of both of these variables while the group



level effects of Feedback Condition and Group Type were constrained to be zero. Table 26 shows selected estimates from this model for the early, middle, and late stages of group.

Table 26

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Participation and Expectancy as Predictors*

Variable	Estimates Between			Estimates Within	
	Means	Participation	Expectancy	Participation	Expectancy
NR Intercept	14.10 (4.43)**	1.50 (1.47)	.30 (.84)	-.05 (.06)	.54 (.20)**
Early NR Slope	1.65 (1.14)	-.15 (.38)	-.47 (.32)	.03 (.02)	-.12 (.07)
Middle NR Slope	-.95 (.96)	.20 (.33)	.14 (.27)	-.03 (.02)	.06 (.06)
Late NR Slope	-1.64 (1.29)	-.15 (.42)	.57 (.39)	.01 (.03)	-.02 (.10)

Note: NR=Negative Relationship

\*\*  $p < .01$

Column one of Table 26 shows that the average initial Negative Relationship score was 14.10 points and that Negative Relationship scores did not change significantly over time when both Participation and Expectancy were estimated as predictors in the model. Columns two and three of Table 26 show that at the group level, neither Participation nor Expectancy predicted initial scores for Negative Relationship nor changes in scores on this variable over time. Column four of Table 26 shows that Participation, at the individual level, was not significantly associated with initial Negative Relationship scores or changes in Negative Relationship scores during the early, middle, or late stages of group. Column five of Table 26 shows that Expectancy at the individual level predicted initial Negative Relationship scores after the first session of group. For every point increase on the Expectancy subscale, initial Negative Relationship scores increased by .54 points ( $p$ -value  $< .01$ ). This suggests that individuals who had lower expectations that group would be helpful to them tended to have higher initial Negative Relationship scores at the start of group. Expectancy at the individual level was not associated with changes in Negative Relationship scores over the course of the group.

Additional models were estimated that controlled for the effects of Feedback Condition and Group Type at the group level. The first of these added Feedback Condition at the between-level while both Participation and Expectancy were estimated in the model as well. The second of these subsequent models added Group Type as a predictor at the group level while also estimating the effects of both Participation and Expectancy. Selected estimates for these two multilevel piecewise linear growth models for Negative Relationship during all three stages of group are shown in Appendix A in Tables A15 and A16. Significant results from these two models are summarized next.

Negative Relationship scores did not change significantly over time when either Feedback Condition or Group Type were estimated along with Participation and Expectancy as predictors in the models. Participation, Expectancy, and Feedback Condition or Group Type at the group level were not significantly associated with initial scores for Negative Relationship nor changes in the scores on this variable over time for any of the stages of group. Participation at the individual level did not predict initial scores on the Negative Relationship subscale nor was it associated with changes in Negative Relationship scores during the course of the group. Expectancy at the individual level was not significantly associated with change in Negative Relationship scores during any of the stages of group, but it did significantly predict initial Negative Relationship scores in both models. For each unit on the Expectancy subscale, initial Negative Relationship scores was .54 points higher ( $p < .01$ ), suggesting that individuals who had lower expectations that the group would be helpful to them had higher initial Negative Relationship scores at the start of group.

Finally, a multilevel piecewise linear growth curve model with Participation and Expectancy subscales as predictors at the individual level and both Feedback Condition and

Group Type as predictors at the group level for all three stages of group was estimated. Selected estimates for this model can be seen in Table 27.

Table 27

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Participation, Expectancy, Feedback Condition, and Group Type as Predictors*

Variable	Means	Estimates Between			Group Type
		Participation	Expectancy	Condition	
NR Intercept	14.65 (3.89)**	1.26 (1.27)	.17 (.92)	-.39 (1.29)	.69 (1.83)
Early NR Slope	1.22 (1.40)	-.15 (.51)	-.53 (.38)	.45 (.47)	.40 (1.29)
Middle NR Slope	-.09 (1.20)	.19 (.33)	.25 (.27)	-.53 (.42)	-.88 (.64)
Late NR Slope	-1.59 (2.92)	-.12 (.42)	.49 (.41)	-.47 (1.32)	.26 (2.27)

Variable	Estimates Within	
	Participation	Expectancy
NR Intercept	-.05 (.06)	.53 (.21)*
Early NR Slope	.03 (.02)	-.12 (.08)
Middle NR Slope	-.03 (.02)	.06 (.06)
Late NR Slope	.01 (.04)	-.03 (.10)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 27 shows that the average initial Negative Relationship score was 14.65 points and that there were no significant changes in Negative Relationship during any of the three stage of group. Columns two and three of Table 27 depicting the estimates between groups show that Participation and Expectancy at the group level did not significantly predict initial Negative Relationship scores or changes in this variable during the course of the group. Columns four and five of Table 27 of the between estimates portion of the table show that Feedback Condition and Group Type at the group level also did not significantly predict initial Negative Relationship scores or changes in the scores of Negative Relationship during the early, middle, or late stages of group. The third column of Table 27 displaying the estimates within show that Participation also did not predict initial Negative Relationship scores nor was it associated with changes in Negative Relationship scores during the early, middle, or late stages

of group. Column four of Table 27 in the estimates within portion of the table show that Expectancy predicted initial Negative Relationship scores, with each additional point on the Expectancy subscale being associated with a .54 point ( $p < .05$ ) increase on the Negative Relationship subscale after controlling for Feedback Condition and Group Type at the group level. Thus, individuals who had lowered expectations that group would be helpful to them, tended to have higher Negative Relationship scores after the first session of group. Expectancy scores at the individual level were not associated with changes in Negative Relationship scores over the course of the group.

**Summary of model fit.** Table 28 presents the -2 log likelihood, AIC, and BIC estimates for each of the seven models that were used to test the effects of participation and expectancy on negative relationship during all three stages of group.

Table 28

*Comparison of Fit Statistics for Models Testing the Effects of Participation and Expectancy on Negative Relationship*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	54	14844.06	14952.06	15142.43
Participation Only	62	14836.12	14960.12	15178.7
Expectancy Only	62	14830.17	14954.17	15172.75
Participation and Expectancy	70	14822.53	14962.53	15209.31
Participation, Expectancy, and Feedback Condition	74	14819.26	14967.26	15228.15
Participation, Expectancy, and Group Type	74	14818.24	14966.24	15227.13
Participation, Expectancy, Feedback Condition, and Group Type	78	14814.56	14970.56	15245.55

Using the -2 log likelihood estimates, chi-square tests were calculated to compare the fit of the models testing the effects of Participation and Expectancy on negative relationship. In the

first series of chi-square tests, the models looking at the effects of Participation and Expectancy without estimating the group level variables were compared to the initial outcome model. Chi-square tests revealed that these early models were not significantly better than the initial outcome model. Additional chi-square tests were then calculated in order to examine the fit of models that also factored in the effects of Feedback Condition and Group Type. When comparing these models to the model with both Participation and Expectancy as predictors, no significant differences were found. When looking at the AIC and BIC estimates, presented in columns three and four of Table 28, the estimates for the initial outcome are lowest, which also suggests that the data fit the initial outcome model the best.

**Negative relationship with total score as predictor.** Next, multilevel piecewise linear growth curve models testing the effects of the GRQ Total Score on Negative Relationship across the three stages of group were estimated. An initial outcome model constraining the effects of the GRQ Total Score, Feedback Condition, and Group Type, to be zero was the first of the subsequent models to be estimated. Table 29 presents selected parameter estimates from this initial outcome model for Negative Relationship.

Table 29

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for Negative Relationship*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
NR Intercept	18.99 (.65)**	7.23 (3.36)*	30.48 (5.59)**
Early NR Slope	.40 (.27)	.26 (.53)	1.90 (.68)**
Middle NR Slope	-.10 (.22)	-.57 (.53) <sup>a</sup>	.49 (.40)
Late NR Slope	-1.02 (.34)**	-.44 (1.41) <sup>a</sup>	.58 (1.04)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

a: Negative variance estimate due to skew of dependent variable

Columns one through three of Table 29 show the means for the Negative Relationship intercept and Negative Relationship slopes as well as the standard errors and  $p$ -values for these estimates during all three stages of group. The average initial Negative Relationship score was 18.99 points and Negative Relationship scores did not change significantly during the early or middle stages of group. However, they did significantly decrease by 1.02 points ( $p < .01$ ) on average during the late stage of group for each subsequent administration of the GQ. Columns four through six of Table 29, which depict the variances between groups around the intercept and slopes for the three stages of group, show that only the intercept had significant variance. Columns seven through nine of Table 29 show that there is significant variance between individuals around the intercept ( $p < .01$ ) and slopes ( $p < .05$ ) for the early stage of group, but not the middle and late stages.

Estimates for the residual variances at both the individual level (within) and group level (between) for each of the 12 occasions of group for this initial outcome model with Negative Relationship as the dependent variable are shown in Table 30.

Table 30

*Multilevel Piecewise Linear Growth Curve  
Model for Negative Relationship, Occasion-  
specific Variances*

Occ.	<u>Between</u>	<u>Within</u>
	Est. (S.E.)	Est. (S.E.)
1	2.93 (2.47)	11.74 (4.25)**
2	4.70 (2.90)	24.27 (3.60)**
3	5.14 (4.29)	30.31 (4.12)**
4	8.12 (6.37)	25.87 (3.72)**
5	5.77 (2.77)*	17.24 (2.68)**
6	3.39 (2.95)	30.47 (4.08)**
7	5.61 (4.46)	33.87 (4.69)**
8	11.59 (6.77)	30.08 (4.55)**
9	37.18 (11.16)**	28.93 (4.36)**
10	7.52 (3.89)	23.49 (4.13)**
11	9.05 (5.44)	16.72 (4.30)**
12	11.68 (16.66)	27.94 (8.61)**

Column one of Table 30 shows the variances at the group- or between-level for Negative Relationship for each of the 12 occasions of group. The majority of these variances shown are not significant. Only the between-level variances for the fifth and ninth sessions were significant ( $p < .01$  and  $p < .05$ , respectively), suggesting that there is significant variance in scores between groups on the Negative Relationship subscale during these two sessions after time has been accounted for. On the other hand, all of these variances at the individual- or within-level are significant at the  $p < 0.01$  level, indicating that there is still unexplained variance at the individual level after accounting for time in the model.

The next model run allowed the effect of the GRQ Total Score to be freely estimated while the effects of Feedback Condition and Group Type were constrained to zero. Selected parameter estimates for this multilevel piecewise linear growth curve model are presented in Table 31.

Table 31

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship,  
With Total Score as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Total Score	Total Score
NR Intercept	18.61 (.88)**	1.08 (.98)	.03 (.05)
Early NR Slope	.51 (.32)	-.25 (.31)	.01 (.02)
Middle NR Slope	-.16 (.25)	.19 (.24)	-.01 (.02)
Late NR Slope	-1.03 (.35)**	.07 (.31)	.00 (.03)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 31 shows the means for the Negative Relationship intercept and slopes across the three stages of group after the effects of Total Score have been estimated in the model. The average initial Negative Relationship score after the first session of group was 18.61 points and Negative Relationship scores decreased significantly by 1.03 points ( $p < .01$ ) during the last stage of group at each subsequent administration of the GQ. There were no significant changes to Negative Relationship scores during the early and middle stages of group after adding Total Score into the model. Column two of Table 31 shows the estimates at the between-level for the effects of Total Score on Negative Relationship intercept and each of the slopes for the three stages of group. None of these estimates were significant. Column three of Table 31, which depicts the estimates at the individual-level for the effects of Total Score on Negative Relationship, shows that Total Score did not significantly predict initial Negative Relationship scores or changes in its slope during the early, middle, or late stages of group.

Despite the effects of the GRQ Total Score not being significantly associated with Negative Relationship scores, two subsequent multilevel piecewise linear growth curve models were estimated including the effects of the group-level variables of Feedback Condition and Group Type. The first of these models allowed Feedback Condition and Total Score to be freely



estimated while Group Type was constrained to be zero. The second model allowed Group Type along with Total Score to be freely estimated while constraining Feedback Condition to be zero. Select parameter estimates for these two models are presented in Tables A17 and A18 in Appendix A, but the findings from these two analyses will be presented next.

In summary, the effects of Total Score at the group level were not significantly associated with initial Negative Relationship scores or changes in Negative Relationship scores during any of the stages of group. The effects of either Feedback Condition or Group Type at the group level also were not significantly associated with initial Negative Relationship scores or changes in this variable over the course of group. At the individual level, after controlling for the effects of either Feedback Condition or Group Type, the effects of Total Score continued to not be significantly associated with initial Negative Relationship scores or changes in Negative Relationship during any of the three stages of group.

Finally, a multilevel piecewise linear growth curve model that tested the effects of Total Score, Feedback Condition, and Group Type simultaneously in the same model was estimated.

Table 32 shows selected parameter estimates for this model.

Table 32

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Total Score, Feedback Condition, and Group Type as Predictors*

Variable	Estimates Between				Estimates Within
	Means	Total Score	Condition	Group Type	Total Score
NR Intercept	18.16 (1.77)**	.84 (.80)	-.27 (1.24)	.78 (1.78)	.03 (.05)
Early NR Slope	.20 (.66)	-.22 (.28)	.42 (.47)	.09 (.77)	.01 (.02)
Middle NR Slope	.83 (.57)	.23 (.20)	-.54 (.41)	-.83 (.58)	-.01 (.02)
Late NR Slope	-1.30 (1.09)	.05 (.27)	-.55 (.64)	.62 (1.10)	-.01 (.03)

Note: : NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 32 shows the means for the Negative Relationship intercept and slopes across the early, middle, and late stages of group after the effects of Total Score, Feedback Condition, and Group Type have been estimated in the model. The average initial Negative Relationship score after the first session of group was 18.16 points and Negative Relationship scores did not significantly change during any of the group stages once these group-level variables were controlled for in the model. Column two of Table 32 shows the estimates at the between-level for the effects of Total Score on Negative Relationship intercept and each of the slopes for the three stages of group. None of these estimates were significant. Columns three and four of Table 32 show the estimates for the effects of Feedback Condition and Group Type at the group level. As can be seen, neither Feedback Condition nor Group Type were significantly associated with initial Negative Relationship scores or changes in Negative Relationship during any of the stages of group. Column five of Table 32 shows the estimates at the individual-level for the effects of Total Score on Negative Relationship. After controlling for the effects of both Feedback Condition and Group Type, Total Score continued to not be significantly associated with initial Negative Relationship scores or changes in Negative Relationship scores during any of the three stages of group.

**Summary of model fit.** Table 33 presents estimates for the -2 log likelihood, AIC, and BIC for each of the five models that was used to test the effects of total score on negative relationship during all three stages of group.

