Adjustment to Chronic Illness and Disability through an Attachment Lens

The Makings of an Attachment-Adaptation to Chronic Illness and Disability Model

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General Abstract

Introduction: Attachment may be relevant to psychosocial adaptation to chronic illness and disability (CID) and to treatment outcomes. Research supports attachment as a transdiagnostic risk factor for both physical and mental health. Attachment plays an important role in how individuals seek and receive care, and predicts treatment outcomes. However, there is a paucity of research examining the role of attachment in CID, especially from a transdiagnostic perspective. This dissertation includes three studies that examine the role of attachment insecurity dimensions (i.e., attachment anxiety and attachment avoidance) on the process of adaptation to CID, and that attempt to better elucidate mechanisms related to group psychotherapy process and outcome for adults living with CID. The first study proposed and tested an attachment-informed model of psychosocial adaptation to CID. The second study examined treatment predictors and outcomes of a process-based group psychotherapy intervention rooted in the principles of cognitive-behavioural therapy (CBT) and acceptance and commitment therapy (ACT). The third study examined change in psychological symptoms and group cohesion across eight sessions of the group psychotherapy, assessed for a possible reciprocal symptom-cohesion relationship, and examined if pre-treatment attachment insecurity dimensions moderated change in within-person session-by-session change in symptoms, cohesion, or in the reciprocal relationship between them. **Method:** Participants across the three studies were recruited from The Ottawa Hospital Rehabilitation Centre (TOHRC) between September 2016 and January 2020 (prior to changes in service delivery resulting from the COVID-19 pandemic). All participants were referred to TOHRC's outpatient psychology program by their treating physiatrist at the same institution for support with adjustment to CID. All participants completed a battery of questionnaires (see Appendices B to J) at assessment (i.e.,

pre-treatment) as part of standard clinical care, and to help inform psychological assessment and treatment planning. Following assessment, most participants were referred to group psychotherapy. A total of 164 patients were invited to participate in the present research and 132 (80.5 %) consented. A total of 23 groups were formed and each group comprised two to eight consenting patients (note that the number of patients per group was larger, however not all patients consented to study participation). In addition to the pre-treatment/assessment questionnaires, group participants completed a battery of questionnaires at post-treatment (see Appendices C to J), as well as weekly measures of depression, anxiety, and group cohesion (see Appendix K). In study one, the final sample included a proportion of consenting participants who completed questionnaires of interest at pre-treatment/assessment ($N = 90$). In study two, the sample included participant pre- and post-treatment measures ($N = 109$). And in study three ($N = 109$), the sample included participants' weekly questionnaires as well as pre-treatment attachment scores examined as predictors of change. The sample size in studies two and three included patients who showed indications of elevated psychological symptoms at pre-treatment on a measure of depression, anxiety, and/or overall distress, as determined by established clinical cut-offs. **Results:** In study one, higher avoidant coping and lower health self-efficacy mediated the relationship between attachment avoidance and health-related quality of life (HRQoL). That is, individuals with higher attachment avoidance disengage at the cognitive, behavioural, and social/emotional levels in response to illness-related stress, and this has a negative impact on health self-efficacy and HRQoL. In study two, participants who completed the group therapy showed improvements in several areas from pre- to post-treatment, including HRQoL, depression, anxiety, and self-efficacy. Pre-treatment attachment anxiety was associated with more positive outcomes for anxiety, self-efficacy, and general psychological distress. Reliable

change indices suggest clinically meaningful change for the majority of participants, however most did not reliably recover. In study three, participants experienced a decrease in depression and anxiety, and an increase in group cohesion across eight sessions of the group therapy. Pre-treatment attachment avoidance was a significant moderator of the association between within-person change in depression and subsequent session change in group cohesion across eight therapy sessions. That is, for individuals with lower pre-treatment attachment avoidance, a decrease in depression was associated with an increase in group cohesion at the subsequent session. Conversely, for individuals with higher pre-treatment attachment avoidance, an increase in depression was associated with a decrease in group cohesion at the subsequent session. In terms of treatment adherence in studies two and three, patients attended an average of 6.8 sessions out of a possible 8 sessions (85% adherence). **Discussion:** Individual differences in attachment insecurity dimensions may shape how someone contends with CID-related stressors, and how they respond to group psychotherapy. This dissertation lends further support for transdiagnostic approaches in CID and provides proof-of-concept support for a process-based ACT-CBT group therapy. Overall, results suggest that attachment is relevant to adaptation to CID and integrating principles of attachment theory with existing models of psychosocial adaptation to CID warrants further consideration in order to better tailor treatments.

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Content of Dissertation and Contribution of Authors

This thesis contains three original studies. All studies were prepared in collaboration with Dr. Louise Balfour, my doctoral research supervisor. All data were collected at The Ottawa Hospital Rehabilitation Centre (TOHRC). Dr. Monique Lefebvre modified a previously developed group intervention to create the Coping with Disabilities and Health Conditions group. Various clinicians at TOHRC (Drs. Louise Balfour, Monique Lefebvre, and Christine Boisvert) assessed patients as part of standard clinical care and referred them to the group therapy, as clinically indicated. Drs. Lefebvre and Boisvert facilitated the group therapy as part of standard clinical care. An undergraduate student (Shaezeen Sayed) supported with participant recruitment, data collection, and data entry (2016-2017). Drs. Balfour and Lefebvre also helped facilitate recruitment and data collection throughout the study period (September 2016 to January 2020).

Drs. Balfour and Lefebvre, in consultation with Dr. Tasca and myself, were responsible for choosing clinical measures and deciding on the measurement framework as part of the Clinical Psychology Outpatient Program at TORHC. Drs. Balfour, Lefebvre, and myself were responsible for preparing and submitting the protocol to the research ethics board. I was responsible for conducting the literature review, formulating the hypotheses, participant recruitment, data collection and entry, completing data analyses, and writing all components of the document. I regularly consulted with Dr. Balfour regarding all components of the research, and with Dr. Tasca regarding data analysis and interpretation. I was responsible for submitting the manuscripts for publication in peer-reviewed journals with ongoing input from all co-authors: Drs. Balfour, Lefebvre, and Tasca.

Table of Contents

General Introduction

Overview of Introduction

Understanding psychosocial adaptation to chronic illness and disability (CID) is a long-standing challenge in the fields of health and rehabilitation (Livneh & Parker, 2005). Models of adaptation postulate that a CID leads to illness stressors which induce cognitive, behavioural, and emotional responses that interact to influence adaptation and health-related quality of life (HRQoL). Research demonstrates that individual trajectories of adaptation to CID and treatment outcomes vary, and that multiple person-, illness-, and lifestyle-related factors contribute to individual differences in adaptation and treatment response. Attachment theory, despite its known pertinence to the healthcare context (e.g., Maunder and Hunter, 2001), as well as to individual and group treatment outcomes (Levy et al., 2018; Tasca, Ritchie, et al., 2006), has not been integrated into models of adaptation to CID. Viewing adaptation to CID through an attachment framework may provide a more parsimonious conceptualization of adaptation and help guide future theory-driven research. The current dissertation consists of three studies, that together, advance our understanding of adaptation to CID and how attachment plays a role in process and treatment outcomes.

In this introduction, I will begin with a brief discussion of rehabilitation care, followed by a discussion of adaptation to CID, including common experiences among those living with CID. I will then discuss interventions to help promote adaptation to CID, including treatment of psychological comorbidity, followed by a review of group psychotherapy processes. Next, I will briefly comment on transdiagnostic approaches to care and describe the intervention studied in this dissertation. Lastly, I will review attachment theory and discuss how attachment is relevant to CID.

The present dissertation is set in the context of a tertiary care physical rehabilitation centre which provides person-centred care for adults who have experienced a disabling physical illness or injury. The care provided is multidisciplinary in approach and addresses the physical, psychological, social, and spiritual needs of the individual. In keeping with the World Health Organization's (WHO) definition of rehabilitation, the centre aims to help individuals optimize their functioning and adapt to life in the context of their health status and any associated impairments. The centre serves individuals with impairments such as acquired brain injuries (ABI) and major strokes, amputations, severe burns, chronic pain, communication disorders, lung disease, and various neurological conditions (e.g., spinal cord injury, amyotrophic lateral sclerosis, multiple sclerosis, etc.). Given the chronic nature of many of the health conditions of individuals who are served by the centre, the term chronic illness or disability (or CID) will be used throughout this document to capture the various health conditions and injuries. This is also a common term used in the literature.

Rehabilitation Care

The tides of health and rehabilitation care are turning. Several global trends, including a rising life expectancy and aging population, an increase in non-communicable diseases, and most recently the SARS-CoV-2 (COVID-19) pandemic, have contributed to a higher prevalence of people experiencing functional impairment, disability, and poorer HRQoL than ever before in our history (de Oliveira Almeida et al., 2022; Hacker et al., 2021; Stucki et al., 2018). These trends have led to a greater emphasis on the long-term management of chronic conditions and impairments, highlighting the importance of functioning as a health indicator in addition to the traditional indicators of morbidity and mortality (Stucki et al., 2018). This points to rehabilitation

care as a crucial component of health-care – one that should be universal and available to anyone with functioning needs (Cieza, 2019).

Rehabilitation care is defined as a set of interventions with the goal of optimizing functioning and reducing disability in individuals experiencing limitations in everyday functioning due to disease (acute or chronic), disorder, injury, trauma, or other circumstances such as pregnancy, aging, stress, congenital anomaly, or genetic predisposition (World Health Organization and World Bank, 2011). The WHO's International Classification of Functioning, Disability, and Health (ICF, 2001) is the most widely accepted framework for conceptualizing and classifying functioning and disability, and is becoming increasingly influential in informing rehabilitation practice (Gao et al., 2021; Perin et al., 2020; Stucki et al., 2018). The ICF conceptualizes functioning and disability as the intersection between health conditions, body function and structure, daily activities, and social participation, while also taking into account the role of personal and environmental contextual factors (Bornman, 2004; World Health Organization and World Bank, 2011). However, missing from the ICF is the explicit inclusion of psychological/psychosocial adjustment to illness and disability, thereby limiting future theory-driven research on the process of adaptation and optimizing functioning (Dekker & de Groot, 2018; Geyh et al., 2019; Müller & Geyh, 2015).

Adjustment to Chronic Illness and Disability (CID)

Chronic illnesses and disabilities are broadly defined as either congenital or adventitious diseases or health conditions of long duration. Adapting to life with a CID is a complex, unpredictable, and continuously evolving process (Livneh & Parker, 2005). Consistent with the biopsychosocial model (Engel, 1977), conceptualizations of adjustment to CID incorporate the interrelated domains of cognitive, emotional, behavioural, social, and physical processes.

Theoretical models of adjustment to CID are underpinned by more general frameworks of how individuals respond to stress and disease, such as the stress-coping model (Folkman & Greer, 2000; Lazarus & Folkman, 1984), and the illness representation model (Leventhal et al., 1984). Several models have contributed to our evolving understanding of psychosocial adaptation to CID, including: (1) the illness intrusiveness model (Devins et al., 2006), (2) the disability centrality model (Bishop, 2005), (3) the biopsychosocial model of coping with life crises (Moos & Holahan, 2007), (4) the adjustment to chronic illness model (Moss-Morris, 2013), (5) the tripartite model of adjustment to CID (Livneh, 2001, 2021), and (6) contributors to adjustment to chronic illness (Hoyt & Stanton, 2018). No consensus exists on a preferred model of adjustment to CID. However, there is significant overlap between many of the models (Hoyt & Stanton, 2018; Livneh, 2001, 2021; Moos & Holahan, 2007; Moss-Morris, 2013), and when considered together, they offer a comprehensive conceptual framework of psychosocial adaptation to CID.

When integrated, the models include three overarching components: antecedents, processes, and outcomes[1] (Figure 1). Antecedents refer to pre-disposing contextual factors such as personal/intrapersonal, social/interpersonal, environmental/extrapersonal factors, and disease/treatment factors. Processes refer to the dynamically evolving illness stressors (acute and chronic stressors) and the individual's emotional, cognitive, and behavioural responses to these stressors. Outcomes refer to various indicators that serve as a snapshot of functioning and HRQoL, and include physical, social, and emotional domains.

[1] It should be noted that the tripartite model of adjustment to chronic illness and disability (Livneh, 2021) explicitly describes model components as antecedents, processes, and outcomes. However, other models adopt this framework as well, although they use different terminology (e.g., contexts of risk & resilience; cognitive, affective, & behavioural responses; domains of adjustment); (Hoyt & Stanton, 2018; Moos & Holahan, 2007; Moss-Morris, 2013).

Together, the multiple models of adaptation to CID posit that an illness or disability leads to acute and ongoing illness stressors which reduce current HRQoL and disrupt emotional equilibrium. Consistent with cognitive-behavioural theory (Beck & Haigh, 2014), illness stressors induce cognitive, behavioural, and emotional responses, which interact to influence health outcomes and adaptation (Barrett et al., 2016). Adaptive cognitive, behavioural, and emotional responses can contribute to adaptive adjustment, whereas maladaptive responses can contribute poorer adjustment. It should be noted, although it will not be reviewed in length in this introduction, that there are two schools of thought in terms of how adjustment is conceptualized – either as a discrete/dichotomous outcome (i.e., adaptive versus non-adaptive) or as a dimensional/continuous outcome (i.e., continuum of outcomes ranging from adaptive to non-adaptive; Livneh, 2021). A dimensional approach will be used in this dissertation.

Given that adaptation is a multidimensional and dynamic phenomenon, operationalization and measurement of the construct can be challenging. Psychosocial adaptation to CID can, in part, be indicated by a person's HRQoL. Health-related quality of life is multidimensional and encompasses a person's subjective evaluation of their own functioning in the context of their CID (Livneh et al., 2004). Health-related quality of life encompasses the domains of physical, social/family, emotional, and functional well-being. It is an important indicator of adjustment to CID and is the most widely used and accepted measure of psychosocial adaptation in the rehabilitation field as it maps on to the main goal of rehabilitation: optimizing functioning from a biopsychosocial perspective (Guyatt et al., 1993; Livneh, 2001). One major advantage of using HRQoL as an indicator of adaptation to CID is that physiologic measures do not always correlate with functional capacity, and so assessing an individual's subjective well-being is more meaningful (Guyatt et al., 1993). This is relevant in transdiagnostic-CID groups, in the case of

CID-multimorbidity, or in multisystemic diseases such as diabetes, lupus, or COVID-19, as it circumvents the issue of attempting to make sense of comparing different illness-related symptoms and biological indicators of health (i.e., lung function, glycemic control, neurological indicators, immunological indicators, etc.). This is especially important given that CID-multimorbidity is the norm (Tinetti et al., 2012).

Individual trajectories of adaptation vary. Although many individuals seem to progress toward acceptance, functional adaptation, and personal growth gradually with time (Livneh & Parker, 2005), others experience distress and dysfunction and benefit from additional support (Bair & Wu, 2008; Scott et al., 2007). Researchers have examined trajectories of adjustment across various CID populations (e.g., stroke, breast cancer, mixed-CIDs) using latent class growth mixture modelling and have found several different trajectory patterns: consistently low HRQoL, consistently high HRQoL, increase in HRQoL over time (i.e., moving toward adaptation), and decline in HRQoL over time (Goyal et al., 2018; Pucciarelli et al., 2020; Seves et al., 2021; van Mierlo et al., 2018).

Various person-, illness-, lifestyle-, and caregiver-related factors have been examined as predictors of membership in a specific HRQoL trajectory (e.g., social support, self-efficacy, coping, acceptance of the disability, symptoms of depression and anxiety, neuroticism, and pessimism), however given the nascent research in this specific area, no general conclusions can be drawn in terms of which factors consistently predict different HRQoL trajectories (Goyal et al., 2018; Pucciarelli et al., 2020; Seves et al., 2021; van Mierlo et al., 2018). This brings attention to the need to better understand predictors of adaptation to CID in order to improve rehabilitation care and prevent an unfavourable HRQoL trajectory. Attachment theory may help

increase our understanding of adaptation to CID and individual differences in treatment outcomes, and will be discussed later.

Common Experiences among People Living with Chronic Illness and Disability

The onset of a new CID, an illness exacerbation, or worsening prognosis, can mark the beginning of a process of adjusting to physical, psychological, social, and environmental changes (Bishop, 2005). Although CIDs may differ with respect to etiology, clinical presentation, and/or treatment needs, many individuals with CID share common experiences and illness stressors that can interfere with adaptation. For example, change in identity and life roles, managing uncertain illness course or prognosis, financial stressors, managing symptoms and treatment, contending with inequity and systemic barriers, experiences of stigma and exclusion, and experiencing a range of emotional reactions (Heijmans et al., 2004; Joachim & Acorn, 2000; Livneh, 2021).

Emotional difficulties, such as depressed mood and anxiety, are common experiences among individuals living with CID (Dai et al., 2020; Daré et al., 2019). The combined effects of mental and physical disorder on disability are interactive, that is, the presence of one disorder amplifies the association of the other disorder with disability (Scott et al., 2009). Emotional distress in CID is associated with greater disability and dysfunction, barriers to treatment, and poorer self-management of disease or disability, thereby impeding successful psychosocial adaption to CID (Bair & Wu, 2008; Blakemore et al., 2014; Katon, 2011; Kołtuniuk & Rosińczuk, 2020; Kong et al., 2021; Scott et al., 2009; Stein et al., 2006; Turan et al., 2014; Wilroy et al., 2021). Because physical-psychological comorbidity has an additive effect on impairment, and represents an economic burden and challenge for the healthcare system, understanding and treating psychological symptoms in people living with CID is important to the overall health and well-being of this population.

Interventions to Promote Adjustment in Chronic Illness and Disability

Previous research has demonstrated that psychological interventions provided in a variety of formats (e.g., individual therapy, group-based therapy, guided self-help, peer-led, clinician-led, internet-based, face-to-face) help to improve quality of life (QoL) as well as physical and psychological health in a multitude of CID samples (Anderson & Ozakinci, 2018; Jackson et al., 2019). Some of the most commonly used and researched interventions are based on the principles of cognitive behavioural therapy (CBT; Beck & Haigh, 2014), and mindfulness-based behavioural approaches such as acceptance and commitment therapy (ACT; Hayes et al., 2016).

Selecting the most appropriate treatment for each patient, that is, matching the intervention to the clinical need, is important for patient outcomes (Beutler et al., 2016). This can be difficult to apply in clinical practice given the abundance of different therapeutic approaches (Kazdin, 2021). Determining patient treatment needs in the context of comorbid CID and emotional difficulties is complex and requires careful consideration of how the physical and psychological conditions may reinforce or maintain one another. Strong evidence suggests a negative synergistic association between physical and psychological conditions, so if one domain (i.e., physical or psychological) remains unaddressed, then the negative feedback cycle can maintain itself over time and lead to poorer adjustment and lower HRQoL (Gontijo Guerra et al., 2021). Integrative psychotherapy plays an important role in patient-centred care (Norcross & Goldfried, 2019), and may be a well-positioned approach to address both the CID-related issues (e.g., CID symptoms and health self-management) as well as psychological correlates of CID (e.g., emotional symptoms). Flexibly integrating different theories or techniques, or focusing on therapeutic factors that are common across all models of therapy, allows therapists to better tailor interventions to meet individual patient needs (Zarbo et al., 2016), and may provide more

holistic, parsimonious, and optimized treatment in the rehabilitation context.

Both CBT and ACT group-based interventions improve psychological and behavioural health outcomes across a range of conditions such as cancer, chronic obstructive pulmonary disease, chronic pain, diabetes, epilepsy, HIV, neurological disorders (e.g., Parkinson's disease, Huntington's disease, multiple sclerosis), renal disease, spinal cord injury, and ABI (Graham et al., 2016; Rizzo et al., 2011; Stenhoff et al., 2020). Interventions stemming from traditional CBT have been widely used to improve self-management and emotional well-being in CID and have perhaps been the most popular. Traditional CBT is a change-based approach whose primary aim is to alter the form or frequency of unhelpful cognitions and/or emotions as a means of decreasing or eliminating emotional distress and improving functioning (Beck & Haigh, 2014). Conversely, ACT is an acceptance- and mindfulness-based approach that aims to help people step back or defuse from their negative thoughts, accept what is out of their control, decrease experiential avoidance, and create a meaningful life in spite of painful emotions (Hayes et al., 2016). In ACT, symptom reduction is not a primary goal although a reduction in distress may occur as a consequence of therapy (Hayes et al., 2016). Despite key theoretical differences between CBT and ACT, they can be used conjointly and different techniques can be applied based on individual patient or group needs (Ciarrochi & Bailey, 2008).

Emerging research on integrated ACT-CBT individual therapy has demonstrated some improvement in symptoms of anxiety, depression, and pain, as well as improved quality of life (QoL) in adults with anxiety (Lunde & Nordhus, 2009; Orsillo et al., 2003; Roemer & Orsillo, 2007). One study of integrated ACT-CBT group therapy demonstrated efficacy at decreasing depressive symptoms and improving QoL in adults with major depressive disorder (Hallis et al., 2017). An integrated ACT-CBT intervention is relevant to promoting adaptation to CID,

especially in the context of comorbid emotional distress, as it allows for the flexible application of different strategies to best meet individual patient and group needs. For instance, CBT strategies such as cognitive restructuring can be useful when working with maladaptive thinking patterns that would benefit from replacement with a more balanced thought (e.g., "*I am a worthless person and terrible parent because I cannot play with my kids at the park*"). An ACT-based strategy, such as acceptance or defusion, may be more helpful when the negative thinking or feeling is a reasonable reaction given the context (e.g., "*I am grieving the change in my physical functioning and I am sad that I cannot play with my kids the way I used to*").

Related strategies from CBT can be integrated with ACT for additional benefit. For example, combining behavioural activation from CBT with values-based/committed action from ACT may provide added benefit in terms of targeting emotional symptoms and pain, as well as improving functioning (Hooker, Masters, et al., 2020; Hooker, Slattengren, et al., 2020; Vowles et al., 2014). Taking a values-based approach to behavioural activation may be a relevant way to encourage CID patients to engage in activities that are pleasurable or promote mastery as a means of improving mood and functioning. This would allow for a more focused behavioural activation intervention which is important for individuals who also benefit from taking a paced approach to activity engagement. Incorporating both CBT and ACT interventions may also be useful when treating a group of patients with different illness chronicity, as some research suggests that CBT may be more helpful earlier in the illness course as compared to when emotional symptoms are more chronic or treatment-resistant, which is when ACT may offer additional benefit (Clarke et al., 2014). Taking an inclusive perspective toward various theoretical models and integrating CBT and ACT techniques across individual and group-based interventions may allow therapists to better tailor treatments to meet patient needs. The group-

based intervention studied in this dissertation integrates principles from CBT and ACT, and will be described later following discussion of group psychotherapy processes.

Group Psychotherapy Process

Meta-analytic research demonstrates that group psychotherapy is an effective treatment modality across various mental disorders and medical conditions, and that group modalities are just as effective as individual psychotherapy across a variety of populations (Burlingame et al., 2016; Rosendahl et al., 2021). Pressures on the healthcare system to reduce long wait-times (Sampalli et al., 2015) have led many tertiary care settings to prioritize group-based psychological interventions over individual therapy due to group therapy being more cost-effective and efficient given the patient-to-clinician ratio (Asplund et al., 2021; McCrone et al., 2005; Roberge et al., 2008). These pressures will likely continue to increase as prevalence rates of CIDs rise, and with the added pressures of post-COVID-19 syndrome (sometimes called long-COVID; Michelen et al., 2021; Skou et al., 2022; Tinetti et al., 2012).

In addition to being economic, a unique benefit of group therapy as compared to individual modalities is that groups allow for interpersonal dynamics, such as those between individual members, between a member and the leader, and between a member and the group. The interactions experienced by patients in group therapy create opportunities for learning, adapting, and change (Yalom & Leszcz, 2020). Yalom and Leszcz (2020) identified eleven primary therapeutic factors for effective group therapy: Instillation of hope, universality, imparting information, altruism, the corrective recapitulation of the primary family group, development of socializing techniques, imitative behaviour, interpersonal learning, group cohesiveness, catharsis, and existential factors. These factors are interdependent and their interplay, which can depend on various individual- and group-level factors, contributes to group effectiveness (Forsyth, 2021;

Yalom & Leszcz, 2020). One important group-level factor is group cohesiveness (i.e., group cohesion), which is necessary for the other group factors to operate (Yalom & Leszcz, 2020).

Group Cohesion

Group cohesion is the group therapy cognate of therapeutic alliance in individual psychotherapy (Yalom & Leszcz, 2020). However, group cohesion is more complex because it implies interactions at the member-member, member-leader, and member-group levels, whereas therapeutic alliance is a dyadic phenomenon occurring between one patient and one therapist. The intersection between group members, leaders, and the group-as-a-whole interactions are complex and have made group cohesion difficult to define. As such, research on group cohesion has been plagued by the use of various definitions, scales, and measurement perspectives (Yalom & Leszcz, 2020). Nonetheless, research points to group cohesion as a critical aspect of group functioning. And group cohesion is one of the most widely researched therapeutic factors related to group psychotherapy outcomes (Burlingame et al., 2018).

In this dissertation, group cohesion is defined as a shared sense of unity of purpose and sense of interpersonal connection or closeness between group members, as well as between group members and leaders (Burlingame et al., 2018; Forsyth, 2021; Rosendahl et al., 2021). Group cohesion develops and deepens over time as the group continues to interact (Marmarosh & Sproul, 2021). Strong group cohesion predicts positive treatment outcomes ($r = 0.26$) across various psychological diagnoses, clinical settings, and different theoretical orientations (Burlingame et al., 2018). Individuals in groups with stronger cohesion have better attendance, higher participation, increased self-disclosure, offer more mutual support, value the group more highly, and are less susceptible to disruptions such as attrition (Yalom & Leszcz, 2020). Overall, group cohesion is the foundation upon which other group therapeutic factors are built, thereby

contributing to the change process in group psychotherapy (Yalom & Leszcz, 2020). One way to build group cohesion is by attending to group process (Bieling et al., 2022; Yalom & Leszcz, 2020)

Group Process

Group process is defined as the focus on the here-and-now, that is, what is happening in the present moment. Process involves two complimentary steps: experiencing emotions related to the here-and-now and self-reflection that examines the here-and-now behaviour (Yalom & Leszcz, 2020). The therapist's role is to both facilitate the here-and-now experience and to reflect on what information can be gleaned from each experience with respect to the multiple and complex relationships within the group (i.e., member-member, member-leader, group-as-a-whole), as well as to the task of the group. This approach is at the core of process-oriented group therapies, but is often omitted in group-based cognitive therapies that tend to follow manualized protocols which emphasize the teaching and use of specific strategies (Bieling et al., 2022). However, understanding group therapy process and incorporating this work as a therapist-facilitator jointly with theory-specific content has a positive impact on treatment effectiveness and is important even when group process work is not traditionally a central part of the therapeutic work (Bernard et al., 2007; Bieling et al., 2022; Leszcz, 2018). As such, therapists do not need to choose between focusing on enhancing process or teaching and implementing theory-specific strategies (e.g., CBT, ACT), because these components can be integrated (Bieling et al., 2022).

Relevance of Group Psychotherapy Processes to CIDs

One advantage of integrating an awareness of, and attention to group-level factors (e.g., group cohesion, group process) with theory-specific strategies (e.g., CBT, ACT), is that the group can be more effective (Bieling et al., 2022). Most group psychological interventions (i.e., not

referring to supportive therapies such as supportive-expressive group therapy; Goodwin et al., 2001) for patients with medical conditions focus on more structured and cognitive-based strategies with a focus on improving coping, symptoms, and HRQoL, and de-emphasize process-based (i.e., here-and-now) interventions (Brassington et al., 2016; Graham et al., 2016; Leszcz, 2020; Ruesch et al., 2017). As such, there is an opportunity to improve existing group therapies for adults with CID by considering the integration of process-based work as an adjunct to evidence-based group psychological interventions for CID (Bieling et al., 2022) – and the practice guidelines for group psychotherapy would suggest the same (Bernard et al., 2007).

Attention to common and group-level factors may be particularly pertinent in CID from a clinical standpoint because the therapeutic factors inherent to groups may help address various elements that can contribute to, and maintain poorer adaptation to CID such as: social isolation and withdrawal (Bannon et al., 2021), denial (Livneh, 2009), experiential avoidance (Trindade et al., 2016), low mood/emotional symptoms (Lichtman et al., 2014), interpersonal or social difficulties (Figueiredo et al., 2004), and illness-related feelings of shame, guilt, and burden (Trindade et al., 2018).

These maintenance factors of poorer adaptation to CID can, in part, be addressed through some of Yalom's core therapeutic factors (Yalom & Leszcz, 2020). For instance, *instillation of hope* can occur when group members witness others coping effectively with their illness and adjusting to their CID. *Universality* can serve to decrease shame, stigma, and isolation. *Imparting information* can come from leader-facilitated psychoeducation or from advice provided by fellow group members. *Altruism* can be experienced when members support one another and feel useful to the group. *Imitative behaviour* and *interpersonal learning* are present when group members learn new coping skills and move toward adaptation through the modelling

of other group members, or when receiving direct feedback from other group members or the leader. *Group cohesiveness* helps counter social isolation by providing social support within the group. *Catharsis* is prominent when group members self-disclose previously unstated thoughts and feelings which can bring relief. Perhaps members share illness- or treatment-related fears or concerns that they have kept to themselves for fear of worrying or burdening their loved ones. *Existential factors* are evident when members confront either their own or others' deteriorating health or fears about death and dying.

Groups can help to alleviate the psychological distress that accompanies a CID and help move individuals toward better adaptation and HRQoL (Leszcz, 2020). Regardless of the group's theoretical orientation, the leader's understanding and attention to core group therapy processes can have a positive impact on group outcomes (Yalom & Leszcz, 2020). As such, better understanding the mechanisms by which group factors, such as cohesion, contribute to therapeutic change in CID may help clinicians decide which therapeutic factors to harness and which tasks to prioritize in order to maximize treatment effects. Some early research suggests that homogenous groups help to better facilitate group cohesion (Leszcz & Goodwin, 1998), and authors of a recent book reviewing group CBT recommend selecting homogenous participants as a means of improving cohesion (Bieling et al., 2022). However, cohesion develops in heterogenous groups as well (Christensen et al., 2021; Norton & Kazantzis, 2016). Transdiagnostic approaches [for psychological diagnoses] are effective, acceptable, and gaining interest as a way to optimize resources and shorten waiting lists (Aguilera-Martín et al., 2022; Barlow et al., 2017). More research is needed to better understand the effectiveness of transdiagnostic approaches in CID, from both the psychological and CID perspectives.

Transdiagnostic versus Disease-Specific Treatment Considerations

Theoretical models of psychosocial adaptation to CID take a transdiagnostic stance by outlining common acute and chronic illness stressors across CIDs, emotional reactions to these stressors, and postulate that improving adaptive coping via cognitive and behavioural strategies, as well as improving health behaviours (e.g., self-management) can lead to improved adaptation to CID and HRQoL (Hoyt & Stanton, 2018; Livneh, 2001, 2021; Moos & Holahan, 2007; Moss-Morris, 2013). However, this does not align with most research on adaptation to CID which generally takes a disease-specific approach, that is, focusing on one CID (e.g., ABI, multiple sclerosis, cancer, diabetes, cerebral palsy, cardiac, etc.) or on one class of CIDs (e.g., degenerative neuromuscular conditions, respiratory illnesses).

