EVALUATING THE PARENT ADOLESCENT COMMUNICATION TOOLKIT: USABILITY, MEASURE ASSESSMENT AND PRELIMINARY CONTENT EFFECTIVENESS

by

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ABSTRACT

This study aimed to assess the usability and preliminary effectiveness of the Parent-Adolescent Communication Toolkit (PACT), an online intervention designed to improve parents' communication with their adolescents. The concurrent criterion validity of a scale entitled the IWK-Parent Adolescent Communication Checklist (IWK-PACC) and the differences between two types of PACT skill module delivery styles (sequential and unrestricted module access) were examined. Usability ratings were high and parent feedback was positive. The sequential module access groups rated the PACT content higher and completed more content than the unrestricted chapter access group, indicating support for the PACT sequential access design. The IWK-PACC was moderately correlated with an established communication scale and indicated validity. Parent mean post-test communication scores were significantly higher than pre-test scores. No significant differences were detected for adolescent participants. Findings suggest that PACT has potential to improve parent-adolescent communication but further effectiveness assessment is required before dissemination of PACT occurs.

LIST OF ABBREVIATIONS USED

PACT	Parent-Adolescent Communication Toolkit
IWK-PACC	IWK-Parent Adolescent Communication Checklist
IRIS	Intelligent Research Innovation Software
DASS-21	Depression Anxiety Stress Scale-21
PACS	Parent-Adolescent Communication Scale
PHWSUQ	Perceived Health and Website Usability Questionnaire
RCT	Randomized Control Trial
BCA	Building Closeness and Admiration
RRC	Reducing and Repairing Conflict
IC	Increasing Conflict

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CHAPTER 1 INTRODUCTION

Parent-adolescent conflict is common (Montemayor, 1983). When parents communicate negatively with their adolescents, it can adversely affect the relationship. Poor parent-adolescent communication is associated with detrimental parent and adolescent health outcomes and can impact the choices an adolescent makes (Resnick, 1997). Despite the importance of communication at this stage of child development, there are few accessible interventions that help parents improve the relationship with their adolescent. The overall purpose of this study is to further develop and improve the Parent-Adolescent Communication Toolkit (PACT). PACT is an online parenting intervention that teaches strategies to improve communication between parents and adolescent. The toolkit is modeled from the relationship repair strategies developed by John Gottman (Gottman & Ryan, 2004; Gottman & Silver, 1999; Gottman & DeClaire, 2001). This study was necessary for the development of the PACT project before the effects of the intervention could be tested in a randomized clinical trial. The long-term goal for PACT is that it will be available as a public health intervention. Although prior content usability assessment had occurred, the intervention web based delivery system and content modifications had not been assessed.

Easy access to these interventions and the intervention relevance in addressing parent concerns is crucial. Both easy access to interventions and relevance of the intervention information can help ensure maximum intervention effectiveness and low participant attrition rates (Park & Choi, 2009). Distance therapy interventions such as teletherapy (therapy via the telephone) and bibliotherapy (therapy via books) have been used to increase the accessibility of mental health interventions. The PACT project is important given the innovative nature of the

intervention, and the potential it has to improve parent-adolescent relationships as a communication tool. Further assessment of website usability and a pilot test of the content effectiveness was required to determine preliminary outcomes of the PACT intervention on parent-adolescent communication.

Relevance of Parent-Adolescent Communication to Health Promotion

Health promotion is defined by the World Health Organization, in the Ottawa Charter for Health Promotion (1986) as,

> … the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well-being.

This definition emphasizes both the need for personal and institutional public health strategies that promote the health of individuals in relation to their specific demands. The WHO definition of health promotion encompasses the importance of the social determinants of health and describes the global requirements for positive health conditions. Health is not defined as the absence of illness, but as a resource to increase the overall quality of life across populations (World Health Organization, 1986). This definition is inclusive, even potentially insistent, of interventions that enable the promotion of physical, social or mental well-being. Interventions such as PACT aim to achieve these goals, through the use of evidence based and accessible health information.

This study corresponds with the nature of the WHO aspirations of the health promotion discipline by providing mechanisms to facilitate individual behavioural change of parents within a family unit via the PACT intervention. The current study aimed to assess the effectiveness of the PACT intervention to provide an accessible, evidence based approach to improving parental communication skills. These behavioural change strategies can potentially produce constructive environmental modification within families by improving parenting practices. This study attempted to assess an effective means to secure overall enhancement of adolescent mental health outcomes and general well being.

Knowledge translation strategies are a key component of the health promotion discipline and are used to promote evidenced decision making to increase positive parent-adolescent communication within families. PACT aims to improve family relationships through the dissemination of effective and highly accessible information to parents of adolescents. The intervention allows parents to access relevant solutions to potentially difficult problems and encourages positive behavioural changes for parents, in a behavioural approach to health promotion. This approach suggests that modifying specific, individual behaviours to promote peak health and wellness through the use of health education, health communication and behavioural modification (Cohen, 2012). PACT offers support to parents who want to take the initiative to increase communication within their family and empowers them to foster healthy parent-adolescent relationships.

The information provided by PACT and assessed in this study might mitigate the impact of poor communication and prevent parent-adolescent relationships from further deteriorating. The intervention presents parents with information that may encourage the modification of parenting behaviours to improve the overall health of family relationships. Dissemination of the

study in the parental behavioural intervention literature and knowledge gained from the findings of the study may further aid the development of innovative parenting programs and alternative approaches to parent-adolescent communication. The PACT project will continue empirical testing and will eventually be offered to the public to aid parents to strengthen communication with their adolescents. Dissemination could be delivered through public health departments and via the Strongest Families Institute (www.strongestfamilies.com) a not-for-profit organization dedicated to spreading effective distance interventions across Canada.

CHAPTER 2 LITERATURE REVIEW

This chapter will review relevant literature on the importance of parent-adolescent communication in reducing conflict in parent-adolescent dyads. The affect of conflict on adolescent outcomes will be discussed as well as how perceptions of conflict can vary within the dyad. The impact monitoring has on this conflict is reviewed. Literature discussing communication and parenting interventions, specifically those with an online component, are reviewed. Research by the parenting institution, Strongest Families, and the relationship therapy of John Gottman are outlined, as both were important to the conceptual development of PACT. The chapter concludes with a description of the PACT intervention, including prior research on PACT and an outline of the research objectives for this study.

Benefits of Parent-Adolescent Communication

The relationship that parents maintain with their adolescents is a crucial factor in the growth and development of those adolescents. Adolescence can be a potentially difficult time for both parents and adolescents as the needs for youth are unique from alternative developmental stages. Due to these demands of adolescents, it is crucial to have specialized mental health services to meet these unique needs of adolescents (Sawyer, Proimos, & Towns, 2010). Not only are adolescent bodies changing as they experience puberty, but the cognitive development of teenagers is also developing (Casey, Jones & Hare, 2008). Adolescence marks a time of increased responsibility and challenging of previously established freedoms. It marks the developmental stages of increased likelihood of engaging in sexual activity, substance use, and risk-taking behaviours as youth began to explore their own self-identities and test limits with authority figures (Martin, Kelly, Rayens, Brogli, Brrenzel, Smith, & Omar, 2002). Adolescents may ‘act out’ in new ways or more frequently as they navigate new social responsibilities such as

increased emotion regulation and cope with new problems (Silk, Steinberg, & Sheffield Morris, 2003). Previously avid interests may change and adolescents may begin to slowly focus more on their future and adulthood responsibilities. Adolescents can experience a range of mental health concerns, as they attempt to discover their personal identities, and develop their social relationships such as those with parents, peers and intimate partners (Paley, Cogner, & Harold, 2000).