Table 33

*Comparison of Fit Statistics for Models Testing the Effects of Total Score on Negative Relationship*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	51	13717.60	13819.60	13999.40
Total Score Only	59	13710.26	13828.27	14036.27
Total Score and Feedback Condition	63	13706.86	13832.86	14054.97
Total Score and Group Type	63	13705.33	13831.33	14053.44
Total Score, Feedback Condition, and Group Type	67	13701.97	13835.98	14072.18

Chi-square tests of significance were computed in order to examine the fit of these various models. When comparing the model that tested only the effects of Total Score on negative relationship to the initial outcome model, there was no significant difference between these two models. There were also no significant differences between the models examining the effects of the group level variables of Feedback Condition and Group Type and the model examining only the effects of Total Score on negative relationship. When looking at the AIC and BIC estimates, shown in columns three and four of Table 33, the initial outcome model appears to have the lowest estimates, suggesting that the data fit the initial outcome model the best.

### **Hypothesis 2: Outcome**

Descriptive statistics for the OQ-45 scores were examined prior to running multilevel models. Table 34 presents the means, standard deviations (S.D.), number of observations (N), and intraclass correlations (ICC) for this outcome variable during the 12 sessions of group.

Table 34

*Means, Standard Deviations, Number of Observations, and Intraclass Correlations for OQ-45 Scores*

Occasion	Mean	S.D.	N	ICC
1	68.07	23.60	166	0.061
2	68.05	23.51	177	0.073
3	68.38	23.65	186	0.065
4	68.89	25.02	184	0.078
5	66.72	24.02	193	0.058
6	66.29	23.14	180	0.041
7	65.88	24.46	176	0.083
8	66.29	24.37	181	0.070
9	67.60	25.72	166	0.049
10	62.30	23.98	129	0.073
11	65.16	24.18	116	0.062
12	65.87	22.22	55	0.061

Column four of Table 34 shows the intraclass correlations for OQ-45 scores. The ICC values ranged from .041 to .083, which suggests that roughly 4% to 8% of differences in OQ-45 scores are associated with group membership.

**Outcome with participation and expectancy as predictors.** In order to test the second hypothesis that the Expectancy and Participation subscale scores and the Total Score of the GRQ will be significantly negatively correlated with client improvement during the early, middle, and late stages of group, as measured by the OQ-45, another series of multilevel piecewise linear growth curve models were estimated. The first model that was tested was an initial outcome model that constrained the effects of the individual level variables of Participation and Expectancy as well as the group level variables of Feedback Condition and Group Type to be zero. Selected estimates for this model are presented in Table 35.

Table 35

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for OQ-45*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
OQ Intercept	67.43 (1.59)**	17.27 (23.66)	439.00 (49.79)**
Early OQ Slope	.73 (.29)*	.70 (1.17)	3.42 (2.10)
Middle OQ Slope	-.26 (.28)	.46 (.93)	10.00 (1.89)**
Late OQ Slope	-.51 (.63)	1.72 (3.80)	27.56 (5.20)**

\*  $p < .05$ , \*\*  $p < .01$

Columns one through three of Table 35 show the estimates for the means of the OQ-45 intercept and slopes for this variable during the early, middle, and late stages of group as well as the standard errors and  $p$ -values. The average initial OQ-45 score was 67.43 points and OQ-45 scores significantly increased by an average of .73 points ( $p < .05$ ) per session during the early stage of group. OQ-45 scores did not significantly change during the middle and late stages of group. Columns four through six of Table 34 show the variances around the intercept and slopes of the OQ-45 across the course of group at the group level. As can be seen in these columns, there was no significant variance at the group level. Columns seven through nine of Table 35 show the variances around the intercept and slopes of the OQ-45 across the three stages of group at the individual level. There was significant variance around the intercept and OQ-45 slopes during the middle and late stages of group, but not during the early stage of group.

Next, estimates for the residual variances from this initial outcome model were examined. Table 35 presents these estimates at both the individual and group levels.

Table 36

*Multilevel Piecewise Linear Growth Curve Model  
for OQ-45, Occasion-Specific Variances*

Occ.	<u>Between</u>	<u>Within</u>
	Est. (S.E.)	Est. (S.E.)
1	.26 (8.02)	77.86 (15.24)**
2	.22 (6.37)	64.76 (10.34)**
3	.04 (4.90)	60.12 (8.57)**
4	.17 (7.81)	72.51 (10.57)**
5	.18 (8.38)	90.63 (12.25)**
6	.10 (15.79)	85.48 (10.70)**
7	.12 (11.29)	102.39 (12.91)**
8	.13 (9.10)	51.00 (9.53)**
9	.66 (7.31)	69.01 (12.44)**
10	10.80 (8.67)	50.80 (10.25)**
11	.11 (5.96)	59.07 (13.89)**
12	.12 (5.78)	-3.24 (19.68)

Column one of Table 36 shows the estimates of the residual variances at the group level for the initial outcome model. All of these estimates were non-significant, suggesting that at the group level there is no additional variance to be explained after time has been accounted for. Column two shows the estimates of the residual variances at the individual level for the initial outcome model. All of these estimates were significant ( $p < .01$ ) with the exception of the residual for Session 12. This suggests that there is significant variance at the individual level during the sessions that remains to be explained after time has been accounted for in the model. The estimate for the residual variance for session 12 at the individual level was negative although it was not significantly different from zero. It is possible that a negative estimate was reached due to the sparseness of the data at Session 12. Since the residual variance at session 12 did not significantly differ from zero, the model was re-estimated after fixing the variance component to zero in order to determine if this would affect the other estimates in the model. Fixing the variance component to zero did not change the significance of the estimates although

it slightly changed the value of the estimates. For instance, the estimate for the intercept decreased .39 points and the estimate for the slope during the early stage of group increased by .001 points. All other relationships that were significant in the initial outcome model that included data from Session 12 remained significant once data from Session 12 was excluded.

The next two models examined the effects of either Participation or Expectancy on OQ-45 scores across all three stages of group. In the first model, the effects of Participation were freely estimated while the effects of Expectancy, Feedback Condition, and Group Type were constrained to zero. In the second model, the effects of Expectancy were freely estimated while the effects of Participation, Feedback Condition, and Group Type were constrained to zero. Selected estimates from these two models are shown in Appendix A in Tables A19 and A20. However, the results from these two models will be summarized next.

In summary, OQ-45 scores did not change significantly during the early, middle, or late stages of group when either Participation or Expectancy were estimated in the models. Participation at the group level did not significantly predict initial OQ-45 scores or changes in this variable over the course of group, but did significantly predict initial OQ-45 scores at the individual level. A one-point increase in Participation scores at the individual level was associated with a .51 increase ( $p < .01$ ) in initial OQ-45 scores, suggesting that group members who reported that they typically participate less in group settings tended to have higher initial OQ-45 scores. Expectancy, significantly predicted initial OQ-45 scores at the group level, with each point of the Expectancy subscale being associated with a 4.4 point increase ( $p < .05$ ) on the OQ-45. This means that groups with higher average Expectancy scores, or groups whose members in general had lower expectations that group would be beneficial to them, tended to have initial OQ-45 scores that were higher. Expectancy at the individual level was not

associated with initial OQ-45 scores or changes in OQ-45 scores during any of the stages of group.

The next multilevel piecewise linear growth curve model estimated the effects of both Participation and Expectancy on OQ-45 scores while the effects of Feedback Condition and Group Type were constrained to zero. Selected estimates for this model are presented in Table 37.

Table 37

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Participation and Expectancy as Predictors*

Variable	Estimates Between			Estimates Within	
	Means	Participation	Expectancy	Participation	Expectancy
OQ Intercept	58.38 (8.18)**	.74 (2.27)	3.90 (2.29)	.55 (.18)**	-.67 (.60)
Early OQ Slope	.21 (1.32)	-.18 (.43)	.57 (.45)	-.04 (.04)	.11 (.12)
Middle OQ Slope	-1.27 (1.41)	.24 (.50)	.18 (.41)	.00 (.04)	.07 (.13)
Late OQ Slope	-1.37 (2.76)	.54 (.93)	-.36 (.79)	-.07 (.08)	-.05 (.24)

\*\*  $p < .01$

Column one of Table 37 shows the estimates for the OQ-45 intercept and slopes across the three stages of group. Initial OQ-45 scores were 58.38 points on average and OQ-45 scores did not change significantly when the effects of both Participation and Expectancy were included in the model. Neither Participation nor Expectancy at the group level significantly predicted initial OQ-45 scores nor were they associated with changes in OQ-45 scores during the course of group. Participation at the individual level continued to predict initial OQ-45 scores with each point on the Participation subscale being associated with a .55 point increase ( $p < .01$ ) in initial OQ-45 scores. This means that group members who rated themselves as being less participatory in group settings tended to have higher initial OQ-45 scores before starting group. Participation at the individual level was not associated with changes in OQ-45 scores during any of the stages



of group. Expectancy at the individual level was not associated with initial OQ-45 scores or changes in this variable during any of the three stages of group.

The next two multilevel piecewise linear growth curve models tested the effects of both Participation and Expectancy while alternately controlling for the effects of either Feedback Condition or Group Type at the group level. Selected estimates for these two models are presented in Appendix A in Tables A21 and A22 in Appendix A, but results from these two models will be summarized next.

OQ-45 scores did not change significantly during the early, middle, or late stages of group when either Feedback Condition or Group Type were included in the models. Neither Participation nor Expectancy at the group level were associated with initial OQ-45 scores or changes in this variable during the course of group when either Feedback Condition or Group Type were included in the model. In both models, Participation at the individual level significantly predicted initial OQ-45 scores, with each additional point on the Participation subscale being associated with an increase of .55 points ( $p < .01$ ) when Feedback Condition was estimated and an increase of .56 points ( $p < .01$ ) when Group Type was estimated. Thus, group members who tended to rate themselves as having a less participatory style in group settings typically had higher initial OQ-45 scores at the start of group. Participation at the individual level was not associated with changes in OQ-45 scores during any of the stages of group. Expectancy at the individual level was not associated with initial OQ-45 scores or changes in outcome during any of the stages of group.

The final multilevel piecewise linear growth curve model tested the effects of both Participation and Expectancy on outcome when both Feedback Condition and Group Type were included in the model. Selected estimates for this model are presented in Table 38.

Table 38

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Participation, Expectancy, Feedback Condition, and Group Type as Predictors*

Variable	Means	Estimates Between			
		Participation	Expectancy	Condition	Group Type
OQ Intercept	59.14 (6.05)**	.55 (1.88)	3.91 (2.03)	-1.42 (3.02)	.61 (4.28)
Early OQ Slope	-.28 (1.17)	-.18 (.38)	.33 (.38)	-.54 (.54)	1.49 (.73)
Middle OQ Slope	-1.26 (1.37)	.28 (.48)	.25 (.42)	.32 (.57)	-.47 (.81)
Late OQ Slope	-2.36 (2.82)	.56 (.94)	-.36 (.82)	1.18 (1.36)	.41 (2.19)

Variable	Estimates Within	
	Participation	Expectancy
OQ Intercept	.56 (.18)**	-.69 (.60)
Early OQ Slope	-.04 (.04)	.10 (.12)
Middle OQ Slope	.00 (.04)	.08 (.13)
Late OQ Slope	-.08 (.07)	-.08 (.24)

Note: PB=Positive Bond, PW=Positive Work, NR=Negative Relationship

\*\*  $p < .01$

Column one in Table 38 shows the estimates for the OQ-45 intercept as well as the slopes for OQ-45 scores during the early, middle, and late stages of group. The average initial OQ-45 score was 59.14 points and OQ-45 scores did not significantly change during any of the three stages of group. Columns two and three of Table 38 show the effects of Participation and Expectancy at the group level on OQ-45 scores while columns four and five show the effects of Feedback Condition and Group Type on OQ-45 scores. None of these variables at the group level significantly predicted initial OQ-45 scores or changes in this variable during the course of group. Participation at the individual level continued to predict initial OQ-45 scores. Each point on the Participation subscale was associated with a .56 point ( $p < .01$ ) increase in initial OQ-45 scores. Thus, individual group members who tended to see themselves as not participating as much in group settings, tended to have higher initial OQ-45 scores at the first session of group regardless of whether or not their group leaders received GQ feedback and regardless of what type of group they were in. Participation at the individual level did not predict changes in OQ-45

scores during any of the stages of group. Expectancy at the individual level also was not associated with initial OQ-45 scores or changes in this variable over the course of group.

**Summary of model fit.** Table 39 shows the -2 log likelihood, AIC, and BIC estimates for each of the seven models that were used to test the effects of participation and expectancy on outcome as measured by the OQ-45.

Table 39

*Comparison of Fit Statistics for Models Testing the Effects of Participation and Expectancy on OQ-45*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	54	17852.70	17960.70	18151.07
Participation Only	62	17838.84	17962.84	18181.42
Expectancy Only	62	17843.13	17967.13	18185.71
Participation and Expectancy	70	17830.67	17970.67	18217.45
Participation, Expectancy, and Feedback Condition	74	17828.61	17976.61	18237.49
Participation, Expectancy, and Group Type	74	17825.39	17973.39	18234.27
Participation, Expectancy, Feedback Condition, and Group Type	78	17823.14	17979.14	18254.13

Using the -2 log likelihood estimates (column 2 of Table 39) three each of the models, chi-square tests were calculated in order to evaluate the fit of the models. None of the models testing participation and/or expectancy fit significantly better than the initial outcome model. Columns three and four show the AIC and BIC estimates for each of the models, and the AIC and BIC for the initial outcome level are the lowest, suggesting that the data fit this model best.

**Outcome with total score as predictor.** Next a series of multilevel piecewise linear growth curve models were estimated to test the relationship between GRQ Total Score and outcome as measured by the OQ-45. The first model constrained Total Score, Feedback

Condition, and Group Type to zero and selected estimates for this model are presented in Table 40.

Table 40

*Multilevel Piecewise Linear Growth Curve Model, Initial Outcome Model for OQ-45*

Variable	<u>Between Estimates</u>	<u>Between Variances</u>	<u>Within Variances</u>
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
OQ Intercept	67.43 (1.59)**	17.27 (23.66)	439.00 (49.79)**
Early OQ Slope	.73 (.29)*	.70 (1.17)	3.42 (2.10)
Middle OQ Slope	-.26 (.28)	.46 (.93)	10.00 (1.89)**
Late OQ Slope	-.51 (.63)	1.72 (3.80)	27.56 (5.20)**

\*  $p < .05$ , \*\*  $p < .01$

Columns one through three of Table 40 show the estimates, standard errors, and  $p$ -values for the group level means for all three stages of group. On average initial OQ-45 scores were 67.43 points and OQ-45 scores tended to increase by .73 points ( $p < .05$ ) during the early stage of group at each subsequent administration of the questionnaire. On the other hand, OQ-45 scores did not significantly change during the middle and late stages of group. Columns four through six of Table 40 depict the variances between groups for initial OQ-45 scores and changes in this variable during the early, middle, and late stages of group. As can be seen in these columns, there was no significant variance in OQ-45 scores between groups. Columns seven through nine of Table 39 show the variances between individuals for OQ-45 scores. There was significant variance at the individual level around the intercept as well as around the slope of changes in OQ-45 scores during the middle and late stages.