This segmented and CID-specific approach to care and research on adaptation to CID is understandable given the landscape in which clinical care and research often occur, that is, within specialized, diagnosis-specific clinics and across different professions including rehabilitation, mental health, and medicine. Historically, a disease-specific approach has resulted in a richness of information on factors related to adaptation to a number of specific CIDs, however this information tends to remain siloed with little cross-talk between different CID domains. As a consequence, patients, clinicians, and researchers may not fully benefit from the existing wealth of information across various CIDs. A CID-specific approach also limits the generalizability of findings as multimorbidity of CIDs is prevalent (Skou et al., 2022; Tinetti et al., 2012).

Research on the effectiveness of psychological interventions for emotional distress in adults with CIDs also generally adopts a diagnosis-specific approach, focusing on one emotional disorder or cluster of symptoms (e.g., depression, anxiety) within one specific CID (Osma et al.,

2021). When considering psychosocial adaptation to CID (e.g., HRQoL), a transdiagnostic approach (Norton & Paulus, 2016; Osma et al., 2021) may be more parsimonious and clinically relevant, particularly given the high prevalence of comorbidity between CIDs and emotional problems (Daré et al., 2019). Transdiagnostic approaches focus on shared stressors and experiences across various CIDs that impact adaptation (Heijmans et al., 2004), as well as shared processes across emotional disorders that maintain symptoms (Barlow et al., 2017; Tasca et al., 2020).

Evidence from a systematic review of nine studies points to some benefits of transdiagnostic psychological interventions for symptoms of anxiety and/or depression in several CID-specific groups (i.e., chronic pain, irritable bowel syndrome, multiple sclerosis, HIV, idiopathic Parkinson's disease, infertility, and breast cancer; Osma et al., 2021). The systematic review included 4 randomized controlled trials (RCTs), 2 single-condition pilot studies, 2 single-case experimental design studies, and 1 pediatric case study. These studies are characterized by small sample sizes, ranging from 45-70 for the RCTs and 2-15 for the other study designs, and so more research is needed to better understand transdiagnostic psychological interventions, particularly in mixed-CID groups.

A comparably smaller number of studies have examined psychological interventions for transdiagnostic-CID groups. For instance, one study examined the effectiveness of an 8-week CBT group for adults with chronic physical disorders and co-morbid depression or adjustment disorder who were on a waiting list for individual services (Ruesch et al., 2017). Study participants had a chronic physical disorder such as cardiovascular disease, stroke, cancer, chronic respiratory diseases, or diabetes. Results indicate that the 8-week CBT group intervention improved depressive symptoms, as well as mental and physical QoL at post-

treatment, but only improvements in physical QoL were maintained at 2-month follow-up (Ruesch et al., 2017).

Another study examined the effectiveness of an 8-session ACT group for adults with a chronic physical condition and a functional pattern of experiential avoidance of symptoms, thoughts, or feelings (Brassington et al., 2016). Results indicated that the intervention improved psychological distress at post-treatment and gains were maintained at 3-month follow-up (Brassington et al., 2016). Overall HRQoL did not improve following the ACT group intervention, however some specific domains of HRQoL improved at post-treatment (i.e., physical role limitations, emotional roles limitations, and emotional well-being) and were maintained at 3-month follow-up (Brassington et al., 2016).

Neither study used data analytic strategies that account for the nested nature of the data (i.e., repeated measures within participants, and participants nested within groups), therefore results do not account for possible shared variance at the group level, which is an area of future improvement that will be addressed in the present dissertation. Both the Ruesch (2017) and Brassington (2016) studies reported some improvements across different adaptation and emotional symptom indicators following their respective group-based interventions. These studies help lay the groundwork for continued research on group-based interventions for transdiagnostic-CID groups.

The Intervention: Coping with Disabilities and Health Conditions

The intervention studied in the present dissertation (studies two and three) integrates principles from CBT (Beck & Haigh, 2014) and ACT (Hayes et al., 2016), as well as a significant interpersonal process component (Yalom & Leszcz, 2020). The group-based intervention, entitled *Coping with Disabilities and Health Conditions*, is a modification of a

manualized CBT protocol that was previously developed by colleagues at The Ottawa Hospital Rehabilitation Centre (TOHRC). Modifications to the original manualized CBT protocol were made by colleague and co-author, Dr. Monique Lefebvre, C.Psych., and included the addition of ACT-based interventions and attention to group process.

Incorporating a group process orientation allowed the group leader to respond to group members' experiences in the here-and-now, facilitate self-reflection on these experiences, and relate reflections to the main goal of the group, which was to improve adaptation to CID via theory-specific content (i.e., ACT and CBT).

In keeping with the principles of ACT and interpersonal process psychotherapy, group leaders flexibly adhered to the following topics: (a) psychoeducation about CID and about the CBT/ACT models, (b) behavioural activation, goals, pacing, and self-care, (c) stress, symptoms, and the benefits of mindfulness and relaxation, (d) depression, grief, and the power of acceptance, (e) managing anger, (f) managing worry, uncertainty, and existential anxiety, (g) relationship building with role plays, and (h) review of learned skills and farewells.

The group intervention included eight weekly 120-minute sessions with a 15-minute break. Group admission was closed. Consistent with ACT, a 15-minute therapist-led relaxation or mindfulness exercise was included at the end of each session. Adaptations to the physical space were made in order to create an accessible and comfortable space for individuals with a variety of physical needs. For example, curtains were closed and lights dimmed to maximize comfort for individuals with ABI.

The original manualized group was designed to accompany the self-management workbook called *Positive Coping with Health Conditions: A Self-Care Workbook* (Bilsker et al., 2009), and use of the workbook was retained as reading material. Patients were asked to read a workbook

chapter before each weekly session, and brief worksheets were provided to increase exposure to concepts for those who wanted additional independent learning. Consistent with ACT- and process-oriented therapies, no formal homework was assigned, although patients had the opportunity to ask questions about any of the group materials.

Overall, evidence-based group psychological interventions (e.g., CBT, ACT) improve emotional and behavioural health outcomes across various CIDs (Brassington et al., 2016; Graham et al., 2016; Jackson et al., 2019; Ruesch et al., 2017). There is precedent to integrate elements from CBT and ACT to augment therapeutic benefit (e.g., Hallis et al., 2017; Lunde & Nordhus, 2009), and layering in group process can further enhance outcomes (Bernard et al., 2007; Bieling et al., 2022; Leszcz, 2018). This has not yet been studied in CID.

Although many patients show reliable improvement following evidence-based treatment, some individuals continue to experience clinically high levels of emotional symptoms at post-treatment (Ruesch et al., 2017). Understanding the factors that contribute to treatment response and therapeutic change in a process-oriented ACT-CBT group therapy for adults with CID and emotional symptoms is important in order to tailor treatments to better meet patient needs. One relevant construct that may help to further inform our understanding of adaptation to CID and individual differences in treatment outcomes from a transdiagnostic perspective is attachment. Research supports attachment as a transdiagnostic risk factor for psychopathology (Herstell et al., 2021; Mikulincer & Shaver, 2012), and it is also pertinent to health and CID (Hunter & Maunder, 2016).

Attachment Theory

Attachment theory posits that humans evolved to develop attachment systems that motivate infants to seek proximity to caregivers and maintain their availability during times of threat to

ensure survival (Ainsworth & Bell, 1970; Bowlby, 1970, 1980). At its core, attachment is a biologically-rooted behavioural system. Before attachment systems are overtly recognizable as behaviours (e.g., crying, clinging), the attachment system serves to regulate an infant's physiology, including nutrition, temperature, and activity through interactions with primary caregivers (Hofer, 2006; Kuhn & Schanberg, 1998). Early, repeated experiences with caregivers shape the attachment system into relatively stable and lifelong patterns of expectations, desires, feelings, and behaviours in interpersonal interactions (Hazan & Shaver, 1987). The nature of an individual's repeated experiences with caregivers shapes that person's attachment style such that warm and consistent caregiving results in a secure attachment bond, whereas rejecting, harmful, or inconsistent caregiving results in an insecure attachment bond (Bowlby, 1980). Other meaningful interactions throughout adolescence and adulthood also help to shape the attachment system (Bowlby, 1980).

Adult attachment was originally conceptualized as categorical (e.g., secure, insecure), however a dimensional approach better captures individual differences (Mikulincer & Shaver, 2007) and will be used in this dissertation. Dimensions of adult attachment are attachment anxiety and attachment avoidance (Mikulincer & Shaver, 2007). Individuals with lower levels of attachment anxiety and of attachment avoidance are conceptualized as securely attached (Fraley et al., 2015). Securely attached individuals view themselves as worthy, view others as dependable and responsive, and are able to acknowledge and express their emotions. Relative to individuals with an insecure attachment style (i.e., higher levels of attachment anxiety or attachment avoidance), those with secure attachment are more comfortable with closeness, intimacy, and interdependence in relationships (Mikulincer & Shaver, 2007). Individuals higher on attachment anxiety have a negative view of themselves, fear being undervalued, fear

abandonment, have high needs for intimacy and approval, are emotionally dependent, and have limited internal resources (Mikulincer & Shaver, 2007). These individuals tend to be hypervigilant to cues of rejection and seek reassurance through physical proximity in an attempt to preserve the attachment bond (Mikulincer & Shaver, 2007). They also tend to have strong emotional reactions when distressed (Mikulincer & Shaver, 2007).

Individuals higher on attachment avoidance have a negative view of others and relationships, find trusting and depending on others difficult, and avoid emotional closeness with others (Mikulincer & Shaver, 2007). In an effort to thwart attachment bonds, individuals with higher levels of attachment avoidance tend to deny their attachment needs, demonstrate self-reliant attitudes, and avoid dependency in relationships (Mikulincer & Shaver, 2007). They also tend to downplay and avoid their emotional experience (Mikulincer & Shaver, 2007).

The prototypical patterns and expectations about relationships that are formed early in life transfer to new relationships and also unfold in the healthcare context (Hazan & Shaver, 1987; Hunter & Maunder, 2001). Individuals higher on attachment anxiety may amplify their physical and emotional symptoms, or over-use healthcare resources, whereas individuals higher on attachment avoidance may suppress their physical and emotional symptoms, or minimize help-seeking behaviours (Maunder & Hunter, 2009). Relative to insecurely attached individuals, those who are more securely attached are better able to manage distress and are more comfortable depending on others for support in response to illness-related threat (Hunter & Maunder, 2001).

Attachment and CID

Attachment is relevant to CID and may help guide future theory-driven research on adaptation to CID and rehabilitation care. Attachment has long-been recognized as pertinent to health. Two prominent models describe how attachment insecurity relates to disease: 1) Maunder and

Hunter's (2001) model of attachment and disease describes how attachment can lead to an increased risk of disease via altered stress-modulation, affect-regulation, and help-seeking pathways; 2) Meredith and colleagues' (2008) attachment-diathesis model of chronic pain describes how attachment insecurity relates to the development of chronic pain via cognitive, emotional, and social pathways. Information from these attachment-based models can be integrated into existing models of adaptation to CID. That is, attachment is relevant at the antecedent, process, and outcome levels of the combined model of adaptation to CID (see Figure 1).

Antecedents: Attachment and Contexts of Risk & Resilience

An exhaustive review of how attachment relates to antecedents, or pre-disposing factors to CID (see Figure 1) is beyond the scope of the current dissertation, however it is important to highlight a few key points. Insecure attachment can negatively influence physical health via several interacting neurobiological mechanisms, including stress response, inflammatory/immune responses, changes in neurocircuitry, and epigenetics (Chambers, 2017).

For example, individuals with insecure attachment can have a greater inflammatory response relative to securely attached individuals who are experiencing similar levels of chronic or acute stressors (Ehrlich, 2019). The inflammatory response is essential to survival, but can become dysregulated leading to chronic inflammation. Chronic inflammation is associated with many chronic illnesses such as diabetes, stroke, coronary heart disease, rheumatoid arthritis, inflammatory bowel disease, multiple sclerosis, HIV, ABI, and many more (Dregan et al., 2014; Fairbrass et al., 2020; Harezlak et al., 2011; Matthews, 2019; Weil et al., 2014). In terms of epigenetics, attachment insecurity and early adversity are associated with DNA-methylation (Darling Rasmussen & Storebø, 2021), a process which alters gene expression and tracks with

disease state. Research demonstrates that an aberrant DNA-methylation profile is associated with multiple sclerosis (Celarain & Tomas-Roig, 2020).

In addition to neurobiological mechanisms contributing, in part, to the onset or progression of some CIDs, the neurobiological embedding of insecure attachment can impact outcome following injury (e.g., ABI), although much more research in this area is needed. For example, neuroinflammation and cortisol stress responses are both acutely and chronically altered following a ABI, and higher dysfunction in these systems post-ABI is associated with poorer rehabilitation outcomes (Tapp et al., 2019). It is known that pre-morbid conditions, such as microglial priming which can be caused by psychological stress (Niraula et al., 2017), can further exacerbate neuroinflammation (Tapp et al., 2019). It is conceivable, then, that individuals with pre-morbidly dysregulated neurobiological mechanisms, such as a dysregulated cortisol stress response system which is associated with insecure attachment (Quirin et al., 2008), could be more vulnerable to poorer rehabilitation outcomes post-ABI. Said differently, attachment insecurity might prime the various neurobiological pathways in the body, making insecurely attached individuals less resilient to injury from a biological perspective.

Process: Attachment and Responses to CID as a Threat (see Figure 1)

The onset or exacerbation of a CID is a major stressful event for many individuals and their families, and can be conceptualized as a physical and psychological threat (Moos & Holahan, 2007; Roos & Neimeyer, 2007). This threat activates the attachment system (Bowlby, 1970; Maunder & Hunter, 2001; Mikulincer et al., 2002). Threat permeates life with a CID and comes in various forms such as threat to someone's life, integrity, security, sense of identity, sense of coherence, relationships, livelihood, and hopes for the future. Therefore, the attachment system

is likely repeatedly, if not chronically activated in response to threats, making attachment relevant to understanding adaptation to CID.

Living with a CID can be conceptualized as an *extended life crisis* requiring ongoing management of intermittent or unremitting CID-related symptoms and stressors through cognitive, affective, and behavioural strategies. Attachment insecurity is relevant to how individuals respond to threat and adapt to CID via multiple pathways, for example: poorer emotion regulation (Mikulincer & Shaver, 2019); poorer coping (Zimmer-Gembeck et al., 2017); challenges with dyadic coping (Martins et al., 2022; Pietromonaco et al., 2013); lower self-efficacy (Bandura, 1989; Bender & Ingram, 2018); poorer treatment adherence (Ciechanowski et al., 2001), difficulties with social support and caregiving (McLeod et al., 2020; Trejnowska et al., 2019), poorer communication with healthcare providers and maladaptive help-seeking behaviour (Hunter & Maunder, 2001; Maunder & Hunter, 2009); and increased risk of psychopathology (Herstell et al., 2021; Mikulincer & Shaver, 2012).

Outcomes: Attachment and Adjustment & Treatment Outcomes

Outcomes in the merged model of adaptation to CID (Figure 1) refers to the outcome of psychosocial adaptation, that is, a snapshot of functioning and HRQoL at any given time. Outcomes can also refer to treatment outcomes. As previously mentioned, individual trajectories of adaptation to CID and individual responses to treatment vary. Several factors have been investigated as predictors of adaptation to CID (e.g., social support, self-efficacy, coping, acceptance of the disability, depressive symptoms, neuroticism, and pessimism), but more research in this area is needed (Goyal et al., 2018; Pucciarelli et al., 2020; Seves et al., 2021; van Mierlo et al., 2018). Attachment can help further elucidate individual differences in adjustment to CID and treatment outcomes.

It is well known that attachment insecurity is associated with poorer health and treatment outcomes overall (Levy et al., 2018; Meredith & Strong, 2019; Pietromonaco & Beck, 2019), as well as to poorer rehabilitation outcomes (e.g., Adellund Holt et al., 2016; Heenan et al., 2020; Kowal et al., 2015). Research on the distinct contributions of attachment anxiety and attachment avoidance are mixed (Brandão et al., 2018; Heenan et al., 2020; McWilliams & Bailey, 2010), perhaps as a result of different methods of conceptualizing (e.g., discrete versus dimensional) and measuring attachment. Some research suggests that the relationship between attachment insecurity dimensions and treatment outcomes may depend on the theoretical orientation of the treatment (e.g., educational, cognitive, relational; McBride et al., 2006; Tasca et al., 2006). More research is needed to better understand how attachment anxiety and attachment avoidance impact treatment outcomes across various treatment orientations and modalities (e.g., group therapy).

Attachment theory helps to conceptualize individual differences in interpersonal functioning, emotion regulation, symptom expression, help-seeking behaviour, and ability to reflect on one's own and others' mental states. As such, attachment is particularly salient to group psychotherapy process and outcome. As previously mentioned, groups are teeming with opportunities for interpersonal interactions at the member-member, member-leader, and member-group levels, and attachment insecurity dimensions can impact these dynamics (Tasca & Maxwell, 2021). Attachment is also relevant to group process and Yalom and Leszcz's (2020) therapeutic factors. For example, group cohesion – a fundamental therapeutic factor that augments all other therapeutic factors – has been likened to the concept of a secure base (Mikulincer & Shaver, 2007). When the group feels like a secure base, that is, when group members feel that they can rely on the group for comfort and support, then an individual member may be more likely to be vulnerable and take risks in the group which promotes learning and change (Mikulincer &

Shaver, 2007).

It is important not to pathologize insecure attachment styles (i.e., attachment anxiety and attachment avoidance) because they were adaptive in the circumstances under which they developed (i.e., a stressful developmental environment). Difficulties associated with an insecure attachment style become evident when physical or psychological safety is threatened (Bowlby, 1980) and when attachment styles interact with treatment modalities to impact health outcomes. Overall, more research is needed to better understand how an individual's level of attachment anxiety and attachment avoidance interact with specific treatment orientations (e.g., cognitively-oriented versus relationally-oriented) and modalities (e.g., individual, group therapy) to effect treatment outcomes (McBride et al., 2006; Tasca, Ritchie, et al., 2006). No studies to date have investigated how attachment insecurity dimensions relate to psychosocial adaptation (i.e., HRQoL) or to outcomes of group psychotherapy for emotional distress in transdiagnostic-CID samples. The present dissertation will address these gaps.

The Current Dissertation

The current dissertation is comprised of three studies whose overarching goal is to examine psychosocial adaptation to CID and treatment outcomes from an attachment perspective. A transdiagnostic-CID approach is utilized across all three studies. Building on the literature on attachment and CID, study one proposed and tested an attachment-informed model of psychosocial adaptation to CID using a cross-sectional path analysis. Direct and indirect effects were examined to better understand how attachment anxiety, attachment avoidance, social coping, avoidant coping, and health self-efficacy related to adaptation to CID.

Study two examined outcomes of the *Coping with Disabilities and Health Conditions* intervention. The first goal of study two was to examine the outcomes of depression, anxiety,

psychological distress, self-efficacy, and HRQoL from pre- to post-treatment. The second goal was to test if pre-treatment levels of attachment anxiety or attachment avoidance predicted change in treatment outcomes. Multilevel analyses were used to account for the hierarchical nature of the data. Given the pre-post no control group design, reliable change indices were calculated to describe clinically significant changes in outcomes and to minimize threats to validity.

Study three builds upon the literature on attachment and group process by examining how group cohesion impacts outcomes of the *Coping with Disabilities and Health Conditions* intervention. The first goal was to examine weekly change in psychological symptoms (i.e., depression and anxiety) and group cohesion across eight weeks of treatment. The second goal was to assess for a possible reciprocal relationship between change in psychological symptoms and group cohesion across sessions (i.e., reciprocal cohesion-outcome relationship). The third goal was to examine goals one and two through an attachment lens. That is, I tested if pre-treatment levels of attachment anxiety or attachment avoidance predicted within-person change in depression, anxiety, or group cohesion over time. I also tested if pre-treatment levels of attachment anxiety or attachment avoidance moderated the reciprocal cohesion-outcome relationship. As in study two, multilevel analyses were used to account for the hierarchical nature of the data. To assess for a possible reciprocal cohesion-outcome association, I disaggregated within- and between-person effects which allowed me to examine within-patient session-by-session change.

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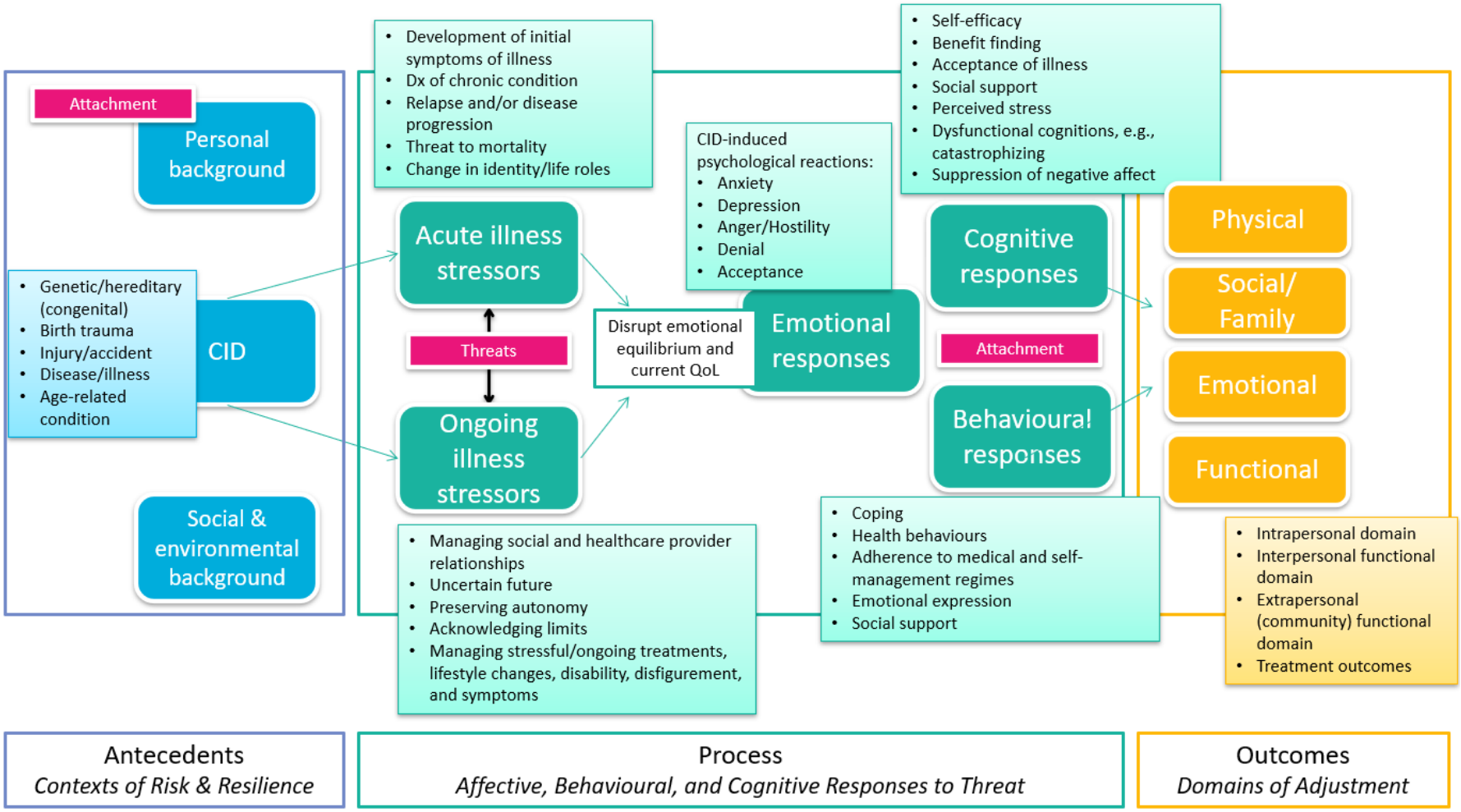
Figure 1

The Integrated Attachment-Adaptation to Chronic Illness and Disability Model



Study One

Attachment Avoidance and Health-Related Quality of Life: Mediating Effects of Avoidant Coping and Health Self-Efficacy in a Rehabilitation Sample

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Abstract

The onset of chronic illness or disability (CID) can be conceptualized as a threat that activates the attachment system. Moreover, the waxing-and-waning nature of CID-related symptoms and management of acute and chronic illness stressors means that the attachment system may be repeatedly activated. Contending with repeated threats to health (i.e., security) can complicate psychosocial adjustment to CID and can negatively impact health-related quality of life (HRQoL). Adjustment to CID requires intrapersonal resources, such as adaptive coping and self-efficacy. In spite of attachment theory's relevance to conceptualizing adaptation to CID, no models of psychosocial adaptation to CID account for individual differences in coping behaviours and health self-efficacy through an attachment lens. This limits future theory-driven research. Thus, the present study proposes and tests an integrated model of psychosocial adaptation to CID using an attachment framework. Participants in this study included adults referred for psychological services at a tertiary care physical rehabilitation centre between 2016 and 2020. Ninety adults completed measures of attachment anxiety and attachment avoidance, coping, health self-efficacy, and HRQoL at one time point. Path analysis indicated that the proposed model fits the data well. Higher attachment avoidance was significantly related to lower HRQoL, as mediated by higher avoidant coping and lower health self-efficacy. Results suggest that individuals high on attachment avoidance may require additional support to move toward psychosocial adaptation. Further research examining the role of attachment insecurity dimensions in adaptation to CID is warranted and should include longitudinal designs to replicate these findings.

Keywords: attachment anxiety, attachment avoidance, chronic illness or disability, coping, health self-efficacy, quality of life, rehabilitation

Attachment Avoidance and Health-Related Quality of Life: Mediating Effects of Avoidant Coping and Health Self-Efficacy in a Rehabilitation Sample

For many, the onset of a chronic illness or disability (CID) marks the beginning of a lifelong process of adjusting to physical, psychological, social, and environmental changes. Although some individuals seem to gradually and independently move toward functional adaptation and personal growth, others struggle with the process and require additional support. Understanding better the factors that influence adaptation to CID can help to contribute to an integrative model of adjustment. A comprehensive model of adaptation to CID can help guide future theory-driven research with the goal of improving rehabilitation care, and ultimately the physical, psychological, and cognitive functioning of people living with a CID.

The International Classification of Functioning, Disability and Health (ICF, 2001) is the most widely accepted framework for conceptualizing and classifying functioning and disability, and is becoming increasingly influential in informing rehabilitation practice (Gao et al., 2021; Perin et al., 2020; Stucki et al., 2018). The ICF conceptualizes functioning and disability as the intersection between health conditions, body function and structure, daily activities, and social participation, while also taking into account the role of personal and environmental contextual factors (Bornman, 2004; World Health Organization and World Bank, 2011). Missing from the ICF, is the *explicit* inclusion of psychological adjustment to CID, thereby limiting future theory-driven research on the process of adaptation to CID (Dekker & de Groot, 2018; Geyh et al., 2019; Müller & Geyh, 2015).

Theories of self-regulation (Hagger & Orbell, 2021; Leventhal et al., 1984), stress appraisal, coping (Lazarus & Folkman, 1984), and self-efficacy (Bandura, 1977) underpin the process of adaptation to CID and have helped to inform a number of theoretical frameworks that endeavour

to explain adaptation to CID (Dekker & de Groot, 2018; Livneh, 2001; Moos & Holahan, 2007; Moss-Morris, 2013; Walker et al., 2004). The working model of adjustment to chronic illness posits that an illness or disability leads to acute and ongoing illness stressors. These stressors induce cognitive, behavioural, and emotional responses that interact to influence health and psychosocial outcomes (Moss-Morris, 2013), such as health-related quality of life (HRQoL).

Together, the ICF and Moss-Morris' model organize many important facets of adjustment to CID (e.g., illness stressors, coping response) and acknowledge the contribution of individual and social differences (e.g., personality, life goals, socio-economic status), thereby providing a solid foundation upon which to continue building our understanding of psychosocial adaptation to CID. However, to date, no model fully captures both the intra- and inter-personal factors associated with adaptation within a unifying, parsimonious theoretical framework. The addition of an attachment theory lens could provide this beneficial structure.

Attachment theory (Ainsworth & Bell, 1970; Bowlby, 1970, 1980, 1982), which provides a framework for individual differences in coping with stressful emotions and seeking support from others, may help guide future work in rehabilitation research and practice. Adapting to CID requires people to mobilize existing intra- and inter-personal resources (e.g., self-efficacy, social support), and to respond flexibly to changing needs by acquiring additional help (Barlow et al., 2002). People living with CID may need to depend more on others for support or to develop strong self-management skills. To the best of our knowledge, there is no model of psychosocial adaptation to CID that explicitly incorporates attachment dimensions. However, attachment theory has long been recognized in understanding the development of, and adaptation to, chronic pain (Meredith et al., 2008; Mikail et al., 1994), and to the development of illness and disease

(Maunder & Hunter, 2001). The present study draws from these previous works to develop and test a comprehensive model of adaptation to CID from an attachment theory perspective.

Attachment Theory

Attachment theory describes a lifelong pattern of response to threat that is learned early in life. The theory posits that humans evolved to develop attachment systems that motivate infants to seek proximity to caregivers to ensure survival (Ainsworth & Bell, 1970; Bowlby, 1970, 1980). Warm and consistent caregiving may result in a secure attachment bond, whereas rejecting, harmful, or inconsistent caregiving may result in an insecure attachment bond (Bowlby, 1980). Relative to insecurely attached individuals, those with a secure attachment style can express affect, are able to manage illness-related distress, and are comfortable depending on others for support in response to illness-related threat (Hunter & Maunder, 2001).

Although researchers originally conceptualized adult attachment as categorical (e.g., secure, insecure), a dimensional approach is now more widely accepted as it better captures individual differences (Mikulincer & Shaver, 2007) and recognizes that attachment security exists along a continuum (Raby et al., 2020). Two commonly derived dimensions are attachment anxiety and attachment avoidance (Mikulincer & Shaver, 2007). Adults higher on *attachment anxiety* have a negative view of themselves, fear abandonment, have high needs for intimacy and approval, are emotionally dependent, fear being undervalued, and have limited internal resources (Mikulincer & Shaver, 2007). Adults higher on *attachment avoidance* have a negative view of others and relationships, find trusting and depending on others difficult, and avoid emotional closeness with others (Mikulincer & Shaver, 2007). Individuals with lower levels of both attachment anxiety and attachment avoidance can be conceptualized as securely-attached (Fraley et al., 2015; Raby et al., 2020).

Although attachment insecurity dimensions are adaptive under certain circumstances, difficulties associated with higher insecure attachment become evident when physical or psychological safety is threatened (Bowlby, 1980). Living with a CID can be conceptualized as an extended life crisis requiring ongoing management of acute and chronic illness stressors (e.g., illness symptoms and exacerbations, treatment regimens, future uncertainty, interpersonal strains, etc.; Moos & Holahan, 2007). Therefore, the attachment system is likely repeatedly, if not continuously, activated during CID, making attachment styles relevant to adapting to CID.