The strength of the parent-adolescent relationship can impact the quality of the adolescent's decisions regarding sex (Wilson & Donenberg, 2004), education (Hill et al., 2004), alcohol use (Chaplin et al., 2012), tobacco use (Tilson, Mcbride, Lipkus & Catalano, 2004), and a wide range of other health related behaviour. A strong relationship between a parent and adolescent can encourage positive decision making for the adolescent and protects adolescents from emotional distress, suicidal thoughts and violence (Resnick, 1997). This section will review the effects of positive parenting practices and the importance of parent training.

The effects of parenting communication can influence future adolescent health behaviours and choices. Parent-adolescent communication is critical to creating and maintaining a positive bond that will affect the long term well being of adolescents. It is the quality and the frequency of communication that positively impacts youth as demonstrated in studies that examined adolescent sexual health (Boyas, Stauss & Murphy-Erby, 2012), loneliness as a function of internet use (Appel, Holtz, Stiglbauer & Batinic, 2012) and age of onset of smoking (Hiemstra, Otten, van Schayck & Engels, 2012). For example, Parkes, Henderson, Wight and Nixon (2011) assessed adolescent sexual risk taking related to parenting practices and communication using self-reported questionnaires of 1 854 youth. A supportive parent-adolescent relationship was predictive of positive sexual outcomes including condom use,

delayed intercourse and a higher likelihood that intercourse would occur in the context of a relationship. Increased ease of communication between parents and adolescents was also associated with delayed adolescent intercourse, indicating that comfortable discussions regarding difficult topics potentially predicted positive health behaviours (Parkes et al., 2011).

Despite the importance of a strong parent-adolescent relationship, conflict commonly occurs within the parent-adolescent dyad (Fletcher, Fischer, Barkley & Smallish, 1996). Adolescents begin testing their power in the relationship with their parent, challenging prior family rules and demanding more privileges. Conflict can arise from a variety of factors in an adolescent's daily life, with the most common being conflict with siblings, use of the family vehicle and chores (Montmeyer, 1983). Parents are more likely to rate adolescence as the most difficult developmental stage of their child to parent, due to problems with control and independence (Pasley & Gecas, 1984). Parents feel least competent at this stage of parenting compared to other childhood stages and are more likely to report stress due to parent-adolescent conflicts (Ballenski & Cook, 1982). It is worthwhile to offer parents resources to intervene before conflict with adolescents' increases or the quality of the parent-adolescent relationship is negatively affected by increased conflict.

There are many ways that parent-adolescent relationships can be strengthened to create positive outcomes like those illustrated in the Parkes et al. (2011) study. For example, the way a parent begins a conversation can drastically effect how the conversation continues. Conflict between parents and adolescents varies based on each initial conversation response within the dyad, with negative primary responses inducing the most negative secondary responses by adolescents (Fletcher et al., 1996).

Fletcher et al. (1996) described the percentage of negative interactions within parent-adolescent conversations by coding interactions between parents and their adolescents during two ten minute, videotaped conversations. These conversations were defined as neutral (discussing a potential trip) or conflict (attempting to resolve previous parent- reported conflict issues). Conversation behaviours between each dyad were coded into positive, neutral and negative communication. Overall, the total rate of negative interactions in both conversation types between each parent-adolescent dyad varied based on diagnoses of the adolescent (normal, ADHD or combined ADHD and ODD). Adolescents who were classified as normal experienced a negative interaction and conflict in 13% of the total interactions they shared with their parent. Adolescents diagnosed with ADHD experienced conflict in 18% of the total interactions with their parent. Adolescents diagnosed with both ADHD and ODD had the highest rate of conflict, with 27% of the conversation interactions being coded as negative (Fletcher et al., 1996).

Fletcher et al. (1996) demonstrated that parent adolescent conflict increased if the adolescent was diagnosed with a behavioural disorder in comparison to typically developing adolescents, and was especially high if more than one behavioural disorder was present. Parent training, especially for those parents of adolescents experiencing comorbid behavioral disorders, could strengthen the parent-adolescent relationship. Adolescents, who perceive positive bonds with their parents, are more likely to seek out conversations with their parent, voluntarily disclose information, and perceive an overall more positive parent-adolescent bond.

Weisskirch (2011) examined cell phone communication in relation to parent self-esteem and the overall parent-adolescent relationship. An increase in both parental self-esteem and relationship satisfaction were moderated by the nature of the cell phone calls and who primarily initiated the conversation. Adolescents who called their parents seeking emotional support

reported higher self-esteem and a higher quality relationship with their parents. Parents also reported higher self-esteem from these calls. Negative calls were associated with less support and increased conflict although sometimes these interactions were rated as increased communication, specifically if the call involved parent monitoring of schoolwork (Weisskirch, 2011). These findings suggested that the quality of parent-adolescent communication was crucial to creating or maintaining a positive parent-adolescent relationship. This study demonstrated that if monitoring activities within the parent-adolescent relationship are completed in a way that is perceived as disagreeable to the adolescent, benefits of the parenting practice could be lost.

Monitoring, defined as parents increasing their knowledge about their adolescents' activities, can also influence positive communication within the parent-adolescent relationship. The benefits of parental communication and monitoring activities are typically associated with positive adolescent outcomes regarding parent limit setting, rules and tracking adolescent compliance to these boundaries (Guilamo-Ramos, Jaccard, & Dittus, 2006). Positive adolescent outcomes associated with monitoring can be overshadowed if monitoring activities are completed poorly and can negatively affect the parent-adolescent relationship.

Belle and Phillips (2010) discuss the consequences of "mis-monitoring" in a qualitative, longitudinal study that examined parent monitoring behaviours over four years. Parents who were overly aggressive with their monitoring behaviour and limit setting, or attempted it in a style that adolescents perceived as threatening, did not have as positive results as those who used a less aggressive monitoring technique (Guilamo-Ramos et al., 2006). Authoritarian parenting, with rigid control over rules and monitoring compliance without emotion or friendly daily conversation can have detrimental effects on the parent-adolescent relationship, regardless of

whether monitoring of adolescent behaviour occurs (Guilamo-Ramos et al., 2006). High levels of control and precise expectations combined with low levels of responsiveness or emotional warmth indicate a poor relationship between parent and adolescent. In contrast, authoritative parenting, which consists of high levels of control and increased emotional responsiveness in the parent-adolescent relationship, is considered to positively influence child and adolescent outcomes (Braumrind, 1971). For example, children with authoritative parents were more emotionally stable, had higher self-esteem and did better in school than children with parents who used authoritarian parenting styles (Dornbursch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). Any relationship may have participants in it who see the relationship differently. Issues to do with power, control and independence may particularly contribute to differences in perceptions of relationship satisfaction for parents and adolescents.