Estimates for the variances in OQ-45 scores for the specific occasions of group were also calculated as part of this initial outcome model. These estimates are presented in Table 41.

Table 41

*Multilevel Piecewise Linear Growth Curve Model  
for OQ-45, Occasion-Specific Variances*

Occ.	<u>Between</u> Est. (S.E.)	<u>Within</u> Est. (S.E.)
1	.27 (8.02)	77.86 (15.24)**
2	.22 (6.37)	64.76 (10.34)**
3	.04 (4.90)	60.12 (8.57)**
4	.17 (7.81)	72.51 (10.57)**
5	.18 (8.38)	90.63 (12.25)**
6	.10 (15.79)	85.48 (10.70)**
7	.12 (11.29)	102.39 (12.91)**
8	.13 (9.10)	51.00 (9.53)**
9	.67 (7.31)	69.01 (12.44)**
10	10.80 (8.67)	50.80 (10.25)**
11	.11 (5.96)	59.07 (13.89)**
12	.12 (5.78)	-3.24 (19.68)

Column one of Table 41 shows the occasion-specific variances for OQ-45 scores at the group level. There was no significant variance in OQ-45 scores between groups for any of the 12 sessions. This suggests that there is no significant variance at the group level to be explained once time has been included in the model. Column two shows the occasion-specific variances for OQ-45 scores at the individual level. There was significant variance in OQ-45 scores during all of the sessions, but Session 12. This indicates that there is significant variance in OQ-45 scores at the individual level left to be explained after accounting for time in the model.

The next multilevel piecewise linear growth curve model that was tested, estimated the effects of Total Score on outcome while the variables of Feedback Condition and Group Type were constrained to zero. Selected parameter estimates for this model are presented in Table 42.

Table 42

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Total Score as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Total Score	Total Score
OQ Intercept	66.75 (1.76)**	1.95 (1.06)	.49 (.16)**
Early OQ Slope	.67 (.32)*	.16 (.27)	-.03 (.03)
Middle OQ Slope	-.32 (.31)	.16 (.27)	.02 (.03)
Late OQ Slope	-.50 (.73)	.00 (.55)	-.06 (.07)

\*  $p < .05$ , \*\*  $p < .01$

Column one of Table 42 shows the group level estimates for the means of the OQ-45 intercept and slopes during the early, middle, and late stages of group. The average initial OQ-45 score was 66.75 points and OQ-45 scores increased by .67 points ( $p < .05$ ) at each subsequent administration of the OQ-45 during the early stage of group. Column two of Table 42 shows the estimates of the effects of Total Score at the group level on OQ-45 scores. None of these estimates were significant, suggesting that at the group level, Total Score did not significantly predict initial OQ-45 scores or changes in the scores over time. Column three of Table 42 shows the estimates of the effects of Total Score at the individual level on OQ-45 scores. Total Score significantly predicted individual group member's initial OQ-45 scores, with OQ-45 scores being estimated to increase by .49 points ( $p < .01$ ) for each unit on the Total Score scale. This suggests that individuals who were less prepared for group tended to have higher OQ-45 scores or be in the more distress at the start of group. Total Score at the individual level was not associated with changes in OQ-45 scores during any of the stages of group.

The next series of multilevel piecewise linear growth curve models that tested the relationship between GRQ Total Score and outcome in group also controlled for the effects of Feedback Condition and Group Type at the group level. The first two models alternated

including either Feedback Condition or Group Type while still freely estimating the effect of the GRQ Total Score in the model. Selected parameter estimates for these two models are presented in Appendix A in Tables A23 and A24, but findings from these two models are presented next.

In summary, OQ-45 scores tended to increase by .98 points ( $p < .05$ ) during the early stage of group when Feedback Condition was included in the model as a predictor. However, when the effect of Group Type was included in the model, OQ-45 scores did not significantly change during any of the stages of group. At the group level, Total Score, Feedback Condition, and Group Type were not significantly associated with initial OQ-45 scores or changes in this variable during any of the three stages of group in either of the two models. At the individual level, Total Score positively predicted initial OQ-45 scores, with OQ-45 scores tending to increase an average of .49 points ( $p < .05$ ) for each unit on the Total Score scale after either Feedback Condition or Group Type was taken into account. This continues to suggest that group members who were less prepared for group tended to have initial higher distress at the start of group. Total Score at the individual level did not significantly predict changes in OQ-45 scores across the course of group regardless of the inclusion of the group level variables in the models.

Finally, a multilevel piecewise linear growth curve model was tested that freely estimated Total Score, Feedback Condition, and Group Type all at the same time. Selected parameter estimates for this model are presented in Table 43.

Table 43

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Total Score, Feedback Condition, and Group Type as Predictors*

Variable	Estimates Between				Estimates Within
	Means	Total Score	Condition	Group Type	Total Score
OQ Intercept	66.54 (4.23)**	1.82 (1.42)	-1.19 (3.03)	1.06 (4.21)	.49 (.16)**
Early OQ Slope	-.29 (.96)	.05 (.29)	-.56 (.64)	1.57 (1.03)	-.03 (.03)
Middle OQ Slope	-.21 (.78)	.20 (.31)	.34 (.58)	-.35 (.83)	.02 (.04)
Late OQ Slope	-1.42 (2.47)	.04 (.68)	1.17 (1.47)	.36 (2.99)	-.06 (.07)

\*\*  $p < .01$

Column one of Table 43 shows the estimates for the group-level means of the OQ-45 intercept and slopes across the three stages of group. The average initial OQ-45 score was 66.54 points and OQ-45 scores did not significantly change during the early, middle, or late stages of group. Columns two through four of Table 43 show the estimates for the group level effects of Total Score, Feedback Condition, and Group Type on OQ-45 scores. None of these estimates were significant, suggesting that none of these variables significantly predicted initial OQ-45 scores or changes in this variable over time at the group level. Column five of Table 43 shows the estimates for the effects of Total Score on OQ-45 scores at the individual level. At the individual level, each unit increase on the Total Score subscale was associated with an average of a .49 point ( $p < .01$ ) increase in initial OQ-45 scores, which continues to suggest that group members who were less prepared for group tend to have higher distress when starting the group.

**Summary of model fit.** Table 44 displays the estimates for the -2 log likelihood, AIC, and BIC for each of the five models used to test the effects of total score on outcome as measured by the OQ 45.



Table 44

*Comparison of Fit Statistics for Models Testing the Effects of Total Score on Negative Relationship*

	Number of Parameters	-2LL	AIC	BIC
Initial Outcome Model	51	16726.24	16828.24	17008.04
Total Score Only	59	16708.39	16826.39	17034.39
Total Score and Feedback Condition	63	16706.35	16832.35	17054.46
Total Score and Group Type	63	16702.9	16828.9	17051
Total Score, Feedback Condition, and Group Type	67	16700.6	16834.6	17070.81

The -2 log likelihood estimates, presented in column two of Table 44, chi-square tests of significance were calculated to evaluate the fit of the models. The model that estimated the effects of Total Score while constraining group level variables to be zero was found to have a significantly better fit than the initial outcome model. The models that included Feedback Condition and Group Type as predictors were found to not be significantly different from the model estimating only Total Score as predictor. When looking at columns three and four of Table 44, the model with Total Score as the only predictor has the lowest AIC and BIC estimates, suggesting that the data fit this model the best.

### **Discussion**

This study attempted to bridge a gap in the literature by answering two general questions regarding the predictive power of the GRQ. First, can the GRQ predict group process as measured by GQ subscales of Positive Bonding Relationship, Positive Working Relationship, and Negative Relationship? And second, can the GRQ predict outcome as measured by OQ-45? Furthermore, it attempted to control for potential statistical error by analyzing the data using multilevel analysis to better account for the nested nature of group data.

## Summary of Results

The first hypotheses tested whether the Expectancy and Participation subscale scores and the Total Score of the GRQ would be significantly negatively correlated with positive group processes and significantly positively correlated with negative group processes during the early, middle, and late stages of group. This hypothesis was partially supported. As expected, Participation at the individual level was negatively associated with changes in Positive Bonding scores during the early stage of group, with Positive Bonding scores decreasing by .07 points at each subsequent administration of the GQ for each unit increase on the Participation subscale. However, Participation at the individual level was positively associated with changes in Positive Bonding scores during the middle stage of group, with Positive Bonding scores increasing by .05-.06 points, depending on which model was tested, during each session of group for each unit increase on the Participation subscale. This means that group members who tend not to participate in group settings were less bonded to the group during the first four sessions, but that they became more bonded to the group during the middle four sessions. Surprisingly, it was found that Participation was not predictive of either initial Positive Working Relationship scores or changes in this subscale of the GQ during any of the stages of group. It was also not associated with initial Negative Relationship scores or changes in this subscale across the three stages of group.

Previous studies testing the effects of GRQ scores on group process and outcome had different methodologies, thus making it somewhat challenging to directly compare results of this study and the Phase I, Phase II, and Replication studies. The Phase I study (Burlingame, Cox, et al., 2011) sampled a population of high school students recovering from the aftermath of civil war, while the Phase II (Burlingame, Cox, et al., 2011) and Replication (Cox, 2008) studies both

studied the GRQ's ability to predict group process and outcome in samples of college students participating in group therapy at their university counseling centers. Since the sample for the Phase I study was drawn from a population that is quite different from that of the current study and the Phase II and Replication studies, the current analysis and discussion focuses primarily on how the results from this study compare to those of the Phase II and Replication studies.

The findings that Participation subscale scores negatively predicted Positive Bonding scores during the early stage of group and positively predicted Positive Bonding scores during the middle stage of group, but were not associated with Positive Work or Negative Relationship scores in any way are somewhat different than those of the Phase II study (Burlingame, Cox, et al., 2011). Burlingame, Cox, et al. (2011) found that group members with higher scores on the Participation subscale tended to see themselves as less engaged during the late stage of group, to view their groups as having lower levels of conflict during the early and middle stages of group, and to perceive their groups as having lower levels of cohesion during the late stage of group. On the other hand, the finding that Participation subscale scores were not predictive of the Positive Work and Negative Relationship aspects of group process were similar to the findings of the Replication study conducted by Cox (2008). Cox's study found that Participation scores were only predictive of attrition and were unrelated to group process.

As predicted, Expectancy at the individual level was negatively associated with initial Positive Bonding scores. It was found that initial Positive Bonding scores decreased by .79 points for each unit increase on the Expectancy subscale. Thus, group members who had lower expectations that group would be helpful to them tended to feel less bonded to the group after the initial session. However, Expectancy was not found to predict changes in Positive Bonding scores during the early, middle, or late stages of group. It was also found that Expectancy did not

predict initial scores on the Positive Working Relationship subscale or changes in scores on this subscale across the course of group. Conversely, Expectancy was positively associated with initial scores on the Negative Relationship subscale, with Negative Relationship subscale scores increasing anywhere from .51 to .53 points for each unit increase on the Expectancy subscale.

This suggests that group members who had lower expectations that group would be helpful to them tended to perceive more conflict between group members after the initial session.

Expectancy was not associated with changes in Negative Relationship subscale scores during any of the stages of group.

These findings regarding Expectancy's relationship to initial measures of group process support previous research, but differs from previous research in terms of Expectancy's relationship with changes in group process scores over time. For instance, the direction of the relationship between Expectancy and Positive Bonding and Negative Relationship were both consistent with the directions of the relationships between Expectancy and other group process measures in the Phase II (Burlingame, Cox, et al., 2011) and Replication (Cox, 2008) studies. However, the current study found that Expectancy subscale scores did not predict changes in group process scores during any of the stages of group. This is different than the findings of the Phase II study (Burlingame, Cox, et al., 2011), which found that Expectancy subscale scores negatively predicted cohesion and engagement during the early and middle stages of group and positively predicted conflict during the early stage of group. The findings from the current study are also different than those of the Replication study (Cox, 2008) which found that group members with lower expectations of group therapy being beneficial to them tended to view their groups as having lower cohesion during the middle stage of group.

Surprisingly, Total Score on the GRQ was positively associated with changes in Positive Bonding scores during the middle stage of group with Positive Bonding scores increasing by .05 points for each unit increase in Total Score. This suggests that group members who were less prepared for group tended to experience more bonding with the group during the middle stage. However, this finding was no longer significant after controlling for Group Type at the group level. Total Score did not predict changes in Positive Bonding scores during either the early or late stages of group. Total Score was not associated with initial scores or changes in scores on either the Positive Working Relationship or Negative Relationship subscales of the GQ.

These findings are different than those of the Phase II study (Burlingame, Cox, et al., 2011) which found that Total Score negatively predicted cohesion and engagement during the early stage of group and positively predicted conflict during the early stage of group. On the other hand, findings from the current study are similar to those of Cox (2008) in the Replication study, who found that Total Score was not related to group process during any of the stages of group.

The second hypothesis of this study was that the Participation and Expectancy subscale scores and the Total Score of the GRQ will be significantly negatively correlated with client improvement during the early, middle, and late stages of group, as measured by the OQ-45. This hypothesis was partially supported in that GRQ scores were correlated with initial OQ-45 scores, but they were not correlated with changes in OQ-45 scores over time. It was found that Participation at the individual level was positively associated with initial OQ-45 scores, with initial OQ-45 scores increasing between .51 to .56 points, depending on the model, for each unit increase in the Participation subscale. This means that group members who were inclined to be less participatory in group settings tended to be experiencing more distress prior to starting

group. Participation, however, did not predict changes in outcome during the early, middle, or late stages of group.

As noted previously, the Participation subscale measures an individual's perception of their behaviors in group settings. Individuals with higher Participation subscale scores typically avoid self-disclosure in group settings and may appear withdrawn to others. Previous findings show that actual participation and self-disclosure in group does affect outcome (MacNair & Corazzini, 1994; MacNair-Semands, 2002; Yalom & Leszcz, 2005). Thus, it can be expected that the group members who demonstrate a reluctance to disclose personal feelings or actively participate in the group process will most likely have more distress coming into the group. However, the relationship between a tendency to be less participatory in group settings and emotional distress is in no way causal. It is possible that when someone is in distress they may become less willing to self-disclose and participate in group settings. Regardless of the direction of this relationship, findings from the current study differ from those of the Phase II study (Burlingame, Cox, et al., 2011) which found that group members who had higher scores on the Participation subscale tended to have less change in their symptoms during the late stage of group. However, it should be noted that the direction of the relationship between Participation and the initial outcome scores was in the expected direction given the findings of the Phase II study (Burlingame, Cox, et al., 2011), suggesting that the findings from the current study lend support to this previous research. On the other hand, findings from the current study are similar to those from the Replication study (Cox, 2008), which found that Participation subscale scores were not predictive of outcome.