While it is generally established that attachment insecurity correlates with poor health outcomes (Andersen et al., 2019; Bennett et al., 2011; Kowal et al., 2015; Meredith & Strong, 2019; Pietromonaco & Beck, 2019; Schmidt et al., 2002; Sirois & Gick, 2016), the differential contributions of the dimensions of attachment anxiety and attachment avoidance are less consistently documented in the research. Some researchers demonstrated that attachment anxiety is a stronger predictor of poor health indicators (Heenan et al., 2020; Martin et al., 2012), whereas others have shown that attachment avoidance is the stronger predictor (Ávila et al., 2015; Brandão et al., 2018). Attachment insecurity dimensions are also differentially related to health conditions. In a large U.S. sample, higher attachment avoidance was associated with pain conditions, and higher attachment anxiety was associated with cardiovascular conditions (McWilliams & Bailey, 2010). The picture is further muddied by researchers using different methods of assessing insecure attachment dimensions, different definitions of health, different sample characteristics (e.g., clinical versus non-clinical samples), and different intervening variables.

Nevertheless, attachment may prove pivotal to our understanding of CIDs. Coping (Lazarus & Folkman, 1984) and self-efficacy (Bandura, 1977) are related but distinct constructs from

attachment. Researchers have demonstrated the importance of both coping and self-efficacy to psychological adjustment to CID (e.g., Korpershoek et al., 2011; Selzler et al., 2020). Hence, examining these constructs in addition to attachment anxiety and attachment avoidance may be useful when considering a model of psychosocial adjustment to CID. Moreover, the modifiable nature of coping strategies and self-efficacy (Sheeran et al., 2016) provides potential treatment targets to improve adjustment to CID.

Coping

Coping is defined as a cognitive strategy used to decrease, modify, or diffuse the impact of stressful events or situations (Billings & Moos, 1981). Most studies of coping and CID use two broad categories of coping: adaptive/engaged and maladaptive/disengaged. Engaged coping refers to active, direct, and goal-oriented strategies (e.g., problem-solving, seeking support) that tend to be associated with more positive outcomes (Livneh & Martz, 2014; Shao et al., 2019; Soberg et al., 2015). Disengaged coping refers to passive, indirect, or avoidance-oriented strategies (e.g., denial, blame, substance abuse), that tend to be associated with poorer adaptation to CID and more psychological distress (Livneh, 2019; Nahlén Bose et al., 2015).

Attachment anxiety and attachment avoidance influence coping strategies (Holmberg et al., 2011; Mikulincer & Shaver, 2019; Zimmer-Gembeck et al., 2017). Research suggests that individuals higher on attachment avoidance use more disengaged coping responses and tend to seek less social support (Maunder & Hunter, 2009; McLeod et al., 2020; Van Vleet & Helgeson, 2019). However, the research is less clear on the relationship between attachment anxiety and engaged versus disengaged coping. Researchers have found that attachment anxiety is associated with excessive support-seeking behaviour (i.e., a generally adaptive coping strategy) and higher perceived dissatisfaction with support received (Gick & Sirois, 2010; Shaver et al., 2005). There

is some evidence of no association between attachment anxiety and engaged coping (Holmberg et al., 2011). Attachment anxiety has also been associated with disengaged coping (Krasuska et al., 2018; Simon et al., 2020). Understanding how individual differences in attachment anxiety and attachment avoidance influence coping in rehabilitation populations may be useful to better tailor treatments and improve psychosocial adaptation to CID.

Self-Efficacy

Self-efficacy refers to an individual's beliefs regarding their capacity to accomplish tasks and is a powerful driver of behavioural change (Bandura, 1977). Low self-efficacy is related to increased emotional distress and functional impairment, and decreased HRQoL in many medical populations (Baak, 2015; Benyon et al., 2010; Borjalilu et al., 2017; Cicerone & Azulay, 2007; Jackson et al., 2014; Korpershoek et al., 2011; Pjanic et al., 2014; van Diemen et al., 2017; Yazdi-Ravandi et al., 2013). One domain-specific self-efficacy construct that is particularly relevant to people with CID is health self-efficacy, which is defined as an individual's confidence in their ability to perform a specific health behaviour (e.g., to undertake a health behaviour even in adverse circumstances; Sheeran et al., 2016).

Theory and research suggest that attachment influences the development of self-efficacy (Bandura, 1989). Negative internal working models that are characteristic of those with high attachment anxiety and high attachment avoidance may help to explain the link between self-efficacy and attachment. For example, high insecure attachment dimensions are associated with low self-efficacy in primary care patients with multiple CIDs (Brenk-Franz et al., 2015), and in adults with a spinal cord injury (Blake et al., 2018), and higher attachment anxiety predicts lower pain self-efficacy in women with genito-pelvic pain (Charbonneau-Lefebvre et al., 2019). Yet, other researchers have found that neither attachment anxiety nor attachment avoidance are

related to self-efficacy (Van Vleet & Helgeson, 2019). Understanding how attachment anxiety and attachment avoidance relate to health self-efficacy in rehabilitation populations may be important to improve efforts to increase health self-efficacy – a robust predictor of health behaviour change and adjustment (Aitken et al., 2016; Korpershoek et al., 2011; Sheeran et al., 2016).

Although coping and self-efficacy are sometimes discussed in isolation and treated as static variables, they are part of a reciprocal process influencing behaviour (Clark & Dodge, 1999). The bidirectional nature of coping and self-efficacy is widely acknowledged in the literature. An individual's level of perceived self-efficacy can inform their coping response (Lazarus & Folkman, 1984), and in turn, feedback from coping efforts helps to increase or decrease self-efficacy (Bandura, 1977).

The Present Study

Our goal is to develop and conduct a preliminary test of an over-arching, attachment-informed model of psychosocial adaptation to CID in the rehabilitation context that accounts for individual differences in coping behaviours and health self-efficacy. Such a model will facilitate future theory-driven research and may guide clinical practice. The present study contributes to the nascent literature on attachment and rehabilitation (e.g., Andersen et al., 2019; Blake et al., 2018), and is the first study to examine how attachment insecurity dimensions, coping, and health self-efficacy relate to HRQoL in a rehabilitation sample.

We tested if coping and health self-efficacy mediated the relationship between attachment insecurity dimensions and HRQoL in patients with CID. Based on theory and past research, we hypothesized the following direct effects: (1) attachment anxiety and attachment avoidance will be negatively associated with HRQoL, (2) attachment anxiety will be positively associated with

social coping, (3) attachment avoidance will be negatively associated with social coping and positively associated with avoidant coping, (4) attachment anxiety and attachment avoidance will be negatively associated with health self-efficacy, (5) social coping will be positively associated with health self-efficacy and HRQoL, (6) avoidant coping will be negatively associated with health self-efficacy and HRQoL, and (7) health self-efficacy will be positively associated with HRQoL.

Of greater relevance to our model, we hypothesized the following indirect or mediation effects: (8) higher avoidant coping, lower social coping, and lower health self-efficacy will mediate the relationship between attachment avoidance and HRQoL, and (9) higher social coping and lower health self-efficacy will mediate the relationship between attachment anxiety and HRQoL. For mediation effects related to attachment avoidance (hypothesis 8), we predicted that individuals higher on attachment avoidance will engage in cognitive, emotional, and social deactivating strategies to manage illness-related distress, which will result in negative feedback on the coping behaviour thereby reinforcing the individual's deep sense of inadequacy (i.e., low health self-efficacy). Together, coping and health self-efficacy will explain the relationship between high attachment avoidance and poorer HRQoL. For the mediation effect related to attachment anxiety (hypothesis 9), given that high attachment anxiety is associated with excessive reliance on others, excessive help-seeking, and higher perceived unhelpfulness of support, we hypothesized that higher attempts at social coping will result in lower health self-efficacy due to negative feedback received on the coping behaviour, and that together, this will result in poorer HRQoL.

Examining these relationships can help deepen our understanding of how the dimensions of attachment insecurity relate to adaptation to CID. The literature indicates that adaptive coping

(e.g., social coping) and high self-efficacy are key components of adjustment to CID. However, the efficacy of a particular coping strategy may depend on the individual's level of attachment anxiety or attachment avoidance. For example, social coping may seem adaptive on the surface, but if this coping strategy is excessive and serves to undermine health self-efficacy, then it may not be as adaptive as initially presumed.

Method

Participants

The final sample included 90 adults (M_{age} = 46.64 years, *SD* = 12.90; 64% female, n = 58) who were referred for psychological services by their treating physiatrist. All participants were outpatients receiving treatment at a tertiary care physical rehabilitation centre in an urban, Canadian city. Participant medical and socio-demographic data are presented in Table 1.

Measures

Attachment

Attachment anxiety and attachment avoidance were assessed using the Experiences in Close Relationships Scale—Short Form (ECR-SF), which is a reliable and valid 12-item self-report measure of general adult attachment (Wei et al., 2007). Items are rated on a 7-point Likert-type scale (1 = strongly disagree; 7 = strongly agree). The attachment anxiety subscale (6 items) assesses fear of abandonment or rejection, and the attachment avoidance subscale (6 items) assesses discomfort with closeness and depending on others (Wei et al., 2007). Mean total scores on each subscale range from 1 to 7, with higher scores indicating higher levels of attachment anxiety or attachment avoidance. The ECR-SF has good psychometric properties (Wei et al., 2007), and has been validated in health samples (e.g., Pfeifer et al., 2019). Cronbach alphas for

the attachment anxiety and attachment avoidance subscales in the present study were .78 and .75, respectively.

Coping

The Brief Coping Orientations to Problems Experienced scale (Brief COPE; Carver, 1997) is a 28-item self-report multidimensional coping inventory comprised of 14 different subscales. Items are rated on a 4-point Likert-type scale (1 = I usually don't do this at all; 4 = I usually do this a lot). The Brief COPE is one of the most widely used coping inventories in health populations (Livneh, 2019), and can assess situational or dispositional coping; the latter was used in the present study. The psychometric properties of the Brief COPE are adequate to good (Carver, 1997). The two factors used in the present investigation, avoidant coping (items 3, 4, 6, 8, 11, 16) and social coping (items 5, 9, 10, 15, 21, 23; Cramer et al., 2020; Nahlén Bose et al., 2015), were chosen based on a review of various Brief COPE factor structures in medical populations and on conceptual considerations (Livneh, 2019). Items on the avoidant coping factor reflect disengagement (e.g., denial, drugs/alcohol use, and defeat), whereas items on the social coping factor are consistent with engagement (e.g., reaching out for support and releasing/venting of emotions). Cronbach alphas in the present study were .75 for each of the avoidant and social coping scales.

Health Self-Efficacy

The Self-Efficacy for Managing Chronic Disease Scale (SEMCD) is a 6-item questionnaire assessing an individual's confidence in their ability to manage several domains related to living with a CID, namely symptom control (i.e., fatigue, pain), emotional functioning, task and role function, and healthcare utilization (Lorig et al., 2001). Each item is rated on a 10-point Likert-type scale (1 = not at all confident; 10 = totally confident). The total score is computed as the

mean of the 6 items. Higher scores indicate higher health self-efficacy. The SEMCD has excellent psychometric properties (Lorig et al., 2001). Cronbach alpha in the present study was .82.

Health-Related Quality of Life

The Functional Assessment of Cancer Therapy – General (FACT-G) is a 27-item questionnaire that measures four HRQoL domains; physical well-being, social/family well-being, emotional well-being, and functional well-being (Cella et al., 1993). Although originally developed to assess HRQoL in cancer patients, the FACT-G has been validated in other populations such as patients managing a chronic illness (e.g. multiple sclerosis, HIV), and in the general population (Brucker et al., 2005). Each item of the FACT-G is rated on a 5-point Likert-type scale (0 = not at all; 4 = very much). A total score is computed by adding all items. Total scores range from 0 to 108 with higher scores indicating better HRQoL. The FACT-G has good to excellent psychometric properties (Victorson et al., 2008). Internal consistency of the FACT-G was good in the present study with a total score Cronbach alpha of .87.

Procedure

Outpatients receiving care at a tertiary care rehabilitation centre who were referred for psychological services by their treating physiatrist were invited to participate in the present study between September 2016 and January 2020 (prior to the COVID-19 pandemic). As part of standard clinical care, and to help inform psychological assessment and treatment planning, participants completed a battery of self-report, questionnaires assessing psychosocial functioning, socio-demographic, and basic medical information at one time point (i.e., prior to their psychological assessment interview). Patients provided written informed consent to participate in the study, which involved allowing their psychosocial, socio-demographic, and

medical data to be utilized for research purposes. Inclusion criteria were: (a) referral from treating physiatrist at the rehabilitation hospital, and (b) 18 years of age or older. Exclusion criteria were: (a) ABI severity that interfered with comprehension and completion of self-report questionnaires; (b) primary substance abuse problem; and (c) current serious unmanaged mental illness (e.g., acute psychosis, active suicidality, or a severe personality disorder). The Ottawa Health Science Network Research Ethics Board approved the study.

Data Analysis

Analyses were performed using IBM SPSS Statistics and Analysis of Moment Structures (AMOS) version 27.0. Associations between all variables were evaluated using zero-order and partial correlations. Path analysis using maximum likelihood estimation was performed using observed variables. Model fit was assessed using the chi-square goodness-of-fit test (with $p > .05$ indicating minimal discrepancy between predicted and obtained covariance structures; good model fit), as well as the following criteria, as recommended for use with maximum likelihood estimation and smaller sample sizes: χ^2/df (between 1-3), comparative fit index (CFI) ≥ 0.95; standardized root mean squared residual (SRMR) ≤ 0.08; incremental fit index (IFI) > 0.90, (Byrne, 2016; Hu & Bentler, 1998; Krebsbach, 2014; Weston et al., 2008).

Specific indirect effects (i.e., mediation paths) were estimated using the bootstrapping procedure via AMOS plugin (Gaskin et al., 2020). Parameters, standard errors (SE), and 95% confidence intervals were estimated using 5,000 samples with replacement. Bootstrapping is a statistical approach used to help increase statistical power (Bai & Pan, 2008) and assess model fit (Mooijaart & Montfort, 2004) when working with smaller samples.

Results

Data Screening

The majority of participants (n = 60; 65.2 %) had complete data at the item level on all measures of interest. Little's MCAR was non-significant indicating that data were missing completely at random, χ^2 (10) = 13.56, p = .194. Missing items were imputed at the item level using individual participant mean scale scores (or mean subscale scores where appropriate) when participants had less than 25% missing data. One case was deleted because of too many missing items on the FACT-G. No univariate outliers were identified and all variables were normally distributed. Graphical examination of Mahalanobis distances revealed one case that appeared substantially separate from the group and was therefore removed (p = .002). Relationships between variables appeared linear and homoscedastic based on visual inspection. Data screening was repeated after deleting two cases and results indicated the data met criteria for parametric testing.

Sample Characteristics

The means and standard deviations of predictor and outcome variables are presented in Table 2. The mean HRQoL reported in our sample was 50.84 (SD = 16.74), which is significantly lower than a normative sample of 1,075 adults in the general population (M = 80.1, SD = 18.1, t(1163) = 14.81, p < .0001, d = 1.68), and a sample of 2,236 cancer patients (M = 80.9, SD = 17.0, t(2324) = 16.46, p < .0001, d = 1.78; Brucker et al., 2005).

The mean score of health self-efficacy in our sample was 4.89 (SD = 1.73). Compared to other samples of mixed CIDs, patients in our sample reported similar health self-efficacy to some mixed CID patient samples in Australia, Canada, the UK, and the USA (all small effect sizes ranging from d = 0.01 to d = 0.16; Cohen, 2003), and lower health self-efficacy than other mixed

CID patient samples from Australia, Canada, China, Germany, New Zealand, and the USA (all $p < .0001$, all moderate-to-large effect sizes ranging from $d = 0.66$ to $d = 1.14$; Thombs et al., 2017). Patients in our sample reported similarly low levels of health self-efficacy as those reported by patients with lupus ($d = 0.06$) and respiratory disease ($d = 0.11$ to 0.29), and significantly lower health self-efficacy than patient populations with Parkinson's disease ($d = 2.04$), spinal cord injury ($d = 0.97$), multiple sclerosis ($d = 1.58$), organ transplant ($d = 2.91$), end-stage renal disease, ($d = 1.64$) breast cancer survivors ($d = 1.66$), chronic heart failure ($d = 1.69$), and scleroderma ($d = 0.74$), (all $p < .0001$; independent samples *t*-tests; see Thombs et al., 2017).

Path Analysis and Mediation

Many of the correlations among pairs of variables in the model were statistically significant and in the expected direction (Table 2). A path analysis was performed to examine the hypothesized relationships between attachment insecurity dimensions, coping styles, health self-efficacy, and HRQoL. Goodness-of-fit indices indicated that the model fit the data well: $\chi^2 (1) = 1.397$, $p = .237$; $\chi^2/df = 1.397$; CFI = 0.996; SRMR = 0.032; and IFI = 0.996. The root mean squared error of approximation (RMSEA) was .067 [90% CI: .000 to .300]. The wide confidence interval around the RMSEA could indicate error in the estimate, but the upper end of the confidence interval remained well below acceptable cut-offs (Byrne, 2016). Given that the majority of indices were in the excellent range, it is reasonable to presume that the model is a good fit to the data and that there is little misspecification.

Direct Effects (Hypotheses 1 to 7)

Results of the path analysis are presented in Figure 1 and Table 3. All direct effects were consistent with bivariate correlations, except for hypothesis 2 (discussed later). Squared multiple

correlations (R^2) indicated that, overall, the path model explained 50.8% of the variance in HRQoL, 10.5% of the variance in health self-efficacy, 10.1% of the variance in avoidant coping, and 11.4% of the variance in social coping. Hypothesis 1 was partially supported. Consistent with our prediction, attachment avoidance was significantly negatively related to HRQoL, after controlling for attachment anxiety. However, the direct effect of attachment anxiety on HRQoL was not statistically significant after controlling for attachment avoidance. Hypothesis 2 was supported in that attachment anxiety was significantly positively related to social coping after controlling for attachment avoidance. Results supported hypothesis 3 in that attachment avoidance was significantly negatively associated with social coping and positively associated with avoidant coping, again after controlling for attachment anxiety. Hypothesis 4 was not supported. Neither attachment anxiety, nor attachment avoidance, had a significant association with health self-efficacy. In partial support of hypothesis 5, social coping was positively related to HRQoL but was not significantly related to health self-efficacy after controlling for variables entered earlier in the model. In support of hypothesis 6, avoidant coping was significantly negatively related to both health self-efficacy and HRQoL after controlling for variables entered earlier in the model. Hypothesis 7 was supported with a significant positive association between health self-efficacy and HRQoL, again after controlling for variables entered earlier in the model.

Indirect Effects (Hypotheses 8 and 9)

To test key assumptions of our model, we conducted tests of mediation. Mediation effects (i.e., specific indirect effects) are presented in Table 3. Results partially supported hypothesis 8. The relationship between attachment avoidance and HRQoL was significantly mediated by higher avoidant coping and lower health self-efficacy. However, higher social coping and lower

health self-efficacy did not mediate the relationship between attachment avoidance and HRQoL. Results did not support hypothesis 9. Social coping and health self-efficacy did not mediate the relationship between attachment anxiety and HRQoL.

Post-Hoc Analyses: Power and Reciprocal Suppression

A post-hoc power analysis was conducted using power calculator software for multiple regression (Soper, 2021) to assess if the analyses and sample size yielded sufficient power to detect the effects. The number of predictors was 5, the observed R^2 was .506 for HRQoL, the probability level was set at alpha = .05, and the sample size as 90. Results revealed statistical power of 1.0 which is above the commonly acceptable level of .80 (Stevens, 2012).

We suspected that the significant direct effect to test hypothesis 2 was inconsistent with the bivariate correlation between attachment anxiety and social coping due to a reciprocal suppression effect (Cohen, 2003) between attachment anxiety, attachment avoidance, and social coping. Reciprocal suppression occurs when the two explanatory variables are correlated (i.e., attachment anxiety and attachment avoidance; Table 2), in which one explanatory variable is negatively correlated with the outcome variable (i.e., attachment avoidance and social coping; Table 2), and when the partial regression coefficient for each explanatory variable is greater than its zero-order coefficient but the sign is unchanged (which was the case in our data). Thus, including both explanatory variables (i.e., attachment anxiety and attachment avoidance) in the model controls for overlapping variance and their mutual suppression is remedied (Paulhus et al., 2004). Under these conditions, attachment avoidance appeared to reciprocally suppress the relationship between attachment anxiety and social coping. The zero-order correlation between attachment anxiety and social coping was small and not significant (r = .079, p = .461), but became stronger after controlling for attachment avoidance (*partial correlation* r = .217, p =

.041). Similarly, the relationship between attachment avoidance and social coping (r = -.265, p .012) became stronger after controlling for attachment anxiety (*partial correlation* r = -.329, p .002).

Discussion

The goal of the current study was to examine an integrative model of psychosocial adaptation to CID by testing a mediation model to explain the effects of attachment anxiety and attachment avoidance on HRQoL. Although mediation effects are of key interest in evaluating the over-arching model of psychosocial adaptation to CID, we provide a brief overview of the direct effects first for context.

Direct Effects

We found partial support for hypotheses of direct effects. Attachment avoidance was directly and negatively related to HRQoL after controlling for attachment anxiety, suggesting that difficulties associated with high attachment avoidance become evident in the face of illness-related threat and interfere with well-being. This is in line with other studies showing that high attachment avoidance is related to lower quality of life. The non-significant association between attachment anxiety and HRQoL after controlling for attachment avoidance is consistent with some research showing no direct relationship (Brandão et al., 2018), but contrary to findings of other studies (Fagundes et al., 2014; Heenan et al., 2020). Overall, our findings suggest a clear role of attachment avoidance in HRQoL of individuals with CID.

As hypothesized, higher attachment anxiety was related to greater social coping after controlling for attachment avoidance. Individuals higher on attachment anxiety have a negative view of themselves and are emotionally dependent on others, and so it follows that higher attachment anxiety was associated with reaching out to others for support in the face of threat

(Maunder & Hunter, 2009). Also as expected and consistent with past research (Maunder & Hunter, 2009), higher attachment avoidance was related to more disengaged coping and less social coping. Those with attachment avoidance place a premium on self-reliance, but also engage in poorer social coping, denial of emotions, and disengagement.

Attachment anxiety and attachment avoidance were not significantly related to health self-efficacy. This is contrary to our hypothesis and to studies on attachment dimensions and self-efficacy in some non-clinical samples (Brenk-Franz et al., 2015; Charbonneau-Lefebvre et al., 2019). This discrepancy may be due to the nature of our sample's characteristics (i.e., clinical sample of distressed patients referred for psychological services who have a low overall mean of health self-efficacy). Future research may examine differences in the associations between insecure attachment dimensions and health self-efficacy across clinical and non-clinical rehabilitation samples.

Our fifth hypothesis was partially supported. Consistent with past research (e.g., Livneh & Antonak, 2005), we found that social coping was positively related to HRQoL, suggesting that reaching out to others for support promotes psychosocial adaptation to CID. However, contrary to our hypothesis, social coping was not related to health self-efficacy. Finally, we found that avoidant coping was negatively associated with health self-efficacy and HRQoL, and that health self-efficacy was positively related to HRQoL. These findings fit with past research (e.g., Livneh & Antonak, 2005; Sheeran et al., 2016), and suggest that disengaged coping contributes to poorer illness management and well-being, whereas more confidence in managing illness stressors contributes to more positive well-being.

Mediation Effects

The main goal of this study was to test an integrated model of psychosocial adaptation to CID using an attachment framework. And so, the mediation hypotheses speak directly to the validity of this model. Hypothesis 8 was partially supported. Higher avoidant coping and lower health self-efficacy mediated the relationship between attachment avoidance and HRQoL. Adults higher on attachment avoidance tend to use defensive strategies to help regulate stress and emotions. Early childhood experiences with their caregivers have taught them that emotional expression is often unsafe, and so strategies to disengage from emotions and relationships were probably adaptive at that time. However, when illness-related factors threaten security, the typical responses of individuals high in attachment avoidance may no longer be adaptive. That is, they may respond by cognitively and behaviourally disengaging through denial and/or use of substances. Consistent with theories of coping and social cognitive theory (Bandura, 1977), avoidant coping strategies likely contribute to low health self-efficacy due to negative feedback on the coping style. This may be particularly salient for individuals higher on attachment avoidance who tend to prioritize self-reliance. For example, it is hard to experience a sense of personal mastery if one's chosen coping strategy (e.g., disengaging by using drugs or alcohol) interferes with adaptation. Moreover, it is incongruent to feel confident about managing an illness whose existence or impact is not fully acknowledged.

Hypothesis 9 was not supported. Increased social coping and decreased health self-efficacy, together, did not mediate the relationship between attachment anxiety and HRQoL. Based on coping, social cognitive, and attachment theories, we expected that excessive social coping by individuals with higher attachment anxiety would relate to lower health self-efficacy because dissatisfaction with social coping might interfere with mastery experiences, positive

reinforcement, or positive affective states. This would hinder a sense of agency in terms of illness self-management and potentially reinforce the reliance on others for help. However, the presumption was that the individual seeking social support will attribute support-seeking success/failure to themselves (i.e., internal locus of control). A hallmark of attachment anxiety is a negative view of the self, therefore, it is possible that even if the person seeking support is satisfied with the type of support being received, they may not acknowledge their own role in adaptive coping. This would deprive them of the opportunity to develop health self-efficacy. Further investigation into the associations between attachment insecurity dimensions, social coping, and health self-efficacy may help to advance the understanding of their collective impact on HRQoL.

Limitations

A key limitation of this study is that the cross-sectional design precludes causal inferences, and so the results should be interpreted in this light. It is theoretically possible, and mathematically likely, that a different ordering of variables could yield equivalent results (Fiedler et al., 2011). For example, given the transactional relationship between coping and self-efficacy, their order could be reversed. Although ordering of variables in the hypothesized path analysis of this study was based on theory and previous research, future research should use longitudinal designs to replicate these findings and to understand better the relationship between attachment insecurity dimensions and HRQoL as mediated by coping and health self-efficacy.

The limitations of self-report measures should be acknowledged. Replication using different assessment approaches, such as the clinician-administered Adult Attachment Interview (AAI; George et al., 1996), should be considered especially because the AAI provides a more direct assessment of secure attachment and childhood experiences. The clinician-rated ICF could also

be considered to categorize health status instead of the patient-reported outcome measure of HRQoL. Also, our sample was diagnostically diverse with a large proportion of patients with a mild-ABI)/post-concussion syndrome (PCS). A larger sample might have allowed for cross-diagnostic validation of the model or including CIDs with different characteristics (e.g., acquired versus congenital, stable versus progressive, or visible versus invisible disability). Our sample was relatively homogeneous in terms of socio-demographics. Replication with larger and more diverse samples is important to better our understanding of how social or cultural factors play a role.

In addition, our sample may be biased toward treatment- and research-accepting individuals which may limit the generalizability of our findings to the greater rehabilitation population. Nonetheless, the nature of our sample is useful in terms of gleaning more information about attachment and psychosocial adaptation to CIDs in clinical populations. Future research with a general rehabilitation population may be helpful in terms of better understanding how attachment security and attachment insecurity dimensions relate to psychosocial adaptation in individuals who seem to independently move toward adjustment to their CID.

Many other variables not assessed in the present study might influence pathways in the model. For example, cognitive impairments accompanying some CIDs (e.g., mild-ABI/PCS, multiple sclerosis) might impact some of the pathways in our model (Boosman et al., 2015), although less likely in our sample given our exclusion criteria. As well, relationships with healthcare providers (e.g., Brenk-Franz et al., 2017) and dyadic coping (Greenman et al., 2014; Van Vleet & Helgeson, 2019) may explain the relationship between attachment insecurity dimensions and adaptation to CIDs. However, the broad and well-researched constructs related to attachment

insecurity are known to subsume concepts like affect regulation, relationship style, self-concept, and coping (Mikulincer & Shaver, 2005, 2019).

Clinical Implications and Conclusion

As the first study to propose and test a comprehensive model of psychosocial adaptation to CIDs through the lens of attachment theory in a clinical physical rehabilitation sample, the present study contributes to the growing literature on attachment and CIDs and provides a springboard for future theory-driven research. Overall, our findings suggest that individual differences in attachment insecurity dimensions may shape how someone responds to, and manages, CID-related stressors. Our results indicate that individuals with higher attachment avoidance disengage at the cognitive, behavioural, and social/emotional levels in response to illness-related stress. This has a negative impact on health self-efficacy and HRQoL.

Findings have implications for future rehabilitation studies, clinical practice, and person-centred care. Our results highlight the importance of considering the differential relationships among attachment dimensions, coping, and health self-efficacy when determining treatment fit, tailoring treatment, and outcome monitoring. Interventions consistent with the CBT framework often employ strategies such as behavioural activation and increasing social connections (e.g., Sage et al., 2013). It may be helpful to modify existing CBT treatment protocols by incorporating an attachment-framework. For example, therapists can assess and provide individualized feedback about a patient's attachment style, provide psychoeducation about the link between attachment and health, and prepare patients for potential experiential interventions aimed at decreasing their attachment avoidance.

Adopting this attachment-focused lens may help improve HRQoL outcomes by mitigating treatment barriers such as poor adherence and drop-out. Given that patients with high attachment

avoidance tend to cope by behaviourally deactivating and socially disengaging, preparing patients prior to CBT-based interventions that ask them to do the opposite (i.e., behavioural activation and social engagement) may help improve treatment adherence. This may then provide an opportunity for increased health self-efficacy through positive feedback from the coping experience and ultimately improvements in HRQoL. Similarly, given that individuals higher on attachment avoidance are more vulnerable to treatment drop-out (Tasca, Ritchie, et al., 2006), using knowledge of someone's level of attachment insecurity may help improve treatment retention. Perhaps carefully selecting group participants (i.e., pairing those higher on attachment avoidance with those lower on attachment avoidance) can help improve social connections (Kivlighan, Coco, et al., 2017) and group engagement (Illing et al., 2011), which may lead to better HRQoL outcomes via decreased avoidant coping strategies.

It is also important for clinicians to remain aware of how differences in attachment dimensions and coping relate to symptom reporting. For instance, individuals higher on attachment avoidance tend to under-report symptoms and may appear self-sufficient on the surface. However, further investigation may reveal that they are using avoidant coping strategies and are indeed struggling to manage their health.

Patients high on attachment avoidance that are ostensibly self-reliant may appear to be appropriate candidates for CBT-based self-management programs (e.g., Lorig et al., 1999). However, patients high on attachment avoidance may not benefit from self-management strategies as they are unlikely to receive positive feedback on their coping style and thereby be less likely to experience increased health self-efficacy and HRQoL. Beyond CBT-based interventions, attachment-based interventions such as Group Psychodynamic-Interpersonal Psychotherapy (Tasca et al., 2020) or Emotionally Focused Therapy (Johnson, 2019) may be

helpful to treat rehabilitation populations, as these approaches focus on patients developing a better understanding of how their attachment style plays a role in their coping strategies and health self-efficacy.