Disparities in Perceived Communication and Relationship Satisfaction

Parents and adolescents vary in how satisfied they are with the relationship between one another and the correlation between the parents' and adolescents' reported quality of the relationship is only moderate (Zhien, Xiaoming & Stanton, 2011). If parents or adolescents perceive the relationship as poor, parents are typically more willing than adolescents to initiate change to improve the relationship despite often perceiving the relationship as more positive than the adolescent (Weisskirch, 2011). Given the higher motivation of parents to modify the relationship with their adolescent, parents are the ideal target population for behavioural interventions related to parent and adolescent care (Wilson & Donenberg, 2004).

Relationship satisfaction and communication between parents and adolescents can be difficult to measure. Most daily communication between parents and adolescents occurs spontaneously and casually rather than as planned conversations. For example, family dinners

are naturally occurring events that facilitate communication among parents and adolescents and can have positive effects on youth. Family dinners create opportunities for communication within families and have many pro-social benefits. The frequency of family dinners is positively related to adolescent emotional well-being, prosocial behaviour and life satisfaction, with the ease of parent-adolescent communication partly accounting for the strength of this association (Elgar, Craig, & Trites, 2013). For male adolescents, the frequency of family dinners is associated with lower probabilities of binge drinking, physical fights, stealing, property destruction and running away from home. The frequency of family dinners is also associated with a lower frequency of marijuana use (Sen, 2010). Parents are more likely to engage in conversations with their adolescents over dinner, and adolescents are more likely to perceive this communication as positive in comparison to other times of family interaction (Fulkerson et al, 2010). Despite these benefits, the causality of the correlation between family dinner frequency and parent-adolescent communication benefits remains unknown. It is unclear whether families who communicate more positively are more likely to have dinner, or if sharing meals together consistently results in better communication.

Perception of the importance of family dinners and communication behaviours can vary within each family, making it difficult to draw precise conclusions about the strength of a parent-adolescent relationship. The perceived level of trust and amount of communication can vary in a parent-adolescent relationship. For example, Guilamo-Ramos, Jaccard, Dittus and Bouris (2006) compared parent-adolescent communication regarding adolescent tobacco use and sexual behaviour with parental expertise, trustworthiness and accessibility to communication. Six hundred and twenty-three parent-adolescent pairs completed self-administered questionnaires assessing these constructs. Adolescent perceptions of parental expertise were correlated with

perceived parental trustworthiness (r= 0.96, p <.01). Parental trustworthiness was associated with the frequency of parental-adolescent communication (r= 0.25 p<.01). Parental perceptions of trust, expertise and accessibility of communication were only weakly associated (trust= 0.06, expertise= 0.13, accessibility= 0.07, p <.01) with adolescent perceptions of these constructs. The results of this study indicated that parents might perceive a higher level of trust, credibility and accessibility than their adolescents in the same relationship (Guilamo-Ramos et al., 2006). Despite perceived differences in the relationship between parents and their adolescents, many interventions designed to change adolescent behavioural outcomes are targeted to parents and can be successful.

Communication and Parenting Interventions

There is a need for effective, evidence based, therapeutic interventions that are addressed specifically to parents. There are currently few resources or treatments that prove effective in addressing parent-adolescent communication conflict. This section will review interventions related to parent training and factors that improve parent-adolescent communication.

Interventions intended to address adolescent health needs often focus on parents rather than adolescents. Interventions addressed to parents have proven to be effective, specifically those that focus on parent training. For example, the Connect Program, is a manualized attachment focused intervention that is aimed to improve parenting practices for parents with adolescents at risk for aggressive behaviour. The parenting skills were taught in person by trained therapists, and were shown to increase parental satisfaction, reduce adolescent conduct problems, depression and anxiety compared to a wait list control group (Moretti & Obsuth, 2009). It is common that parenting interventions are often administered by a psychiatrist,

psychologist or social worker, and thus are often difficult to obtain for many families due to location as well as cost (McGrath, Lingley-Pottie, Emberly, Thurston & McLean, 2009).

Mothers have been the primary users of parenting interventions, although efforts have been made to encourage paternal involvement. Father participation in parenting interventions has been strongly encouraged by researchers such as Tiano and McNeil (2005), who critically examined the literature regarding fathers and parenting interventions. To improve father involvement in parenting interventions, it was recommended that parenting intervention research include both mother and father reports if available. Fathers tend to differ from mothers in reporting of both intensity and frequency of child behavioural concerns (Tiano & McNeil, 2005); therefore study measures such as self-reports and communication measures should be completed by both parents. Fathers also rate parenting intervention as less useful than mothers, in regards to how the interventions are made available, with over 500 fathers in one study by Lee and Feldgaier (2013), rating all interventions as below 50% in usefulness. The same study found that fathers rated web-based interventions as the most useful way to seek parenting care, a difference from mothers who preferred individual in person care as the best approach for obtaining parenting care or advice (Lee & Feldgaier, 2013). Despite these perceptions, fathers can be engaged in parenting behavioural change interventions if they are engaged correctly and have increased interest in the intervention (Fabiano et al., 2012).

Burrus et al. (2011) systematically reviewed sixteen interventions that examined parent/caregiver training for adolescents at risk for detrimental health behaviours such as tobacco use or unsafe sexual behaviour. Interventions taught general parenting practices, specific skills to address the target health behaviour and provided information regarding the target issue. Parents were presented with the intervention information, completed homework assignments and

role-played scenarios determined by each intervention specifications. Caregiver targeted interventions were deemed effective, with effectiveness determined by the engagement of the adolescent in the specific risk behaviour, frequency of the risk behaviour and alternative adolescent health outcomes such as mood or physical health. A potential barrier of addressing interventions to caregivers was highlighted, specifically the difficulty of recruiting and retaining parents until intervention completion. Attrition rates for interventions were high, especially for those parenting at risk adolescents (Burrus et al., 2011). It was recommended that parent training was an effective method for influencing at risk adolescent behaviour, and could be a method to reduce costs of adolescent interventions.

One area where communication interventions are particularly well developed, and could serve as a model for parent-adolescent interventions is couple therapy, particularly if the therapy has a cognitive-behavioural focus that lends itself to online interventions.

Gottman's Couple Therapy

The couple therapy of John Gottman (Gottman & Ryan, 2004; Gottman & Silver, 1999; Gottman & DeClaire, 2001) offers expertise in couple communication. It has produced long-standing research of romantic couple communication that have been disseminated to the public. It was Gottman's maritial therapy literature that was used as a theoretical model for the PACT intervention and will be reviewed in detail below.