Expectancy at the group level was positively associated with initial OQ-45 scores, with initial OQ-45 scores increasing by 4.4 points on average with each unit increase on the

Expectancy subscale. This means that when average group Expectancy scores increased by one unit, members of that group tended to have initial OQ-45 scores that increased by 4.4 points. Thus, groups where the members on average had low expectations that group would be helpful to them had group members who were experiencing more initial distress when the group commenced. Again, it is difficult to determine causality and it is possible that initial distress precedes a group member's low expectations of group being helpful to them. However, this significant finding only existed in the model that examined the effects of Expectancy on outcome while constraining the effects of Participation (and the group-level variables of Feedback Condition and Group Type) to be zero. Expectancy at the individual level was not associated with initial outcome or changes in outcome over time as the group progressed. These results regarding the relationship between Expectancy at the group level and initial outcome scores is a novel finding since none of the previous GRQ studies examined this relationship. However, the finding that Expectancy at the individual level was not predictive of changes in outcome during any of the stages of group is similar to those of the Phase II (Burlingame, Cox, et al., 2011) and Replication (Cox, 2008) studies, which also found no relationship between Expectancy and client improvement.

Total Score at the individual level was found to be positively associated with initial OQ-45 scores as well. It was found that initial OQ-45 scores increased on average by .49 points for each unit increase on the Total Score scale. Thus, group members who tended not to be prepared for group, or who had higher scores on the Total Score scale, were experiencing more distress prior to the first session of group. Total Score at the individual level was not associated with changes in OQ-45 scores during any of the stages of group. These findings differ from those of the Phase II study (Burlingame, Cox, et al., 2011), which found that Total Score was positively

associated with less change in symptoms. However, the findings from this study are consistent with those of the Replication study (Cox, 2008) which found that Total Score was not associated with outcome.

It should be noted that all of these relationships between the GRQ variables and the dependent variables, with the exception of Expectancy at the group level predicting initial outcome scores, proved to be significant after adding Group Type and Feedback Condition into the models. This suggests that the significant findings are robust and that the variation they are predicting is due to the constructs underlying the GRQ and not to these factors of group membership. This increases the confidence in the findings and is encouraging in that clinicians can trust the results and subsequently use them to inform their clinical practice.

Outside of the testing of the hypotheses with focused statistical tests, this study also examined omnibus tests evaluating the goodness of fit for each model. It was found that in most cases, the initial model provided a significantly better fit for the data. The exceptions to this finding were when the model testing the effects of Expectancy on Positive Bond proved to provide a significantly better fit and when the model testing the effects of the GRQ Total Score on outcome provided a better fit than the initial outcome model. The fact that the remainder of the models did not produce significantly better fit than the initial outcome model is not necessarily discouraging since omnibus tests for goodness of fit evaluate whether adding all the additional parameters in a model, not just those that are significant, improve the overall fit of the model. Thus, models that increase the degrees of freedom (more parameters being estimated) without significantly increasing the difference in the deviance will produce chi-square tests that are nonsignificant. For instance, in all but one of the models, the effects of group level variables were not significantly associated with the dependent variable. Adding these group level



variables to the models increased the degrees of freedom, but did not lower the deviance enough to produce significant chi-square tests. The presence of these nonsignificant variables thus contributed to poorer fit despite often having one or more variables in the models that were significant and could have contributed to better fit. So while the omnibus tests are helpful to some extent, there are limitations to their interpretation and usefulness and the results from the focused statistical tests should not be disregarded just because oftentimes the initial model provided the best fit to the data.

Another finding from this study, though not directly related to the hypotheses in question, is the relative importance of group membership. Although the relationships between group level variables and the dependent variables were rarely significant, this study found that a large percentage of differences in group process scores was related to being in groups. Specifically it found that 10-52% of differences in Positive Bond scores, 8-27% of the differences in Positive Work scores, 13-59% of the differences in Negative Relationship scores, and 4-8% of the differences in OQ-45 scores were due to group membership. This finding emphasizes the importance of controlling for group association when analyzing data as suggested by Baldwin, et al., (2008).

### **Limitations**

Data from this study were gathered over the course of two years in order to facilitate collecting a large enough sample to enable an adequate sample size that could be examined using multilevel analysis to answer the research questions. Appropriate methods to analyze the data were also selected to control for potential bias that could be introduced when the nested nature of group data is not taken into account. Despite these efforts to ensure suitable collection and handling of the data, this study is limited in several ways that need to be discussed.

First, from a statistical standpoint, this study was in fact limited by the sample size. Although having 33 groups was adequate to run a multilevel analysis, it was not large enough to run a piecewise model that allowed simultaneous analysis of all three GQ process measures as dependent variables at the same time. Due to this limited sample size, models looking at the predictive power of the GRQ on the Positive Bonding, Positive Work, and Negative Relationship subscales had to be estimated separately and correlations between the residuals of the three dependent process variables could not be taken into account. This valuable information could have shed light on possible unexplained covariance between the dependent variables.

Another statistical constraint on the data was the skewed nature of the GQ process data. Although the skewness of Positive Bond (-1.102), Positive Work (-.590), and Negative Relationship (1.324) were not extreme (above 3.0), the SEM analyses used Maximum Likelihood estimation which assumes there is multivariate normality in the data. It is possible that the skew to the dependent variable data violated the assumption of multivariate normality, which could have resulted in unreliable or biased parameter estimates to some degree.

Another statistical concern is the gradual reduction in data for analysis during the late stage of group. Groups began and ended within semesters, which lasted approximately 15 to 16 weeks. However, some groups were not started until several weeks of the semester had passed and these groups were not able to meet for the full twelve sessions of the expected analysis period. Thus, the number of cases available for multilevel analyses decreased during the late stage of group. For instance, at Session 9 there were 216 cases available for analysis as compared with 185 cases at Session 10, 161 cases at Session 11, and only 87 cases at Session 12. The gradual reduction in cases available for analysis may have significantly decreased the power

during the late stage of group and thus limited the possibility of finding significant statistical relationships between the independent and dependent variables.

One practical limitation of the study is the use of arbitrary points to differentiate between the early, middle, and late stages of group. Although most groups will exhibit the common behaviors characteristic of the early, middle, and late stages of group process, not all groups may have gone through the stages at the same pace. It is possible that some of the groups in this study may have experienced shorter or longer stages and thus the arbitrary use of cutoff points of Session 5 and Session 9 may not closely align with the experiences of the actual groups and may not fit have fit the data well.

An additional limitation of the present study is the archival nature of the data collection for the BYU subsample of students. BYU students completed the GRQ at the time of their intake, which was anywhere from a week to several years prior to participating in the study. Approximately 21% of the BYU sample completed the GRQ a semester prior to participating in the study while an additional 23% of BYU students completed the GRQ over a year before they actually participated in the study. It is possible that the level of expectancy and style of participating in group settings of these students changed during the months following the time they filled out the GRQ, thus rendering their scores on this measure obsolete or inaccurate. If their scores on the GRQ were not accurate, this may have confounded the GRQ's ability to project the individual student's group process and outcome scores.

This study also did not control for previous group therapy experience on the part of the students. The GRQ assesses general participatory behaviors in any type of group setting and it is assumed that the group member will participate in group therapy in the same way that they participate in other types of groups. It is possible that some group members participated in group

therapy prior to participating in the current study and their previous experiences in these groups may have affected how they participated in the sessions during the study time period. For instance, if a student, who generally does not participate well in group settings and has a high score on the Participation subscale of the GRQ, had previous experience in group therapy where they learned to value self-disclosure in that particular setting, they may have been more likely to participate well and self-disclose during their group in the study. Their score on the Participation subscale of the GRQ then would not accurately reflect their actual behavior in group therapy and their GRQ score may not be predictive of their group process and outcome scores. Thus, not controlling for previous group therapy experience in the analyses may have limited this study's ability to correctly assess the effects of GRQ scores on group process and outcome scores.

Another potential limitation of the current study is that it did not account for the possible influence that group leaders had on group process and outcome. For instance, group leaders subscribed to various theoretical orientations, which most likely influenced their style of leadership and the types of interventions they used with group members over the course of their groups. These differences along with subsequent interventions could have affected group members' scores on both the GQ and OQ-45. Furthermore, although the study controlled for whether or not group leaders received ongoing feedback about how their members were perceiving group processes as well as outcome scores for each member of their group, it did not control for how group leaders used this information during groups. Woodland (2015) and Whitcomb (2016), in their analyses of how group leaders used GQ feedback, found that there was significant variability in how leaders reportedly used the GQ feedback they received, with some leaders using feedback in minimal ways while other leaders using feedback to guide or enhance the interventions they employed during group. Thus, the group level variable of

Feedback Condition used in this study may have been overly broad and less precise than directly coding how group leaders specifically used the feedback that they received. However, such questions were beyond the scope of this research study. Regardless of these potential limitations, there was very little variance at the group level to be explained, and it is probable that including more specific group-level variables regarding group leader theoretical orientation or specific use of GQ or OQ-45 feedback would not have affected the results of this study.

Finally, data to answer the research questions came from counseling centers at three universities in the Southwest. Some of the sample characteristics also introduced some potential limitations. The majority of the groups in the study came from a large, conservatively religious university in the Southwest. Students who made up the groups were primarily Caucasian and highly religious. These characteristics could potentially limit the generalizability of the findings to populations with greater multicultural diversity. Additionally the entire sample was made up of relatively young, full-time college students, which could also limit the applicability of these findings to populations outside of university students in early adulthood who may be seeking treatment in other settings, such as hospitals or outpatient community clinics.

### **Implications for Future Research**

This study found partial support for its hypotheses that the subscales and the Total Score of the GRQ could predict group process and outcome in psychotherapy groups. Due to the limitations described above, further research could be conducted to more fully establish the predictive power of the GRQ. These future studies could expand on past and current GRQ research while controlling for some of the limitations that this current study faced.

First, future studies could assess whether the GRQ can predict group process and outcome in a sample of groups that is comprised of populations outside of college counseling

centers. Previous research regarding the predictive capabilities of the GRQ has focused on secondary- and college-age students. Furthermore, the majority of the samples included in this and previous studies have been Caucasian. Investigating whether the findings of this current study and past studies are supported in populations who are not students and who are of a mix of races or ethnic groups could greatly improve the generalizability of the results.

Of course future studies will need to attend to the statistical constraints that go along with studying group data. Multilevel analysis will need to be used to control for the nested nature of the data, but sample size should also be taken into account. The current study faced statistical limitations due to gradual reduction of cases in the late stage of group, thus limiting the study's statistical power needed to uncover significant relationships between the GRQ and process and outcome during the last stage of group. Future studies will need to include a large enough sample to ensure adequate power throughout all stages of the groups that are being studied.

Additionally, future studies can also take into consideration the effects of group leaders on the process and outcome data. The current study was limited by inadequate variance at the group level. However, should future studies have significant variance at the group level, they should control for leader characteristics, such as theoretical orientation and experience, and how the leaders are using process and outcome feedback if the variable of leaders receiving feedback is included in the research design.

Finally, another area to be explored in future research is how compositions of groups possibly affect group process and outcome. Yalom and Leszcz (2005) noted that group members who display significantly different behaviors as compared to the rest of the members of their group are at risk of deteriorating, being rejected by other group members, and dropping out early from treatment. Other researchers have also taken interest in how the relative nature of group

members' characteristics, experiences, and behaviors affect group process and outcome (Gillis, Kivlighan & Russell, 2016; Gullo, et al., 2014; Kivlighan, Paquin, Hsu, & Wang, 2016; Paquin, Kivlighan, & Drogosz, 2013). Future studies could use the GRQ to explore how composition of group members' scores on the Participation and Expectancy subscales and their overall Total Score affect group process and outcome.

### **Implications for Practitioners**

Although it could be argued that the effect sizes of the GRQ's ability to predict process and outcome are relatively small, these small effect sizes still hold clinical significance. Take for example the finding that a one-point increase on the Participation subscale was associated with a .05 point decrease in Positive Bonding scores at each session during the early stage of group. Though .05 points may not seem like much, this small decrease over time in feeling connected to the group may make the difference between a group member remaining silent and withdrawn or opening up to the group or even between the member returning to group the next week or not. Thus, feeling less connected to the group during the early stage can result in behaviors or ultimate withdrawal that could have negative consequences for the group member. So while the effect sizes may seem relatively small, the results still have clinical importance.

Significant findings from this study suggest that clinicians can use the GRQ as a PBE measure to inform treatment of both potential and actual group members. Clinicians who are in the pre-group phase of treatment can use the Expectancy subscale of the GRQ to predict which group members will be more likely to begin group with lower bonding and higher perceived conflict. Clinicians who are thinking about referring such clients to a group can then take steps to better prepare these clients for entry into a psychotherapy group. For instance, once a clinician knows that a potential group member has lower expectations for the group to be helpful

for them, he or she can talk about the benefits of group in more detail and discuss behaviors the potential group member should take while in session to get the most out of their experience in group. The clinician can emphasize the potential group member's need to be open in disclosing their thoughts and feelings to other group members in order to build a level of closeness and bonding to the group. Thus, clinicians can find the GRQ to be a useful tool in preparing their clients for membership in group therapy.

The finding that group members who had higher Participation scores tended to increasingly feel less bonded to the group during the early stage of group is also useful for clinicians who lead groups. This suggests that group leaders could use their group members' Participation scores to determine which of their members are at risk for a declining sense of bonding to the group during the first few sessions. Knowing this information allows group leaders to watch these less participatory members and employ interventions to draw the group member out or facilitate positive interactions with other members to enhance the likelihood that the less engaged member can feel more bonded to the group. These early efforts to help the group member engage more fully with the group can also help the group member experience first-hand the benefits of participating more actively in group and reinforce participatory behaviors during the remaining sessions.