Our results suggest that the added value of knowing someone's level of attachment insecurity and how this influences individual responses to CID-related stressors may be fundamental to our understanding of psychosocial adaptation to CID, and therefore merits further investigation and consideration for inclusion in frameworks relevant to functioning, disability, and rehabilitation (e.g., ICF). These findings highlight the relevance of the attachment system to the process of adaptation, particularly given the attachment system's chronic activation during CID. The findings also highlight the possibility of tailoring interventions to best meet the individual needs of patients—adopting a person-centred approach to care and rehabilitation—and hopefully inspire future theory-driven research through an attachment lens.

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Table 1

Participant Medical and Socio-Demographic Data

Indicator	*n*	%
Chronic illness or disability (Primary diagnosis)		
Acquired brain injury - mild (mild ABI)	63	70.0
Neuro-muscular condition	21	23.3
Respiratory	2	2.2
Fibromyalgia	2	2.2
Orthopedic	1	1.1
Other	1	1.1
Ethnicity (self-identified)		
Indigenous	1	1.1
Asian and Middle Eastern origins	10	11.11
Black	3	3.3
Latin, Central, and South American origins	1	1.1
White	70	77.8
Multiple ethnicities	5	5.6
Education [a]		
Elementary school	1	1.1
High school	7	7.9
Some college/university	17	19.1
College/University/Postgraduate degree	64	72.0
Employment status		
Currently working	13	14.4
Currently not working	77	85.6
Income (household) [b]		
Very low (less than $20k)	15	19.5
Low ($20,000 - $39,999)	16	20.8
Middle ($40,000 – $79,999)	24	31.2
High ($80,000 or more)	22	28.6
Living situation		
Alone	26	28.9
Cohabitating (with partner/roommate/family)	61	67.8
Other	3	3.3
Relationship status [c]		
Not in a relationship	30	34.5
In a relationship	57	65.5
Sexual orientation [c]		
Heterosexual	78	89.7
Gay/Lesbian/Bisexual	5	5.7
Another orientation	4	4.6

Note. Sample characteristics without data imputation. N = 90.

[a] 1 participant did not answer. [b] 13 participants did not answer. [c] 3 participants did not answer.

Table 2

Bivariate Correlations, Means, and Standard Deviations of Variables of Interest

	Mean (*SD*)	1	2	3	4	5	6	7	8
1. Age	46.64 (*12.90*)								
2. Sex	-	**-.281****	-						
3. CID	-	.016	.030	-					
4. Anx	3.77 (*1.27*)	**-.289****	**.218***	.099	-				
5. Avd	3.00 (*1.18*)	-.012	-.010	**.223***	**.419****	-			
6. Avd cope	9.96 (*3.49*)	-.201	-.062	.168	**.228***	**.296****	-		
7. Soc cope	14.65 (*3.73*)	-.095	**.218***	-.036	.079	**-.265***	-.166	-	
8. HSE	4.89 (*1.73*)	.036	.072	.159	-.145	.026	**-.270***	.062	-
9. HRQoL	50.84 (*16.74*)	.104	.049	.102	**-.297****	**-.359****	**-.474****	**.302****	**.537****

Note. $N = 90$. Anx = Attachment anxiety. Avd = Attachment avoidance. Avd cope = Avoidant coping. Chronic illness or disability (CID; 0 = mild acquired brain injury; 1 = all other chronic illnesses and disabilities). HRQoL = Health-related quality of life. HSE = Health self-efficacy. Sex (0 = male; 1 = female); Soc cope = Social coping.

Significant correlations are presented in **bold**.

*$p < .05$; ** $p < .01$.

Table 3

Direct and Specific Indirect Effects

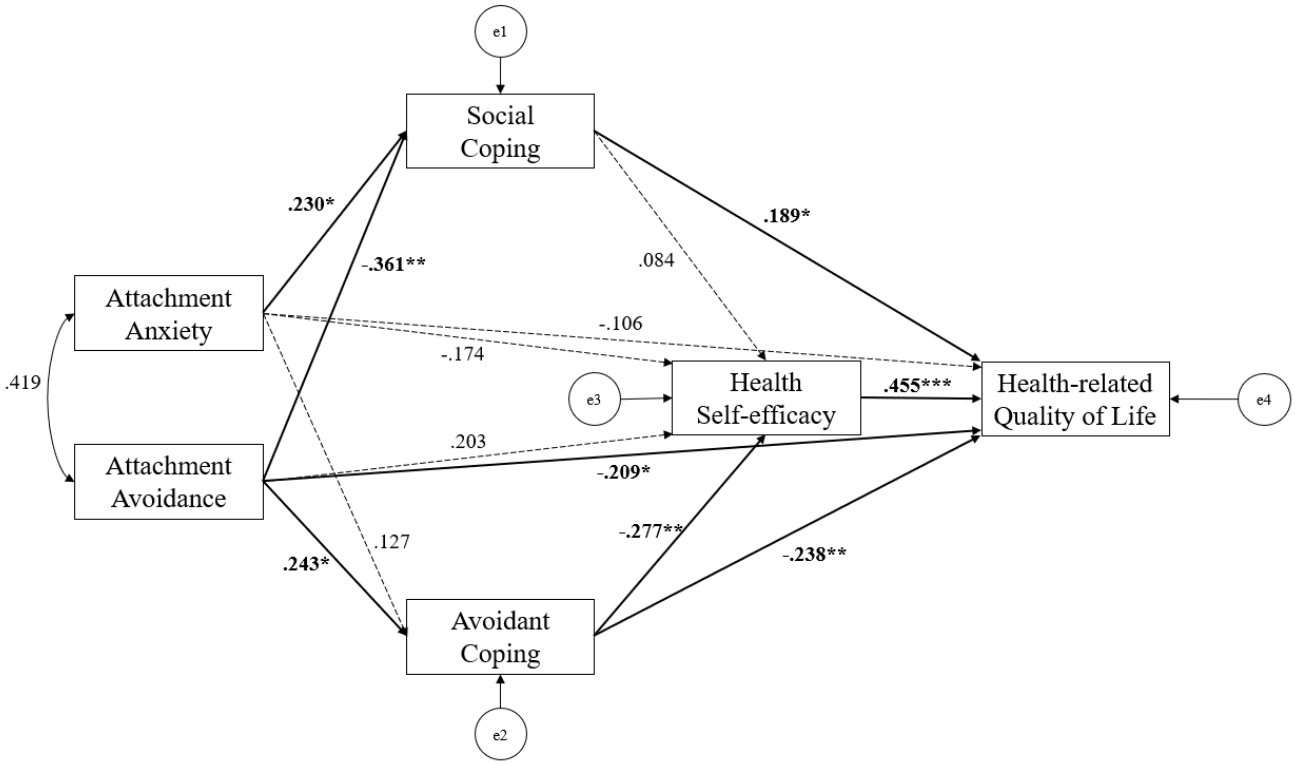
Direct Effects	Unstandardized Estimates	*SE*	*β*	*p*
Anx → Social coping	**.675**	**.322**	**.230**	**.036**
Anx → Avoidant coping	.348	.304	.127	.253
Anx → HSE	-.236	.155	-.174	.127
Anx → HRQoL	-1.382	1.116	-.106	.216
Avd → Social coping	**-1.139**	**.346**	**-.361**	**.001**
Avd → Avoidant coping	**.716**	**.327**	**.243**	**.028**
Avd → HSE	.293	.175	.203	.090
Avd → HRQoL	**-2.929**	**1.264**	**-.209**	**.020**
Social coping → HSE	.039	.049	.084	.430
Social coping → HRQoL	**.842**	**.352**	**.189**	**.017**
Avoidant coping → HSE	**-.137**	**.052**	**-.277**	**.009**
Avoidant coping → HRQoL	**-1.131**	**.386**	**-.238**	**.003**
HSE → HRQoL	**4.368**	**.754**	**.455**	**< .001**

Specific Indirect Effects	Unstan-dardized Estimates	*SE*	*β*	95% bias-corrected CI		
				Lower	Upper	*p*
Anx → Social coping → HSE → HRQoL	.115	.173	.019	-.141	.590	.276
Anx → Avoidant coping → HSE → HRQoL	-.208	.002	-.035	-.850	.060	.126
Avd → Social coping → HSE → HRQoL	-.194	.003	-.030	-.997	.253	.329
Avd → Avoidant coping → HSE → HRQoL	**-.428**	**.003**	**-.067**	**-1.230**	**-.068**	**.017**

Note. $N = 90$. Direct effects after controlling for variables entered earlier in the model. Estimated using maximum likelihood. Specific indirect effects estimated using bootstrapping with 5,000 samples with replacement. Significant effects are presented in **bold**. Anx = Attachment anxiety; Avd = Attachment avoidance; HRQoL = Health-related quality of life; HSE = Health self-efficacy.

Figure 1

Path Analysis Model of the Influence of Attachment Insecurity Dimensions, Coping, and Health Self-Efficacy on Health-Related Quality of Life



Note. Solid lines represent significant direct effects (after controlling for variables entered earlier in the model). Dashed lines represent non-significant direct effects. Numbers represent standardized regression weights. Significant weights are presented in **bold**.

*$p < .05$, **$p < .01$, ***$p < .001$. $N = 90$.

Study Two

Attachment Insecurity Predicts Outcomes in an ACT-CBT Group Therapy for Adults in a Physical Rehabilitation Centre

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Abstract

Adapting to chronic illness or disability is accompanied by acute and ongoing illness stressors. Psychological factors such as emotional distress and low self-efficacy are common experiences in chronic illness and disability, and interfere with adaptation and psychosocial outcomes such as health-related quality of life. Transdiagnostic group psychotherapy may provide a parsimonious approach to psychological treatment in rehabilitation care by targeting shared illness stressors across mixed chronic illnesses and disabilities, and shared processes that maintain psychological symptoms. Attachment theory may explain individual differences in outcomes and help identify individuals at risk of poor health-related quality of life trajectories. Adults (N = 109) participated in an 8-week process-based ACT-CBT psychotherapy group at a tertiary care physical rehabilitation centre between 2016 and 2020. Participants completed measures of emotional distress, self-efficacy, health-related quality of life, and attachment at pre- and post-treatment. Multilevel analyses indicated that patients improved on most outcomes at post-treatment. Attachment anxiety at pre-treatment was associated with more positive outcomes. Reliable change indices suggest clinically meaningful change for the majority of participants, but most were not recovered. Results provide proof-of-concept for the transdiagnostic group intervention, and suggest that a longer course of treatment may be clinically indicated. Results warrant replication with larger and more diverse samples, and more robust designs.

Keywords: attachment, chronic illness or disability, quality of life, emotional distress, group

Attachment Insecurity Predicts Outcomes in an ACT-CBT Group Therapy for Adults in a Physical Rehabilitation Centre

Chronic illnesses and disabilities (CID) are defined as illnesses or health conditions of long duration that can interfere with overall functioning and health-related quality of life (HRQoL). The global disease, injury, and disability burden has long been high at the individual and societal levels (Haagsma et al., 2016; Vos et al., 2015), and is projected to increase (World Health Organization, 2014). Global trends including a rising life expectancy, an increase in non-communicable diseases, and most recently the Covid-19 pandemic have accelerated the growth of CID-related morbidity and mortality rates worldwide, leading to the highest prevalence of people living with functional impairment, disability, and decreased HRQoL than ever before (de Oliveira Almeida et al., 2022; Hacker et al., 2021; Stucki et al., 2018). Effective, accessible, and cost-effective interventions are needed to help improve functioning and HRQoL in individuals living with CID.

Adapting to life with a CID is a continuously evolving, complex, and heterogenous process. Some individuals move toward adaptation (i.e., toward higher HRQoL), some remain stable, and others experience decline in adaptation (Goyal et al., 2018; Livneh, 2021). Psychological factors such as emotional distress and low self-efficacy can impede adaptation to CID. Group psychological interventions are cost-effective (Johnsen & Friborg, 2018), and can help to improve emotional distress and increase self-efficacy, and ultimately improve HRQoL among adults living with a CID (Jackson et al., 2019). Group therapy interventions may also be particularly beneficial in the context of CID to help decrease stigma and loneliness which have a negative impact on well-being (Masi et al., 2011; Skinta et al., 2015), as well as to provide a sense universality and connectedness (Yalom & Leszcz, 2020).

Models of adaptation to CID posit that an illness or disability leads to acute and ongoing illness stressors, which induce cognitive, behavioural, and emotional responses that interact to influence health and psychosocial outcomes (Livneh, 2021). Although CIDs may differ in terms of etiology, biological markers of disease, their visibility to others, and/or medical management and physical rehabilitation care needs, many individuals with CID share common experiences. Some common illness stressors and barriers to adaptation include: functional limitations that can interfere with independence; interference with family, social, and vocational functioning; uncertain illness course or prognosis; psychosocial stress related to the injury or disease process itself; financial stressors; changes to self-concept; and the experiences of stigma, exclusion, and inequity (Christensen et al., 2021; Heijmans et al., 2004; Joachim & Acorn, 2000; Livneh, 2021). One common factor that can interfere with adaptation to CID is psychological functioning. Symptoms of emotional difficulties, such as depressed mood and anxiety, are common experiences among individuals living with a CID (Daré et al., 2019), and are associated with greater disability, barriers to treatment, and poorer self-management of disease or disability (Katon, 2011). Lower self-efficacy, defined as a person's belief in their ability to accomplish tasks (Bandura, 1977), is consistently related to poorer emotional and functional outcomes, and lower HRQoL (van Diemen et al., 2017). Psychological interventions that target these factors may help to improve the well-being and adjustment of adults living with a CID.

Theoretical models of adaptation to CID (Hoyt & Stanton, 2018; Livneh, 2001, 2021; Moos & Holahan, 2007; Moss-Morris, 2013) tend to adopt a trans-CID approach highlighting the common factors across CIDs, however the majority of studies examining the effectiveness of psychological interventions for emotional distress in CID focus on one emotional disorder (e.g., depression, anxiety) within one specific disease or condition (Osma et al., 2021). This limits the

generalizability of findings, as CID-psychological comorbidity is common (Daré et al., 2019) and multimorbidity of CIDs is the norm (Tinetti et al., 2012) and becoming more relevant in the Covid-19 context (Brown & O'Brien, 2021; Fernández-Nino, Guerra-Gómez, & Idrovo, 2021). A more parsimonious and clinically relevant approach may involve providing transdiagnostic approaches to care (Norton & Paulus, 2016). Transdiagnostic approaches focus on shared processes across emotional disorders that maintain symptoms (Barlow et al., 2017; Tasca et al., 2020), as well as shared stressors and experiences across various CIDs that impact adaptation (Heijmans et al., 2004).

Some of the most widely researched psychological interventions for adults with CIDs are cognitive behavioural therapy (CBT; Beck & Haigh, 2014) and mindfulness-based behavioural interventions such as acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 2016). Traditional CBT is a change-based therapeutic approach which postulates that cognitions cause emotional and behavioural responses (Beck & Haigh, 2014). The primary aim of traditional CBT is to decrease or eliminate emotional distress in order to improve functioning and well-being (Beck & Haigh, 2014). This goal is achieved through modification of maladaptive cognitions or distorted information-processing styles using techniques such as cognitive restructuring (Beck & Haigh, 2014).

Acceptance and commitment therapy is a mindfulness- and acceptance-based therapeutic approach which encourages individuals to accept what is out of their control, decrease experiential avoidance, and create a meaningful life that is in-line with their values (Hayes et al., 2016). In ACT, less emphasis is placed on reducing distress, although symptom reduction may occur as a by-product of therapy (Hayes et al., 2016). Individuals are taught to decouple or defuse from their thoughts by stepping back from negative thoughts and seeing them as "just

thoughts" versus objective truths (Hayes et al., 2016). In contrast to CBT, which targets the form and frequency of thoughts, ACT emphasizes the context of cognitions and emotions and places less emphasis on cognitions that give rise to negative emotions (Hayes et al., 2016). Independently, both CBT and ACT group-based interventions improve psychological and behavioural health outcomes across a range of conditions such as cancer, chronic obstructive pulmonary disease, chronic pain, diabetes, epilepsy, HIV, neurological disorders (e.g., Parkinson's disease, Huntington's disease, multiple sclerosis), renal disease, spinal cord injury, and ABI (Graham et al., 2016; Rizzo et al., 2011). Although CBT and ACT differ in terms of their conceptualization of the role of cognitions and emotions, and in terms of therapeutic techniques, together they offer complementary strategies that can be applied differently based on each individual patient's preference or context (Ciarrochi & Bailey, 2008).

Some small-scale studies have shown that integrated ACT-CBT interventions can help decrease anxiety, depression, and pain, and improve QoL in adults with anxiety disorders when delivered in an individual therapy format. And one study found than an integrated ACT-CBT group therapy decreased depression and improved QoL in adults with major depressive disorder (Hallis et al., 2017). An ACT-CBT integrated intervention may be particularly relevant in the context of promoting adaptation in CID (e.g., treating emotional symptoms in CID) because therapists can flexibly use strategies from each approach to best meet patient needs. For example, individuals can use CBT-based strategies such as cognitive restructuring to work with maladaptive thoughts of the self and can use ACT-based techniques when the thinking pattern is unhelpful but warrants acceptance or defusion versus replacing with another thought.

Some evidence supports transdiagnostic psychological interventions for emotional distress in CID-specific groups (see Osma et al., 2021 for a systematic review of nine studies and three

protocols), but comparably very few studies examine psychological interventions for mixed-CID groups. For instance, one study examined the effectiveness of an ACT group (Brassington et al., 2016) and another the effectiveness of a CBT group (Ruesch et al., 2017) for adults with various CIDs and emotional difficulties. Both studies reported some improvements across different adaptation and emotional symptom indicators (e.g., HRQoL, depression, anxiety, psychological distress) at post-treatment (after 8 sessions). Some research supports the use of various group-based interventions to improve self-efficacy in adults with CIDs (Jackson et al., 2019). For example, the peer-led Chronic Disease Self-Management Programme (Lorig et al., 2001) can help improve self-efficacy in some mixed-CID groups (Hevey et al., 2020), although results are not consistent across all CID samples (Elzen et al., 2007).

Trajectories of adaptation to CID are heterogenous. Various inter- and intra-personal psychological factors (e.g., social support, self-efficacy, coping, acceptance of the disability, depressive symptoms, neuroticism, and pessimism) can differentiate between favourable and unfavourable HRQoL trajectories in adults with stroke (van Mierlo et al., 2018), breast cancer (Goyal et al., 2018), ABI (Aza et al., 2021), and mixed-CIDs (Seves et al., 2021). One relevant patient factor that may help to further expand our understanding of adaptation to CID is attachment. Attachment has not yet been examined as a predictor of treatment response among adults with mixed-CIDs, though research for other conditions suggest that attachment insecurity may predict group treatment outcomes (Tasca, Ritchie, et al., 2006).

Attachment theory describes a lifelong pattern of response to threat that is learned early in life through repeated interactions with significant caregivers. A secure attachment bond develops through sensitive and consistent caregiving, whereas an insecure attachment bond may develop through rejecting, harmful, or inconsistent caregiving (Bowlby, 1980). Early, repeated

experiences with caregivers result in the formation of relatively stable patterns of expectations, desires, feelings, and behaviours in interpersonal interactions (Hazan & Shaver, 1987), including interactions with healthcare providers (Hunter & Maunder, 2001). In response to illness-related threat, securely attached individuals are better able to express emotions, manage distress, and are more comfortable relying on others for support when compared to insecurely attached individuals (Hunter & Maunder, 2001).

Two commonly derived adult attachment dimensions are attachment anxiety and attachment avoidance. Adults higher on attachment anxiety have a negative view of themselves as unworthy of love and an overly positive view of others (Mikulincer & Shaver, 2007). In an effort to maintain the attachment bond, individuals with higher levels of attachment anxiety tend to remain hypervigilant to cues of rejection, seek intimate/physical proximity as a means of reassurance, and they tend to have strong emotional reactions when distressed (Mikulincer & Shaver, 2007). In the healthcare context, this may result in amplification of physical and emotional symptoms and overutilization of healthcare resources (Maunder & Hunter, 2009).

Adults higher on attachment avoidance have a negative view of others as unresponsive or unreliable and an overly positive view of the self to manage everyday stressors (Mikulincer & Shaver, 2007). Individuals with higher levels of attachment avoidance tend to deny their attachment needs, demonstrate self-reliant attitudes, and avoid dependency in relationships (Mikulincer & Shaver, 2007). In the healthcare context, this can translate into suppression of physical and emotional symptoms and minimal help-seeking behaviour (Maunder & Hunter, 2009). There is a paucity of research examining how attachment insecurity dimensions relate to outcomes in transdiagnostic CID samples (with or without accompanying emotional distress).

Chronic and acute illness and disability stressors can be conceptualized as threats to physical

and psychological safety that activate the attachment system (Bowlby, 1980; Mikulincer & Shaver, 2007). In the context of contending with intermittent or unremitting CID-related symptoms and other illness stressors, the attachment system is likely repeatedly, if not chronically activated. Attachment insecurity is related to the development and maintenance of emotional symptoms (Mikulincer & Shaver, 2019) such as depression and anxiety that interfere with adaptation to CID. Attachment is also related to self-efficacy (Bandura, 1977; Meredith et al., 2006), which is a salient patient-factor in models of adaptation to CID.

Also, attachment theory provides a framework for understanding individual differences in comfort with interpersonal closeness, symptom expression, and help-seeking behaviour (Hunter & Maunder, 2001; Maunder & Hunter, 2009). Therefore, an attachment lens may help to understand individual differences in rehabilitation and group therapy outcomes in CID. Individuals with CID often experience functional limitations, emotional impairment, and social barriers, which may increase their need to rely on others, such as family, friends, or healthcare providers for practical or emotional support. Receiving support from others may be distressing for individuals higher on attachment avoidance who prefer self-reliance (Mikulincer & Shaver, 2007), yet support is excessively sought by those higher on attachment anxiety who have high needs for dependence and approval (Mikulincer & Shaver, 2007). These interpersonal differences may inform how individuals make use of the group psychotherapy intervention and may impact psychological treatment outcomes for those with CID.

Meta-analytic findings support the idea that attachment insecurity dimensions predict treatment outcomes in general (Levy et al., 2018). Overall, research suggests that higher attachment anxiety predicts poorer outcomes when compared to lower attachment anxiety, and that attachment avoidance may be less related to outcome (Levy et al., 2018), although some

research indicates that this may depend on the specific treatment modality offered (McBride et al., 2006; Tasca, Ritchie, et al., 2006). Some researchers have demonstrated that attachment insecurity relates to poorer rehabilitation outcomes in chronic pain (Kowal et al., 2015), cancer (Adellund Holt et al., 2016), and cardiac patients (Heenan et al., 2020). There is also some evidence suggesting that higher attachment avoidance is related to poorer HRQoL in a mixed-CID rehabilitation sample (Maras et al., 2021).

Attachment is relevant to group therapy outcomes. Research suggests that attachment anxiety and avoidance impact member-member, member-leader, and member-group interactions (Tasca & Maxwell, 2021). Some evidence shows that individuals higher on attachment anxiety benefit more from relationally-oriented treatment versus educationally-oriented therapy (Tasca, Ritchie, et al., 2006), and from group therapy if group cohesion increases over time (Tasca & Maxwell, 2021). Conversely, individuals higher on attachment avoidance may do better in groups with gradual self-disclosure (Tasca & Maxwell, 2021). No studies to date have investigated how attachment insecurity dimensions impact outcomes of a group psychotherapy for emotional distress in a mixed-CID sample.

The Present Study

Our study's first aim was to examine outcomes of a process-oriented ACT-CBT group psychotherapy intervention in a sample of adults with various CIDs and emotional distress at a tertiary care physical rehabilitation centre. We tested if the intervention improved adaptation to CID, emotional symptoms, and self-efficacy. We hypothesized the following: (1) HRQoL will increase from pre- to post-treatment, (2) depression, anxiety, and general psychological distress will decrease from pre- to post-treatment, and (3) general self-efficacy will increase from pre- to post-treatment.

Our study's second aim was to use an attachment-informed framework to test if pre-treatment attachment insecurity dimensions (i.e., attachment anxiety and attachment avoidance) predicted change in the treatment outcomes. Since this analysis was exploratory in nature and novel for a physical rehabilitation sample, and for an integrated process-based ACT-CBT group intervention, we did not make specific hypotheses regarding how attachment anxiety and attachment avoidance may differentially impact group psychological treatment outcomes.

Method

Participants

Participants were 109 adults (M_{age} = 47.03 years, *SD* = 12.82; 64.2% female; *n* = 70) who were part of an 8-week group psychotherapy as outpatients at a tertiary care physical rehabilitation centre. A total of 23 groups were offered by two psychologists, and each group was comprised of 2 to 8 consenting patients. Table 1 presents participant medical and socio-demographic data.

Measures

Health-Related Quality of Life

The Functional Assessment of Cancer Therapy – General (FACT-G) is a 27-item self-report questionnaire that measures HRQoL (Cella et al., 1993). Each item is rated on a 5-point Likert-type scale (0 = not at all; 4 = very much). Total scores range from 0 to 108 with higher scores indicating better HRQoL across four domains: physical, social/family, emotional, and functional (Cella et al., 1993). The FACT-G has adequate psychometric properties (Victorson et al., 2008), and has been validated in general and medical populations (Brucker et al., 2005). Test-retest correlation was .88 (Victorson et al., 2008). Internal consistency was .85 at pre-treatment and .89 at post-treatment in this study sample.

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) is a 9-item self-report scale assessing symptoms of depression (Kroenke et al., 2001). Items are rated on a 4-point Likert-type scale (0 = not at all; 3 = nearly every day). Total scores range from 0 to 27 with higher scores reflecting a higher level of depressive symptoms. Clinical cut-points correspond to minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe depression (20-27). Scores of ≥ 10 on the PHQ-9 indicate clinically significant symptoms of depression. The PHQ-9 is psychometrically sound (Kocalevent et al., 2013; Kroenke et al., 2001). Test-retest correlation for the PHQ-9 was .96 (Lowe et al., 2004). Internal consistency was .74 at pre-treatment and .83 at post-treatment in the present study sample.

Anxiety Symptoms

The Generalized Anxiety Disorder Scale (GAD-7) is 7-item self-report questionnaire that assesses anxiety symptoms (Spitzer et al., 2006). Items are rated on a 4-point Likert-type scale (0 = not at all; 3 = nearly every day). Total scores range from 0 to 21 with higher scores reflecting a higher level of anxiety symptoms. Clinical cut-points correspond to minimal (0-4), mild (5-9), moderate (10-14), and severe (15-21) anxiety. Scores of ≥ 10 on the GAD-7 indicate clinically significant symptoms of anxiety. The GAD-7 is a well validated measure commonly used in healthcare settings. The GAD-7 has adequate psychometric properties (Spitzer et al., 2006). Test-retest correlation for the GAD-7 was .87 (Bischoff et al., 2020). Internal consistency was .84 at pre-treatment and .87 at post-treatment in the present study sample.

General Psychological Distress

The Outcome Questionnaire-45 (OQ-45) is a 45-item self-report questionnaire measuring overall psychological distress based on three domains of functioning: symptom distress,

interpersonal relations, and social role functioning (Brown & Lent, 2008; Lambert, Gregersen, & Burlingame, 2004). Each item is rated on a 5-point Likert-type scale (0 = never; 4 = always). Total scores range from 0 to 180 with higher scores representing higher overall distress. Total scores of ≥ 63 indicate clinically significant psychological distress. Changes of 14 points or more represent clinically significant change (Brown & Lent, 2008). The OQ-45 has adequate psychometric properties (Lambert et al., 2004). Internal consistency for the total score was .90 at pre-treatment and .93 at post-treatment in the present study sample.

Self-Efficacy

The General Self-Efficacy Scale (GSES) is a 10-item self-report questionnaire that measures an individual's belief in their ability to cope with stressful situations (Schwarzer & Jerusalem, 1995). Each item is rated on a 4-point Likert-type scale (1 = absolutely not true; 4 = absolutely true). Higher total scores indicate stronger feelings of perceived self-efficacy. The GSES is psychometrically sound (Scholz et al., 2002). Test-retest correlation was .80 (Nilsson et al., 2015). Internal consistency in the present study was .91 at pre- and post-treatment.

Attachment Dimensions

The Experiences in Close Relationships Scale – Short Form (ECR-SF) is a 12-item self-report scale assessing attachment anxiety and attachment avoidance (Wei et al., 2007). Items are rated on a 7-point Likert-type scale (1 = strongly disagree; 7 = strongly agree). Mean total scores on each subscale range from 1 to 7 with higher scores indicating higher levels of attachment anxiety or attachment avoidance. The ECR-SF has good psychometric properties (Wei et al., 2007), and has been validated in health samples (Pfeifer et al., 2019). Internal consistency in the present study sample was .77 and .79 for baseline attachment anxiety and baseline attachment avoidance, respectively.

Procedure

Participants were recruited from The Ottawa Hospital Rehabilitation Centre (TOHRC) Clinical Psychology Outpatient Program. All participants were enrolled in the *Coping with Disabilities and Health Conditions* group between September 2016 and March 2020 (all data were collected prior to changes in service delivery associated with the COVID-19 pandemic). As part of standard clinical care, participants completed a battery of questionnaires assessing psychosocial functioning at pre- and post-treatment. Participant recruitment occurred at arms-length from clinical care. Data were collected from consenting patients. The study was approved by The Ottawa Health Science Network Research Ethics Board.

Inclusion criteria were: (a) a referral to the Clinical Psychology Outpatient Program from a physician at TOHRC, (b) match between patient-identified needs and goals, and the group intervention as determined by a treating clinician during an individual pre-group preparation session, (c) indications of elevated psychological symptoms at pre-treatment on a measure of depression, anxiety, and/or overall distress, as determined by established clinical cut-offs, and (d) ability of the patient to speak and write in English. Exclusion criteria were: (d) medically unstable (e.g., severe ABI symptoms that would preclude the patient from engaging in, and benefitting from, group content), (e) problematic substance use, or (f) current serious unmanaged mental illness that would make the group therapy inappropriate for the patient (e.g., acute psychosis, acute suicidality, or a severe personality disorder).

The Intervention

The *Coping with Disabilities and Health Conditions* intervention was an 8-session, psychologist-led, group-based treatment grounded in the principals of ACT and CBT, and included an interpersonal process component. A clinical, health, and rehabilitation psychologist

at TOHRC (*ML*) modified a manualized CBT protocol previously-developed by colleagues at the same institution through incorporation of some ACT interventions and by amplifying the interpersonal process component. The manualized CBT protocol was originally designed to accompany the self-management workbook called *Positive Coping with Health Conditions: A Self-Care Workbook* (Bilsker et al., 2009). Use of the workbook as reading material was retained. The group intervention comprised 8 weekly 120-minute sessions with a 15-minute break.