Gottman focused on spousal perceptions of the relationship, and combined it with subtle communication strategies that couples can use when communicating with each other. He video taped couples interactions (Levenson, Cartensen, & Gottman, 1994), examined their physiological stress responses (Levenson & Gottman, 1985) and used self-report measures (Carrere et al., 2000) to understand the predictors of romantic relationship breakdown. He

focused on the amount of communication- both the type (verbal or non verbal), as well as situations where there is an absence of communication to understand the effects on a romantic relationships over time (Levenson et al., 1994). He has provided examples of poor communication and has been 94% successful in predicting heterosexual marital breakdown based on this model, (Carrere, Buehlman, Coan, Gottman, Coan, & Ruckstuhl, 2000). The Gottman model of couple communication was effective in predicting couple divorce rates after researchers experienced only three minutes of participant couple communication (Carrere & Gottman, 1999).

Gottman provided strategies to improve communication for romantic couples. Communication interventions that were created from his research have proven to be effective (Gottman & DeClaire, 2001). Gottman has established an intensive therapy training program for clinicians that separated his communication repair strategies into modules, effectively creating a marriage between research on communication problems and therapeutic intervention solutions. The programs Gottman has created were empirically validated, and are administered by certified therapists to ensure correct implementation (Bray & Jouriles, 1995).

As an alternative therapeutic method, couples can also complete Gottman's interventions by using his therapeutic books, e.g. bibliotherapy, without the aid of a therapist. Gottman's bibliotherapy explains complex relationship problems using straightforward repair strategies that couples can implement at their own pace. He simplified his research findings by offering practical suggestions that couples can use to improve their marriage as an alternative and simplified approach to traditional therapy (Gottman & Silver, 1999). Gottman's bibliotherapy includes couple activities, writing exercises and relationship self-assessments to increase engagement of couples with the therapy and supplement the written intervention content.

Gottman has written a New York Times bestseller, entitled 'The Seven Principles for Making Marriage Work," where he discussed both the positive and negative communication strategies in which couples engage. He offered methods on how to increase the communication and provided descriptions and case studies from his research projects (Gottman & Silver, 1999). In this book, Gottman discussed common couple communication problems in an easily accessible format. Book chapters included topics such as Nurturing Fondness and Admiration, Creating Shared Meaning and Turning Towards Each Other (Gottman & Silver, 1999). This book, and others such as The Relationship Cure, by Gottman and colleagues allow couples access to specific, simple communication strategies as a step to healing romantic relationship problems. Gottman's bibliotherapy is not the only form of distance interventions available. As the Internet becomes more accessible, many interventions are now being offered online.

Web-based Therapeutic Interventions

An estimated 34% of the global population (with a 566% growth rate between the years 2000 and 2012), and specifically 79% of the North American population are using the Internet as of June 2012 (Internet World Stats, 2012). Specifically for Canada, the Statistics Canada Canadian Internet Use Survey reports that 89.5% of individuals between 16-24 years and 83% of 25-44 year olds in the lowest household income quartile had home Internet access in 2012 (derived from Table 358-0154). Access is even greater in higher income groups. With such high access to the Internet among Canadians, web based interventions can provide accessible care at a low cost.

For example, a large-scale sexual health parenting communication intervention study with 288 parent intervention participants had a mean start up cost of $543.03 US (SD, $289.98) and an average cost of $28.05 US (SD, $4.08) per parent. Each session was taught to a group of

participants, with an average of fifteen parents per session (Ladapo et al., 2013). The cost of this intervention was much lower than a typical cognitive-behavioural treatment cost, estimated as costing $1650 US over two years, or $90 US per session, in one study examining individual treatment cost of panic disorder (Gould, Otto, & Pollack, 1995). Group therapy for panic disorder in this study was estimated at $840 US per participant (Gould et al., 1995). Even with higher start up costs, web-based interventions can reach a large number of participants, in a short time, thus decreasing costs per participant (Sukhanova et al., 2009). By simple program cost comparison, web based interventions are more cost effective treatment options than traditional therapeutic interventions.

Web-based interventions are also a method to reduce stigma associated with individuals who access mental health treatment. For example, self stigma can affect whether an individual seeks mental health treatment, and is defined by the internal negative perceptions an individual has regarding mental health and treatment for mental health disorders (Corrigan, 2004; Luckted, Drapalski, Calmes, Forbes, DeForge, & Boyd, 2011). By allowing individuals to access and undergo interventions in the privacy of their own homes, web-based interventions serve to mitigate the effects of self stigma of individuals who are accessing care. Web-based interventions are offered as accessible behavioural interventions, and can increase self-esteem and self-efficacy of participants, allowing a decrease in total self-stigma, thus encouraging individuals to obtain mental health care, in increased comfort. Self directed services like web-based interventions serve to encourage self-directed therapy and interventions, allowing individuals who may be uncomfortable with traditional forms of therapy to empower themselves and obtain care (Lucksted et al., 2011).

Most importantly, web-based interventions have been found to be as effective solutions for the treatment of mental health concerns (Portnoy, Scott-Sheldon, Johnson & Carey, 2008). Effective web-based interventions have been created for a range of mild to moderate heath concerns, with examples including infertility related stress on women (Sexton, O'Donohue, & Jacobs, 2010), college student alcohol consumption (Neighbors et al., 2010), and adolescent substance use (Fang, Schinke, & Cole, 2010). A meta-analysis of behavioural change outcomes obtained using web-based interventions, comparing 17 studies also found positive results (Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004).

Studies analyzing the specific components of providing care via the Internet are expanding in the literature as efforts are made to understand components that ensure a successful intervention for participants. Although intervention creators often aim to provide evidence based care, it is not clear what specific components of an online intervention make it successful. Thus, researchers may not be using the best intervention format when providing health interventions online. A meta-analysis by Webb, Joseph, Yardley and Michie (2010) identified various characteristics that influence the effect sizes of health related interventions using a sample of 85 interventions and a total of 43 236 participants. Interventions that were created from specific theories had the largest effect sizes for participants. Behavioural change techniques (specifically related to self monitoring, identifying barriers and increasing problem solving skills) were the most commonly used, with 30% of the interventions using these techniques. Within these behavioural change interventions, those promoting stress management and general communication techniques demonstrated the highest effect sizes though were surprisingly not as prevalent as emotional coaching techniques.

The difference between effect sizes and prevalence of techniques within the behavioural change model suggest that intervention creators may not be using the most effective foundations when designing online interventions. It is difficult to compare web interventions within the framework of a meta-analysis due to important differences that can exist within web-based therapy research. The nature of the content (which can range from physical activity to binge eating behaviours), the various content presentation methodology (websites, mobile applications or CD-ROMS) and the communication structure with professionals (email support, reminder text messages or telephone coaching) can all contribute to the success of an intervention and are difficult to isolate within a meta-analytic framework. The mode of delivery has a significant effect on the effectiveness of an intervention, with more personal support (access to an advisor) demonstrating a higher effectiveness than automated messages (Webb et al., 2010). If the therapy is administered online with the help of an intervention coach or paraprofessional therapist, therapeutic alliances between participant and administrator can exist (Lingley-Pottie & McGrath, 2006; Knaevelsrud & Maercker, 2006). A positive relationship between administrator and participant in a web-based intervention creates a positive response to the therapy and could possibly increase participant compliance to the skills taught. These differences in research can make it difficult to compare studies, making the contributing factors of intervention success difficult to detect.