## **Conclusion**

The goals of the present study were to test the ability of the GRQ to predict process and outcome in group psychotherapy while controlling for the interdependent nature of group data using multilevel analysis. This study found that group members who typically participate less in group settings tended to experience greater initial distress and to feel less bonded to other group members and the group as a whole during the early stage of group, but that these same group



members started to feel more bonded to the group during the middle stage of group. It also found that group members who did not expect the group to be helpful to them tended to initially perceive themselves as less connected or bonded to the group and to perceive more conflict within the group after the first session. Additionally, groups that tended to have more members with low expectations that the group would be helpful to them, were in general comprised of group members that had higher initial distress. Group members who were generally less prepared for group, as measured by the Total Score of the GRQ, tended to be experiencing higher initial distress prior to starting the group and to gradually feel more connected to their group during the middle stage.

Although further research could be done to improve the generalizability of these findings, these significant results support the conclusion that the GRQ can be used as a PBE measure. The information gathered from the GRQ can enhance clinicians' abilities to better prepare potential group members to participate in group psychotherapy and to facilitate interventions to help less participatory group members feel more bonded to the other members in their groups. Such efforts could in turn help promote better outcomes for these at-risk group members.

Despite the potential usefulness of the GRQ, research shows that in terms of pre-group preparation, only one out of every four therapists uses some sort of assessment measure that tries to capture potential group members' personality characteristics and that approximately one out of every five therapists uses an assessment measure focusing on potential group members' interpersonal or group behavior (Riva, Lippert, & Tackett, 2000). Given that approximately 75-80% of therapists do not appear to use assessment measures to select or prepare group members, this area has the potential to grow and develop by using approaches guided by PBE. By using assessment measures that have been shown to predict group process and outcome in group

therapy, therapists can potentially enhance the quality and helpfulness of their group interventions. The Group Readiness Questionnaire (GRQ) is one such measure that offers these potential benefits to therapists.

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## APPENDIX A: Additional Tables

Table A1

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Participation as Predictor*

Variable	<u>Estimates Between</u>		<u>Estimates Within</u>
	Means	Participation	Participation
PB Intercept	78.75 (5.52)**	-1.26 (1.78)	-.01 (.09)
Early PB Slope	-.87 (1.55)	.03 (.50)	-.06 (.03)
Middle PB Slope	1.39 (1.57)	-.35 (.50)	.06 (.03)*
Late PB Slope	2.39 (1.66)	-.11 (.60)	-.02 (.05)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A2

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Expectancy as Predictor*

Variable	<u>Estimates Between</u>		<u>Estimates Within</u>
	Means	Expectancy	Expectancy
PB Intercept	76.64 (2.64)**	-1.02 (1.39)	-.77 (.28)**
Early PB Slope	-1.13 (.90)	.23 (.47)	.11 (.11)
Middle PB Slope	.58 (.89)	-.13 (.47)	.03 (.08)
Late PB Slope	3.42 (1.01)**	-.72 (.51)	-.23 (.15)

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A3

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Participation, Expectancy, and Feedback Condition as Predictors*

Variable	Means	<u>Estimates Between</u>		
		Participation	Expectancy	Condition
PB Intercept	79.19 (6.48)**	-1.28 (2.10)	-.72 (1.46)	1.48 (1.99)
Early PB Slope	-.90 (1.81)	-.04 (.58)	.31 (.51)	-.41 (.71)
Middle PB Slope	1.64 (1.93)	-.40 (.62)	.02 (.48)	-.14 (.68)
Late PB Slope	2.35 (1.91)	.11 (.55)	-.58 (.50)	1.10 (.85)
Variable	<u>Estimates Within</u>			
	Participation	Expectancy		
PB Intercept	.04 (.09)	-.79 (.29)*		
Early PB Slope	-.07 (.03)*	.16 (.11)		
Middle PB Slope	.05 (.03)*	-.01 (.08)		
Late PB Slope	.00 (.05)	-.23 (.15)		

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A4

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Participation, Expectancy, and Group Type as Predictors*

Variable	Means	<u>Estimates Between</u>		
		Participation	Expectancy	Group Type
PB Intercept	78.47 (5.22)**	-1.05 (1.74)	-.72 (1.50)	1.02 (3.02)
Early PB Slope	-.35 (1.49)	-.03 (.48)	.44 (.51)	-1.38 (1.07)
Middle PB Slope	.66 (1.55)	-.33 (.48)	-.14 (.50)	1.24 (1.08)
Late PB Slope	3.15 (1.87)	.10 (.56)	-.77 (.56)	.05 (1.60)
Variable	<u>Estimates Within</u>			
	Participation	Expectancy		
PB Intercept	.04 (.09)	-.79 (.29)**		
Early PB Slope	-.07 (.03)*	.15 (.11)		
Middle PB Slope	.05 (.03)*	-.02 (.08)		
Late PB Slope	.00 (.05)	-.22 (.15)		

Note: PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A5

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Total Score and Feedback Condition as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Condition	Total Score
PB Intercept	74.64 (1.63)**	-1.00 (1.15)	1.21 (1.98)	-.08 (.08)
Early PB Slope	-.54 (.57)	.05 (.34)	-.39 (.71)	-.03 (.03)
Middle PB Slope	.51 (.56)	-.26 (.36)	-.10 (.69)	.05 (.02)*
Late PB Slope	1.49 (.74)	-.08 (.33)	1.34 (.86)	-.04 (.04)

Note: : PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A6

*Multilevel Piecewise Linear Growth Curve Model for Positive Bonding, With Total Score and Group Type as Predictors*

Variable	Means	Estimates Between		Estimates Within
		Total Score	Group Type	Total Score
PB Intercept	74.65 (2.58)**	-.79 (1.35)	.75 (3.02)	-.08 (.08)
Early PB Slope	.10 (.88)	.06 (.31)	-1.16 (1.06)	-.03 (.03)
Middle PB Slope	-.53 (.91)	-.28 (.31)	1.23 (1.06)	.05 (.02)
Late PB Slope	2.67 (1.36)*	-.12 (1.00)	-.67 (2.51)	-.04 (.06)

Note: : PB=Positive Bond

\*  $p < .05$ , \*\*  $p < .01$

Table A7

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Participation as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Participation	Participation
PW Intercept	44.64 (3.07)**	-1.65 (.99)	-.04 (.08)
Early PW Slope	-1.19 (.63)	.23 (.21)	.01 (.03)
Middle PW Slope	-.26 (1.02)	.01 (.34)	-.03 (.02)
Late PW Slope	.82 (1.39)	.12 (.48)	.01 (.04)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A8

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Expectancy as Predictor*

Variable	<u>Estimates Between</u>		<u>Estimates Within</u>
	Means	Expectancy	Expectancy
PW Intercept	41.17 (2.05)**	-.72 (1.04)	-.25 (.27)
Early PW Slope	-1.10 (.48)*	.32 (.24)	-.08 (.10)
Middle PW Slope	-.21 (.68)	.00 (.34)	-.09 (.08)
Late PW Slope	2.14 (.95)*	-.57 (.57)	.05 (.13)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A9

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Participation, Expectancy, and Feedback Condition as Predictors*

Variable	Means	<u>Estimates Between</u>		
		Participation	Expectancy	Condition
PW Intercept	44.73 (3.31)**	-1.65 (1.00)	-.05 (.98)	-.16 (1.46)
Early PW Slope	-1.39 (.77)	.21 (.23)	.24 (.25)	-.29 (.40)
Middle PW Slope	-.27 (1.04)	.01 (.36)	.02 (.38)	.02 (.52)
Late PW Slope	.91 (1.23)	.14 (.40)	-.48 (.59)	1.23 (.65)
Variable	<u>Estimates Within</u>			
	Participation	Expectancy		
PW Intercept	-.02 (.09)	-.23 (.28)		
Early PW Slope	.02 (.03)	-.10 (.10)		
Middle PW Slope	-.02 (.03)	-.08 (.08)		
Late PW Slope	.01 (.04)	.04 (.13)		

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A10

*Multilevel Piecewise Linear Growth Curve Model for Positive Work, With Participation, Expectancy, and Group Type as Predictors*

Variable	Means	Estimates Between		
		Participation	Expectancy	Group Type
PW Intercept	43.48 (3.15)**	-1.62 (.87)	-.29 (1.00)	1.86 (2.13)
Early PW Slope	-1.41 (.67)*	.19 (.19)	.25 (.26)	-.14 (.61)
Middle PW Slope	-.44 (1.02)	-.01 (.35)	-.09 (.39)	.50 (.81)
Late PW Slope	2.12 (1.47)	.21 (.45)	-.51 (.57)	-.81 (1.26)

Variable	Estimates Within	
	Participation	Expectancy
PW Intercept	-.02 (.08)	-.24 (.28)
Early PW Slope	.02 (.03)	-.10 (.10)
Middle PW Slope	-.02 (.03)	-.08 (.08)
Late PW Slope	.01 (.04)	.05 (.13)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A11

*Multilevel Piecewise Linear Growth Curve Model for Positive Working Relationship, With Total Score and Feedback Condition as Predictors*

Variable	Means	Estimates Between		Estimates Within
		Total Score	Condition	Total Score
PW Intercept	40.50 (1.27)	-1.26 (.81)	-.34 (1.44)	-.06 (.07)
Early PW Slope	-.46 (.31)	.20 (.15)	-.25 (.39)	.01 (.03)
Middle PW Slope	-.24 (.40)	-.02 (.24)	.05 (.52)	-.03 (.02)
Late PW Slope	.32 (.59)	.03 (.34)	1.38 (.68)	.01 (.04)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A12

*Multilevel Piecewise Linear Growth Curve Model for Positive Working Relationship, With Total Score and Group Type as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Group Type	Total Score
PW Intercept	38.73 (1.90)**	-1.28 (.70)	1.95 (2.04)	-.06 (.08)
Early PW Slope	-.57 (.51)	.19 (.15)	-.02 (.58)	.01 (.03)
Middle PW Slope	-.62 (.68)	-.07 (.25)	.50 (.80)	-.03 (.02)
Late PW Slope	2.33 (1.12)*	.11 (.37)	-1.45 (1.26)	.01 (.04)

Note: PW=Positive Work

\*  $p < .05$ , \*\*  $p < .01$

Table A13

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Participation as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Participation	Participation
NR Intercept	14.84 (3.75)**	1.42 (1.24)	-.02 (.06)
Early NR Slope	1.17 (1.16)	-.26 (.38)	.02 (.02)
Middle NR Slope	-.76 (.89)	.23 (.30)	-.03 (.02)
Late NR Slope	-1.03 (1.17)	.01 (.41)	.01 (.03)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A14

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Expectancy as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Expectancy	Expectancy
NR Intercept	17.84 (1.63)**	.68 (.85)	.51 (.20)**
Early NR Slope	1.29 (.61)	-.51 (.31)	-.11 (.07)
Middle NR Slope	-.45 (.51)	.18 (.26)	.04 (.06)
Late NR Slope	-2.00 (.78)*	.52 (.38)	-.01 (.10)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A15

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Participation, Expectancy, and Feedback Condition as Predictors*

Variable	Means	<u>Estimates Between</u>		
		Participation	Expectancy	Condition
NR Intercept	14.48 (4.32)**	1.45 (1.43)	.30 (.83)	-.41 (1.25)
Early NR Slope	1.45 (1.12)	-.15 (.37)	-.47 (.31)	.41 (.45)
Middle NR Slope	-.63 (.89)	.19 (.30)	.13 (.26)	-.51 (.40)
Late PB Slope	-1.29 (1.30)	-.15 (.41)	.52 (.38)	-.53 (.63)

Variable	<u>Estimates Within</u>	
	Participation	Expectancy
NR Intercept	-.05 (.06)	.54 (.20)**
Early NR Slope	.03 (.02)	-.12 (.07)
Middle NR Slope	-.03 (.02)	.06 (.06)
Late NR Slope	.01 (.03)	-.02 (.10)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A16

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Participation, Expectancy, and Group Type as Predictors*

Variable	Means	<u>Estimates Between</u>		
		Participation	Expectancy	Group Type
NR Intercept	14.29 (3.86)**	1.31 (1.28)	.19 (.86)	.69 (1.80)
Early NR Slope	1.46 (1.06)	-.15 (.36)	-.52 (.34)	.39 (.73)
Middle NR Slope	-.47 (.89)	.22 (.28)	.26 (.28)	-.87 (.60)
Late NR Slope	-1.94 (1.24)	-.11 (.37)	.52 (.40)	.31 (1.11)

Variable	<u>Estimates Within</u>	
	Participation	Expectancy
NR Intercept	-.05 (.06)	.54 (.20)**
Early NR Slope	.03 (.02)	-.12 (.07)
Middle NR Slope	-.03 (.02)	.06 (.06)
Late NR Slope	.01 (.03)	-.02 (.10)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A17

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Total Score and Feedback Condition as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Condition	Total Score
NR Intercept	18.75 (1.11)**	1.04 (.95)	-.28 (1.25)	.03 (.05)
Early NR Slope	.28 (.41)	-.25 (.30)	.40 (.46)	.01 (.02)
Middle NR Slope	.14 (.32)	.18 (.22)	-.53 (.40)	-.01 (.02)
Late NR Slope	-.67 (.45)	.05 (.30)	-.68 (.62)	.00 (.03)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A18

*Multilevel Piecewise Linear Growth Curve Model for Negative Relationship, With Total Score and Group Type as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Group Type	Total Score
NR Intercept	18.02 (1.61)**	.89 (.83)	.77 (1.78)	.03 (.05)
Early NR Slope	.44 (.61)	-.22 (.29)	.09 (.78)	.01 (.02)
Middle NR Slope	.53 (.55)	.25 (.22)	-.83 (.59)	-.01 (.02)
Late NR Slope	-1.65 (1.00)	.06 (.29)	.69 (1.13)	.00 (.03)

Note: NR=Negative Relationship

\*  $p < .05$ , \*\*  $p < .01$

Table A19

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Participation as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Participation	Participation
OQ Intercept	62.33 (5.92)**	1.77 (1.93)	.51 (.18)**
Early OQ Slope	.60 (1.09)	.05 (.36)	-.03 (.04)
Middle OQ Slope	-1.03 (1.29)	.27 (.44)	.01 (.04)
Late OQ Slope	-1.24 (2.16)	.25 (.72)	-.07 (.08)

\*  $p < .05$ , \*\*  $p < .01$



Table A20

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Expectancy as Predictor*

Variable	Estimates Between		Estimates Within
	Means	Expectancy	Expectancy
OQ Intercept	59.65 (4.07)**	4.41 (2.14)*	-.27 (.59)
Early OQ Slope	-.13 (.77)	.49 (.42)	.08 (.12)
Middle OQ Slope	-.74 (.76)	.27 (.40)	.07 (.13)
Late OQ Slope	-.19 (1.51)	-.18 (.74)	-.09 (.23)

\*  $p < .05$ , \*\*  $p < .01$

Table A21

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Participation, Expectancy, and Feedback Condition as Predictors*