Interventions based on ACT and CBT were integrated and flexibly applied based on patient and group needs and preferences. For example, therapists encouraged use of CBT-based strategies to identify and challenge biased or unrealistic thinking patterns, whereas ACT-based strategies were used to help promote acceptance of cognitions, emotions, physical sensations, and situations in cases where negative thoughts are justified or in contexts that cannot be changed (e.g., illness, losses, past trauma). In keeping with the principles of ACT and interpersonal process psychotherapy, sessions were not rigidly structured, allowing the therapist to be responsive to the process of the group and apply examples reflected by the needs of group participants. Overall, sessions covered the following topics: (a) psychoeducation about CID and about the CBT and ACT models, (b) behavioural activation, goals, pacing, and self-care, (c) stress, symptoms, and the benefits of mindfulness and relaxation, (d) depression, grief, and the power of acceptance, (e) managing anger, (f) managing worry, uncertainty, and existential anxiety, (g) relationship building with role plays, and (h) review of learned skills and farewells.

Patients were encouraged to share personal experiences including perceived internal obstacles to adjustment. The therapist modelled helpful responses to disclosures and encouraged group members to respond to one-another in interpersonally adaptive and authentic ways. Consistent with ACT (Hayes et al., 2016), mindfulness was embedded in each weekly group in the form of a

different 15-minute, therapist-led relaxation or mindfulness exercise at the end of each session. Patients were asked to complete a different chapter weekly from the workbook (Bilsker et al., 2009) prior to session. Brief additional worksheets were provided weekly to further deepen exposure to concepts, for those wanting additional independent learning. No formal homework was assigned nor reviewed at the subsequent session, although patients had an opportunity to ask questions about any of the materials.

Data Analyses

Analyses were performed using IBM SPSS Statistics Version 27.0, and Hierarchical Linear Modelling (HLM) Version 8 with full maximum likelihood estimation. Associations between all variables were evaluated using zero-order correlations. Repeated measurements were nested within participants whose data were nested within groups. We assessed for dependence in the data using a 3-level random effects model (model 1 in Appendix L). The intraclass correlation coefficient (ICC) for several of the outcome variables was > .05 indicating non-ignorable dependence in the data (Tasca et al., 2009). Hence, to test the hypotheses we used 3-level models with repeated measurement within participants modelled at level-1 (i.e., the effect of time), between participant effects modelled at level-2, and group effects modelled at level-3 (model 2 in Appendix L). The Holm-Bonferroni correction was applied to adjust for multiple comparisons (Holm, 1979).

Two level multilevel models (Tasca & Gallop, 2009) were used for the exploratory analyses examining if attachment insecurity dimensions at pre-treatment predicted post-treatment outcomes after controlling for pre-treatment scores (model 3 in Appendix L). Pseudo-R^2 was used as a measure of effect size, or the percentage of variance accounted for by adding predictors at level-1 of the models (Singer & Willett, 2003). Effect sizes of .01 were considered small, > .13

as medium, and > .26 as large (Cohen, 1988).

To decrease threats to study validity in the context of this study with no control group, we used reliable change indices (RCI) to describe clinically significant changes in outcomes while taking into account measurement error. We used the method suggested by Jacobson and Truax (Jacobson & Truax, 1991) to calculate RCI for depression (PHQ-9), anxiety (GAD-7), and self-efficacy (GSES). Patients were deemed to have experienced clinically meaningful improvement when RCI > 1.96 (Jacobson & Truax, 1991). We used the previously published reliable change values of 14 for the OQ-45 (Brown & Lent, 2008) and 5 for the HRQoL (Brucker et al., 2005) to indicate clinically meaningful change on these measures (i.e., an RCI > 1.96). That is, any change greater than these values in the direction of better functioning was considered reliable change not attributable to measurement error. Also, published clinical cut-off scores were used to determine recovery, such that a post-treatment score < 10 on the PHQ-9 (Kroenke et al., 2001), < 10 on the GAD-7 (Spitzer et al., 2006), and < 63 on the OQ-45 (Lambert et al., 2004) indicated that the participant's score was no longer in the range of a clinical population. Cut-off scores were calculated for the FACT-G and GSES as per the recommended methods described by Jacobson and Truax (Jacobson & Truax, 1991). In order to meet the criteria of *reliably recovered*, a participant had to demonstrate a reliable change from pre-treatment to post-treatment and a post-treatment score that was not in the range of a clinical population.

Results

Preliminary Analyses and Sample Characteristics

A missing data analysis using Little's MCAR test revealed that data were missing completely at random at pre-treatment, χ^2 (6738) = 5298.95, p = 1.00, and at post-treatment χ^2 (4784) = 3567.04, p = 1.00. Missing items were imputed at the item level using individual participant

mean scale scores (or mean subscale scores where appropriate) when participants had less than 25% missing data. No univariate or multivariate outliers were identified at pre- or post-treatment, all variables were normally distributed at both time-points, and no issues with multicollinearity or singularity were noted.

Table 2 presents pre- and post-treatment means, standard deviations, and associated sample sizes. The data indicate that the sample consisted of adults with high emotional distress and low mean HRQoL at pre-treatment when compared to established norms (Brucker et al., 2005). Many zero-order correlations were significant and in the expected direction (see Appendix L).

Treatment Outcomes

To test hypotheses 1 to 3, that adaptation, symptoms, and patient-factor outcomes will improve significantly across the 8-week intervention, we assessed if scores changed across time (model 2 in Appendix L). Fixed and random effects are presented in Table 3. Results supported hypothesis 1 about adaptation to CID. Scores on FACT-G significantly increased over time, with a small effect size (pseudo R^2 = .09). Results partially supported hypothesis 2 about emotional symptoms. Scores on the PHQ-9 and GAD-7 significantly decreased over time, with large (pseudo R^2 = 0.26) and medium (pseudo R^2 = 0.12) effect sizes, respectively. However, there was no significant change in total score on the OQ-45. Decreasing OQ-45 total scores over time approached statistical significance with a small effect size (pseudo R^2 = .01). The results supported hypothesis 3. Scores on the GSES significantly increased over time, with a small effect size (pseudo R^2 = .08).

Clinically Significant Change in Outcomes from Pre- to Post-Treatment

Reliable change indices were used to supplement hypotheses and describe clinically meaningful changes in outcomes among subsamples of patients scoring in the clinically impaired

range on each outcome variable at pre-treatment (Table 2). Most patients in each subsample showed reliable improvement on the PHQ-9 (51.8%), GAD-7 (51.7%), and the GSES (61.0%). Many patients also reliably improved on the FACT-G (45.0%) and fewer improved on the OQ-45 (23.7%). A modest proportion of patients met criteria for reliable recovery on the FACT-G (15.0%), PHQ-9 (24.1%), GAD-7 (29.3%), and OQ-45 (11.9%), however, a larger proportion achieved reliable recovery on the GSES (46.3%).

Predicting Treatment Outcomes

Our exploratory analysis examined if pre-treatment attachment anxiety and attachment avoidance predicted post-treatment outcome scores after controlling for pre-treatment outcome scores (model 3 in Appendix L). Fixed and random effects are presented in Table 4. Higher pre-treatment anxious attachment was associated with lower anxiety on the GAD-7, lower general psychological distress on the OQ-45, and higher general self-efficacy on the GSES at post-treatment, after controlling for pre-treatment scores and attachment avoidance. Attachment avoidance was not a significant predictor of any outcome. Neither attachment dimension was associated with post-treatment HRQoL or depression outcomes after controlling for pre-treatment scores.

Discussion

The main objective of the current study was to examine outcomes of the *Coping with Disabilities and Health Conditions* group for emotional distress in adults with mixed-CIDs. We also used an attachment-informed framework to explore if attachment insecurity dimensions predicted outcomes. This study contributes to the physical rehabilitation and group psychotherapy literatures as one of the few studies adopting a transdiagnostic-CID approach to group psychological treatment, the first to study an integrated ACT-CBT group psychotherapy in

this population, and the first to examine the impact of levels of attachment anxiety and attachment avoidance on group psychotherapy outcomes in a mixed-CID physical rehabilitation sample.

Adaptation to Chronic Illness or Disability

As hypothesized, total HRQoL improved from pre- to post-treatment. This is in line with the two previous studies examining outcomes of a group psychological intervention for adults with mixed-CIDs (Brassington et al., 2016; Ruesch et al., 2017). Brassington and colleagues (2016) found that an 8-session ACT group intervention improved some domains of a HRQoL measure at post-treatment. Ruesch and colleagues (2017) found that an 8-session CBT group improved physical and mental QoL scores at post-treatment. More generally, our results are consistent with CID-specific studies demonstrating improved HRQoL following group CBT for spinal cord injury (Dorstyn et al., 2011), and following group-based self-management interventions for various chronic conditions (Jackson et al., 2019). To understand the clinical meaningfulness of these findings, we also conducted an analysis of the proportion of participants who reliably improved and recovered. An RCI analysis revealed that 45.0% of a significantly impaired subsample in the present study reliably improved on the FACT-G and 15.0% reliably recovered. Proportions of reliable change in the present sample are similar to reliable change in a sample of adults who underwent brain tumour surgery (Verhaak, 2020).

Emotional Symptoms and Self-Efficacy

We found partial support for our second hypothesis, that is, symptoms of depression and anxiety decreased from pre- to post-treatment, but general psychological distress did not (discussed later). Our results are in line with previous studies with mixed-CID samples demonstrating improved depression (Brassington et al., 2016; Ruesch et al., 2017) and anxiety

(Brassington et al., 2016) scores at post-treatment after ACT and CBT group-based interventions.

An RCI analysis revealed that 51.8% of a significantly depressed sub-sample in the present study reliably improved on the PHQ-9 and 24.1% reliably recovered. Of those presenting with clinically significant levels of anxiety at pre-treatment, 51.7% reliably improved on the GAD-7 and 29.3% reliably recovered. In the absence of similar RCI studies in the CID literature, we look to the broader literature for comparison. A study of transdiagnostic seven session group CBT for emotional disorders in primary care found a reliable recovery rate for combined PHQ-9/GAD-7 of 49.5% at post-treatment (Cano-Vindel et al., 2021), and a study of an eight session group mindfulness-based cognitive therapy for adults with depression in primary and secondary care reported a reliable recovery rate of 34.4% (Tickell et al., 2020). Hence, it appears that the reliable recovery rates in our CID sample is lower than those reported in a mental health sample receiving similar treatment. However, differences in results across studies are difficult to qualify given the heterogeneity of studies, including differences in methodologies, intended target populations, level of care, and sample characteristics. It is possible that recovery rates are lower in our sample when compared to other studies due to the presence of several patient factors that may complicate treatment (Beutler et al., 2002; Bohart & Wade, 2013). For example, our participants reported higher levels of functional impairment (e.g., 84% unemployed in our sample versus 41% in the Tickell et al. study (2020) and 48% in the Cano-Vindel et al. study (2021), and higher physical-psychological comorbidity.

Contrary to hypothesis two, general psychological distress did not improve over time in our sample. Of those with a clinically significant level of psychological distress at pre-treatment, 23.7% showed reliable improvement and only 11.9% demonstrated reliable recovery on the OQ-

45. Ruesch and colleagues (2017) also did not demonstrate a statistically significant decrease in general psychological distress following a group-based CBT intervention in a mixed-CID sample. The results suggest that brief group-based CBT may not be sufficient to reduce symptoms of general psychological distress in individuals with CID. The domains included in the OQ-45 total score are symptom distress, interpersonal relationships, and social role functioning. We might not expect all subscales such as interpersonal and social role functioning to change in eight weeks, particularly given the high level of functional impairment in our sample. And so, this may explain why there was not a significant improvement from pre- to post-treatment on total psychological distress, although results approached statistical significance. Other patient factors, such as attachment, may provide additional insight into the results.

Consistent with hypothesis three, general self-efficacy improved from pre- to post-treatment. Results are consistent with studies demonstrating improvements in self-efficacy in samples of adults with various chronic diseases (Lorig et al., 2001), as well as other medical samples (e.g., spinal cord injury) following a CBT-based intervention (Dorstyn et al., 2011; Li et al., 2020). An RCI analysis revealed that 61.0% of those with low self-efficacy at baseline either reliably improved or recovered at post-treatment. To our knowledge, no studies to date have calculated an RCI value for the GSES, and so the current results may serve as a benchmark for future studies.

Predicting Treatment Outcomes

As our second aim, we used an attachment-informed framework to explore if baseline levels of attachment anxiety or attachment avoidance predicted post-treatment outcomes, after controlling for pre-treatment scores. Overall, results indicated that individuals higher on anxious attachment at pre-treatment experienced statistically significant improvements in anxiety, general

psychological distress, and general self-efficacy after controlling for pre-treatment scores and attachment avoidance. It is possible that the process-oriented nature of the ACT-CBT group intervention allowed for more affective expression and self-reflection than traditional CBT-oriented therapies that tend to focus more on psychoeducation, skills-building, coping, and problem-solving. This process-orientation may have allowed individuals with higher attachment anxiety to use the group more effectively by providing them with an opportunity to reflect and receive feedback on their affective experiences. This is in line with findings from a study in binge-eating disorder, in which individuals higher on attachment anxiety experienced better outcomes if the group treatment was relationally-oriented rather than educational in nature (Tasca, Ritchie, et al., 2006).

It is also possible that those higher on attachment anxiety experienced more growth in therapeutic relationship factors such as the therapeutic alliance, as previously demonstrated in an eating disorder sample by Tasca and colleagues (Tasca et al., 2007). Furthermore, it is possible that an individual group member's attachment fit with the group-as-a-whole (i.e., is a member's attachment congruent or discrepant with the aggregated group attachment) had an impact on outcomes (Kivlighan, Lo Coco, et al., 2017). Results related to attachment insecurity as predictors of treatment outcome in a mixed-CID sample are exploratory and so these results warrant replication and should be interpreted with caution.

The results indicated that level of attachment avoidance was not related to post-treatment outcomes. It is possible that the increased affective expression, interpersonal interactions in the group, and some of the interventions (i.e., behavioural activation, relationship building) may have led to a defensive response from individuals with higher attachment avoidance. Those with higher attachment avoidance tend to be uncomfortable with emotional expression and

interpersonal closeness. This may have caused them to retreat from some components of the group intervention in an attempt to regulate distress. This may explain their relatively lower treatment progress following the intervention.

Limitations and Future Directions

A key limitation of this study is the single-group pre-post design and accompanying threats to validity. The absence of a control group makes it impossible to know if improvements are solely attributable to the intervention or biased by the natural course of symptoms or regression to the mean. We applied an RCI analysis of the outcome data in an attempt to mitigate this threat to validity. Nevertheless, the results should be interpreted cautiously. The lack of a follow-up assessment limits the conclusions we can draw in terms of longer-term efficacy of the intervention. Our sample consisted largely of White, heterosexual adults who completed post-secondary education. Replication with more diverse samples is needed to understand how cultural, social, and systemic factors play a role in treatment outcomes (Quiñones et al., 2019). Our sample is biased toward treatment- and research-accepting individuals receiving care at a tertiary care physical rehabilitation centre. This may limit the generalizability of our findings to a broader physical rehabilitation population. Comparison across studies is challenging given differences in HRQoL measurement, different sample characteristics, and various treatment approaches.

Even within these limitations, this study offers proof-of-concept for continued research of a process-based ACT-CBT group psychotherapy intervention for adults with mixed-CIDs and emotional distress. Replication with more robust methodological designs should be considered, such as process-outcome research studies and randomized controlled trials. Researchers could consider examining how this type of integrated group intervention translates to an online therapy.

Also, given that therapeutic alliance is a robust predictor of positive outcomes in psychotherapy (Lo Coco et al., 2022), future research should examine the relationship between attachment insecurity dimensions and therapeutic alliance factors, including alliance rupture and repair, in mixed-CID samples (Lo Coco et al., 2019).

Future researchers could consider examining various group quality dimensions (e.g., positive bonding, positive working, and negative relationship), group structure dimensions (member-member, member-leader, and member-group) in CID (Gullo et al., 2015), and group process (Marogna & Caccamo, 2014) in a brief ACT-CBT intervention. Examining other attachment factors as predictors of outcome, such as how an individual group member's attachment fits with their group's attachment (Kivlighan, Lo Coco, et al., 2017), or how a patient's attachment impacts how they reflect on their time in the group (Talia et al., 2019) could shed light on the role of group composition in the treatment for CID.

Conclusions

As one of the first studies to examine group psychotherapy for adults with mixed-CIDs and emotional distress, and the first to explore attachment insecurity dimensions as predictors of group therapy outcomes in this context, this work adds to the limited research on transdiagnostic approaches to psychological care in CID. Findings are clinically relevant to the physical rehabilitation field given that physical-psychological comorbidity and multimorbidity of CIDs are common (Daré et al., 2019; Tinetti et al., 2012). Results have implications for clinical decision-making and service delivery models.

Results indicate that despite statistically significant improvements in depression, anxiety, self-efficacy, and HRQoL at post-treatment, many patients remained in the clinical range on measures of emotional distress. This is not surprising given the short-term nature of the

intervention and the complex patient presentations. The 8-week *Coping with Disabilities and Health Conditions* group intervention may be a helpful start to treatment, but likely does not provide a sufficient dose for clinically meaningful change and reliable recovery for many patients. While wait lists for free-of-charge, hospital-based psychological services can be prohibitive when it comes to offering longer treatments, a longer course of treatment, for example, 12-20 sessions (still considered short-term therapy), may be clinically indicated in patients presenting with comorbid CID and emotional distress (Juul et al., 2019; Lazar et al., 2018). In addition to allowing more time for participants to practice and integrate newly learned skills, a group treatment lasting 12-20 sessions would provide more opportunity to strengthen group cohesion, which is a therapeutic factor that has a positive impact on outcomes (Burlingame et al., 2018; Rosendahl et al., 2021).

Albeit exploratory, results related to the impact of attachment anxiety and attachment avoidance on CID-treatment outcomes set the stage for future research in this area. Examining predictors of outcome may help tailor treatment to better meet patient needs, and help identify individuals who may be at risk of poor treatment response and an unfavourable HRQoL trajectory (Seves et al., 2021). Our results suggest that people higher on anxious attachment benefit more from the *Coping with Disabilities and Health Conditions* group in terms of anxiety, psychological distress, and self-efficacy. Future research should continue to explore how attachment insecurity dimensions impact group therapy and physical rehabilitation outcomes in CID, with the goal of moving toward person-centred care.

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Table 1

Participant Medical and Socio-Demographic Data

Indicator	*n*	%
Chronic illness or disability (Primary diagnosis)		
Mild acquired brain injury/Post-concussion syndrome	73	67.0
Neuro-muscular condition	23	21.1
Respiratory	5	4.6
Fibromyalgia	8	7.3
Ethnicity (self-identified)		
Asian and Middle Eastern origins	10	9.2
Black	3	2.8
Indigenous	1	0.9
Latin, Central, and South American origins	2	1.8
White	87	79.8
Multiple ethnicities	6	5.5
Education [a]		
Elementary school	1	0.9
High school	12	11.3
Some college/university	24	22.6
College/University/Postgraduate degree	69	65.1
Employment status [b]		
Currently working	17	15.7
Currently not working	91	84.3
Income (household) [c]		
Very low (less than $20k)	14	15.4
Low ($20,000 - $39,999)	25	27.5
Middle ($40,000 – $79,999)	27	29.7
High ($80,000 or more)	25	27.5
Living situation [b]		
Alone	34	31.5
Cohabitating (with partner/roommate/family)	71	65.7
Other	3	2.8
Relationship status [d]		
Not in a relationship	39	37.5
In a relationship	65	62.5
Sexual orientation [e]		
Heterosexual	95	90.5
Gay/Lesbian/Bisexual	6	5.7
Another orientation	4	3.8

Note. Sample characteristics without data imputation. $N = 109$.

Number of participants that did not answer: [a] 3; [b] 1 [c] 18; [d] 5; [e] 4.

Table 2

Descriptive Statistics and Reliable Change Index

Variable	Pre-treatment			Post-treatment			Reliable Change Index Subsamples, valid *% (n)*					
	n	*M*	*SD*	*n*	*M*	*SD*	*n**	Deteriorated	Not Classifiable	Recovered†	Total Improved	Missing *n*	RCI
Att anx	99	3.86	1.29	87	3.98	1.27							
Att avd	99	3.07	1.25	87	3.17	1.28							
FACT-G	95	48.36	15.92	90	52.25	16.81	76	23.3 (*14*)	31.7 (*19*)	15.0 (*9*)	45.0 (*27*)	16	5
PHQ-9	109	15.01	5.01	100	12.11	5.54	92	10.8 (*9*)	37.3 (*31*)	24.1 (*20*)	51.8 (*43*)	9	2.4
GAD-7	109	11.02	4.97	99	9.46	5.06	65	12.1 (*7*)	36.2 (*21*)	29.3 (*17*)	51.7 (*30*)	7	2.8
OQ-45	89	84.76	22.38	82	78.82	25.63	74	13.6 (*8*)	62.7 (*37*)	11.9 (*7*)	23.7 (*14*)	15	14
GSES	93	25.00	5.71	79	27.39	5.65	54	4.9 (*2*)	34.1 (*14*)	46.3 (*19*)	61.0 (*25*)	13	4.5

Note. Recovery cut-points are as follows: FACT-G > 62; PHQ-9 < 10; GAD-7 < 10; OQ-45 < 63; GSES > 27. *SD* = standard deviation; Att anx = attachment anxiety; Att avd = attachment avoidance; FACT-G = health-related quality of life; PHQ-9 = depression; GAD-7 = anxiety; OQ-45 = general psychological distress; GSES = general self-efficacy; Missing *n* = number of patients in the subsample without post-treatment scores; RCI = reliable change index values indicate clinically meaningful change when scores on the measure change in the direction of better functioning (RCI > 1.96).

*Subsample size of patients in the clinical range at pre-treatment.

†Recovered includes individuals who reliably improved and reliably recovered.

Table 3

Effects for the Longitudinal Changes in Outcomes Obtained Through 3-Level Random Effects Model

Y	Model	Pm	Coefficient	*t*	*df*	*p*	*p'*	σ^2		R^2
								Base	Time	
HRQoL	Level 3: Intercept	γ_{000}	49.87	32.45	22	<.001	.005	43.60	39.52	.0936
	Level 3: Slope	γ_{100}	3.04	2.70	52	.009	.018			
PHQ	Level 3: Intercept	γ_{000}	13.45	22.37	22	<.001	.005	14.42	10.74	.2552
	Level 3: Slope	γ_{100}	-2.78	-7.47	76	<.001	.005			
GAD	Level 3: Intercept	γ_{000}	10.23	20.03	22	<.001	.005	8.59	7.59	.1164
	Level 3: Slope	γ_{100}	-1.46	-3.33	75	.001	.005			
OQ	Level 3: Intercept	γ_{000}	81.28	32.34	22	<.001	.005	154.25	152.29	.0127
	Level 3: Slope	γ_{100}	-3.25	-1.72	38	.093	.093			
GSES	Level 3: Intercept	γ_{000}	26.15	48.76	22	<.001	.005	30.57	28.19	.0779
	Level 3: Slope	γ_{100}	2.35	3.51	36	.001	.005			

Note. HRQoL = Health-related quality of life; PHQ = depression; GAD = anxiety, OQ = psychological distress; GSES = general self-efficacy; Y = outcome; Pm = parameter; *p'* = Holm-Bonferroni corrected *p*-value; Time = Model with time as a predictor; R^2 = pseudo R^2.

Table 4

Effects for the Random Effects Model Predicting the Effect of Attachment Insecurity Dimensions on Post-Treatment Scores After Controlling for Pre-Treatment Scores

Y	Model	Pm	Coefficient	*t*	*df*	*p*	σ^2		
							Base	Cov	Pred
HRQoL	Level 2: Intercept	γ_{00}	52.37	27.80	22	<.001	267.09	138.52	143.12
	Level 2: Pre-score	γ_{10}	0.74	0.09	55	<.001			
	Level 2: Att anx	γ_{20}	1.34	1.38	49	.175			
	Level 2: Att avd	γ_{30}	-0.63	-0.52	49	.608			
PHQ	Level 2: Intercept	γ_{00}	11.91	17.08	22	<.001	25.39	19.43	19.71
	Level 2: Pre-score	γ_{10}	0.65	7.02	76	<.001			
	Level 2: Att anx	γ_{20}	-0.28	-0.59	67	.559			
	Level 2: Att avd	γ_{30}	-0.10	-0.24	67	.809			
GAD	Level 2: Intercept	γ_{00}	9.32	15.43	22	<.001	22.37	15.80	15.23
	Level 2: Pre-score	γ_{10}	0.59	8.13	75	<.001			
	Level 2: Att anx	γ_{20}	-0.54	-2.19	66	.032			
	Level 2: Att avd	γ_{30}	0.11	0.48	66	.635			
OQ	Level 2: Intercept	γ_{00}	78.78	26.19	22	<.001	617.57	348.31	322.84
	Level 2: Pre-score	γ_{10}	0.71	6.89	47	<.001			
	Level 2: Att anx	γ_{20}	-3.14	-2.22	42	.032			
	Level 2: Att avd	γ_{30}	-0.25	-0.12	42	.908			
GSES	Level 2: Intercept	γ_{00}	27.45	37.66	22	<.001	26.95	26.94	28.31
	Level 2: Pre-score	γ_{10}	0.13	1.10	48	.276			
	Level 2: Att anx	γ_{20}	1.13	2.10	41	.042			
	Level 2: Att avd	γ_{30}	-0.33	-0.80	41	.429			

Note. HRQoL = Health-related quality of life; PHQ = depression; GAD = anxiety, OQ = psychological distress; GSES = general self-efficacy; Y = outcome; Pm = parameter; Cov = covariate model excluding attachment predictors; Pred = predictor model including covariate; R^2 = pseudo R^2; Att anx = attachment anxiety; Att avd = attachment avoidance.

Study Three

The association between group cohesion and outcomes in ACT-CBT group treatment for adults with chronic illness or disability

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Abstract

Group psychotherapy is an important part of rehabilitation care and can help improve psychological health and functioning in chronic illness and disability (CID). Individual attachment dimensions and group cohesion relate to group psychotherapy outcomes across various patient populations, but less is known about how these factors contribute to therapeutic change in CID. Some research points to a reciprocal association between change in symptoms and change in group cohesion across group therapy sessions. This reciprocal association has not been examined in CID. Adults with CID (N = 109 in 23 groups) participated in an 8-week process-based acceptance and commitment therapy/cognitive behavioural therapy (ACT-CBT) group at a tertiary care physical rehabilitation centre between 2016 and 2020. Participants completed weekly measures of depression, anxiety, and group cohesion, and at pre-treatment they completed a measure of attachment. Multilevel analyses revealed that psychological symptoms decreased, and that group cohesion increased across eight sessions. Attachment avoidance moderated the association between within-person change in depression and subsequent session change in group cohesion across time. Results provide preliminary support for the effectiveness of an integrated and process-based ACT-CBT group intervention for adults with CID and psychological symptoms. Findings highlight the value of weekly assessment of symptoms and group cohesion and the potential role of attachment avoidance on the within-person symptom-cohesion relationship. Replication is needed with larger and more diverse samples, and a more robust design.

Keywords: attachment insecurity, chronic illness or disability, group cohesion, physical rehabilitation, psychological symptoms

Group Cohesion and Outcomes in ACT-CBT Group Treatment for Adults with Chronic Illness or Disability

The onset of a chronic illness or disability (CID) can be overwhelming and stressful. Individuals with CID often experience symptoms of depression and anxiety (Daré et al., 2019) which can impede adaptation to CID and lead to poorer health-related quality of life (HRQoL) and increased disability (Katon, 2011). Evidence demonstrates the value of group psychological interventions to improve mental health and HRQoL in CID (Jackson et al., 2019).

Group psychological interventions, such as cognitive behavioural therapy (CBT) and acceptance and commitment therapy (ACT), improve emotional and behavioural health outcomes across various CIDs (Brassington et al., 2016; Maras et al., 2022; Ruesch et al., 2017). Many patients show reliable improvement following evidence-based psychological treatment, but some continue to experience clinical levels of psychological symptoms at post-treatment (Maras et al., 2022; Ruesch et al., 2017). Understanding the factors that contribute to treatment response and therapeutic change in group therapy for adults with CID and psychological symptoms is important to tailor treatments to better meet patient needs.

One of the most widely researched change processes, or common factors, related to group psychotherapy outcomes is group cohesion. Group cohesion is defined as the sense of interpersonal connection or closeness between group members and between group members and leaders (Burlingame et al., 2018; Rosendahl et al., 2021) and a unity of purpose shared among group members (Forsyth, 2021). Group cohesion is the cognate of the therapeutic alliance in individual psychotherapy. But group cohesion is more complex because group psychotherapy implies interactions between a member and the leader, between individual members, and between a member and the group. Group therapists concur that cohesion deepens over time as

the group continues to interact (Marmarosh & Sproul, 2021). Higher levels of group cohesion is a reliable predictor of positive group process and treatment outcomes ($r = 0.26$) across psychological diagnoses, clinical settings, and theoretical orientations (Burlingame et al., 2018). Better understanding how group cohesion contributes to therapeutic change in CID may help clinicians decide which therapeutic factors to harness and which tasks to prioritize to maximize treatment effects.

One postulated mechanism of change is the session-by-session association between cohesion and symptoms. Meta-analytic research supports a within-patient synergistic unfolding of a reciprocal alliance-outcome relationship, particularly in the early phase of individual therapy (i.e., sessions 1-7; Flückiger et al., 2020). That is, a patient's higher alliance scores in one therapy session predicted a decrease in their symptoms at the subsequent session, and lower symptoms in a patient during one therapy session predicted an increase in their own alliance scores at the subsequent session. Similarly, some researchers have examined the relationship between group therapeutic factors and symptom change over time. For example, some evidence supports a reciprocal relationship between group therapeutic factors and symptoms in adults with eating disorders (Obeid et al., 2018; Tasca & Lampard, 2012). But other research found a unidirectional relationship whereby an increase in the therapeutic alliance in group therapy was associated with lower symptoms at a subsequent session, but not the reverse in a sample of adults with an eating disorder (Tasca et al., 2016). There is a paucity of research examining the within-patient relationship between group cohesion and symptoms of depression or anxiety, and there is no research specific to CIDs. One goal of this study is to examine the unfolding association between group cohesion and psychological symptoms in the psychological treatment of a physical rehabilitation sample.

Patient factors may influence the cohesion-outcome relationship (Burlingame et al., 2018). One such factor is attachment. Attachment theory explains how repeated interactions between infants and significant caregivers lead to lifelong patterns of interpersonal interactions and response to threat (Bowlby, 1980). Sensitive and consistent caregiving leads to the development of a secure attachment state of mind, whereas rejecting, harmful, or inconsistent caregiving can lead to an insecure attachment state of mind (Bowlby, 1980). Two dimensions of adult attachment are attachment anxiety and attachment avoidance. Adults higher on *attachment anxiety* see themselves as unworthy of love and see others in an overly positive way (Mikulincer & Shaver, 2007). Those higher on attachment anxiety tend to seek reassurance through intimate/physical proximity while remaining hypervigilant to cues of rejection, and their emotions may stay in a hyper-aroused state for longer (Mikulincer & Shaver, 2007). Adults higher on *attachment avoidance* have an overly positive view of themselves as able to manage stressors and see others as unresponsive or unreliable (Mikulincer & Shaver, 2007). Individuals higher on attachment avoidance tend to avoid dependency in relationships, deny their attachment needs, and demonstrate self-reliant attitudes while tending to maintain a level of hypo-arousal of conscious emotions (Mikulincer & Shaver, 2007). Adults with lower levels of attachment anxiety and of attachment avoidance are conceptualized as securely attached (Fraley et al., 2015). Securely attached individuals are better able to manage distress, are more comfortable relying on others for support in response to illness-related threat, have a positive view of their selves, and manage their emotions in an adaptive manner (Hunter & Maunder, 2001).