Specifically for distance interventions (telephone and web-based), it is not only the program information but also the structure of the program content that is crucial for increasing user participation, satisfaction and success rates. The 'information architecture' of a website is defined as how information is designed and presented to users. It relies on research and theory to determine the most effective way to manage information electronically (Resmini & Rosati,

2012). Information architecture can affect the way users experience and engage with a website and can thus impact the way participants perceive the content presented.

For behavioural change web interventions, there are four common types of information architecture design. These types include the free form matrix design, hierarchical design, tunnel design and hybrid design. The most common is the free form matrix design, which allows users to move independently through the intervention content, with very little structure, accessing information that they deem interesting. The hierarchical design allows for more increased structure, providing users with a top-down approach to access increasingly specific information as they experience the intervention content. The hierarchical design still allows freedom for the user, but with a more streamlined approach to obtaining information due to an increased amount of categorization. The tunnel design is more linear than the hierarchical, and forces participants to click through all of the intervention content, one page at a time. This design ensures participants experience all the information presented in the intervention and is commonly used in online academic courses and many behavioural change programs. The tunnel design can be inflexible, and funnels users to move through various content, reducing freedom of choice in learning. The hybrid design is often a combination of the hierarchical design and the tunnel design, allowing creative approaches to meet individual intervention information access demands. At times, a matrix design can be incorporated into a hybrid as well (Danaher, McKay, & Seeley, 2005).

The rationale for the choice of an information architecture design depends specifically on the goals of the intervention. There are strengths and limitations for all web designs, which are depicted in Appendix A and have been adapted from the research of Danaher, McKay and Seeley (2005). It is widely accepted in the field of information architecture that the design of

information impacts the effectiveness of the intervention; however how much influence the design choice has on participant outcomes is unknown. The structure of the intervention combined with the content has been demonstrated to affect participant adherence to the intervention and can affect attrition rates of participants (Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012). Careful consideration must be made when choosing an information layout to proliferate positive participant experiences.

Attrition rates are a pressing concern for most therapeutic interventions, regardless of intervention delivery style. Without a therapist, participants in web-based therapy have a higher likelihood of not completing the intervention compared to those in traditional therapy, as demonstrated in a physical education study (Peels, Bolman, Golsteijn, De Vries, Muddle, van Stralen, & Lechner, 2012). In this study, participants were provided with either a physical book or access to a web-based intervention to view the exact same content regarding physical activity. Condition drop out rates were significantly different, with 53% (453/855) of participants dropping out in the web-based condition compared to 39% (340/874) of participants in the paper-based condition. Due to the independent nature of web-based learning, simply providing the same content online as in a physical paper-based format may not be effective although both interventions were administered without the aid of a therapist (Peels et al., 2012). The overall engagement of participants within the intervention is theorized to be a contributing factor to high web-based attrition rates.

It is likely that engagement of participants with an online intervention may be associated with their likelihood to rely on the Internet for health seeking behaviour. For example, women are more likely to use the Internet for health advice, and are also more likely to participate in web-based health interventions (Atkinson, Saperstein & Pleis, 2009). A meta-analysis conducted

by Atkinson, Saperstein and Pleis (2009), described the population characteristics and additional determinants of health seeking behaviour using the Internet. The authors found that women, ethnic and racial minority groups were more likely to seek health information online. Men, people with less than a high school diploma or community college degree and those who did not have children were less likely to use the Internet to seek online for health information.

Many of these reported determinants of using the Internet for health information seeking behaviour correspond to factors that increase the likelihood of participation in a web-based health intervention. Social determinants such as an increased education, gender, higher socio-economic status, marital status and reported rates of health concern increase the likelihood that participants will engage in an online health programs (Cugelman, Thelwall & Dawes, 2011). Some of these determinants can also be found for those who seek traditional therapy as well, specifically in regards to participant case complexity and service seeking behaviour (Reid & Brown, 2008) previously discussed.

For any type of online learning, having access to support and the relevance of the topic to the participant are important factors in decreasing attrition of participants (Park & Choi, 2009). It is important to create highly relevant material for participants, and to maintain engagement throughout the web-based intervention to ensure successful transference of intervention skills. For example, an intervention for problem drinking was found to be effective to reduce instances of alcohol consumption. Nevertheless, due to high attrition rates (507 non completers of 780 participants, or 65% of participants), the intervention was deemed unsuccessful. Participants listed personal reasons, intervention dissatisfaction and personal satisfaction with improvement as reasons for not completing the intervention. To improve participant completion, study

administrators suggested increased intervention flexibility and study reminder notifications (Postel, de Haan, Huurne, van der Palen, Becker, & de Jong, 2011).

There are many benefits to providing health interventions online, although care should be taken to ensure these services are executed using the recognized standards of best practice. The reduced cost of delivery, increased convenience for users, reduction of stigma, increased user and supplier control and reduction of health service costs are the most common factors in the continuation of providing health services online, as stated by a meta-analysis of 29 web-based studies (Griffiths, Lindenmeyer, Powell, Lowe & Thorogood, 2006). Providing care online is not without drawbacks, and the authors suggested that researchers should carefully implement health services with serious consideration to the purpose of providing specific interventions online. Increased awareness of participant safety and program outcomes must be made when implementing services online. It is important to recognize both the benefits and consequences of providing online intervention health care and to ensure that participant welfare is of the highest concern. Empirical evidence and comparisons between alternative forms of therapy must continue to ensure that participants of online interventions are receiving the best care possible. One example of a successful empirically based program is Strongest Families, which is offered via telephone and is beginning to be offered online.

The Strongest Families Program

Using a combination of telehealth and online learning, the Strongest Families program provides a manualized treatment approach as an alternative form of distance therapy. Through the use of empirically evaluated studies (McGrath et al., 2011; McGrath, Lingley-Pottie, Emberly, Thurston & McLean, 2009), Strongest Families offers treatment to families requiring support for childhood behavioural disorders, anxiety disorders and enuresis.

Accessing empirically based mental health care can be difficult for many families, resulting in the need for interventions such as Strongest Families. For parents who desire to access services for their children or adolescents, it can be even more difficult due to the lack of treatments, location of services, wait lists and case complexity (Reid & Brown, 2008). Parents generally seek help for their children from multiple agencies for a variety of child health concerns. Many parents are discouraged by the treatment options available to them, and may continue to seek services until they find an adequate solution. An Ontario based study that examined 60 parents for their help seeking behaviour discovered that a quarter of parents who accepted treatments, did so without a strong desire for receiving the accepted treatment, indicating a possible lack of alternative desirable options (Shanley, Reid, & Evans, 2007).

The Strongest Families program aims to reduce typical treatment barriers that exist for parents seeking support by providing programs using 'telehealth,' or therapy administered using the telephone. Access to Strongest Families programs is designed to comply with user convenience, with extended business hours and multiple methods of session reminders, including via text message, email and telephone. Parents seeking multiple services can increase the strain on the mental health care system, by lengthening the wait time for services, and reducing the likelihood that parents will receive the most desirable or best treatment option for their children due to time constraints and an increased demand (Reid et al., 2010). The Strongest Families program enables parents to receive treatment rapidly to prevent further problem deterioration and reduce wait list times for additional health services (McGrath et al., 2011).