Variable	Means	Estimates Between		
		Participation	Expectancy	Condition
OQ Intercept	58.88 (7.71)**	.84 (2.13)	3.90 (2.27)	-1.47 (3.06)
Early OQ Slope	.40 (1.25)	-.13 (.40)	.56 (.43)	-.56 (.56)
Middle OQ Slope	-1.42 (1.40)	.23 (.49)	.18 (.41)	.32 (.58)
Late OQ Slope	-1.87 (2.61)	.49 (.85)	-.31 (.78)	1.13 (1.28)
Variable	Estimates Within			
	Participation	Expectancy		
OQ Intercept	.55 (.18)**	-.68 (.60)		
Early OQ Slope	-.04 (.04)	.11 (.12)		
Middle OQ Slope	.00 (.04)	.07 (.13)		
Late OQ Slope	-.07 (.07)	-.06 (.24)		

\*  $p < .05$ , \*\*  $p < .01$

Table A22

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Participation, Expectancy, and Group Type as Predictors*

Variable	Means	Estimates Between		
		Participation	Expectancy	Group Type
OQ Intercept	58.62 (6.04)**	.43 (1.96)	3.87 (2.04)	.81 (4.30)
Early OQ Slope	-.47 (1.24)	-.23 (.41)	.34 (.39)	1.51 (.74)*
Middle OQ Slope	-1.09 (1.37)	.28 (.48)	.26 (.42)	-.50 (.81)
Late PB Slope	-1.73 (2.93)	.62 (1.02)	-.38 (.83)	.17 (2.16)

Variable	Estimates Within	
	Participation	Expectancy
OQ Intercept	.56 (.18)**	-.68 (.60)
Early OQ Slope	-.04 (.04)	.10 (.12)
Middle OQ Slope	.00 (.04)	.08 (.13)
Late OQ Slope	-.08 (.08)	-.06 (.24)

\*  $p < .05$ , \*\*  $p < .01$

Table A23

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Total Score and Feedback Condition as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Condition	Total Score
OQ Intercept	67.40 (2.39)**	1.98 (1.05)	-1.24 (3.03)	.49 (.16)**
Early OQ Slope	.98 (.44)*	.17 (.26)	-.57 (.57)	-.03 (.03)
Middle OQ Slope	-.50 (.45)	.16 (.27)	.34 (.58)	.02 (.03)
Late OQ Slope	-1.06 (.92)	.00 (.45)	1.10 (1.26)	-.05 (.07)

\*  $p < .05$ , \*\*  $p < .01$

Table A24

*Multilevel Piecewise Linear Growth Curve Model for OQ-45, With Total Score and Group Type as Predictors*

Variable	Estimates Between			Estimates Within
	Means	Total Score	Group Type	Total Score
OQ Intercept	65.77 (3.81)**	1.76 (1.52)	1.23 (4.22)	.49 (.16)**
Early OQ Slope	-.60 (.75)	.03 (.27)	1.59 (.90)	-.03 (.03)
Middle OQ Slope	-.01 (.70)	.21 (.32)	-.38 (.82)	.02 (.04)
Late OQ Slope	-.64 (1.94)	.07 (.68)	.11 (2.36)	-.06 (.07)

\*  $p < .05$ , \*\*  $p < .01$

## APPENDIX B: Review of Literature

The purpose of the subsequent review is to establish the necessity of further study of the Group Readiness Questionnaire (GRQ). I will first review what practice-based evidence is and how the field of group psychotherapy is incorporating it into practice through use of the CORE and CORE-R. Second, I will discuss how client characteristics have been tied to group selection, process, and outcome in recent empirical and theoretical literature. Third, I will review the history of the GRQ and its clinical utility as it relates to practice-based evidence.

### **Practice-based Evidence**

Over the last two decades, the field of mental health has gradually moved toward standards of care that involve “evidence-based practice” (EBP). In both the United States and countries that rely on socialized medicine, mental health clinicians have begun to rely on types of treatments that have been shown to empirically provide results. Those treatments that have been shown to be effective through empirical study are considered to meet the criteria of EBP. In general, there appear to be three main models of the EBP: empirically supported treatments (EST), practice guidelines, and practice based evidence (PBE) (Burlingame & Beecher, 2008).

The first model of EBP, EST, began with a task force within the Society of Clinical Psychology (APA Division 12) which was created to review controlled research studies on psychotherapy approaches for specific mental health disorders. The criteria that this task force used favored randomized clinical trials to define the “sufficient evidence” necessary to determine whether a treatment works for a particular diagnostic group. Within this model, treatment is guided by the diagnosis of the client since empirical studies have shown that a particular diagnostic population has tended to respond in a particular way with a given treatment (Burlingame & Beecher, 2008).

The second model of EBP, practice guidelines, was developed when healthcare and professional organizations became interested in presenting strategies for patient care. Practice guidelines are documents that discuss topics that include the etiology and natural history of various mental disorders, as well as broadly defined treatments for these disorders, such as medication and psychosocial treatments. They also present clinical factors that might impede positive outcomes and treatment. Since their presentation, practice guidelines have become common among states and insurance companies as a way to ensure better and more cost-effective care (Burlingame & Beecher, 2008).

The third model of EBP is PBE. In this model, the “evidence” is guided less by patient diagnosis and more by the response of a particular patient to the treatments he or she is being given. PBE involves measuring patient outcomes during treatment and then feedback from the measures being given to the clinician to determine whether or not the treatment is working for the individual client. If the treatment is not working, then the clinician can adjust the treatment as necessary. Studies have shown that feedback during treatment regarding the symptomatic status of individual clients improves final outcomes and yields more cost-effective treatment (Burlingame & Beecher, 2008; Harmon, et al., 2007; Slade, Lambert, Harmon, Smart, & Bailey, 2008).

Although all three of these models are considered to be EBP, it is important to note that the first two approaches to EBP use generalizations that the clinician applies to a specific client. On the other hand, the approach of PBE works from the individual client’s needs and outcome to adjust treatment. Because of this difference, it can be argued that PBE is the only EBP to allow clinicians to treat their clients in a flexible, emergent way that takes into account the uniqueness of each individual client. However, despite these differences, it is important to point out that all

three of these approaches rely on outcome as the central point in determining whether or not they are EBP. Since outcome is essential in determining if treatment constitutes EBP, even if clinicians are using PBE on the individual level with their clients, it is essential that the measures they use are predictive of outcome in some way.

### **The CORE and CORE-R**

In the early 1980s the American Group Psychotherapy Association (AGPA) produced a battery of measures, called the CORE (Clinical Outcome REsults Standardized Measures), that group therapists could use to measure outcomes in their groups. One of the main goals of the production of the CORE was to give clinicians a way to evaluate their work and to encourage clinicians to be more objective and scientifically based when monitoring patient improvement. However, this initial effort was met with some resistance due to a variety of possible factors. It was thought that the financial cost and complexity of obtaining and using the instruments may have created a barrier for some clinicians who might have otherwise considered utilizing the suggested measures. Still others may have not been interested in systematically tracking group member outcomes (Strauss, Burlingame, & Bormann, 2008).

Despite this lukewarm reception of the original CORE battery, in 2003 the AGPA created a task force to revise the CORE in order to better support evidence-based group treatment. The goal of this task force was to create a revised CORE battery that would be appropriate for both clinical practice and research efforts. The revised CORE, or CORE-R, was finally completed and published in 2006 by the AGPA (Burlingame, et al., 2006), and was divided into three sections. The first section presented measures that would be helpful for clinicians as they considered group selection and starting a group. The second section proposed measures that assess group-level processes that have been linked to outcome in the literature (i.e., cohesion,

alliance, empathy, and climate). The third and final section suggests measures that assess member outcomes (Strauss, et al., 2008). In order to be included in the CORE-R battery in any of the sections, measures had to be well-established and psychometrically sound.

In the first section dealing with group selection and starting a group, the authors list two standardized measures that clinicians can use to select, place, and prepare potential group members. The first measure, the Group Therapy Questionnaire (GTQ), is a self-report instrument that is designed to evaluate preexisting client variables that could potentially affect group behavior (MacNair-Semands, 2002; MacNair-Semands & Corazzini, 1998). The instrument assesses a variety of areas, some of which include previous therapy experiences, expectations towards group, family roles, goals for group treatment, and barriers and fears related to a successful group treatment. It takes approximately 35-45 minutes to complete and an additional 10-15 minutes to score (Strauss, et al., 2008).

The second group selection measure included in the CORE-R is the Group Selection Questionnaire (now called the Group Readiness Questionnaire, or GRQ). This measure is also a self-report questionnaire and is designed to assess the likelihood that clients will participate during and benefit from group therapy. It takes approximately 3-5 minutes to complete and an additional 5 minutes to score. However, an online program, OQ Analyst, is available that allows instantaneous scoring when the measure is completed. It contains 19 items that reflect two subscales, Participation and Expectancy, as well as additional behaviors that have been shown to negatively impact group processes (Strauss, et al., 2008).

Although the history of and research behind the GRQ will be discussed in more detail at a later point in this chapter, it is important to note that in examining these two measures more closely, relatively few studies have shown a link between the GTQ and outcome in group therapy

(McNair & Corazzini, 1994; McNair-Semands, 2002). This is not to say that the GTQ is not a useful measure in the area of group selection and starting a group. However, the GRQ appears to offer some advantages in terms of its usefulness in pre-group preparation. First of all, the GRQ appears to be less time consuming than the GTQ. Since the cost of time may have deterred clinicians from using measures in the original CORE battery, it is possible that clinicians may prefer the GRQ due to ease of administration and scoring. Secondly, the GRQ seems to have a solid empirical track record when predicting outcome. For example, it has been found in several studies to be predictive of attrition, group process, and outcome (Burlingame, Cox, Davies, Layne, & Gleave, 2011; Cox, 2008; Cox, et al., 2004; Davies, Burlingame, & Layne, 2006; Elder, 2010; Krogel, Beecher, Presnell, Burlingame, & Simonsen, 2009; Löffler, Bormann, Burlingame, & Strauß, 2007). More specifically, low expectancy was found to be predictive of lower levels of engagement in the group and these members were more likely to drop out of group prematurely (Burlingame, et al., 2011). Also, an open, participatory style was found to be associated with greater symptom reduction while a more dominant interpersonal style was associated with less change in symptoms (Burlingame, et al., 2011). Additionally, the GRQ's discriminant validity has been established in a qualitative study of clinical and non-clinical participants (Krogel, et al., 2009). Because of the GRQ's track record in predicting outcome in these studies, it has the potential to be used as a practice-based measure to provide information that allows clinicians to select and prepare potential members for group therapy.

Thus, as clinicians consider which measures to use in their practice-based evidence approaches, the GRQ is potentially useful in assessing client characteristics that can potentially affect outcome. However, further work needs to be done in terms of establishing the predictive power of the GRQ. In the next section, I will discuss research relating to factors that could



potentially affect group selection as well as the history behind the GRQ and its clinical utility. I will also discuss areas of further study that are needed in order to enhance the GRQ's usefulness as practice-based evidence measure.

### **Client Characteristics and Group Selection**

Although literature suggests that certain interpersonal variables and client characteristics are linked to outcome (Piper, Joyce, Azim, & Rosie, 1994; Piper & McCallum, 1994), to date, little research has been done on the selection practices of group leaders. In a national survey of group leaders, Riva, Lippert, and Tackett (2000) found that leaders used a variety of subjective methods to make decisions about assigning members to their groups. Two-thirds of the leaders in the sample used screening interviews and client-initiated requests. Just over half selected members based on referrals from another therapist. Only one out of every four therapists used some sort of assessment measure that tried to capture the individual's personality characteristics, and approximately one out of every five therapists used an assessment measure focusing on interpersonal or group behavior. Given that approximately 75-80% of therapists do not appear to use assessment measures to select group members, this area has the potential to grow and develop by using approaches guided by practice-based evidence. By using assessment measures that have been shown to predict group process or outcome in group therapy, therapists can potentially enhance the quality and helpfulness of their group interventions.

In terms of group selection, research has shown that client characteristics and relational variables can potentially be used to predict group outcomes (Piper, et al., 1994; Piper & McCallum, 1994). Members' expectancies regarding the helpfulness of group and interpersonal behaviors, such as willingness to self-disclose to others, tendency toward introversion or shyness, and social skills can affect the course of work and outcome for individual members and

the group as a whole (Burlingame, MacKenzie, & Strauss, 2004; Piper, et al., 1994; Piper & McCallum, 1994; Yalom & Leszcz, 2005). Various researchers have tried to use these findings to create measures that can adequately predict who will benefit from participation in group therapy. The GRQ is one measure that was created to predict outcome based on client characteristics.

**Research behind the subscales.** The GRQ currently contains 19-items that are broken down into the Expectancy Subscale, Participation Subscale, and Critical Items (formerly called Demeanor). Scoring of these items is such that higher scores reflect lower levels of outcome expectancy and participatory style within groups. Each of these subscales arose out of previous literature that suggested that these constructs were able to predict outcome in group therapy. The findings from studies that support these conclusions are described below.

**Expectancy.** Outcome expectancy refers to group members' expectations about the consequences of participating in group therapy (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011). Members' expectations are positive when they believe that therapy will be helpful and negative when they lack this belief. Frank (1973) quoted Freud as saying that "expectation is a force to be reckoned with in all treatment attempts" (Glass, Arnkoff, & Shapiro, 2001, p. 456), and many studies document that outcome expectancy does significantly affect outcome in both individual and group psychotherapy (Glass, et al., 2001; Leary & Miller, 1986; Yalom & Leszcz, 2005). In one meta-analysis, Kirsch (1990) suggested that at least half of the effectiveness of psychotherapy can be explained by client's outcome expectancy.

While these findings are perhaps describing psychotherapy in general, other studies have found that outcome expectancy is salient in group therapy as well. In a study of 113 participants receiving cognitive-behavioral group therapy treatment for social phobia, Safren, Heimberg, and

Juster (1997) measured the relationship between clients' expectancies regarding potential helpfulness of treatment and outcome following the group intervention. They found that after controlling for severity of symptoms, participants' expectancies were significant in predicting scores on posttreatment measures. Group members with higher initial outcome expectancies experienced less anxiety and fear during social interactions and less depression (as measured by the BDI) following the CBT group therapy interventions. Their analysis revealed that expectancy ratings accounted for 1-8% of the variance in these posttreatment measures. Additionally, Safren, et al. found that outcome expectancy measured at Session 4 significantly predicted group members' scores on the Gross Cohesion Scale at Session 8, with higher levels of expectancy being associated with greater levels of perceived cohesion.