Meta-analytic research suggests that higher attachment insecurity at pre-treatment predicts poorer treatment outcomes across a variety of clinical populations (Levy et al., 2018). However, these associations may depend on the individual's level of attachment anxiety or attachment

avoidance, as well as the theoretical orientation of the treatment (McBride et al., 2006; Tasca, Ritchie, et al., 2006). In a mixed-CID sample, higher pre-treatment attachment anxiety was associated with more improvements in psychological distress, anxiety, and self-efficacy following eight sessions of a process-oriented ACT-CBT group therapy intervention, whereas pre-treatment attachment avoidance was not related to outcomes (Maras et al., 2022).

By nature, group psychotherapy involves complex interactions between members, leaders, and the group that may be affected by different relational patterns of the individual members. Therefore, attachment may be relevant to group cohesion and to the cohesion-outcome association. Research on attachment and group psychotherapy suggests that levels of attachment anxiety and attachment avoidance impact how an individual relates to other group members, the group leader/therapist, and the group as a whole (Tasca & Maxwell, 2021). Although more research is needed, emerging evidence suggests that individuals higher on attachment anxiety at pre-treatment experience more benefit from group treatment if they also experience increasing group cohesion over time. Alternatively, individuals higher on attachment avoidance at pre-treatment may benefit from a gradual approach to self-disclosure and working toward engagement with the group (Tasca & Maxwell, 2021). Building on research of the moderating effect of attachment insecurity dimensions on the cohesion-outcome relation in group therapy (Gallagher et al., 2014; Tasca et al., 2013), the present study examined attachment as a moderator of the cohesion-outcome relationship in adults with various CIDs and psychological symptoms.

To date, no studies have used an attachment framework to investigate the relationship between group cohesion and treatment outcomes in CID. The proposed study contributes to our

understanding of how attachment and group cohesion relate to treatment outcomes in adults with CID attending a process-oriented ACT-CBT group at a physical rehabilitation centre.

The Present Study

Our first aim was to examine levels of psychological symptoms and group process outcomes, and the relationship between them, in a mixed-CID sample of adults attending an ACT-CBT group psychotherapy. To achieve this aim, we first tested if the intervention improved psychological symptoms and facilitated growth in group cohesion throughout the course of the group. We hypothesized that: (1) depression and anxiety symptoms will decrease across eight weeks of treatment, and (2) level of group cohesion will increase across eight weeks of treatment.

Next, we assessed for a possible reciprocal relationship between change in psychological symptoms and group cohesion across sessions of group therapy. That is, we examined the association between change in psychological symptoms and subsequent session change in group cohesion, as well as change in group cohesion and subsequent session change in symptoms of depression and anxiety. Given the novelty of this analysis in the physical rehabilitation literature, we did not make specific hypotheses about a possible reciprocal cohesion-outcome association.

Our second aim was to use an attachment-informed framework to explore if pre-treatment levels of attachment anxiety or attachment avoidance predicted change in progress and process outcomes or moderated the reciprocal relationship between them. We tested if pre-treatment levels of attachment anxiety or attachment avoidance predicted within-person change in symptoms of depression and anxiety across eight weeks of treatment, within-person change in group cohesion across eight weeks of treatment, and the association between change in

psychological symptoms and change in group cohesion. Since these analyses were exploratory and novel for a physical rehabilitation sample, we did not make specific hypotheses.

Method

Participants

Participants included 109 adults (M_{age} = 47.03 years, *SD* = 12.82; 64.2% female; *n* = 70) who participated in an outpatient 8-week ACT-CBT group psychotherapy intervention at a tertiary care physical rehabilitation centre. As described in a previous study, participants in the sample were characterized by elevated psychological symptoms, functional impairment, and low HRQoL at the time of pre-treatment assessment (Maras et al., 2022). Two psychologists offered a total of 23 groups. Each group comprised two to eight patients. Table 1 presents participant medical and socio-demographic data.

Measures

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) is a psychometrically sound self-report scale, and was used to assess symptoms of depression (Kocalevent et al., 2013; Kroenke et al., 2001). The PHQ-9 comprises nine items, each rated on a 4-point Likert-type scale (0 = not at all; 3 = nearly every day). Total scores range from 0 to 27. Higher scores indicate a higher level of depressive symptoms. Mean internal consistency across the eight sessions is .81 (range .76-.83) in the present study.

Anxiety Symptoms

The Generalized Anxiety Disorder Scale (GAD-7) is a reliable and valid self-report questionnaire, and was used to assess symptoms of anxiety (Spitzer, Kroenke, Williams, & Lowe, 2006). The GAD-7 comprises seven items, each rated on a 4-point Likert-type scale (0 =

not at all; 3 = nearly every day). Total scores range from 0 to 21. Higher total scores reflect a higher level of anxiety symptoms. Mean internal consistency across the eight sessions is .86 (range .82-.89) in the present study.

Group Cohesion

The Group Climate Questionnaire-Short form (GCQ-S) is a 12-item self-report scale assessing an individual group member's perception of group atmosphere (MacKenzie, 1983). Items are rated on a 7-point Likert-type scale (0 = not at all; 6 = extremely). The GCQ-S has three scales: *engagement*, *conflict*, and *avoiding*. The Engagement scale (5 items) measures the degree of positive working atmosphere and sense of cohesiveness, and was chosen as a measure of group cohesion in the present study. The Engagement scale has demonstrated adequate psychometric properties in previous research (Gallagher et al., 2014; Tasca, Balfour, et al., 2006). Mean internal consistency for the Engagement scale across the eight sessions is .64. The range of average inter-item correlations (AIC) for the Engagement scale across sessions is .22 to .48, suggesting adequate internal consistency (Clark & Watson, 2019).

Attachment Dimensions

The Experiences in Close Relationships Scale–Short Form (ECR-SF) is a psychometrically sound self-report questionnaire, and was used to assess attachment anxiety and attachment avoidance (Wei et al., 2007). The ECR-SF comprises 12 items, each rated on a 7-point Likert-type scale (1 = strongly disagree; 7 = strongly agree). Mean total scores on each subscale range from 1 to 7. Higher scores reflect higher levels of attachment anxiety or attachment avoidance. Internal consistency in the present sample is .77 and .79 for pre-treatment attachment anxiety and pre-treatment attachment avoidance, respectively.

Procedure

Participants were outpatients enrolled in the group intervention at a tertiary care physical rehabilitation centre in Canada between September 2016 and March 2020 (prior to Covid-19-related changes in service delivery). Inclusion criteria were: (a) a physiatrist's referral to the Clinical Psychology Outpatient Program, (b) match between patient needs/goals and the intervention, (c) indications of elevated psychological symptoms at pre-treatment on a measure of depression, anxiety, and/or overall distress, as determined by established clinical cut-offs (Maras et al., 2022), and (d) ability to speak and write in English. Exclusion criteria were: (d) medically unstable, (e) problematic substance use, or (f) current serious unmanaged mental illness that would make group therapy inappropriate for the patient.

Participants completed a questionnaire assessing levels of attachment insecurity at pre-treatment. They also completed questionnaires assessing psychological symptoms (i.e., PHQ-9, GAD-7) at the beginning of each weekly session, and a measure of group cohesion (i.e., GCQ-S) at the end of each session. The study was approved by the institutional research ethics board. Participants provided written informed consent.

The Intervention

The *Coping with Disabilities and Health Conditions* intervention was a psychologist-led, group-based treatment grounded in the principals of ACT (Hayes et al., 2012) and CBT (Taylor, 2006). The group included a significant interpersonal process component which allowed the therapist to model and encourage group members to respond to others' disclosures in authentic and interpersonally adaptive ways. The group intervention comprised eight weekly 120-minute sessions with a 15-minute break and a 15-minute therapist-led relaxation or mindfulness exercise at the end of each session. Sessions covered the following topics: (a) psychoeducation about CID

and about the CBT/ACT models, (b) behavioural activation, goals, pacing, and self-care, (c) stress and the benefits of mindfulness and relaxation, (d) depression, grief, and the power of acceptance, (e) managing anger, (f) managing anxiety, (g) relationship building with role plays, and (h) review of learned skills and farewells. Therapists flexibly adhered to the agenda which allowed the group leader to comment on interpersonal processes that occurred in the group which furthered the aims of the group. Accompanying group materials included a self-management workbook (Bilsker et al., 2009) and brief worksheets. Patients were asked to complete a workbook chapter before each weekly session, and worksheets were provided to increase exposure to concepts for those who wanted additional independent learning. More details about the group were published elsewhere (Maras et al., 2022).

Data Analyses

Hierarchical linear modelling analyses were used to test study aims. Data were repeatedly measured within individuals, and individuals were nested within groups. Data were assessed for dependence caused by the hierarchically nested data with 3-level unconditional models. We used 3-level hierarchical linear growth models to test hypotheses 1 and 2 (decrease across eight weeks of treatment in depression and anxiety, and increase in group cohesion). Time (session number) was modelled at level-1 (i.e., repeated measurement within participants), between-participant effects were modelled at level-2, and group effects were modelled at level-3 (Model 1a in Appendix M). Week-1 outcome scores in the dependent variable were grand-mean centred and used as a covariate at level-2 (between participants) and at level-3 (between groups) to control for the individual's and group's baseline values.

To assess a possible reciprocal association between change in psychological symptoms (i.e., depression and anxiety) and change in group cohesion across eight weeks of treatment, we used

similar 3-level hierarchical linear models described above, but we disaggregated within-person (i.e. patient) and between-person effects of the level-1 predictors over time using the approach recommended by Curran and Bauer (2011; Model 1b in Appendix M). We included a time-lagged dependent variable as a covariate at level-1 to control for a participant's preceding level of psychological symptoms or cohesion, making the dependent variable an index of change from the previous session. We calculated the residual for the other time varying covariate at level-1 (either psychological symptoms or group cohesion) to indicate change in the time-varying predictor from the previous week. Thus, the model predicted change in the dependent variable (either group cohesion or psychological symptoms, respectively) at a subsequent week by change in the predictor from the previous week.

We also tested if individual pre-treatment levels of attachment anxiety or attachment avoidance moderated change in depression, anxiety, or group cohesion across eight sessions (Model 2a, level 2 in Appendix M), and moderated the association between change in psychological symptoms (i.e., depression and anxiety) and group cohesion (Model 2b, level 2 in Appendix M).

The pseudo-R^2 was used as a measure of effect size, or the percentage of variance accounted for by adding predictors at level-1 of the models (Singer & Willett, 2003). Effect sizes of .01 were considered small, >.13 as medium, and >.26 as large (Cohen, 1988). Analyses were performed using IBM SPSS Statistics Version 27.0 and Hierarchical Linear Modelling Version 8 with full maximum likelihood estimation.

Results

Preliminary Analyses and Sample Characteristics

A missing data analysis using Little's MCAR test revealed that data were missing completely at random at the item level for sessions 1 through 8 (all $p > .05$). Missing items were imputed at the item level using individual participant mean scale scores (or mean subscale scores where appropriate) when participants had <25% missing data. No univariate or multivariate outliers were identified at any of the eight sessions for PHQ-9, GAD-7, and GCQ-Engagement. All session data for the PHQ-9, GAD-7, and GCQ-Engagement were normally distributed. Table 2 presents participant weekly depression, anxiety, and group cohesion scores. For the PHQ-9 outcome, 70.5% of the variance was within-person, 20.3% was between-persons, and 9.2% was between-groups. For the GAD-7, 75.6% of the total variance was within-person, 23.6% was between-persons, and 0.8% was between-groups. For GCQ-Engagement, 40.0% of the variance was within-person, 51.6% was between-persons, and 8.4% was between-groups.

Progress and Process Outcomes

Results supported hypotheses 1 and 2 (fixed and random effects presented in Table 3). Scores on PHQ-9 and GAD-7 decreased significantly across eight sessions with a medium effect size (pseudo R^2 = .21 and .18, respectively). Scores on GCQ-Engagement increased significantly across eight sessions with a large effect size (pseudo R^2 = .32).

Association Between Cohesion and Symptom Change

Results indicated that within-person change in PHQ-9 scores did not significantly predict subsequent session change in GCQ-Engagement scores (p = .607; Model 1b in Appendix M). Similarly, non-significant results were found for within-person change in GAD-7 scores and subsequent session change in GCQ-Engagement scores (p = .861). We then examined the reverse

model (Model 1b in Appendix M). Within-person change in GCQ-Engagement scores did not significantly predict subsequent session change in PHQ-9 scores (p = .212). Also, within-person change in GCQ-Engagement scores did not significantly predict subsequent session change in GAD-7 scores.

Attachment as a Moderator

Attachment insecurity dimensions did not significantly predict change in psychological symptoms or change in group cohesion over time, although attachment avoidance approached significance as a predictor of change in GAD-7 and GCQ-Engagement scores (Table 3; Model 2a in Appendix M).

Regarding our exploratory questions, we examined if pre-treatment attachment scale scores moderated the association between symptom change and subsequent session cohesion change. First, results indicated that level of pre-treatment attachment avoidance was a significant moderator of the association between within-person change in PHQ-9 scores and subsequent session change in GCQ-Engagement scores across eight therapy sessions, γ_{120} = 0.03, SE = 0.01, $t(21) = 2.32$, p = .031. That is, for individuals with lower pre-treatment attachment avoidance, a decrease in PHQ-9 was associated with an increase in GCQ-Engagement scores at the subsequent session. Conversely, for individuals with higher pre-treatment attachment avoidance, a decrease in PHQ-9 scores was associated with a decrease in GCQ-Engagement scores at the subsequent session. Level of pre-treatment attachment anxiety was not a significant moderator of the association between within-person change in PHQ-9 scores and subsequent session levels of GCQ-Engagement (p = .107). Second, results also showed that neither pre-treatment level of attachment anxiety (p = .187) nor attachment avoidance (p = .352) significantly moderated the association between within-person change in GAD-7 and subsequent session GCQ-Engagement

scores across eight therapy sessions. However, the between-persons effect of attachment anxiety on the overall level of GCQ-Engagement was significant, $\gamma_{010} = 0.13$, $SE = 0.06$, $t(21) = 2.11$, $p = .047$. That is, across all individuals in the sample, higher pre-treatment attachment anxiety was associated with higher overall mean GCQ-Engagement scores, after controlling for pre-treatment attachment avoidance and baseline symptoms of anxiety.

Next, we examined the exploratory questions of whether pre-treatment attachment scale scores moderated the reverse association between change in group cohesion and subsequent session change in symptoms. First, the results showed that pre-treatment level of attachment anxiety ($p = .508$) and attachment avoidance ($p = .596$) did not significantly moderate the association between within-person change in GCQ-Engagement scores and subsequent session PHQ-9 scores. However, the between-persons effect of pre-treatment attachment avoidance on PHQ-9 scores was significant after controlling for other variables in the model, $\gamma_{020} = 1.10$, $SE = 0.51$, $t(21) = 2.14$, $p = .044$. That is, across all individuals in the sample, higher pre-treatment attachment avoidance was associated with higher overall mean level of depression when controlling for pre-treatment attachment anxiety and baseline cohesion scores. Second, the results showed that pre-treatment level of attachment anxiety ($p = .912$) and attachment avoidance ($p = .666$) did not significantly moderate the association between within-person change in GCQ-Engagement scores and subsequent session change in GAD-7 scores. However, the between-persons effect of group cohesion on change in GAD-7 scores was significant, $\gamma_{030} = -2.03$, $SE = 0.81$, $t(21) = -2.51$, $p = .020$. That is, across all individuals, higher cohesion scores were associated with lower overall mean anxiety scores when controlling for pre-treatment attachment insecurity dimensions and baseline cohesion scores.

Discussion

Our first objective was to examine change in psychological symptoms and group cohesion, and a possible within-person reciprocal relationship between them, in a mixed-CID sample of adults participating in an 8-week ACT-CBT group psychotherapy. Consistent with hypothesis 1, results showed that symptoms of depression and anxiety significantly decreased across eight sessions. Participants experienced some relief of psychological symptoms after controlling for baseline depression and anxiety scores. On average, depression scores decreased by 0.28 points on the PHQ-9 per session, and anxiety scores decreased by 0.25 points on the GAD-7 per session, representing a medium effect size for depression (*pseudo* $R^2 = .21$) and anxiety (*pseudo* $R^2 = .18$). Treatment effects for depression and anxiety in the present study are somewhat smaller to those reported by Brassington and colleagues (2016) in a group-ACT intervention for adults with mixed-CIDs (depression $\eta_p^2 = 0.12$, anxiety $\eta_p^2 = 0.11$, both large effect sizes). Comparison across studies is challenging given methodological differences, but in general our findings are consistent with previous research.

Consistent with hypothesis 2, results showed that cohesion significantly increased across eight sessions of the group intervention, which is consistent with past research (Marmarosh & Sproul, 2021). On average, group cohesion scores increased by 0.10 points on the GCQ-Engagement subscale per session, representing a large effect size (*pseudo* $R^2 = .32$). This level of growth in GCQ-Engagement is similar to results reported for adults with social anxiety (Thorgeirsdottir et al., 2015). The estimated mean GCQ-Engagement score across all sessions and groups in the present study was 4.13 ($SE = .10$), which indicates that patients on average viewed the group as "quite a lot" engaged (MacKenzie, 1983). This is similar to overall mean GCQ-Engagement scores in a sample of adults with eating disorders (Tasca, Balfour, et al., 2006) and adults with

social anxiety disorder (Thorgeirsdottir et al., 2015) across both CBT and dynamically-oriented group therapies.

The 8-week integrated ACT-CBT group intervention provided opportunities for the development of group cohesion despite the fact that participants were diagnostically heterogeneous (i.e., mixed-CIDs and flexible inclusion criteria from a psychological perspective). This lends some weight to group-based transdiagnostic interventions in CID (Brassington et al., 2016; Maras et al., 2022; Ruesch et al., 2017). It is possible that the group leaders' attention to the common experiences of those with CID (e.g., pain, existential anxiety, uncertainty, acceptance), as well as leaders' attention to group-related processes (e.g., self-disclosure, interpersonal support, sense of unified purpose) helped to facilitate the development of group cohesion despite the differences in individual group members in terms of CID-related symptoms (Burlingame et al., 2018; Heijmans et al., 2004).

Attachment as a Predictor of Change in Psychological Symptoms and Group Cohesion

As part of our secondary aim, we found that pre-treatment attachment anxiety and attachment avoidance did not predict change in depression or anxiety symptoms across sessions. This is in contrast to meta-analytic research which suggests that higher attachment insecurity at pre-treatment is associated with poorer outcomes in individual psychotherapy (Levy et al., 2018). Averaged across all individuals in the present study, we found that higher pre-treatment attachment avoidance was significantly associated with higher mean level of depressive symptoms, which is consistent with past research (Zheng et al., 2020).

In terms of group cohesion, our finding that attachment insecurity dimensions did not significantly predict change in cohesion across sessions is initially surprising given that past research highlights that members' attachment states of mind influence group cohesion (Tasca &

Maxwell, 2021). However, the relationship between attachment and group cohesion may be nuanced and partially dependent on the theoretical orientation of the treatment (Tasca, Ritchie, et al., 2006). Given that the present study intervention integrated components of cognitive and interpersonally oriented approaches, it is possible that the predictive effects of attachment were attenuated. We did find that higher levels of pre-treatment attachment anxiety averaged across all individuals were associated with higher group cohesion scores overall. This makes sense given that individuals higher on attachment anxiety are generally preoccupied with seeking reassurance through intimacy. These individuals tend to view others in an overly positive way and may be intently focused on the level of the group members' closeness and unity of purpose.

The Cohesion-Outcome Association

Research supports that increased group cohesion contributes to therapeutic change (Burlingame et al., 2018), but less is known about how the group cohesion-outcome relationship evolves from one session to the next. Current results did not support a within-person bidirectional relationship between change in psychological symptoms and group cohesion across sessions. This is in contrast to a meta-analysis of individual psychotherapy which supports a within-person reciprocal alliance-outcome relationship (Flückiger et al., 2020). However, it should be noted that groups are more complex than individual psychotherapy due to the simultaneous member-member, member-leader, and member-group interpersonal interactions (Yalom & Leszcz, 2020). As such, our understanding of the cohesion-outcome relationship may be better characterized by considering the impact of various patient-factors, such as attachment (Gallagher et al., 2014; Tasca et al., 2013), and current findings support this idea.

Attachment as a Moderator of the Cohesion-Outcome Association

As part of our second aim, pre-treatment attachment insecurity dimensions were examined as potential moderators of the reciprocal cohesion-outcome relationship. Findings suggested that pre-treatment attachment avoidance, but not attachment anxiety, significantly moderated the within-person association between change in depressive symptoms and subsequent session change in group cohesion. Individuals with lower attachment avoidance who experienced a greater reduction in depressive symptoms subsequently experienced greater growth in group cohesion at the next session. Concurrently, individuals with higher levels of attachment avoidance who experienced a decline in depressive symptoms reported a decrease in group cohesion at the next session. It is possible that experiencing relief from depressive symptoms allowed participants with lower attachment avoidance to enact their typical secure relational style. For instance, individuals lower on attachment avoidance may have been more likely to self-disclose in the group (Shechtman & Dvir, 2006), may have felt more comfortable asking group members for support, and may have perceived others as responsive and reliable. These behaviours may have contributed to a sense of growing cohesion following reduced depressive symptoms for individuals lower on attachment avoidance. Conversely, for those higher in attachment avoidance it is possible that improvement of depressive symptoms led to a defensive response of not needing further support and therefore to a perceived decline in group cohesion. A decline in depressive symptoms may have resulted in such individuals becoming more aware of their interpersonal discomfort and feelings of vulnerability leading to their prototypical relational pattern of avoidance. Future studies could examine how different patient attachment patterns within a group (i.e., attachment heterogeneity in a group) might impact members throughout treatment by using actor-partner interdependence modelling (Kivlighan, Lo Coco, et al., 2017).

Disaggregating Within- and Between-Person Effects

Because within- and between-person effects are simultaneously contained within repeated-measures analyses, we opted to disaggregate these effects (Curran & Bauer, 2011). Disentangling the within-person variance (variance within each patient across sessions) from the between-person variance (variance related to overall differences between patients) is crucial to our understanding of treatment and cohesion processes. Our results highlight the importance of taking this approach in longitudinal modelling as over 70% of the variability in psychological symptoms (depression = 70.5%, anxiety = 75.6 %) was within the individual across sessions. Meanwhile, approximately 40% of the variability in group cohesion was within-person. Therefore, clinicians may consider monitoring and attending to within-patient session-by-session changes in psychological symptoms and cohesion (i.e., a patient's score in one week relative to their scores in previous weeks), rather than only monitoring a patient's level of psychological symptoms or cohesion compared to other patients (e.g., compared only to clinical cut-off scores). Such a within-person approach may provide clinicians with a more accurate depiction of how a given individual is progressing in treatment and may help guide more precise treatment decisions.

Limitations and Future Directions

The absence of a control group and lack of a follow-up assessment limits the conclusions we can draw in terms of treatment efficacy. Nevertheless, treatment effect sizes in the present study for the outcomes of depression and anxiety were generally consistent with previous research (Brassington et al., 2016).

Individuals with CID and comorbid psychological symptoms may benefit from a longer course of treatment (Juul et al., 2019). The brief nature of the current study's intervention may

limit our understanding of how group cohesion evolves over time in CID, as briefer interventions may not allow for the development of mature cohesion which develops through sharing vulnerability, risk taking, and resolving conflict (Marmarosh & Sproul, 2021).

It is possible that the unfolding of the depression-cohesion relationship for those higher on attachment avoidance could be an artifact of treatment length. One study found that attachment avoidance was negatively correlated with group attraction at treatment-midpoint but not at termination (i.e., session 10-12; Chen & Mallinckrodt, 2002). Therefore, our results could have differed with a longer treatment course.

Given that treatment may take longer for individuals with CID and comorbid psychological symptoms (Juul et al., 2019), it is possible that it may also take longer for the reciprocal cohesion-outcome relationship to emerge. Nevertheless, we did identify attachment avoidance as a moderator of the association between change in depressive symptoms and subsequent change in group cohesion. In general, however, there may be a lag in the synergistic unfolding of the relationship between symptoms and group cohesion (Roussos et al., 2018), whereby the impacts of growth in cohesion on symptom improvement is evident not at the subsequent week's session, but at a later session, and vice versa. Future research could test a more complex/extended lagged model of the cohesion-outcome reciprocal relationship in CID, as well as moderating effects of attachment. Replication with more socio-culturally and CID-diverse rehabilitation samples, and using more robust designs is warranted.

Clinical Implications

This is the first study to examine group cohesion and the cohesion-outcome association in a physical rehabilitation sample, and the findings suggest some clinical implications. The integrated nature of the group therapy which included elements of both ACT and CBT, as well as

the promotion of adaptive interpersonal interactions (i.e., process-based work), may have provided a menu of therapeutic components that patients could choose from (i.e., cognitive, acceptance-based, or interpersonal strategies). Patients may have relied on different components of the intervention, with those higher on attachment anxiety perhaps seeking more support from the group, and those higher on attachment avoidance adopting more self-reliant approaches. Because individuals higher on attachment avoidance may have been more sensitive to implicit demands for closeness in the group, they may have modulated their distress by withdrawing from interpersonal demands both as their depression lifted and as other group members became more vulnerable and made bids for closeness.

Findings may also suggest that the specific trajectory of group cohesion change over time in CID treatment may be a secondary phenomenon that occurs because of improving mood, and that this differs depending on level of attachment avoidance. Based on current results, clinicians could consider prioritizing symptom reduction early in treatment and then work to modulate interpersonal closeness depending on an individual's attachment state of mind. Clinicians may consider preparing individuals who are higher on attachment avoidance for the interpersonal aspect of the group intervention, and perhaps set explicit goals around gradual self-disclosure over time and supporting such patients to practice being more vulnerable (Tasca et al., 2021). Weekly assessment of symptoms and group cohesion is clinically useful to monitor treatment progress and interpersonal functioning within the individual group member and may allow clinicians to better respond to patient and group needs on a session-by-session basis, which can contribute to better treatment outcomes.

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Table 1

Participant Medical and Socio-Demographic Data

Indicator	*n*	%
Chronic illness or disability (Primary diagnosis)		
Mild acquired brain injury/Post-concussion syndrome	73	67.0
Neuro-muscular condition	23	21.1
Respiratory	5	4.6
Fibromyalgia	8	7.3
Ethnicity (self-identified)		
Asian and Middle Eastern origins	10	9.2
Black	3	2.8
Indigenous	1	0.9
Latin, Central, and South American origins	2	1.8
White	87	79.8
Multiple ethnicities	6	5.5
Education[a]		
Elementary school	1	0.9
High school	12	11.3
Some college/university	24	22.6
College/University/Postgraduate degree	69	65.1
Employment status[b]		
Working	17	15.7
Not working	91	84.3
Income (household)[c]		
Very low (less than $20k)	14	15.4
Low ($20,000 - $39,999)	25	27.5
Middle ($40,000 – $79,999)	27	29.7
High ($80,000 or more)	25	27.5
Living situation[b]		
Alone	34	31.5
Cohabitating (with partner/roommate/family)	71	65.7
Other	3	2.8
Relationship status[d]		
Single	39	37.5
In a relationship	65	62.5
Sexual orientation[e]		
Heterosexual	95	90.5
Gay/Lesbian/Bisexual	6	5.7
Another orientation	4	3.8

Note. Sample characteristics without data imputation. $N = 109$.

Number of participants that did not answer: [a]3; [b]1 [c]18; [d]5; [e]4.

Table 2

Means and Standard Deviations of Depression, Anxiety, and Group Cohesion Scores by Session

Session	Depression			Anxiety			Group Cohesion		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
1	90	13.95	5.10	88	11.33	5.16	80	3.73	0.81
2	101	13.75	5.22	93	10.89	4.60	98	3.77	0.76
3	100	12.45	5.10	98	10.56	4.86	96	4.00	0.75
4	88	12.55	5.31	86	10.12	4.57	83	4.20	0.89
5	93	12.35	5.52	93	10.61	5.36	85	4.17	0.79
6	93	12.08	5.40	90	9.63	4.75	85	4.19	0.79
7	97	11.60	5.47	96	9.72	4.75	77	4.32	1.00
8	92	11.69	5.49	90	9.63	5.32	82	4.37	0.80

Note. *M* = mean; *n* = total sample size per session; *SD* = standard deviation. Depression was assessed using the Patient Health Questionnaire-9. Anxiety was assessed using the Generalized Anxiety Disorder Scale-7. Group cohesion was assessed using the Group Climate Questionnaire-Short form's Engagement subscale.

Table 3

Fixed and Random Effects for the Longitudinal Changes in Progress and Process Outcomes, Obtained Through 3-level Hierarchically Nested Growth Models (Models 1a and 2a)

Y	Model	Pm	Coefficient	*t*	*df*	*p*	σ^2	R^2
	Base						5.62	
	Level 3: Intercept	γ_{000}	12.81	20.81	22	<.001		
	Unconditional growth						4.44	0.210
	Level 3: Slope	γ_{100}	-.29	-4.55	22	<.001		
PHQ	Unconditional growth with controls						4.31	
	Level 3: Slope	γ_{100}	-.28	-4.08	21	<.001		
	Conditional growth with controls						4.15	
	Level 3: Slope x ECR-Anx	γ_{110}	-0.03	-0.69	22	.498		
	Level 3: Slope x ECR-Avd	γ_{120}	0.01	0.38	22	.707		
	Base						6.11	
	Level 3: Intercept	γ_{000}	10.50	20.98	22	<.001		
	Unconditional growth						5.01	0.180
	Level 3: Slope	γ_{100}	-0.25	-3.92	22	<.001		
GAD	Unconditional growth with controls						4.80	
	Level 3: Slope	γ_{100}	-0.25	-3.84	21	<.001		
	Conditional growth with controls						4.70	
	Level 3: Slope x ECR-Anx	γ_{110}	-0.01	-0.35	22	.734		
	Level 3: Slope x ECR-Avd	γ_{120}	0.08	2.05	22	.053		
	Base						0.41	
	Level 3: Intercept	γ_{000}	4.13	41.71	19	<.001		
	Unconditional growth						0.28	0.317
	Level 3: Slope	γ_{100}	0.09	4.55	19	<.001		
GCQ	Unconditional growth with controls						0.27	
	Level 3: Slope	γ_{100}	0.10	5.64	18	<.001		
	Conditional growth with controls						0.26	
	Level 3: Slope x ECR-Anx	γ_{110}	0.005	0.60	19	.557		
	Level 3: Slope x ECR-Avd	γ_{120}	-0.02	-1.83	19	.084		

Note. ECR-Anx = Attachment anxiety; ECR-Avd = Attachment avoidance; GAD = anxiety; GCQ = group cohesion; PHQ = depression. Base model includes only the DV. Unconditional growth model includes only time (mean centred) as a level-1 predictor. Unconditional growth model with controls includes person-level baseline DV score at level-1 and group-level baseline DV score at level-3 (both grand-mean centred). Conditional growth model with controls (i.e.,

Model 2a in Appendix M) adds attachment insecurity dimensions at level-2 (grand-mean centred).