Strongest Families programs for parents and children are based on learning individual, easy to use, skills to overcome their problems. Families receive educational materials (handbooks and skill demonstration videos) in the mail. Parents also complete weekly telephone

calls with a Strongest Families trained support coach. The coach aims to problem solve with parents and encourage them to integrate Strongest Families program skills into their daily routines. Although highly trained regarding activities related to program implementation, all coaches are nonprofessionals, allowing program costs to remain low (McGrath et al., 2011). Strongest Families has recently created an online component as well, as part of their Finland division, allowing parents to view the material online and email coaches with content questions (McGrath, et al., 2009).

The Strongest Families program content is undergoing ongoing testing in a current randomized-control trial based in Ontario. Three randomized control trials have already been completed, with 243 children that met criteria for Oppositional-Defiant Disorder, Attention – Deficit/Hyperactivity Disorder or Anxiety disorders. Parents evaluated child behaviour outcomes up to a year after entering the study. The study offered evidence that Strongest Families was capable of reducing mild to moderate childhood behavioural disorders, using telephone based, manualized therapy. Parents rated high satisfaction of treatment, bond with their program coach and the quality of service they received. A pilot study that assessed parent perceptions of service and program feasibility for an online, web-based ODD intervention found similar results (Lingley-Pottie, Watters, & McGrath, 2005).

The Strongest Families program is highly effective in reducing treatment barriers as evidenced by the low attrition rate of program participants. Treatment is provided at the parents' convenience, allowing an increased access to care. Participant privacy is protected, therefore reducing possible stigma of accessing public mental health services (Lingely-Pottie & McGrath, 2006). Strongest Families offers evidence-based customizable programs and delivery to meet

parent requirements and increase parent access to care on multiple levels, reflecting a novel and effective approach to increasing family mental health treatment.

The Parent Adolescent Communication Toolkit (PACT)

An online communication intervention has been created, entitled the Parent Adolescent Communication Toolkit (PACT). PACT combines Gottman's romantic relationship repair strategies and the Strongest Families model of care template to create a strategy for parents to improve communication with their adolescents. The PACT intervention was developed with close collaboration between parents of adolescents and the research team. It is targeted at parents of adolescents to potentially improve the communication of parents with their adolescents, and by affiliation, improve their relationship.

PACT was modeled on Gottman's relationship repair strategies given the applicability of his relationship repair theories to a parent-adolescent dyad with some modifications, the cognitive-behavioural background to the strategies and the high success rate of this relationship therapy as was previously described. Gottman has completed research on transition to parenting, the impact of marital discord on parenting practices and emotional coaching. He has been quoted on his website as saying that,

> Much of today's popular advice to parents ignores emotion. Instead it relies on child-rearing theories that address children's misbehavior, but disregards the feelings that underlie that misbehavior. The ultimate goal of raising children should not be simply to have an obedient and compliant child. Most parents hope for much more for their children (Gottman, 2014).

In his parenting behaviour research, Gottman's romantic relationship repair strategies are occasionally applied, specifically listening strategies and problem solving initiatives. Although

these parenting strategies are generally focused on communication and the parenting of children aged 0-6, Gottman indicates the strategies provided can be generalized to parenting adolescents as well. Gottman uses a similar theoretical framework for both his work regarding romantic relationship repair strategies and his emotional coaching techniques for parents. Much of parent-adolescent therapy theoretical orientation uses a behavioural or a family systems approach that is similar to Gottman's romantic relationship repair bibliotherapy. By implementing behavioural changes (obtained from social-learning principles or behavioural exchange theory) that parent-adolescent dyads can apply to their relationships as well as understanding, parent adolescent communication can be improved (Robin & Foster, 2003).

It is theorized, due to the similarities of the communication structures between parent-adolescent dyads and romantic relationships that it would be possible to apply Gottman's work in communication to parents and their adolescents. Although there is a recognized power imbalance between parents and adolescents, modifications to the Gottman content can be made to reduce this concern. Gottman skills, ones that assume an equal relationship, can be modified to be more applicable to parents and their adolescents. For example, compromising is an important skill in Gottman's relationship repair strategies, however when applied to a parent-adolescent relationship, the skill does not directly translate. A parent does not always have to reach a compromise with their adolescent. Although this relationship repair skill is not directly translatable to all communication interactions within the parent-adolescent dyad, it remains a valid skill for parents when it is appropriate to use. Therefore, it can be a skill taught to parents but with slight modifications, staying accurate to Gottman's skills but remaining in the context of useful skill for parents in their relationship with their adolescent.

Another concern when modifying Gottman's romantic relationship communication strategies for a parent-adolescent relationship was the variability of responsibility and freedoms within the parent-adolescent dyad. As adolescents grow, they demand more freedom and begin to challenge previous existing limitations and rules. They increase their responsibility in the parent-adolescent relationship, and roles slowly begin to change within families. Within a romantic relationship, changing responsibilities does not occur as distinctly as those within a parent-adolescent dyad, meaning that Gottman's strategies must be modified to suit specific parent-adolescent needs. To do this, strategies such as Giving Goals Room to Grow were changed to recognize increasing freedoms and autonomy of adolescents but also recognize an adequate level of responsibility that adolescents can maintain. Strategies such as this skill recognize the adolescents' need to have independent goals and consequently encourage parents to support these aspirations and encourage growth as their adolescents mature. Modifying Gottman's strategies allowed PACT to include the majority of skills that Gottman teaches for romantic relationship repair, and provided parents with more tools to potentially improve communication with their adolescents.

The PACT intervention offers an alternative to traditional parenting interventions, as a low cost, preventative measure for parents seeking additional support for parenting their adolescents. It normalizes parent-adolescent conflict, and provides specific skills to reduce these concerns, just as Gottman does in his romantic repair interventions. By delivering the PACT skills online, parents are able to seek information at their own pace, on their own time, thus increasing accessibility to the intervention. It is written at a grade five reading level to increase parent accessibility as well as intervention skill clarity to parents. PACT is designed for parents

to complete without the aid of a therapist, thus allowing more parents to complete the intervention, at a lower cost.

PACT delivery via Individualized Research and Intervention Software (IRIS)

The PACT intervention is delivered using IRIS technology. This platform was developed by the Center for Research in Family Health research team, as a grant funded by CIHR (ref:246529), in partnership with Turku University, Finland. IRIS is used to present web-based interventions, in an appealing and user-friendly format. This software has been used by Strongest Families for anxiety and behavioural children interventions. IRIS is customizable and interactive for families, allowing personalized profiles and content for participants, integrating demographic information with health indicator behaviour inputs. The multiple features IRIS offers, such as messaging services, email reminders and discussion boards, allows for customizable intervention content to suit the specific needs of the PACT intervention.