Westra, Dozois, and Marcus (2007) analyzed data from 67 participants who completed CBT group therapy for treatment of at least one anxiety disorder. They found that for participants struggling with panic disorder or generalized anxiety disorder, outcome expectancy significantly predicted initial change within the first three or four sessions. However, they found that this relationship was mediated by homework compliance, which suggests that outcome expectancies impact initial change mostly through increased involvement of the individual in treatment. They also found that participants with higher expectancy for anxiety change had more rapid drops in anxiety which suggests that expectancy was significantly associated with earlier response to treatment.

More recently, Price and Anderson (2012) studied 67 individuals diagnosed with social anxiety disorder and found that higher outcome expectancy at the start of treatment was related to a greater rate of change for all measures of public-speaking fear. Although half of the sample received the treatment via group therapy and the other half through individual treatment using

virtual reality software, there was no difference in outcome expectancies between the experimental groups nor were there significant differences in the findings. They found that expectancy had a medium-to-large effect on the rate of change in outcomes in their sample. Initial outcome expectancy accounted for approximately 16-33% of the variance for the different measures of fear associated with public speaking. While Price and Anderson studied very specific outcomes related to anxiety, their study demonstrates that outcome expectancy can significantly impact outcome.

Outcome expectancy has also been found to predict outcome in interpersonal psychotherapy groups. Lightsey (1997) analyzed data from 22 group participants from a Masters level group process course. He found that there was an interaction between self-efficacy and outcome expectancy in terms of how the participants rated the helpfulness of the group. Those participants who have high generalized self-efficacy and high initial expectancies rated the group as more helpful than those who had low generalized self-efficacy and high initial expectancies. These findings suggest that while expectancy is important other participant characteristics maybe influential as well.

Finally, Abouguendia, Joyce, Piper, and Ogrodniczuk (2004) studied the effects of outcome expectancy on a variety of outcomes as well as the mediating impact of the therapeutic alliance. The data they gathered came from 107 individuals attending 16 groups. The 15 outcome variables they assessed included 14 measures that captured interpersonal distress, social functioning, psychiatric symptoms, self-esteem, life satisfaction, physical functioning and grief symptoms. Due to moderate to high correlations between the residual change scores of these outcome variables and in an effort to reduce the number of dependent variables, Abouguendia, et al. (2004) conducted a principal components analysis to reduce the 15 variables to a smaller

number of outcome factors. Three factors emerged representing change in General Symptoms, Grief Symptoms, and Target Objective/Life Satisfaction. They analyzed data both on the individual and group levels. On the individual level they found that outcome expectancy significantly predicted changes in General Symptoms and Target Objectives/Life Satisfaction and accounted for approximately 10% of the variance in these outcomes. They also found that outcome expectancy predicted these same two outcomes on the group level, but that expectancy accounted for 14%-25% of the variation in outcome. When testing the mediating force of therapeutic alliance, they found that the direct relationship between outcome expectancy and all three outcomes decreased significantly once the therapeutic alliance was added to the analysis. However, the relationship between outcome expectancy and benefit in General Symptom reduction and Target Objective/Life Satisfaction both remained significant even after controlling for the therapeutic alliance, suggesting that expectancy outcome is still a critical factor in predicting outcome in group psychotherapy.

***Interpersonal effectiveness: Participation and critical items.*** The Participation subscale measures group members' perceptions regarding their attitudes and behavioral patterns associated with interpersonal interactions within small groups. The Critical Items on the GRQ assess some interpersonal behaviors that might cause problems in the context of small groups (e.g., arguing for argument's sake, talking over others). Perhaps due to the interpersonal nature of the intervention, levels of interpersonal functioning have been found to be particularly predictive of outcome in group therapy. Yalom and Leszcz (2005) asserts that members who are not willing to participate in group and are silent; who refuse to open up and self-disclose to the other members; or who are disruptive, angry, or loud are at risk of eventually dropping out of therapy in order to escape the discomfort of being isolated from the other members.

MacNair and Corazzini (1994) reached similar conclusions in their study of university students attending open-ended therapy groups in a university counseling center. Using discriminant analysis to determine which client variables predicted member drop out, they found that alcohol and drug problems, previous experience in psychotherapy, somatic complaints, difficulties with roommates, general fighting, fighting with a partner, and introversion all were significant predictors of client attrition. Six out of the seven predictors from their study had a positive relationship with dropout, while the presence of previous experience with counseling was the only client variable that had a positive relationship with continuing group therapy. Thus, more than half of the significant predictors from their study dealt with interpersonal difficulties or challenges.

Blouin, et al. (1995) also had similar findings in terms of the predictive power of interpersonal style when measuring attrition. In a study of 81 women undergoing cognitive-behavioral group therapy for treatment of bulimia, researchers performed a series of seven discriminant function analyses in order to determine whether members who dropped out of group therapy were significantly different from members who stayed in therapy. Analyses regarding levels of depression, anxiety, difficulties in trust and relating to others, bulimic symptom severity, family environment, weight history and symptom duration, and severity of bulimic cognitions were run on the data. They found that the client variable of difficulties in trust and relating to others was the only significant predictor of dropout from group therapy.

Finally, MacNair-Semands (2002) found that the client characteristics of anger, hostility, verbal abuse, and social inhibition all were predictive of low attendance and poor outcomes. Furthermore, MacNair-Semands was able to predict 58.4% of the members who had low attendance through discriminant analysis using these variables. She suggests that angry clients

may be more likely to feel irritated and annoyed with other members of the group, which may possibly lead to the member becoming less committed to attending group sessions. As an alternative explanation to her findings, she suggests that hostile clients may engage in patterns of interpersonal hostility that cause the other group members to reject the low-attending member. This rejection may further weaken the hostile client's desire to attend sessions. In terms of clients who experience social inhibition, MacNair-Semands suggests that participating in group-related tasks may cause discomfort and anxiety for these clients, which may affect their desire to attend or continue group therapy.

In summary, both outcome expectancy and interpersonal behaviors have been shown to affect both outcome and process in group psychotherapy. The GRQ was created to capture these constructs on an individual level in order to determine who might benefit from group therapy. I will now describe previous studies that advanced the evolution of the GRQ and that have shown that GRQ scores significantly predict group process and outcome.

### **History of GRQ**

**Phase I study/Bosnian study.** During the late 90s, a team of therapists set out to work with Bosnian youth who had been exposed to trauma from a recent war. The demand for services was exceedingly high, and the GRQ (formerly named the Group Selection Questionnaire) was initially designed with the intent to quickly and efficiently predict which Bosnian youth would benefit most from group therapy. Basing the initial measure in literature, which suggested that interpersonal skills and expectancy would most likely predict outcome, the team included 14 items on a 5-point Likert scale in the original questionnaire to measure these theoretical constructs.

Burlingame, et al. (2011) gathered data from students in 10 secondary schools in Bosnia and Herzegovina following the Bosnian war during the 2000-2001 school year. Students were screened for exposure to war-related trauma and resulting posttraumatic stress symptoms, depression symptoms, and symptoms of grief, and the top 20% of students with the most severe levels of distress were then interviewed by a school counselor in order to determine if they would be appropriate for group-based trauma treatment. A total of 160 students were deemed as appropriate candidates for group treatment and half of these students were randomly assigned to participate in an approximately 20-week long, group-based Trauma and Grief Component Therapy (TGCT; Layne, et al., 2001; Saltzman, Layne, Steinberg, & Pynoos, 2006) treatment program. The other half of the sample was randomly assigned to an active-treatment wait list in which they were exposed to a school milieu intervention consisting of classroom-based psycho-educational and skills-building presentations given by the same school counselors running the TGCT groups, as well as informal sharing of skills and knowledge by group members with their classmates and family members. Students from the active-treatment control condition were intermittently interviewed by the school counselor to monitor and collect data on each student's ongoing status. The 14-item Group Selection Questionnaire (GSQ) was administered to students assigned to the TGCT treatment, or experimental condition, prior to starting treatment. Questionnaires capturing group processes (Group Climate Questionnaire and Curative Climate Instrument) and outcomes were administered to students approximately after Sessions 7 (early stage), 15 (middle stage), and 20 (late stage), which corresponded to the end of modules in the treatment program. Selected outcome measures were also administered again at a six-month follow-up (Burlingame, et al., 2011).



In order to determine the factor structure of the GSQ, data was first analyzed using principle component analysis (Burlingame, et al., 2011). Burlingame et al. (2011) found that five distinct factors emerged, which were labeled Expectancy (accounting for 22% of the variance), Non-Participation (accounting for 17% of the variance), Domineering (accounting for 11% of the variance), Group Deviance (accounting for 9% of the variance), and Open Participation (accounting for 8% of the variance). None of the components correlated with any of the other components at a value greater than .23 and the five-factor model that emerged was theoretically in harmony with the conceptualization that expectancy, participation, and deficient social skills represent separate constructs (Burlingame, et al., 2011). The GSQ was scored in such a way that higher scores on the subscales related to less favorable member characteristics or behaviors—i.e. less participation, lower expectancy, and greater problematic or deviant behaviors.

After regressing the process measures onto these five GSQ subscale scores and the total score, Burlingame, et al. (2011) found that the GSQ subscale scores predicted scores in several of the process related domains. Open Participation (positive participatory behaviors) negatively predicted Catharsis during the early stage of group, both Conflict and Catharsis during the middle stage of group, and Engagement, Conflict, Catharsis, and Cohesion during the late stage of group. Thus, due to the way the GSQ was scored, group members who had a tendency to not engage in positive participatory behaviors (i.e. self-disclosure) had lower scores on these process measures during the different stages of group. On the other hand, Non-Participation was positively related to Conflict during the middle stage of group. Deviancy, or the presence of detrimental behaviors, was positively related to group members' perceived satisfaction with their group experiences during the middle stage of group, but negatively associated with Catharsis and

Cohesion during the early stage of group, Engagement and Conflict during the middle stage of group, and Conflict during the late stage of group. Expectancy was also negatively related to satisfaction with group experiences during the middle stage of group and to Insight during the late stage of group. It was found that Total Score on the GSQ was also negatively related to Catharsis during the early stage of group, to Cohesion and Catharsis during the middle stage of group, and to Engagement, Conflict, Cohesion, Catharsis, and Insight during the late stage of group. Thus, the subscales of the GSQ were able to successfully predict group process over the different stages of group.

In order to determine if the GSQ could predict outcome, Burlingame, et al. (2011) calculated change scores on the different outcome measures between pre-group baseline measurement and group members' scores on the same measures at the end of the different modules. They found that the subscales of the GSQ predicted changes in PTSD symptoms, cognitive distortions, grief symptoms, depression symptoms, and social problems with group members who were less participatory or who had lower expectancy (higher scores) having less change in these symptoms at the various stages of group. They also found that the GSQ Total Score predicted changes in cognitive distortions during the late stage of group and depression symptoms during the first stage of group and at the six-month follow-up.

**Phase II/BYU pilot study.** Following the Bosnian study, the GSQ was tested with college students at Brigham Young University's (BYU) counseling center (Burlingame, et al., 2011; Cox et al., 2004). After revising two of the original questions from the measure and adding 10 new items to potentially improve the factor structure, 288 students completed the GSQ when presenting themselves for services at the counseling center. A subset of these students were referred for group therapy and also completed group process and outcome measures. The

84 students who participated in this second portion of the study were assigned to 13 different groups lead by experienced therapists who co-lead groups with a graduate student or intern as co-therapist. Students in these groups completed the Group Climate Questionnaire (GCQ), the Curative Climate Instrument (CCI), and the Outcome Questionnaire (OQ-45) at the end of Sessions 4 (early stage), 8 (middle stage), and 12 (late stage) (Burlingame, et al., 2011).

In the first portion of this study, confirmatory factor analysis was carried out to determine if the five-factor model provided an adequate fit for the data. Burlingame, et al. (2011) found that while the five-factor model did provide an adequate fit, there were high intercorrelations among all the factors except Expectancy. A subsequent three-factor model was tested which resulted in a more parsimonious model. The original Non-Participation and Open Participation subscales combined to form the Participation subscale while the Domineering and Group Deviance subscales combined to form another new subscale, which was called Demeanor. Only the Expectancy subscale remained unchanged. After conducting an exploratory factor analysis, it was found that five of the new 10 items that were also tested loaded on the expected scales and this resulted in a revised GSQ that contained 19 items (Burlingame, et al., 2011).

Following these factor analyses, backward stepwise multiple regression analyses were used to determine if the three subscales of Participation, Expectancy, and Demeanor and GSQ Total Score could predict scores on the group process and outcome data gathered during the three stages of group from the 84 students participating in group therapy at the counseling center (Burlingame, et al., 2011). It was found that Expectancy subscale scores negatively predicted Cohesion, Catharsis, Insight, and Engagement during the early and middle stages of group and that it positively predicted Conflict during the early stage of group. Thus group members who had lower expectations that group would be helpful to them (higher Expectancy scores) had

lower scores on the Cohesion, Catharsis, Insight, and Engagement subscales of the GCQ and CCI during the early and middle stages of group and higher Conflict subscale scores on the GCQ during the early stage of group. Higher Expectancy scores (low expectations that group would be helpful) also predicted premature drop out from the groups as well.

Burlingame, et al. (2011) also found that Participation scores positively predicted Cohesion on the CCI during the late stage of group as well as Conflict during the early stage of group. Group members with higher Participation scores (greater tendency to participate less in group settings) also experienced less change in outcome during the late stage of group. Demeanor subscale scores also positively predicted Conflict during the early stage of group. Group members with higher Demeanor subscale scores (greater tendency to engage in problematic interpersonal behaviors in group settings) also experienced less reduction of symptoms during the early stage of group.

In terms of the GSQ Total Score as a predictor, Burlingame, et al. (2011) found that higher scores, or lower preparedness for group, negatively predicted Cohesion, Catharsis, Insight, and Engagement in the group during the early stage while positively predicting Conflict during the early stage of group. GSQ Total Score also positively predicted total change in outcome during the late stage of group and over the course of the whole group with higher scores, or members being less prepared for group, being associated with less change in overall symptoms.

**German factor validation study.** The next study to test the factor structure of the GSQ was conducted with a clinical sample of psychiatric inpatients from Germany (Löffler, 2005). After deleting three items from the analyses, the three factor model structure of the GSQ displayed a good fit to the data (Chi-squared = 146.8,  $df = 97$ , TLI = .954, RMSEA = 0.044).

These findings were later cross-validated in a second sample of German patients (Löffler, et al., 2007).

**Qualitative study.** A subsequent study by Krogel, et al. (2009) was conducted in order to explore the qualitative differences between individuals who had either high or low scores on the GSQ. Krogel, et al. administered the GSQ to a non-clinical sample of 48 students attending an introductory psychology class and to a clinical sample of 40 students who were attending individual therapy at BYU's counseling center. They then identified the top and bottom quartiles for each group and interviewed these students in a semi-structured, open-ended format to gather information about how these students typically interact with groups. These interviews were then transcribed and coded to identify common themes.