General Discussion

Models of adaptation to CID posit that an illness or disability leads to acute and ongoing illness stressors that induce cognitive, behavioural, and emotional responses that interact to influence adaptation to CID. Emotional symptoms such as depression and anxiety are common experiences in CID and are associated with greater disability and poor HRQoL (i.e., interfere with adaptation to CID). Most psychological treatments in CID are based on the principles of CBT or ACT, and tend to take a diagnosis-specific approach, that is, addressing one stressor (e.g., self-management, depression, anxiety) within one CID or one class of CID. Given the rising prevalence of CID multimorbidity and CID-physical-psychological comorbidity, as well as the increasing demand for psychological services in the wake of the COVID-19 pandemic, transdiagnostic approaches that target shared CID stressors and shared processes across emotional disorders are needed to better meet patient needs.

Despite attachment theory's relevance to understanding disease development, symptom maintenance, treatment outcomes, and group process, the role of attachment in CID is under-studied. Further, the group psychotherapy literature supports the transdiagnostic promotion of group therapeutic factors (e.g., focusing on group process, group cohesion) as a means of augmenting group interventions. Group process in the context of CID has not yet been examined, especially in transdiagnostic samples. Thus, treatment approaches for adults with comorbid CID and emotional symptoms might benefit from the integration of an attachment framework that can help understand individual differences in outcomes as well as the integration of process work to theory-specific approaches (e.g., CBT, ACT), to enhance therapeutic benefits.

The overall goals of this dissertation were to better understand the role of attachment in adaptation to CID, including group psychotherapy process and outcomes, and to examine

outcomes of an integrated, process-based ACT-CBT group therapy. Findings from this dissertation lend further support to the role of attachment in the development and treatment of adults with CID and emotional symptoms, provide proof-of-concept support for the intervention, and lend weight to transdiagnostic approaches in CID. Findings have implications for clinical practice, service delivery, and clinical training.

Brief Review of the Findings

Study One

Study one proposed and tested an attachment-based model of psychosocial adaptation to CID using baseline self-report psychometric data from a transdiagnostic-CID sample of adults receiving care at a tertiary care physical rehabilitation centre. The main objectives of the study were to test direct and indirect effects of attachment insecurity dimensions, coping, and self-efficacy on the outcome of HRQoL (i.e., adaptation). The indirect effects were of primary interest as they assessed key assumptions of the proposed model, that is: (1) higher avoidant coping, lower social coping, and lower health self-efficacy will mediate the relationship between attachment avoidance and HRQoL, and (2) higher social coping and lower health self-efficacy will mediate the relationship between attachment anxiety and HRQoL.

First, for direct effects, I found that (1) higher attachment avoidance was related to lower HRQoL, higher avoidant coping, and lower social coping; (2) higher attachment anxiety was related to greater social coping; (3) higher social coping was related to higher HRQoL; (4) higher avoidant coping was related to lower self-efficacy and lower HRQoL; and (5) higher self-efficacy was related to higher HRQoL. Next, for indirect effects, I found that higher avoidant coping and lower health self-efficacy mediated the relationship between attachment avoidance and HRQoL. That is, individuals with higher attachment avoidance disengage at the cognitive,

behavioural, and social/emotional levels in response to illness-related stress, and this has a negative impact on health self-efficacy and HRQoL. However, higher social coping and lower self-efficacy did not mediate the relationship between attachment anxiety and HRQoL.

These results suggest that individual differences in attachment insecurity dimensions may shape how someone responds to, and manages, CID-related stressors, and that the role of attachment in CID warrants further exploration. Findings suggest a clearer role for attachment avoidance in HRQoL in that individuals with higher attachment avoidance disengage at the cognitive, behavioural, and social/emotional levels in response to illness-related stress/threat, and this has a negative impact on health self-efficacy and HRQoL.

Study Two

Study two was a proof-of-concept group therapy outcome study of a process-based group psychotherapy intervention rooted in the principles of CBT and ACT. Multilevel modelling was used to: (1) examine treatment outcomes from pre- to post-treatment, and (2) assess if attachment insecurity dimensions predicted outcomes. I found that the intervention improved HRQoL (small effect size), depression (large effect size), anxiety (medium effect size), and self-efficacy (small effect size) at post-treatment. General psychological distress did not improve overall at post-treatment (approached significance with small effect size). I also used a reliable change index to assess clinically meaningful change in subsamples of patients who scored in the clinically impaired range on each outcome measure at pre-treatment. Most patients showed reliable improvement on measures of depression (51.8%), anxiety (51.7%), and self-efficacy (61.0%); many reliably improved on HRQoL (45.0%); and fewer improved on general psychological distress (23.7%). Many patients achieved reliable recovery on a measure of self-efficacy (46.3%); and a modest proportion on HRQoL (15.0%), depression (24.1%), anxiety (29.3%), and

general psychological distress (11.9%). For the second aim, testing attachment as a predictor of outcome, I found that higher pre-treatment anxious attachment was associated with lower anxiety, lower general psychological distress, and higher self-efficacy at post-treatment. Attachment avoidance was not a significant predictor of any outcome. Neither attachment dimension was associated with post-treatment HRQoL or depression outcomes.

These findings provide proof-of-concept support for the process-based ACT-CBT group intervention, as well as lend support to a transdiagnostic approach in CID. Although multilevel analyses indicated that many patients showed statistically significant improvement at post-treatment, and reliable change indices suggest clinically meaningful improvement for many patients, a longer course of treatment may be clinically indicated given that most were not recovered at post-treatment.

Study Three

Study three used multilevel modelling to assess: (1) change in psychological symptoms (i.e., depression and anxiety) and group cohesion across eight sessions of the group psychotherapy, (2) for a possible reciprocal symptom-cohesion relationship across eight sessions, and (3) if pre-treatment attachment insecurity dimensions moderated change in within-person session-by-session change in symptoms, cohesion, or in the reciprocal relationship between them.

I found that depression and anxiety symptoms decreased, and group cohesion increased across eight sessions of the group therapy. Pre-treatment attachment avoidance was a significant moderator of the association between within-person change in depression and subsequent session change in group cohesion across eight therapy sessions. That is, for individuals with lower pre-treatment attachment avoidance, a decrease in depression was associated with an increase in group cohesion at the subsequent session. Conversely, for individuals with higher pre-treatment

attachment avoidance, a decrease in depression was associated with a decrease in group cohesion at the subsequent session. Findings lend further support to transdiagnostic approaches in CID and suggest that an individual's specific trajectory of change in group cohesion may occur as a result of improving mood and is dependent on the individual's level of attachment avoidance.

Implications of the Process-Based ACT-CBT Intervention for Transdiagnostic CIDs

Results of the present dissertation provide preliminary support for the effectiveness of the process-based ACT-CBT group intervention for adults with CID and emotional symptoms. More specifically, studies two and three showed that patients improved on several outcomes from pre- to post-treatment (i.e., depression, anxiety, self-efficacy, and HRQoL) and from session-to-session (i.e., depression, anxiety). Although it is promising that most patients showed evidence of reliable improvement following the group intervention, the majority of patients did not recover. Several patient factors are known to complicate treatment, such as level of functional impairment and the presence of comorbid diagnoses, and so interpreting treatment outcome results in this context is important (Beutler et al., 2016). Given the high level of functional impairment and physical-psychological comorbidity in the present sample, as well as the short-term nature (8 sessions) of the intervention, it is not surprising that most patients did not recover at post-treatment.

Change takes time. Current findings suggest that a longer course of treatment is clinically indicated in individuals with CID and emotional symptoms. However, longer interventions can be difficult to implement in tertiary care settings where financial and wait-list pressures may be an administrative priority. Although brief interventions can be beneficial (Ecker et al., 2019) and are certainly attractive from a logistical and hospital-administration perspective, matching the treatment orientation, modality, and dose to each individual's level of need is important for

patient outcomes (Beutler et al., 2016). Other factors may contribute to the need for a longer course of treatment in CID, such as contending with CID-symptoms (e.g., brain fog, pain, headache, breathlessness) that interfere with patient participation and learning. One common strategy used in health and rehabilitation care to facilitate adaptation and improve well-being is activity pacing (Antcliff et al., 2022). Activity pacing involves supporting individuals to modulate times of overactivity and underactivity as a means of managing symptoms. Psychotherapy for individuals with CID should consider embodying the same paced philosophy and allow more time for consolidation and generalization of skills learned in the therapy group by increasing the length of treatment.

Transdiagnostic treatment approaches (as well as group therapy, discussed later) are effective (Barlow et al., 2017; Osma et al., 2021; Tasca et al., 2020) and may be a welcome antidote to help relieve long waitlists and allay institutional financial pressures (Aguilera-Martín et al., 2022). However, the implementation of such approaches can be challenging in healthcare contexts where services are organized by diagnosis. The setting of the current study, that is, a tertiary care physical rehabilitation centre, was conducive to a transdiagnostic approach as the psychology services are centralized and available to all rehabilitation outpatients at the institution and are not tied to a specific diagnosis or clinic. Virtual therapy, private practice, and community-based clinics are other settings where the implementation of transdiagnostic treatments for CID could be practical. Although transdiagnostic approaches do not need to replace diagnosis-specific treatments as both can be beneficial, interventions that target core mechanisms and common factors across CIDs may be a more robust and parsimonious way to effect change, however current dissertation results do not directly address this question empirically. Future research could consider comparing diagnosis-specific to transdiagnostic

approaches to answer this question, and to better understand treatment fit and when a diagnosis-specific versus transdiagnostic treatment approach might be beneficial (Beutler et al., 2016).

Implications for Understanding Adaptation to CID from an Attachment Perspective

In addition to the aforementioned patient factors, attachment style is another well-researched patient factor that contributes to treatment process and outcome (Levy et al., 2018). The results from the present dissertation suggest a role for attachment theory in our understanding of adaptation to CID, and in treatment/rehabilitation processes and outcomes. Numerous transdiagnostic (Hoyt & Stanton, 2018; Livneh, 2001, 2021; Moos & Holahan, 2007; Moss-Morris, 2013) and diagnosis-specific (e.g., Meredith et al., 2008; Walker et al., 2004) models of adjustment to CID exist, and there is considerable overlap between the models. In spite of several transdiagnostic models of adaptation, most research is diagnosis-specific which does not necessarily generalize across illnesses or disabilities, nor does it address the rising prevalence of multimorbidity in CID. The absence of a unifying and parsimonious model of adjustment in the rehabilitation literature limits future theory-driven research and contributes to the siloed care for individual conditions (Skou et al., 2022).

Attachment theory unites; it is an innate biopsychosocial system that is developmentally, transdiagnostically, socially, and culturally relevant (Cassidy & Shaver, 2016). As described in the introduction, attachment theory is relevant to the etiology and maintenance of physical health through neurobiological and interpersonal processes (Maunder & Hunter, 2001). Some chronic diseases have received more attention in terms of their association with attachment theory including diabetes (Brenk-Franz et al., 2017; Ciechanowski et al., 2004), chronic pain (Ciechanowski et al., 2003; Meredith et al., 2008), cardiac populations (Greenman et al., 2014; Heenan et al., 2020), and cancer (Petricone-Westwood et al., 2021). Together, these bodies of

research have helped lay the groundwork for ongoing research and for the development of treatment approaches, but in the absence of a unifying theory of adaptation, research across other CIDs lags behind. Incorporating attachment theory into existing models of adaptation can help provide a parsimonious and clinically relevant framework to help further develop research on adaptation to CID.

Existing models of adaptation to CID are underpinned by theories of self-regulation (Hagger & Orbell, 2021; Leventhal et al., 1984), stress appraisal, coping (Lazarus & Folkman, 1984), and self-efficacy (Bandura, 1977). Attachment integrates well with these theories and it can help explain individual differences in adaptation to CID via mediating mechanisms of affect regulation, stress appraisal, coping, and self-efficacy (Cassidy & Shaver, 2016). Results of the present dissertation partially support this idea, in particular direct and indirect effects in study one. Cross-sectional mediation results from study one suggest a clearer role of attachment avoidance whereby higher avoidant coping and lower self-efficacy mediated the relationship between higher levels of attachment avoidance and lower HRQoL. This implies that individuals with higher attachment avoidance disengage at the cognitive, behavioural, and affective levels in response to illness-related threat, and that this has a negative impact on adaptation to CID. Cross-sectional data provide insight into only a moment in time, and so examining change over time is important.

Implications for Group Outcomes and Process from an Attachment Perspective

Assessing attachment as a predictor of treatment outcomes, group process, and the reciprocal relationship between process and outcome, helps to further refine our understanding of attachment's role in group therapy for CID. Pre- to post-treatment multilevel analyses from study two favour a role of attachment anxiety in predicting outcomes. More specifically, study two

demonstrated that individuals with higher levels of baseline attachment anxiety seemed to benefit more from the intervention at post-treatment, as evidenced by more improvements in anxiety, general psychological distress, and self-efficacy. Study three did not support a similar conclusion as attachment anxiety was not related to session-by-session change. Although these results might seem contradictory, it is important to consider that the measurement framework differed between studies. Study two examined change from pre- to post-treatment, whereas study three examined change across eight sessions which occurred between the pre- and post-treatment measurement timepoints. Moreover, study three disaggregated between-person variance (variance related to overall differences between patients) from the within-person variance (variance within each patient across sessions), whereas study two did not. And so, this should be considered when interpreting the results (i.e., study three might provide more insight given the more robust measurement framework and data analytic strategy).

Current findings contradict meta-analytic research which suggests that higher attachment insecurity at pre-treatment predicts poorer treatment outcomes in individual psychotherapy (Levy et al., 2018). This discrepancy suggests that attachment's role in group psychotherapy outcomes may be more complex when compared to individual therapy, and certainly group psychotherapy research supports this notion (Tasca & Maxwell, 2021). Researchers have demonstrated that the theoretical orientation of the treatment plays a role in attachment's influence on outcomes, with individuals higher on attachment anxiety benefitting more from relationally-oriented treatment (McBride et al., 2006; Tasca, Ritchie, et al., 2006). This can help contextualize current findings. In study three, the average patient improved on measures of depression and anxiety, and attachment did not predict outcome. It is therefore possible that the integrated nature of the group intervention allowed patients to use whichever components of the therapy suited them best (i.e.,

process-based work, cognitive- and/or acceptance-based strategies), which can explain why attachment did not emerge as a significant predictor of session-by-session, within-person change.

As previously mentioned, group cohesion is a foundational therapeutic factor that augments the other group factors and contributes to positive outcomes. Group cohesion deepened across the eight sessions in study three, and this is consistent with past research (Burlingame et al., 2001). The rate of cohesion growth and overall mean level of engagement in the present dissertation is in line with social anxiety (Thorgeirsdottir et al., 2015) and eating disorder samples (Tasca, Balfour, et al., 2006). This adds to the validity of transdiagnostic treatment in CID as group cohesion in this transdiagnostic sample resembled that of other diagnosis-specific samples.

Attachment is relevant to group process. Research shows that levels of attachment anxiety and attachment avoidance impact the complex interactions in groups, such as group cohesion (Tasca & Maxwell, 2021). Some studies have found that higher attachment avoidance is related to lower group engagement (Illing et al., 2011), that higher attachment anxiety is related to higher levels of conflict and avoidance (Harel et al., 2011), or that no relationship exists between individual attachment insecurity and group climate (Kivlighan et al., 2012). Current findings add to the extant literature and showed that higher pre-treatment attachment anxiety, when averaged across all individuals (i.e., the between-persons effect in study three), was associated with higher group cohesion scores overall. Similar to Kivlighan et al., (2012), current findings do not support attachment insecurity as a predictor of within-person change in group cohesion (*although attachment avoidance approached significance as a predictor of change*). More research would help to further our understanding of attachment and group cohesion.

One way that cohesion contributes to change in groups is via the cohesion-outcome association (Burlingame et al., 2018; Lo Coco et al., 2022). The reciprocal cohesion-outcome relation (also called alliance-outcome) is well-documented in the individual therapy literature (Flückiger et al., 2018, 2020), and indicates a positive upward spiral of higher alliance/lower symptoms at one session that predicts lower symptoms/higher alliance at a subsequent session. Findings are more sparse and variable in the group psychotherapy literature, with some studies showing a positive reciprocal relationship (Obeid et al., 2018; Tasca & Lampard, 2012), and others showing a unidirectional association (Tasca et al., 2016). Results of the current dissertation did not support a reciprocal unfolding between symptoms of depression or anxiety and group cohesion in this CID sample. Some factors that may have contributed to the absence of a reciprocal relationship between cohesion and outcome include group size, theoretical orientation, or patient factors (Burlingame et al., 2018).

Overall, our understanding of patient factors that contribute to the reciprocal cohesion-outcome association is lacking. The current dissertation showed that attachment avoidance was an important patient factor. For individuals higher on attachment avoidance, a decrease in depression resulted in a decrease in group cohesion at the subsequent session, and this association was unidirectional. Conversely, for individuals lower on attachment avoidance, a decrease in depression resulted in an increase in group cohesion at the subsequent session, and this association was also unidirectional. As depressive symptoms lifted, individuals with lower attachment avoidance perceived the group as more cohesive and engaged, whereas individuals higher on attachment avoidance perceived the group as less cohesive and engaged. This is in line with past research that suggests that individuals higher on attachment avoidance may do better in groups with gradual self-disclosure (Tasca & Maxwell, 2021). As previously mentioned, perhaps

the integrated nature of the therapy allowed individuals with various attachment states of mind to benefit from the intervention in different ways, and as symptoms improved, enactment of the attachment system became more present as evidenced by group cohesion changing as a function of attachment avoidance. The present findings add to our growing understanding of the cohesion-outcome relationship and suggest that an individual's change in group cohesion in CID group therapy is secondary to improving mood and depends on attachment avoidance. Results highlight the value of continued examination of attachment as a moderator of the cohesion-outcome relationship.

Implications for Progress and Outcome Measurement, and Clinical Training

Routinely monitoring progress and outcomes using standardized psychometric measures is an integral part of clinical practice and training, and is related to improved patient outcomes (Boswell et al., 2015; Lutz et al., 2022). Findings of the current dissertation underscore the advantages of routine, session-by-session assessments over pre-post measurement, such as assessing more granular change, and the ability to answer more complex questions using more advanced analyses that more elegantly account for missing data (Lutz et al., 2022). In general, routine progress and outcome monitoring can augment clinical care in several ways. First, it can provide therapists with useful clinical information in real-time such as alerting the therapist to changes in symptoms, functioning, and cohesion/alliance. Second, it can improve the clinical decision-making process by providing objective (i.e., patient self-report) data to help inform treatment decisions. For instance, clinicians can better assess treatment response, or lack thereof, earlier in the treatment course, and adapt or augment treatment accordingly. Last, it can facilitate program evaluation endeavours and provide a spring-board for empirical assessment of research questions, which together, can be fed back to improve clinical care.

Although progress and outcome monitoring with feedback to the therapist is seen as helpful in practice (Dyason et al., 2020; Lutz et al., 2022), it is not frequently used in clinical practice (Jensen-Doss et al., 2018) or by psychology trainees in Canadian psychology graduate programs (Overington et al., 2015). Some of the most common barriers to implementation include insufficient knowledge and training, perceived burden on patients, concerns regarding additional work, time, and resources (Ionita et al., 2020; Jensen-Doss et al., 2018; Tasca et al., 2019). Although implementation can be challenging, the use of online assessment tools and a movement toward electronic medical records might help. The current dissertation relied on paper-and-pencil data collection and manual data entry without dedicated staffing support for the same. This instills hope for feasibility. As many centres move toward electronic medical records with patient-facing components of the medical record, more opportunities may arise for embedding automatic data collection and extraction into the charting system, which would help to integrate data-capture within clinical care, at least in some settings such as TOHRC.

Given the advantages of routine progress and outcome monitoring, as well as an ethical obligation to do so (Canadian Code of Ethics for Psychologists, 2017), training in this area is important. Offering training in various formats such as professional development opportunities from the governing body association, peer-to-peer training, and embedding training into psychology graduate programs could be helpful to increase uptake of regular progress and outcome monitoring (Ionita et al., 2020; Tasca et al., 2019). In settings with multidisciplinary teams, extra attention might need to be spent on training colleagues from various disciplines and increasing staff buy-in.

Limitations and Future Directions

Some limitations and recommendations for future directions have already been described in each of the three studies. Several additional suggestions for future work on adaptation to CID are included here.

First, future research should endeavour to include more diverse samples in order to advance inclusive health and rehabilitation care, and to better understand the impact of cultural, social, and systemic factors in CID. Like most research in CID, racial, ethnic, and sexual minority groups were underrepresented in our study. Beyond recruiting more diverse samples, researchers and clinicians should strive to better understand the role of minority status in CID. For example, Black middle-aged adults in the United States have higher levels of CID burden compared to their White counterparts, and Black adults reach multimorbidity of CIDs earlier than White adults (Quiñones et al., 2019). Sexual minority groups also suffer health and disability disparities compared to their cis-gendered and heterosexual counterparts (Eckstrand et al., 2017; Lick et al., 2013). Racial disparities in primary care physician speciality referrals disfavour Black and Hispanic patients compared to White patients (Landon et al., 2021), which can gatekeep access to specialized rehabilitation care. In addition to research with more diverse samples and understanding the impact of minority stress on CID, significant organizational and systemic change is needed in order to move toward equitable care.

Sexual minority groups also suffer health and disability disparities compared to their cis-gendered and heterosexual counterparts (Eckstrand et al., 2017; Lick et al., 2013). There is a dearth of research exploring the impact of gender differences in attachment style and how these interact to influence group therapy process and outcome. For example, one study found that male students reported lower levels of attachment anxiety and higher levels of attachment avoidance

when compared to female students, and higher attachment anxiety predicted increased psychotherapy use for male and female students, whereas higher attachment avoidance predicted decreased psychotherapy use for male students only (Weber et al., 2022). This may have implications for understanding group process, such as the development of group cohesion, and may also help to better understand group therapy uptake and drop-out rates. Results of the current dissertation are in line with Weber and colleagues' finding (2022) in that female gender was significantly correlated with higher levels of attachment anxiety (see Table 2 in study one). Future research could examine how various gender identities interact with attachment style to impact group process and outcome in CID.

Second*,* researchers should consider continued evaluation of the transdiagnostic process-based ACT-CBT group intervention for individuals living with CID, including its applicability to individuals living with long-COVID. Long-COVID, also called post-COVID syndrome, is an episodic health condition characterized by prolonged symptoms after an acute COVID-19 infection (Brown & O'Brien, 2021; Liu et al., 2021). Long-COVID symptoms are diverse and involve multiple organ systems including neurological, cardio-vascular, abdominal, and pulmonary (Cau et al., 2022; Lopez-Leon et al., 2021). Some commonly reported symptoms include fatigue, breathlessness, headache, anosmia, cough, sleep disturbances, chest pain, arthralgia, attention difficulties, and poorer overall mental health (Lopez-Leon et al., 2021; Malik et al., 2022). The multisystemic nature of long-COVID combined with high global prevalence rates of approximately 43% (Chen et al., 2022) further highlight the benefit of transdiagnostic approaches in rehabilitation care for CID.

Meta-analytic research shows that long-COVID is associated with clinically significant worsening in HRQoL, especially for patients who needed intensive care unit care during acute

infection and for those with fatigue (Malik et al., 2022). For individuals with CID, many of who have been disproportionately impacted by the pandemic (Kang et al., 2020; Park et al., 2022; Pettinicchio et al., 2021), long-COVID can lead to additional illness and disability stressors and burden. These stressors are further exacerbated for individuals from marginalized groups (Lund, 2020). Pre-existing psychological distress is associated with an increased risk of developing long-COVID and impairment after controlling for other variables such as age, sex, race, healthcare worker status, smoking, body mass index, and various other health conditions (i.e., diabetes, hypertension, high cholesterol, asthma, and cancer; Wang et al., 2022). This lends further support to treatment approaches that address physical and psychological components of CID. There are currently several registered clinical trial protocols examining various interventions for mental health, cognition, and psychological well-being in patients with long-COVID (Hawke et al., 2022). Of the eleven psychological intervention trials, five include self-management and psychoeducation approaches, three are based on principles of CBT or ACT, two on meditation, and one uses a software to enhance rehabilitation care. Most interventions are individual and one is group-based. None include attachment as a variable of interest. The present results may help to inform efforts to provide rehabilitation care to individuals living with long-COVID.

Third, researchers should consider the continued use of attachment theory as an overarching framework to help better understand adaptation to CID, including group process and outcomes. For example, ACT can help to increase acceptance and decrease avoidance of illness-related thoughts and feelings (Graham et al., 2016), and lower attachment avoidance may be related to higher levels of acceptance (Spidel et al., 2019). So, continuing to examine how attachment anxiety and attachment avoidance impact adaptation to CID via other mediating factors such as

acceptance of illness is important. Attachment is a putative risk factor for the development of physical and mental health symptoms, and so interventions that can help insecurely attached individuals (i.e., higher on attachment anxiety and/or attachment avoidance) move toward a more secure state of mind could be a fruitful avenue of future research in CID. Evaluating the effectiveness of therapeutic modalities beyond ACT and CBT is important. For example, attachment-based interventions such as Group Psychodynamic-Interpersonal Psychotherapy (Tasca et al., 2020) or Emotionally Focused Therapy (Johnson, 2019), can help individuals to better recognize how their attachment style impacts their adaptation to CID and are worthwhile areas for future exploration.

More research is needed to better understand how different attachment states of mind impact change processes in groups across various clinical presentations. Group cohesion is a salient common factor and predictor of positive group process and outcomes (Burlingame et al., 2018). Continuing to examine mechanisms by which group cohesion contributes to change, such as the session-by-session cohesion-outcome association, including moderators of this relationship could be helpful. Attachment was a moderator of the cohesion-outcome relationship in the present study, but other moderators should be examined as well. For example, meta-analytic research showed that group size moderates the cohesion-outcome relation, with a stronger correlation in moderately sized groups (five to nine members) as compared to groups larger that nine members (Burlingame et al., 2018). The theoretical orientation of the group and the leader impact the cohesion-outcome association. The association is strongest in interpersonally-oriented groups (r = .48), followed by psychodynamic (r = .27), and cognitive-behavioural/supportive/eclectic (r = .22; Burlingame et al., 2018). Examining other attachment factors, such as how an individual group member's attachment fits with their group's attachment (Kivlighan, Lo Coco, et al., 2017),

or how attachment interacts with different cohesion dimensions (e.g., member-leader) could shed light on the role of group composition and structure in predicting treatment outcomes in CID and other populations as well.

Fourth, the present group was offered in-person, however future studies could examine adapting the group to an online format. The COVID-19 pandemic resulted in major disruptions and changes to the provision of healthcare services, including an increase in virtual psychotherapy (Pierce et al., 2021). Adapting the current intervention to an online format may confer some advantages such as increasing uptake and accessibility of treatment for many CID patients by minimizing regional, financial, transportation, mobility, or symptom-related barriers. However, moving to an online format may have implications for group process and outcomes. For example, a systematic review identified that group cohesion may be slightly lower in online versus face-to-face groups (Gentry et al., 2019), and this could be partly due to group leaders' decreased ability to observe and respond to non-verbal communication, manage avoidance, or foster cohesion in the online environment (Gullo et al., 2022). More research is needed to better understand group process in online groups, and how process and outcomes may change depending on group size, theoretical orientation, or attachment style.

Conclusion

In conclusion, this dissertation highlights that attachment may be fundamental to our understanding of adaptation to CID, and therefore merits further investigation and consideration for inclusion in theoretical frameworks of adaptation to CID. Findings lend support to a group-based intervention to help decrease emotional distress and promote adaptation in a transdiagnostic sample of adults with CID. Results demonstrate the value of viewing adaptation to CID through an attachment lens. This stance can provide a more nuanced understanding of

how individuals may differentially respond to illness-related threats in the context of their CID, as well as a fuller appreciation of individual differences in group process and outcome. Results also underscore the importance of engaging in regular progress monitoring as this can help clinicians remain attuned to the needs of the patients and group-as-a-whole, and can help inform clinical decision-making. Overall, the present dissertation contributes to the CID, attachment, and group psychotherapy literatures and provides a springboard for future theory-driven research in CID.

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Appendix A

Consent Form

Participant Informed Consent Form

Title of Study: The Ottawa Hospital Rehabilitation Centre Clinical Psychology Outpatient Program: Outcome Evaluation of the Group Psychotherapy Program

Principal Investigator:
- Dr. Louise Balfour, Psychology, The Ottawa Hospital Rehabilitation Centre,
- Tel: 613-737-8037

Co-Investigators:
- Dr. Monique Lefebvre, The Ottawa Hospital Rehabilitation Centre, Danijela Maras, Ph.D. Candidate, School of Psychology, The University of Ottawa

Participation in this study is voluntary. Please read this Participant Informed Consent Form carefully before you decide if you would like to participate. Ask the study team as many questions as you like.

Why am I being given this form?

You are being asked to participate in this research study because you have been referred to the Clinical Psychology Outpatient Program at the Ottawa Hospital Rehabilitation Centre (TOHRC).

Why is this study being done?

The Clinical Psychology Outpatient Program at TOHRC is conducting this study to determine how well our program is working. You are being asked to help evaluate our services by providing information from questionnaires and your medical chart. This type of research is called program evaluation.

We estimate that 120 participants will be enrolled in the study.

What is expected of me?

As part of your regular clinical care, you will be asked to complete questionnaires about your mood and anxiety, your social relationships, your quality of life, and your satisfaction with the treatment you receive.

You will be asked to complete some of these questionnaires during your assessment appointment, during treatment, and after you finish treatment. The questionnaires you complete before and after treatment will take approximately 15 minutes each to complete, and will occur during regular appointments. The questionnaires you complete during treatment will take about 5 minutes to complete. You may skip any questions that make you uncomfortable or that you do not wish to answer.

Some information from your hospital medical records (e.g., your medical condition/disability, psychotropic medications, and other diagnoses) will be collected.

How long will I be involved in the study?
The entire study will last approximately 2 years. Your participation in the study will last as long as you are receiving treatment from the Clinical Psychology Outpatient Program at TOHRC.

What are the potential risks I may experience?
There are no serious risks associated with taking part in this research.

Questionnaires: You might find the questionnaires upsetting or distressing. You might not like all of the questions that you are asked. You do not have to answer any questions that make you uncomfortable. You can contact Dr. Louise Balfour to discuss your concerns.

Can I expect to benefit from participating in this research study?
You may not experience any direct benefit from participating in this study. Your participation may allow the researchers to understand how well the program is working and possibly improve it. This may benefit future patients at The Ottawa Hospital Rehabilitation Centre.

Do I have to participate? What alternatives do I have? If I agree now, can I change my mind and withdraw later?
Your participation in this study is voluntary. The alternative to this study is to not allow your information to be used to evaluate the Clinical Psychology Outpatient Program.