IRIS can modify the intervention content presentation, order and time of presentation. IRIS is an effective tool for study administration as well; the technology can deliver questionnaires, collect data and offer study completion reminders to participants. The software can track participant activity, such as time spent on each page and will track participant progress by date in an individual "activity log." Due to these specific features of the software, IRIS is a useful tool for content display but also for intervention assessment online, making it ideal for PACT intervention presentation and study data collection.

Specifically concerning the information architecture of the presentation of the PACT content, IRIS customized the program to meet the study demands. IRIS allowed PACT to be displayed in a hybrid design, allowing a combination of the tunnel and hierarchical designs. These designs were chosen to reduce complexity for new participants but also to ensure that

participants experience the necessary intervention information. PACT users could click through each PACT module in the typical tunnel format design structure, but at times could also access more detailed information depending on their specific needs and interests related to that topic. A design such as this was ideal for PACT, as it was expected that some participants would seek more detailed information and others would not need more as the topic might be less relevant to them. In this way, PACT displays relevant informant to all participants, reduces boredom, and ideally reduces participant attrition.

IRIS also provided the tools necessary for making the tunnel design of PACT as effective as possible to engage intervention users. Danaher et al. (2005) suggested that to increase participant usability of the tunnel format, certain features should be included in the information architecture of the web intervention. These features include that external information be included in pop up windows to reduce the likelihood participants will leave the tunnel, remove standard browser tools such as navigation bars or embedded links and limit the user navigation to "next" and "back" buttons. Progress bars should be included to allow participants to track their progress through each tunnel. Participants should also be clear on how to proceed to each step in the intervention to increase ease of use of the intervention and allow users to focus strictly on learning the skill content.

To meet these criteria using IRIS technology, colored progress bars on the homepage are prevalent. Tutorial videos are provided on how to use the intervention website, that specifically highlight the "next" and "back" buttons. These tutorials are one of the first tunnels that the user experiences with the intervention to ensure that participants were comfortable with the intervention technology before any skills were presented. Although pop up windows are not used within PACT, non-essential information is provided in a clickable format that appears on

screen without increasing the number of stages the participant must proceed through in the tunnel. For further clarification, an example of this format is provided in Appendix B.

The PACT Modules

PACT began as an honours thesis project, with an exploratory usability study examining parental preferences of preliminary intervention content (Toombs, unpublished honours thesis). From this data, myself as the lead student investigator developed further modules from the theoretical models previously described and created more audiovisual content. This content was then revised to be more web-friendly and programmed into the web-based platform, IRIS. From this, an article was published on the PACT intervention, describing the features of PACT and the future goals of the intervention (Toombs, Unruh, & McGrath, 2013).

To date, ten modules of the PACT intervention have been created (entitled Pay Attention, Give Affection and Respect, Create Shared Meaning, Give Goals Room to Grow, Accept Your Teen and His/Her Influence, Compromise, Start Softly, Repair Your Communication, Turn Around Negative Communication and Talk About Difficult Issues). These modules adapt Gottman's couple communication strategies to parent-adolescent communication. The modules use both text and video format to present the intervention skills. The modules are programmed into an interactive website developed by the McGrath research team using IRIS technology previously described. Each module is formatted using the template outlined in Appendix C, presenting a skill relating to the main themes of building relationships, increasing positive communication and avoiding negative communication. Each module is administered using this template, which has been adapted from the Strongest Families Institute's model of care. A list of the ten module titles and a brief description of each module's goals is provided in Appendix D. Appendix E illustrates screenshots of PACT.

The PACT intervention begins with an introduction of how the modules will be delivered, what will be expected of the parent and the potential outcomes of completing the intervention. Prompts asking information (names and ages) regarding both the parent and adolescent are immersed in this content, allowing the intervention to be customized for each individual family. A video of how to use the PACT website is provided at this stage, illustrating specific features of the website such as the Media Library. Parents are shown how to move through the intervention to ensure the usability of the website. At the end of this section, the parent has the opportunity to begin the first of four content sections 'Building Relationships'.

The first content section, Building Relationships, consists of five modules that are entitled Pay Attention, Give Affection and Respect, Create Shared Meaning, Give Goals Room to Grow, and Accept Your Teen and His/Her Influence. Each of these modules focuses on a particular skill that builds a positive relationship between parent and adolescent. The skills in the Building Relationship section are the most fundamental skills of PACT, as they focus on key elements required to strengthen relationships. These skills are presented before any other skills to enable parents to first cover general communication skills before moving forward to more challenging content. For example in the first module, Pay Attention, the skills listed are ones that focus on the parent providing the adolescent with more positive feedback on simple behaviours at home that may typically go unnoticed.

The second module of this section, Give Affection and Respect, focuses on parents learning to express good feelings about adolescents through compliments, praise, and positive statements about who they are as a person. The Create Shared Meaning module builds on these skills even more, by showing the parent how to increase positive moments together with their adolescent. In this module, parents are taught the importance of family routines and traditions as

well as how to establish more routines within their own families, such as increasing family dinner rituals.

Give Goals Room to Grow, the fourth module of the Building Relationships section, provides skills to enable parents to support their adolescent in their individual goals. Parents learn the importance of recognizing and understanding their adolescents' pursuits as well as how they can help achieve their dreams. Accept Your Teen and His/Her Influence teaches parents how to include their adolescents in the family decision-making. This module teaches parents how to recognize whom their adolescents are as people, with individual needs, interests and opinions that may differ from their parents.

The Increasing Positive Communication section is the second section of the PACT intervention. This section consists of three modules, entitled Compromise, Start Softly and Repair Your Communication. The Compromise module encompasses the previous Accept Influence skills, and is designed to teach parents the skills of compromising with their adolescents. Start Softly teaches parents skills on how to gently begin a difficult conversation and describes the consequences of using comparatively harsher conversation starters. The last module, entitled Repair Your Communication, describes conversation repair strategies that parents can use when interactions with their adolescents become negative. This skill is important to improving communication between parents and adolescents, as parents are taught to recognize the onset of a negative interaction and stop it before the interaction declines further.

The next section of PACT is Avoiding Problematic Communication, and consists of one module, Turn Around Negative Communication. This module describes negative communication behaviours such as poor conversation starters and discussing too many concerns at once. The module then teaches parents how to avoid negative interactions with their adolescents. Examples

are provided of what previous skills could be used to reduce negative communication and combat negative communication when it occurs.

The last section of PACT is Applying PACT to Special Issues, which includes 'Talk About Difficult Issues'. Each 'difficult issue' is associated with a topic that many parents find challenging with their teens, and is limited to the topics of healthy relationships and substance use. These modules use the previously learned PACT skills and apply them to realistic conversations that occur between parents and their adolescents. Additional online resources that are specific to each topic are also provided. These resources are considered to be especially useful, as difficult conversations and interventions for communication such as divorce, have minimal presence within parenting literature. By specializing in difficult topics, preventative measures for adolescent maladjustment can be enacted (Barber, 1995).

The PACT intervention content has undergone preliminary usability, readability and likeability testing by fourteen parents. Participants (all parents of youth aged 13 to 17) completed both open and close-ended questions assessing and offering feedback on the intervention content. These comments were used to modify the intervention content and improve it to meet parent needs. Parents gave feedback on two parenting skill videos, with these comments used to create the remaining PACT video content. Constant modification of PACT and updates based on parent feedback as it is obtained is essential to building the most effective PACT intervention possible.