Krogel, et al. (2009) found that the low-scorers, or those who were predicted to do well in group psychotherapy, from both samples consider themselves to be open and are willing to share even with people they have just met. The low scorers also reported that they usually feel like they are part of the group and that they would actively try to facilitate interactions within the group. Low scorers also indicated that they would be willing to interrupt others in the group if they notice that others are doing so. In contrast, Krogel, et al. found that high scorers, or those who were predicted to not do well in group psychotherapy, reported that they will typically wait to participate in a group until they get a feel for the group. These high scorers described themselves as reserved, passive, private, and not open. They also indicated that they did not think that sharing their feelings with a group would help them if they had personal problems and that they prefer to talk to people one-on-one. High scorers also reported that they are never willing to interrupt others and that they typically do not feel like they are part of the group.

**Replication study.** The fourth study (Cox, 2008), which tested both the factor structure of the GSQ as well as its predictive power, attempted to use a larger, more representative clinical sample by sampling subjects from counseling centers from different parts of the United States. Data was collected from 296 university students participating in group psychotherapy at five different university counseling centers. Group members completed the GSQ as well as an instrument measuring symptoms prior to starting group therapy. Group members completed instruments measuring group process and outcome, or symptom levels, after Sessions 4 (early stage of group), 8 (middle stage), and 12 (late stage). Correlation, multivariate multiple regression, and logistic regression were used to test whether the Participation and Expectancy subscales and the Total Score of the GSQ could predict group process and outcome.

Cox (2008) first performed a confirmatory factor analysis (CFA) on the GSQ data collected from the sample and found that the three factor model suggested by the earlier BYU and Germany samples was a poor fit for the data. Cox subsequently examined the three factor model according to specific subsamples within his larger sample. He found that only the data from one of the universities in the study fit the three factor model. Cox next conducted an exploratory factor analysis (EFA) using principle components analysis to investigate whether the misfit he obtained in his earlier CFA signified a significant departure from the original three factor model rather than being due to a heterogeneous sample. He found that the three factor model was maintained, but that two of the items from the Demeanor subscale (5&18) loaded on the Participation subscale instead.

After running bivariate correlations, Cox (2008) found that group members with high scores on the Expectancy subscale, or who had low expectations that group therapy would be beneficial, tended to rate their value for Cohesion during the middle stage of group and their

value for Catharsis during the middle and late stages as being low. He also found that individuals who endorsed problematic interpersonal behaviors on the GSQ tended both to rate group members as demonstrating less avoidance behaviors in group and to perceive insight as a therapeutic factor to be less helpful during the middle stage of group. Group members who were overall poor candidates for group therapy, or those who had high Total Scores on the GSQ, rated the helpfulness of insight during the middle stage of group as having low importance to them.

When GSQ subscales were regressed onto the group process subscale scores, only Demeanor showed a significant multivariate relationship (Cox, 2008). Group participants with negative interpersonal skills, or who had high Demeanor scores, tended to perceive the group as exhibiting low avoidance behaviors in group. Cox (2008) also found that there were no significant relationships between the GSQ subscales or the GSQ Total Score and outcome, or changes in scores on the instrument measuring symptoms. He did find, however, that individuals with higher scores on the Participation subscale tended to stay in treatment longer.

**Archival study.** In an attempt to further study the predictive power of the GSQ, an archival analysis was done by Elder (2010), which examined whether the GSQ could predict final outcome in group therapy versus other treatment modalities, such as individual therapy or a mixed format of therapy (group and individual therapy). Individuals included in the sample completed both the GSQ and OQ-45 at intake and also completed the OQ-45 each week they were in treatment. His sample included 156 participants, with 52 participants in each of the three types of treatment modality. Using initial and final OQ-45 scores, Elder estimated correlations and used multiple regression to determine if GSQ subscale scores could predict OQ-45 change while taking into account treatment modality.

Elder (2010) found that Total Score and Participation and Demeanor subscale scores on the GSQ were positively correlated with initial OQ-45 scores, with individuals who were less prepared for group experiencing higher initial distress prior to starting therapy. Surprisingly, he found that GSQ Total Score and Participation subscale scores were negatively correlated with OQ-45 change. These findings suggested that clients who were less prepared for group therapy or who have a tendency to be less participatory in group settings eventually experienced a greater reduction of symptoms irrespective of the type of treatment modality in which they engaged. Elder suggested that this latter finding may be related to the potential floor effect created by calculating the change scores of the OQ-45 or to possible attenuation of OQ-45 scores as they naturally regressed toward the mean. Elder also found that the Expectancy and Demeanor subscale scores were not associated with change in outcome.

**Convergent validity study.** Finally, the most recent study to test the factor structure of the GSQ was conducted by Baker (2010). Her sample included 300 students who presented for services at BYU's counseling center. Students were asked to complete both the GSQ and the Group Therapy Questionnaire (GTQ) during the intake process. Baker then used the GSQ data to conduct a confirmatory factor analysis (CFA) of the factor model in addition to running Pearson bivariate correlations between the GSQ and GTQ data to establish the convergent validity of the GSQ.

When conducting the CFA, Baker (2010) tested the model established in Cox's (2008) study that allowed questions 5 and 18, now inversely scored, to load on the Participation subscale. The same error correlations as used in previous studies (Cox, 2008; Löffler et al., 2007) were also used by Baker. She found that the three factor structure proposed by Cox (2008) was a good fit for the data ( $P$  for test of close fit = 0.045).



When correlating the subscales of the GSQ with those of the GTQ, Baker (2010) found that the GSQ Expectancy subscale was significantly correlated with the Expectations About Group scale of the GTQ ( $r = -.55$ ) and that the GSQ Participation subscale was significantly correlated with the Interpersonal Problems total scale ( $r = .37$ ). Baker also found that the GSQ Total Score was also significantly correlated with both the GTQ Expectations About Group ( $r = -.25$ ) and GTQ Interpersonal Problems ( $r = .40$ ) subscales. These findings suggest that the GSQ demonstrates convergent validity with the GTQ and that these measures capture the same construct.

### **Statement of Problem**

One critique of the previous studies with the GRQ is that these studies did not control for the interdependence of the data during analysis. According to Baldwin, Stice, and Rohde (2008), when data from groups is being analyzed, steps need to be taken to control for within-group dependence and the fact that group members “share a common environment that can homogenize response to the intervention” (Baldwin, et al., 2008, p. 365). To demonstrate the importance of this point, Baldwin et al. reanalyzed data from two projects and added a variable to control for the interdependent nature of the group data. When comparing their results to those of the original analysis, they found that adding the control variable increased  $p$  values for the tests of the intervention effects in some cases. They also found that changes in the  $p$  values depended on the magnitude of the statistical dependence and available degrees of freedom. They conclude that the rate of Type I errors can potentially be inflated if statistical measures are not taken to control for the potentially dependent nature of group data.

These previous studies of the GRQ did not take into account the intra-group dependence that was present when measures of group process and outcome were completed. Because of the

potential error that can occur when the interdependent nature of group is not taken into account, further study of the predictive power of the GRQ while taking into account the group interdependence is needed. This study will incorporate controls for this issue as the data is analyzed. Specifically, it will attempt to control for the type of error described by Baldwin, et al. (2008) by using multilevel analysis to account for the interdependent nature of the process and outcome data while examining the predictive power of the GRQ on both the individual and group levels.

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## APPENDIX C: Instruments

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## Group Readiness Questionnaire (GRQ)

Name \_\_\_\_\_ ID# \_\_\_\_\_ Date \_\_\_\_\_  
 Male \_\_\_\_\_ Female \_\_\_\_\_ Date of Birth \_\_\_\_\_

**Instructions:** The following questions ask about how you feel about working together in a group. Please read each question carefully, and then mark the box that best describes *How much of the time you have felt this way in the past month (30 days)*. There are no right or wrong answers, so please be as honest as you can.

- 1) When I am with a group of people who are talking about a topic I feel strongly about, how likely am I to express my opinion?.....
- 2) I like to share my feelings with others.....
- 3) I avoid talking in groups.....
- 4) I often feel like an outsider in group discussions.....
- 5) I typically dominate group discussions.....
- 6) I hardly ever say what I'm thinking when I'm with a group of people.....
- 7) If I disagree with what someone is saying, I will interrupt them before they can finish what they are saying.....
- 8) When I first meet someone, I like to share things about myself, including quite personal information.....
- 9) I am very private and hardly ever share how I feel.....
- 10) I think that working in a group will really help me.....
- 11) If I participate in a group, I expect to feel quite a bit better when we are finished.....
- 12) I think that sharing my feelings with others will help me feel better.....
- 13) I am abrupt with others if I feel strongly about what I'm saying.....
- 14) I tend to keep to myself in groups.....
- 15) I often contribute to group discussions.....
- 16) I am an open person.....
- 17) I argue for argument's sake.....
- 18) I am the life of a party.....
- 19) Others tend to see me as withdrawn.....

	Never	Rarely	Sometimes	Frequently	Almost Always	Do Not Mark Below		
						CI	E	P
1)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
2)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
3)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
4)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
5)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
6)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
7)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/>		
8)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
9)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
10)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
11)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
12)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
13)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
14)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
15)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
16)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
17)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/>		
18)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1			
19)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5			
<b>Subscale Totals:</b>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						C	E	P
						Total:		

Developed by D. Rob Davies, Ph.D. and Gary M. Burlingame, Ph. D.  
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## The Group Questionnaire

Thank you for agreeing to complete the Group Questionnaire. The following questions ask about your personal experience in your therapy group. You will be presented with a question containing a blank space. For the bubbles on the left please place the words "group leaders" in the space and answer the question by filling in the bubble. For the bubbles on the right place the words "other group members" in the space and answer the question. Your answers may be different to the left and right sides of the same question. For example:

### Group Leaders

Not true at all
A little true
Slightly True
Somewhat True
Moderately True
Considerably True
Very True

0 0 0 0 0 0 0

The \_\_\_\_\_ were funny today.

### Other Group Members

Not true at all
A little true
Slightly True
Somewhat True
Moderately True
Considerably True
Very True

0 0 0 0 0 0 0

### Group Leaders

1. 0 0 0 0 0 0 0 I felt that I could trust the \_\_\_\_\_ during today's session.
3. 0 0 0 0 0 0 0 The group leaders and I respect each other.
5. 0 0 0 0 0 0 0 I feel the \_\_\_\_\_ care about me even when I do things that they do not approve of.
7. 0 0 0 0 0 0 0 The \_\_\_\_\_ were friendly and warm toward me.
9. 0 0 0 0 0 0 0 The \_\_\_\_\_ and I agree about the things I will need to do in therapy.
11. 0 0 0 0 0 0 0 The \_\_\_\_\_ and I agree on what is important to work on.
13. 0 0 0 0 0 0 0 The \_\_\_\_\_ and I have established a good understanding of the kind of changes that would be good for me.
15. 0 0 0 0 0 0 0 The \_\_\_\_\_ and I are working together toward mutually agreed upon goals.
17. 0 0 0 0 0 0 0 Sometimes the \_\_\_\_\_ did not seem to be completely genuine.
19. 0 0 0 0 0 0 0 The \_\_\_\_\_ did not always seem to care about me.
21. 0 0 0 0 0 0 0 The \_\_\_\_\_ did not always understand the way I felt inside.

### Other Group Members

2. 0 0 0 0 0 0 0
4. 0 0 0 0 0 0 0
6. 0 0 0 0 0 0 0
8. 0 0 0 0 0 0 0
10. 0 0 0 0 0 0 0
12. 0 0 0 0 0 0 0
14. 0 0 0 0 0 0 0
16. 0 0 0 0 0 0 0
18. 0 0 0 0 0 0 0
20. 0 0 0 0 0 0 0
22. 0 0 0 0 0 0 0

These questions ask about your experience with your group in general. Please respond by filling in the bubble to the right of the question.

### The Group in General

- |   |               |
|---|---------------|
| 23. There was friction and anger between the members.   | 0 0 0 0 0 0 0 |
| 24. The members were distant and withdrawn from each other.                                   | 0 0 0 0 0 0 0 |
| 25. There was tension and anxiety between the members.  | 0 0 0 0 0 0 0 |
| 26. The members liked and cared about each other.   | 0 0 0 0 0 0 0 |
| 27. The members felt what was happening was important and there was a sense of participation. | 0 0 0 0 0 0 0 |
| 28. We cooperate and work together in group.  | 0 0 0 0 0 0 0 |
| 29. Even though we have differences, our group feels secure to me.                            | 0 0 0 0 0 0 0 |
| 30. The group members accept one another.   | 0 0 0 0 0 0 0 |

Outcome Questionnaire (OO<sup>®</sup>-45.2) Name: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Never Rarely Sometimes Frequently Always

**Instructions:**  
Looking back over the last week, including today, help us understand how you have been feeling. Read each item carefully and fill the circle completely under the category which best describes your current situation. For this questionnaire, work is defined as employment, school, housework, volunteer work, and so forth.

Developed by  
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1. I get along well with others.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I tire quickly.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I feel no interest in things.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I feel stressed at work/school.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I blame myself for things.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I feel irritated.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I feel unhappy in my marriage/significant relationship.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I have thoughts of ending my life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I feel weak.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I feel fearful.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. After heavy drinking, I need a drink the next morning to get going. (If you do not drink, mark "never")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I find my work/school satisfying.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I am a happy person.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I work/study too much.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I feel worthless.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I am concerned about family troubles.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I have an unfulfilling sex life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I feel lonely.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I have frequent arguments.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I feel loved and wanted.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I enjoy my spare time.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. I have difficulty concentrating.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I feel hopeless about the future.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. I like myself.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Disturbing thoughts come into my mind that I cannot get rid of.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. I feel annoyed by people who criticize my drinking (or drug use)..... (If not applicable, mark "never")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. I have an upset stomach.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. I am not working/studying as well as I used to.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. My heart pounds too much.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. I have trouble getting along with friends and close acquaintances.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. I am satisfied with my life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. I have trouble at work/school because of drinking or drug use..... (If not applicable, mark "never")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. I feel that something bad is going to happen.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. I have sore muscles.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. I feel afraid of open spaces, of driving, or being on buses, subways, and so forth.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. I feel nervous.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. I feel my love relationships are full and complete.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. I feel that I am not doing well at work/school.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. I have too many disagreements at work/school.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. I feel something is wrong with my mind.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. I have trouble falling asleep or staying asleep.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
42. I feel blue.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43. I am satisfied with my relationships with others.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
44. I feel angry enough at work/school to do something I might regret.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
45. I have headaches.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>