You may decide not to have your information used in this study, or to be in the study now, and then change your mind later without affecting the care or other services to which you are entitled or are presently receiving at this institution.

If you decide to withdraw, the study team will ask you if the information collected to date can be used for the study. You can decide if the study team can use the information that has already been collected or not. If you withdraw, the study team will no longer collect your personal health information for research purposes.

Will I be paid for my participation or will there be any additional costs to me?
You will not be compensated for taking part in the study.

How is my personal Information being protected?
- All information collected during your participation in this study will be identified with a unique study number, and will not contain information that identifies you, such as your name, address, etc.
- The link between your unique study number and your name and contact information will be stored securely and separately from your study records, and will not leave this site.
- Any documents leaving The Ottawa Hospital will contain only your unique study number. This includes publications or presentations resulting from this study.
- Information that identifies you will be released only if it is required by law.
- For audit purposes only, your original study records may be reviewed under the supervision of Dr. Louise Balfour's staff by representatives from:
    - The Ottawa Health Science Network Research Ethics Board (OHSN-REB),
    - The Ottawa Hospital Research Institute.
- Research records will be kept for 10 years, after this time they will be destroyed.

Will I be informed about any new information that might affect my decision to continue participating?

You will be told in a timely fashion of any new findings during the study that could affect your willingness to continue in the study. You may be asked to sign a new consent form.

Who do I contact if I have any further questions?

If you have any questions, please contact Dr. Louise Balfour at 613-737-8037.

The Ottawa Health Science Network Research Ethics Board (OHSN-REB) has reviewed the plans for this research study. The Board considers the ethical aspects of all research studies involving human participants at The Ottawa Hospital. If you have any questions about your rights as a study participant, you may contact the Chairperson at 613-798-5555, extension 16719.

The Ottawa Hospital Rehabilitation Centre Clinical Psychology Outpatient Program: Outcome Evaluation of the Group Psychotherapy Program

Consent to Participate in Research

- I understand that I am being asked to participate in a research study about evaluating The Ottawa Hospital Rehabilitation Centre Clinical Psychology Outpatient Program.
- This study was explained to me by _____.
- I have read, or someone has read to me, each page of this Participant Informed Consent Form.
- All of my questions have been answered to my satisfaction.
- If I decide later that I would like to withdraw my participation and/or consent from the study, I can do so at any time.
- I voluntarily agree to participate in this study.
- I will be given a copy of this signed Participant Informed Consent Form.

_____
Participant's Name (Please Print)

_____ _____
Participant's signature Date

Investigator or Delegate Statement

I have carefully explained the study to the study participant. To the best of my knowledge, the participant understands the nature, demands, risks and benefits involved in taking part in this study.

_____
Investigator/Delegate's Name (Please Print)

_____ _____
Investigator/Delegate's Signature Date

Appendix B

Participant Sociodemographic Questionnaire

1.	Age _____	☐ Prefer not to say		
2.	Biological sex	☐ Male	☐ Female	☐ Intersex	☐ Prefer not to say
3.	Ethnic background (*check all that apply*)	☐ Caucasian (White) ☐ Aboriginal ☐ Prefer not to say	☐ African Descent ☐ Hispanic Descent ☐ Other_____	☐ Asian Descent ☐ Middle Eastern Descent
4.	Were you born in Canada?	☐ No	☐ Yes	☐ Prefer not to say
		If *NO*, in what year did you move to Canada? _____		
5.	Level of education (*check the highest level of education completed*)	☐ Grades 1-8 ☐ College/University	☐ High School ☐ Postgraduate degree (e.g. MA, PhD)	☐ Some College/University ☐ Prefer not to say
6.	Employment status (*check all that apply*)	☐ Working: Full-time ☐ Disability ☐ Retired ☐ Prefer not to say	☐ Working: Part-time ☐ Sick leave ☐ Full Time Student	☐ Unemployed ☐ Homemaker/parenting ☐ Other_____
7.	Household income	☐ less than $20,000 ☐ $60,000 – 80,000 ☐ Prefer not to say	☐ $20,000 – 40,000 ☐ $80,000 – 100,000	☐ $40,000 – 60,000 ☐ more than $100,000
8.	Living status	☐ Alone ☐ With parents/family ☐ Prefer not to say	☐ With spouse/partner ☐ No permanent residence	☐ With roommate ☐ Other (e.g. Supportive housing)
9.	Do you have any dependent children?	☐ No	☐ Yes	☐ Prefer not to say
		If *YES*, are they currently living with you?		☐ No ☐ Yes
10.	Current relationship status	☐ Single ☐ Steady Partner ☐ Prefer not to say	☐ Casual dating ☐ Widowed	☐ Married ☐ Divorced
11.	Duration of current couple relationship	_____ (years) and _____(months)		☐ N/A
12.	Sexual orientation	☐ Heterosexual ☐ Bisexual ☐ Prefer not to say	☐ Gay/Lesbian ☐ Another gender identity:_____	
13.	Do you smoke tobacco	☐ Never smoked	☐ Ex-smoker	☐ Current	☐ Prefer not to say

cigarettes? smoker

If *CURRENT SMOKER*, how many tobacco cigarettes do you smoke per day?_____

14. Do you smoke e-cigarettes? (e.g. electronic cigarettes, vaping) ☐ Never smoked ☐ Ex-smoker ☐ Current smoker ☐ Prefer not to say

If *CURRENT SMOKER*, how many times do you use e-cigarettes/vapour per day?_____

15. Do you use medicinal marijuana (all preparations)? ☐ Yes ☐ No ☐ Prefer not to say

If *YES,* ☐ Prescribed by licensed provider ☐ Not prescribed ☐ Prefer not to say

16. Please check all drugs (not including alcohol) you have used in the past 12 months for recreational purposes: ☐ None ☐ Prefer not to say

- ☐ Cannabis/Marijuana (all preparations)
- ☐ MDMA (Ecstasy; E; Molly)
- ☐ Amphetamine (Speed)
- ☐ LSD (Acid)
- ☐ Ketamine (Special K)
- ☐ Ritalin (ADHD medications)
- ☐ Benzodiazepines (e.g. Ativan/lorazepam, Xanax/alprazolam, Valium/diazepam, Rivotril/clonazepam, etc.)
- ☐ Heroine
- ☐ Caffeinated energy drinks or Caffeine pills
- ☐ Cocaine, Crack cocaine
- ☐ Magic mushrooms
- ☐ Poppers (e.g. amyl nitrite, cyclohexyl nitrite, etc.)
- ☐ Opioids (e.g. codeine, fentanyl, hydrocodone, etc.)
- ☐ Nitrous oxide (Laughing gas, Whippets)
- ☐ Sniffing/inhaling/huffing (e.g. glue, paint, paint thinner, cleaning fluids, etc.)
- ☐ Others:_____

17. How often did you have a drink containing alcohol in the past 12 months? ☐ Never ☐ Monthly or less ☐ 2-4 times a month ☐ 2-3 times a week ☐ 4-5 times a week ☐ 6 or more times a week ☐ Prefer not to say

18. How many drinks did you have on a typical day when you were drinking in the past 12 months? ☐ 0 drinks ☐ 1-2 drinks ☐ 3-4 drinks ☐ 5-6 drinks ☐ 7-9 drinks ☐ 10 or more drinks ☐ Prefer not to say

19. How often did you have 6 or more drinks on one occasion in the past 12 months? ☐ Never ☐ Less than monthly ☐ Monthly ☐ Weekly ☐ Daily or almost daily ☐ Prefer not to say

20. Are you currently involved in any ongoing disputes related to your accident/injury? (e.g. legal issues, insurance) ☐ Not applicable ☐ No ☐ Yes ☐ Prefer not to say

21. What led you to be first referred to the rehabilitation centre? (*check all that* ☐ Medical diagnosis or physical disability ☐ Motor vehicle accident ☐ Difficult medical procedure ☐ Workplace accident

apply)	□ Accident, e.g. slip, fall,	□ Natural disaster	□ War, terrorism, political violence	□ Prefer not to say
	□ Other:_____			

Appendix C

Patient Health Questionnaire – 9 Items (PHQ-9)

Over the **last 2 weeks**, how often have you been bothered by any of the following problems? Use the scale at right as a basis for your answers.

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things.	0	1	2	3
2. Feeling down, depressed, or hopeless.	0	1	2	3
3. Trouble falling asleep, staying asleep or sleeping too much.	0	1	2	3
4. Feeling tired or having little energy.	0	1	2	3
5. Poor appetite or overeating.	0	1	2	3
6. Feeling bad about yourself, feeling that you are a failure, or feeling that you have let yourself or your family down.	0	1	2	3
7. Trouble concentrating on things such as reading the newspaper or watching television.	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed, or being so fidgety or restless that you have been moving around a lot more than usual.	0	1	2	3
9. Thinking that you would be better off dead, or that you want to hurt yourself in some way.	0	1	2	3

If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

☐ Not difficult at all ☐ Somewhat difficult ☐ Very difficult ☐ Extremely difficult

Appendix D

Generalized Anxiety Disorder Scale – 7 Items (GAD-7)

Over the **last 2 weeks**, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge.	0	1	2	3
2. Not being able to stop or control worrying.	0	1	2	3
3. Worrying too much about different things.	0	1	2	3
4. Trouble relaxing.	0	1	2	3
5. Being so restless that it is hard to sit still.	0	1	2	3
6. Becoming easily annoyed or irritable.	0	1	2	3
7. Feeling afraid as if something awful might happen.	0	1	2	3

Appendix E

The Outcome Questionnaire-45 (OQ-45)

We wish to learn more about difficulties that you may be experiencing in various aspects of your life (e.g., personal distress, relationships, and responsibilities). Looking back **over the last week, including today**, please help us understand how you have been feeling. For the purpose of this study, **work is defined as employment, school, housework, volunteer work, and so forth**. Please circle the number beside each statement that best describes your current situation.

	Never	Rarely	Sometimes	Frequently	Almost Always
1. I get along well with others.	0	1	2	3	4
2. I tire quickly.	0	1	2	3	4
3. I feel no interest in things.	0	1	2	3	4
4. I feel stressed at work (or school).	0	1	2	3	4
5. I blame myself for things.	0	1	2	3	4
6. I feel irritated.	0	1	2	3	4
7. I feel unhappy in my marriage/significant relationship.	0	1	2	3	4
8. I have thoughts of ending my life.	0	1	2	3	4
9. I feel weak.	0	1	2	3	4
10. I feel fearful.	0	1	2	3	4
11. After heavy drinking, I need a drink the next morning to get going.	0	1	2	3	4
12. I find my work/school satisfying.	0	1	2	3	4
13. I am a happy person.	0	1	2	3	4
14. I work/study too much.	0	1	2	3	4
15. I feel worthless.	0	1	2	3	4
16. I am concerned about family troubles.	0	1	2	3	4
17. I have an unfulfilling sex life.	0	1	2	3	4
18. I feel lonely.	0	1	2	3	4
19. I have frequent arguments.	0	1	2	3	4
20. I feel loved and wanted.	0	1	2	3	4
21. I enjoy my spare time.	0	1	2	3	4
22. I have difficulty concentrating.	0	1	2	3	4
23. I feel hopeless about the future.	0	1	2	3	4

Please continue circling the appropriate number that corresponds with how you have been feeling over this past week, including today.

	Never	Rarely	Sometimes	Frequently	Almost Always
24. I like myself.	0	1	2	3	4
25. Disturbing thoughts come into my mind that I cannot get rid of.	0	1	2	3	4
26. I feel annoyed by people who criticize my drinking (or drug use). (*If not applicable, check 'Never'*).	0	1	2	3	4

27. I have an upset stomach.	0	1	2	3	4
28. I am not working/studying as well as I used to.	0	1	2	3	4
29. My heart pounds too much.	0	1	2	3	4
30. I have trouble getting along with friends and acquaintances.	0	1	2	3	4
31. I am satisfied with my life.	0	1	2	3	4
32. I have trouble at work/school because of drinking or drug use. (*If not applicable, check 'Never'*).	0	1	2	3	4
33. I feel that something bad is going to happen.	0	1	2	3	4
34. I have sore muscles.	0	1	2	3	4
35. I feel afraid of open spaces, of driving, or being on buses, subways, and so forth.	0	1	2	3	4
36. I feel nervous.	0	1	2	3	4
37. I feel my love relationships are full and complete.	0	1	2	3	4
38. I feel that I am not doing well at work/school.	0	1	2	3	4
39. I have too many disagreements at work/school.	0	1	2	3	4
40. I feel something is wrong with my mind.	0	1	2	3	4
41. I have trouble falling asleep or staying asleep.	0	1	2	3	4
42. I feel blue.	0	1	2	3	4
43. I am satisfied with my relationship with others.	0	1	2	3	4
44. I feel angry enough at work/school to do something I might regret.	0	1	2	3	4
45. I have headaches.	0	1	2	3	4

Appendix F

The Functional Assessment of Cancer Treatment - General (FACT-G)

Below is a list of statements that other people with your illness have said are important**. Please circle or mark one number per line to indicate your response as it applies to the past 7 days.**

	PHYSICAL WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GP1	I have a lack of energy	0	1	2	3	4
GP2	I have nausea	0	1	2	3	4
GP3	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
GP4	I have pain	0	1	2	3	4
GP5	I am bothered by side effects of treatment	0	1	2	3	4
GP6	I feel ill	0	1	2	3	4
GP7	I am forced to spend time in bed	0	1	2	3	4

	SOCIAL/FAMILY WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GS1	I feel close to my friends	0	1	2	3	4
GS2	I get emotional support from my family	0	1	2	3	4
GS3	I get support from my friends	0	1	2	3	4
GS4	My family has accepted my illness	0	1	2	3	4
GS5	I am satisfied with family communication about my illness	0	1	2	3	4

GS6	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
Q1	*Regardless of your current level of sexual activity, please answer the following question. If you prefer not to answer it, please mark this box* ☐ *and go to the next section.*					
GS7	I am satisfied with my sex life	0	1	2	3	4

Please circle or mark one number per line to indicate your response as it applies to the <u>past 7 days</u>.

	EMOTIONAL WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GE1	I feel sad	0	1	2	3	4
GE2	I am satisfied with how I am coping with my illness	0	1	2	3	4
GE3	I am losing hope in the fight against my illness	0	1	2	3	4
GE4	I feel nervous	0	1	2	3	4
GE5	I worry about dying	0	1	2	3	4
GE6	I worry that my condition will get worse	0	1	2	3	4

	FUNCTIONAL WELL-BEING	**Not at all**	**A little bit**	**Some-what**	**Quite a bit**	**Very much**
GF1	I am able to work (include work at home)	0	1	2	3	4
GF2	My work (include work at home) is fulfilling	0	1	2	3	4
GF3	I am able to enjoy life	0	1	2	3	4

GF4	I have accepted my illness	0	1	2	3	4
GF5	I am sleeping well	0	1	2	3	4
GF6	I am enjoying the things I usually do for fun	0	1	2	3	4
GF7	I am content with the quality of my life right now	0	1	2	3	4

Appendix G

The General Self-Efficacy Scale (GSES)

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough.	☐	☐	☐	☐
2. If someone opposes me, I can find the means and ways to get what I want.	☐	☐	☐	☐
3. It is easy for me to stick to my aims and accomplish my goals.	☐	☐	☐	☐
4. I am confident that I could deal efficiently with unexpected events.	☐	☐	☐	☐
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	☐	☐	☐	☐
6. I can solve most problems if I invest the necessary effort.	☐	☐	☐	☐
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	☐	☐	☐	☐
8. When I am confronted with a problem, I can usually find several solutions.	☐	☐	☐	☐
9. If I am in trouble, I can usually think of a solution.	☐	☐	☐	☐
10. I can usually handle whatever comes my way.	☐	☐	☐	☐

Appendix H

The Self-Efficacy for Managing Chronic Disease Scale (SEMCD)

We would like to know how confident you are in doing certain activities. For each of the following questions, please circle the number that corresponds to your confidence that you can do the tasks regularly at the present time.

How confident are you that you can……

1. …keep the fatigue caused by your medical condition from interfering with the things you want to do?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident
2. …keep the physical discomfort or pain of your medical condition from interfering with the things you want to do?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident
3. …keep the emotional distress caused by your medical condition from interfering with the things you want to do?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident
4. …keep any other symptoms or health problems you have from interfering with the things you want to do?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident
5. …do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident
6. …do things other than just taking medication to reduce how much your medical condition affects your everyday life?	not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

Appendix I

The Brief Coping Orientations to Problems Experienced Scale (Brief COPE)

INSTRUCTIONS: We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when *you* experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you *usually* do when you are under a lot of stress.

Then respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item *separately in your mind from each other item.* Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer *every* item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU – not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1	2	3	4
I usually don't do this at all	**I usually do this a little bit**	**I usually do this a medium amount**	**I usually do this a lot**

1. I've been concentrating my efforts on doing something about the situation I'm in.	1	2	3	4
2. I've been trying to come up with a strategy about what to do.	1	2	3	4
3. I've been trying to see it in a different light, to make it seem more positive.	1	2	3	4
4. I've been accepting the reality of the fact that it has happened.	1	2	3	4
5. I've been making jokes about it.	1	2	3	4
6. I've been trying to find comfort in my religion or spiritual beliefs.	1	2	3	4
7. I've been getting emotional support from others.	1	2	3	4
8. I've been trying to get advice or help from other people about what to do.	1	2	3	4
9. I've been turning to work or other activities to take my mind off things.	1	2	3	4
10. I've been saying to myself "this isn't real."	1	2	3	4
11. I've been saying things to let my unpleasant feelings escape.	1	2	3	4
12. I've been using alcohol or other drugs to make myself feel better.	1	2	3	4

1	2	3	4
I usually <u>don't</u> do this <u>at all</u>	**I usually do this <u>a little bit</u>**	**I usually do this a <u>medium amount</u>**	**I usually do this <u>a lot</u>**

13. I've been giving up trying to deal with it.	1	2	3	4
14. I've been criticizing myself.	1	2	3	4
15. I've been learning to live with it.	1	2	3	4
16. I've been taking action to try to make the situation better.	1	2	3	4
17. I've been thinking hard about what steps to take.	1	2	3	4
18. I've been looking for something good in what is happening.	1	2	3	4
19. I've been making fun of the situation.	1	2	3	4
20. I've been praying or meditating.	1	2	3	4
21. I've been getting comfort and understanding from someone.	1	2	3	4
22. I've been getting help and advice from other people.	1	2	3	4
23. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	1	2	3	4
24. I've been refusing to believe that it has happened.	1	2	3	4
25. I've been expressing my negative feelings.	1	2	3	4
26. I've been using alcohol or other drugs to help me get through it.	1	2	3	4
27. I've been giving up the attempt to cope.	1	2	3	4
28. I've been blaming myself for things that happened.	1	2	3	4

Appendix J

Experiences in Close Relationships Scale – Short Form (ECR-SF)

Instructions: The following statements concern how you feel in your relationships with people you date or your intimate partner(s). We are interested in how you generally experience relationships, not just in what is happening with your current intimate partners or dating relationships. If you are not currently dating or in a relationship with an intimate partner(s), answer these questions with respect to a former intimate partner(s) or dating relationship(s). Respond to each statement by indicating how much you agree or disagree with it.

Mark your answer using the following rating scale:

1	2	3	4	5	6	7
Strongly Disagree	**Disagree**	**Slightly Disagree**	**Neutral**	**Slightly Agree**	**Agree**	**Strongly Agree**

1.	It helps to turn to my partner(s) in times of need.	1	2	3	4	5	6	7
2.	I need a lot of reassurance that I am loved by my partner(s).	1	2	3	4	5	6	7
3.	I want to get close to my partner(s), but I keep pulling back.	1	2	3	4	5	6	7
4.	I find that my partner(s) don't want to get as close as I would like.	1	2	3	4	5	6	7
5.	I turn to my partner(s) for many things, including comfort and reassurance.	1	2	3	4	5	6	7
6.	My desire to be very close sometimes scares people away.	1	2	3	4	5	6	7
7.	I try to avoid getting too close to my partner(s).	1	2	3	4	5	6	7
8.	I do not often worry about being abandoned.	1	2	3	4	5	6	7
9.	I usually discuss my problems and concerns with my partner(s).	1	2	3	4	5	6	7
10.	I get frustrated if my partner(s) are not available when I need them.	1	2	3	4	5	6	7
11.	I am nervous when partner(s) get too close to me.	1	2	3	4	5	6	7
12.	I worry about my partner(s) won't care about me as much as I care about them.	1	2	3	4	5	6	7

Appendix K

The Group Climate Questionnaire – Short Form (GCQ-S)

Instructions: Read each statement carefully and try to think of the group as a whole.

Using the Rating Scale as a guide, circle the number for each statement that best describes the group during today's session.

Please mark only ONE answer for each statement.

	0 = Not at all	1 = A little bit	2 = Somewhat	3 = Moderately	4 = Quite a lot	5 = A great deal	6 = Extremely
1. The members liked and cared about each other.	0	1	2	3	4	5	6
2. The members tried to understand why they do the things they do, tried to reason it out.	0	1	2	3	4	5	6
3. The members avoided looking at important issues going on between themselves.	0	1	2	3	4	5	6
4. The members felt what was happening was important and there was a sense of participation.	0	1	2	3	4	5	6
5. The members depended on the group leader(s) for direction.	0	1	2	3	4	5	6
6. There was friction and anger between members.	0	1	2	3	4	5	6
7. The members were distant and withdrawn from each other.	0	1	2	3	4	5	6
8. The members challenged and confronted each other in their efforts to sort things out.	0	1	2	3	4	5	6
9. The members appeared to do things the way they thought would be acceptable to the group.	0	1	2	3	4	5	6
10. The members rejected and disrupted each other.	0	1	2	3	4	5	6
11. The members revealed sensitive personal information or feelings.	0	1	2	3	4	5	6
12. The members appeared tense and anxious.	0	1	2	3	4	5	6

Appendix L

Study Two Supplemental Materials

Model 1

Three-Level Random Effects Model Used to Calculate the Intraclass Correlation Coefficient

Level-1 Model

$$Y_{tij} = \pi_{0ij} + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + r_{0ij}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + u_{00j}$$

Note. Y = Scores on measures of health-related quality of life, depression, anxiety, general psychological distress, and general self-efficacy.

The following equation was used to calculate the ICC at baseline for all outcome variables: $\rho = \tau_{00j}/(\tau_{00j} + \tau_{0ij} + \sigma^2)$, or the ratio of between-group variance and total variance (where total variance = between-group variance + between-individual variance + within-individual variance).

Model 2

Three-Level Random Effects Model Assessing Change in Treatment Outcome Variables Across Time (Hypotheses 1 to 3)

Level-1 Model

$$OUTCOME_{tij} = \pi_{0ij} + \pi_{1ij}*(TIME_{tij}) + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + r_{0ij}$$
$$\pi_{1ij} = \beta_{10j}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + u_{00j}$$
$$\beta_{10j} = \gamma_{100}$$

Note. Time modelled at level-1, person modelled at level-2, and group modelled at level-3. Time was coded as 0 and 1 and was uncentred.

Model 3

Two-Level Random Effects Model Assessing Predictors of Post-Treatment Scores After Controlling for Pre-Treatment Scores (Exploratory Analyses Related to Attachment Anxiety and Attachment Avoidance)

Level-1 Model

$$PHQpost_{ij} = \beta_{0j} + \beta_{1j}*(PHQpre_{ij}) + \beta_{2j}*(ECRANXpre_{ij}) + \beta_{3j}*(ECRAVOpre_{ij}) + r_{ij}$$

Level-2 Model

$$\beta_{0j} = \gamma_{00} + u_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$

Note. Person modelled at level-1 and group modelled at level-2. All predictors were grand-mean centred.

Table L

Bivariate Correlations of Variables of Interest at Baseline

	1	2	3	4	5	6
1. Attachment anxiety	-					
2. Attachment avoidance	.411**	-				
3. General self-efficacy	-.062	-.069	-			
4. Depression	.072	.243*	-.387**	-		
5. Anxiety	.095	.160	-.267**	.508**	-	
6. Psychological distress	.358**	.399**	-.554**	.723**	.662**	-
7. HRQoL	-.312**	-.371**	.429**	-.694**	-.515**	-.752**

Note. N = 79 to 109; HRQoL = health-related quality of life.

*$p < .05$; ** $p < .01$.

Appendix M

Study Three Supplemental Materials

Model 1a

Three-Level Growth Model Assessing Change in Progress and Process Outcome Variables Across Eight Weeks (Hypotheses 1 and 2)

Level-1 Model

$$DV_{tij} = \pi_{0ij} + \pi_{1ij}*(TIME_{tij}) + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + \beta_{01j}*(WEEK1score_{ij}) + r_{0ij}$$
$$\pi_{1ij} = \beta_{10j} + \beta_{11j}*(WEEK1score_{ij}) + r_{1ij}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + \gamma_{001}(WEEK1group_{j}) + u_{00j}$$
$$\beta_{01j} = \gamma_{010} + u_{01j}$$
$$\beta_{10j} = \gamma_{100} + \gamma_{101}(WEEK1group_{j}) + u_{10j}$$
$$\beta_{11j} = \gamma_{110} + u_{11j}$$

Note. Time was modelled at level-1, between-person was modelled at level-2, and between-group was modelled at level-3. Time was mean-centred, WEEK1score (person-level baseline DV score) and WEEK1group (group average baseline DV score) were grand-mean centred. Dependent variables (DVs) included depression (PHQ-9), anxiety (GAD-7), and group cohesion (GCQ-S-Engagement).

Model 1b

Three-Level Time-Lagged Covariate Model Assessing the Reciprocal Relationship Between Psychological Symptoms and Group Cohesion Across Eight Weeks (Exploratory Analyses)

Level-1 Model

$$DV_{tij} = \pi_{0ij} + \pi_{1ij}*(prev\_DV_{tij}) + \pi_{2ij}*(IV\_residual_{tij}) + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + \beta_{01j}*(IV\_intercept_{ij}) + r_{0ij}$$
$$\pi_{1ij} = \beta_{10j} + r_{1ij}$$
$$\pi_{2ij} = \beta_{20j} + r_{2ij}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + u_{00j}$$
$$\beta_{01j} = \gamma_{010} + u_{01j}$$
$$\beta_{10j} = \gamma_{100} + u_{10j}$$
$$\beta_{20j} = \gamma_{200} + u_{20j}$$

Note. Within-person effects modelled at level-1, between-person effects modelled at level-2, and between-group effects modelled at level-3. Previous session score on the dependent variable (prev_DV) was group-mean centred, within-person effects of the independent variable (IV_residual) was mean-centred, and between-person effects of the independent variable (IV_intercept) was grand-mean centred. When the dependent variable (DV) was depression (PHQ-9) or anxiety (GAD-7), then the independent variable (IV) was group cohesion (GCQ-S-Engagement). When the dependent variable (DV) was group cohesion (GCQ-S-Engagement), then the independent variable (IV) was either depression (PHQ-9) or anxiety (GAD-7).

Model 2a

Three-Level Growth Model Assessing Attachment Insecurity Dimensions as Predictors of Change in Progress (Depression and Anxiety) and Process (Group Cohesion) Outcome Variables Across Eight Weeks (Exploratory Analyses)

Level-1 Model

$$DV_{tij} = \pi_{0ij} + \pi_{1ij}*(TIME_{tij}) + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + \beta_{01j}*(WEEK1score_{ij}) + \beta_{02j}*(ECR.ANX_{ij}) + \beta_{03j}*(ECR.AVO_{ij}) + r_{0ij}$$
$$\pi_{1ij} = \beta_{10j} + \beta_{11j}*(WEEK1score_{ij}) + \beta_{12j}*(ECR.ANX_{ij}) + \beta_{13j}*(ECR.AVO_{ij}) + r_{1ij}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + \gamma_{001}(WEEK1group_{j}) + u_{00j}$$
$$\beta_{01j} = \gamma_{010} + u_{01j}$$
$$\beta_{02j} = \gamma_{020} + u_{02j}$$
$$\beta_{03j} = \gamma_{030} + u_{03j}$$
$$\beta_{10j} = \gamma_{100} + \gamma_{101}(WEEK1group_{j}) + u_{10j}$$
$$\beta_{11j} = \gamma_{110} + u_{11j}$$
$$\beta_{12j} = \gamma_{120} + u_{12j}$$
$$\beta_{13j} = \gamma_{130} + u_{13j}$$

Note. Time was modelled at level-1, between-persons was modelled at level-2, and between-group was modelled at level-3. Time was mean-centred, WEEK1score refers to the person-level baseline DV score, ECR.ANX (attachment anxiety), ECR.AVO (attachment avoidance), and WEEK1group (group average baseline DV score) were grand-mean centred. Dependent variables (DVs) included depression (PHQ-9), anxiety (GAD-7), and group cohesion (GCQ-S-Engagement).

Model 2b

Three-Level Time-Lagged Covariate Model Assessing the Moderating Effect of Attachment Insecurity Dimensions on the Reciprocal Relationship Between Psychological Symptoms and Group Cohesion Across Eight Weeks (Exploratory Analyses)

Level-1 Model

$$DV_{tij} = \pi_{0ij} + \pi_{1ij}*(IV\_residual_{tij}) + \pi_{2ij}*(prev\_DV_{tij}) + e_{tij}$$

Level-2 Model

$$\pi_{0ij} = \beta_{00j} + \beta_{01j}*(ECR.ANX_{ij}) + \beta_{02j}*(ECR.AVO_{ij}) + \beta_{03j}*(IV\_intercept_{ij}) + r_{0ij}$$
$$\pi_{1ij} = \beta_{10j} + \beta_{11j}*(ECR.ANX_{ij}) + \beta_{12j}*(ECR.AVO_{ij}) + r_{1ij}$$
$$\pi_{2ij} = \beta_{20j} + r_{2ij}$$

Level-3 Model

$$\beta_{00j} = \gamma_{000} + u_{00j}$$
$$\beta_{01j} = \gamma_{010} + u_{01j}$$
$$\beta_{02j} = \gamma_{020} + u_{02j}$$
$$\beta_{03j} = \gamma_{030} + u_{03j}$$
$$\beta_{10j} = \gamma_{100} + u_{10j}$$
$$\beta_{11j} = \gamma_{110} + u_{11j}$$
$$\beta_{12j} = \gamma_{120} + u_{12j}$$
$$\beta_{20j} = \gamma_{200} + u_{20j}$$

Note. Within-person effects modelled at level-1, between-person effects modelled at level-2, and group-effects modelled at level-3. Previous session score on the dependent variable (prev_DV) was group-mean centred, within-person effects of the independent variable (IV_residual) was mean-centred, ECR.ANX (attachment anxiety) and ECR.AVO (attachment avoidance) were uncentred, and between-person effects of the independent variable (IV_intercept) was grand-mean centred. When the dependent variable (DV) was depression (PHQ-9) or anxiety (GAD-7), then the independent variable (IV) was group cohesion (GCQ-S-Engagement). When the dependent variable (DV) was group cohesion (GCQ-S-Engagement), then the independent variable (IV) was either depression (PHQ-9) or anxiety (GAD-7).