The IWK-Parent Adolescent Communication Checklist (IWK-PACC)

The IWK-Parent Adolescent Communication Checklist (IWK-PACC) was developed that modifies Gottman's marital communication model and applies it to parent-adolescent communication to assess the strength of parent-adolescent communication using Gottman's

constructs. Each skill or topic presented in PACT, the IWK-PACC has a corresponding sub-scale. The construct validity of the measure was examined, with the primary goal to detect changes in specific parental behaviours that would indicate a change to overall parent-adolescent communication. The IWK-PACC is an important measure for communication among families, as it assesses the specific behaviours that occur in a relationship that may increase or impair parent-adolescent communication. Thus, if negative behaviours are occurring within a parent-adolescent relationship and are assessed by the IWK-PACC, direct simple solutions from PACT can be offered to modify that behaviour.

Fifty mother and adolescent dyads have been assessed using the IWK-PACC, comparing communication scores of the IWK-PACC to that of a prior, well established parent communication scale, the Parent-Adolescent Communication Scale, developed by Barnes and Olsen (1985). With alpha ranging from 0.7 to 0.96 for the validity of the two scales, the IWK-PACC indicates strong support for accurately assessing parent-adolescent communication (unpublished data). This preliminary evaluation indicates the possibility of quantitatively assessing the strength of parent-adolescent communication scores using Gottman's couple therapy constructs. The IWK-PACC scale is a new scale and needs additional research with a larger number of parent-adolescent dyads, including fathers, mothers, diverse ethnic families, and clinical populations.

The Purpose and Hypotheses of This Study

The main purpose of the current study was to assess the usability of the new PACT content and the online format of the intervention. The current study aimed to assess the intervention usability using parent feedback to provide ideas regarding potential improvements, alternative constructs that could better facilitate participant learning in future modifications to the

PACT intervention. Parent usability ratings are an important step in the development of new content for PACT. It was hypothesized that the parent usability ratings for the PACT intervention content would be high.

As PACT was an entirely novel form of parent-communication intervention, the intervention skill presentation structure and method of presenting the PACT content to parent participants had not been assessed. Therefore, it was unknown what method of delivery style related to the information architecture of the website was most effective for increasing participant outcomes specifically related to usability ratings and content completion. The second aim of this study was to assess two intervention content delivery styles and compare the participant usability data in each group to determine the most optimum method of PACT content delivery. The two intervention delivery styles that were assessed were a sequential method of content module delivery and an unrestricted module access. Parent participants who were randomly assigned to have sequential module access completed each PACT module in a predetermined order, with the following module only unlocked after a previous module was finished. Parent participants who were assigned to have unrestricted module access completed modules in any order of choice, regardless if previous modules were completed. It was hypothesized due to the many benefits of the tunnel delivery style that the sequential module access would have higher participant completion rates and usability ratings than the unrestricted module access group.

The third aim of this study was to assess the preliminary effects of PACT on improving parent-adolescent communication in a six-week intervention time period between pre and post-tests. The study examined the differences in parent-adolescent communication scores before and after parental use of the PACT intervention. Participant mean communication outcomes were

compared to adolescent scores. Parent and adolescent scores were analyzed separately to determine as the literature suggests that there may be disparities in parent-adolescent communication perceptions. It was hypothesized that communication post-test scores would be higher than pre-test scores. Parent and adolescent depression, stress and anxiety scores were analyzed to determine if PACT influenced the emotional functioning of participants. This comparison examined differences within and between parent-adolescent dyads after the intervention completion to determine if the PACT could decrease depression or anxiety scores of parent or adolescent participants. It was hypothesized that PACT would increase the emotional functioning of participants if PACT improved parent-adolescent communication due to the anticipated decrease in conflict within the dyads.

The last aim of this study was to ensure that the IWK-PACC scale is an adequate measure for assessing parent-adolescent communication. The IWK-PACC was an ideal tool for assessing the PACT skill retention in parent-adolescent dyads due to the high correspondence of the Gottman and PACT communication skills. Almost every module that is presented in the PACT is directly assessed using the IWK-PACC measure. To provide more psychometric support for the IWK-PACC, concurrent criterion validity of the IWK-PACC measure was assessed using a well-established parent-adolescent communication measure, the Parent-Adolescent Communication Scale (PACS) (Barnes & Olsen, 1985). It was hypothesized that the IWK-PACC and the PACS would be highly correlated.

In summary, the main hypotheses for this study are as follows:

1. Parent usability ratings for the PACT content would be high.
2. Parents randomized to the sequential module access would have higher completion rates and usability ratings than those randomized to the unrestricted module access group.

3. Parent and adolescent communication and emotional functioning post-test scores would be significantly higher than pre-test scores following parent completion of the PACT intervention.
4. The IWK-PACC measure would be correlated with the PACS measure, indicating high concurrent criterion validity between the two parent-adolescent communication measures.

Summary

Parent-adolescent conflict is common, and can negatively impact the relationship between parent and adolescent. Positive communication is one way to improve a parent and adolescent relationship; however there are few interventions that are effective at improving communication. One area that is well developed as a relationship communication intervention is marital therapy, specifically that designed by John Gottman. Gottman took complex communication strategies, and broke them down into easy to use steps that he presented in his books, otherwise entitled bibliotherapy. Distance interventions such as Gottman's, which can be provided to the public without the help of a therapist, allow increased accessibility to care, at a much lower cost. Web based interventions have shown to be effective in reducing mild to moderate mental health difficulties. A telephone based program, Strongest Families, offers an engaging approach to distance therapy, and maintains low attrition rates of participants.

A web based intervention, the Parent-Adolescent Communication Toolkit, was developed to address the needs of parents, combining the unique Strongest Families model of care with the communication skills developed by Gottman. Prior research has been conducted on PACT, including usability assessment of the content by parents. The IWK-PACC (unpublished) was previously created by the research team. This measure uses Gottman's therapeutic skills. Prior

research using this measure indicated that it is possible to quantitatively apply and assess Gottman's concepts to parent-adolescent communication. The current study aimed to assess the usability, delivery style and preliminary effectiveness outcomes of the PACT intervention.

CHAPTER 3 RESEARCH DESIGN AND RESEARCH METHODS

Chapter 3 describes the methodology used to assess: 1) the usability of the PACT intervention; 2) parental preference of sequential or unrestricted module access of PACT; 3) the preliminary effects of PACT on the parent-adolescent communication; and 4) the concurrent criterion validity of the IWK-PACC. The rationale for the methodology is provided. Research design, data collection procedures, data analysis and expected outcomes are described.

Research Design

The study was completed using a pre-test-post-test design with a six-week intervention. Parent participants were randomized into two groups entitled sequential chapter access or unrestricted module access which affected the order in which the intervention could be accessed, though did not change the content of the intervention. There was no control group. Figure 1 is a diagram of the study design. All study procedures were completed from a distance, using correspondence by telephone or email with the study investigator.

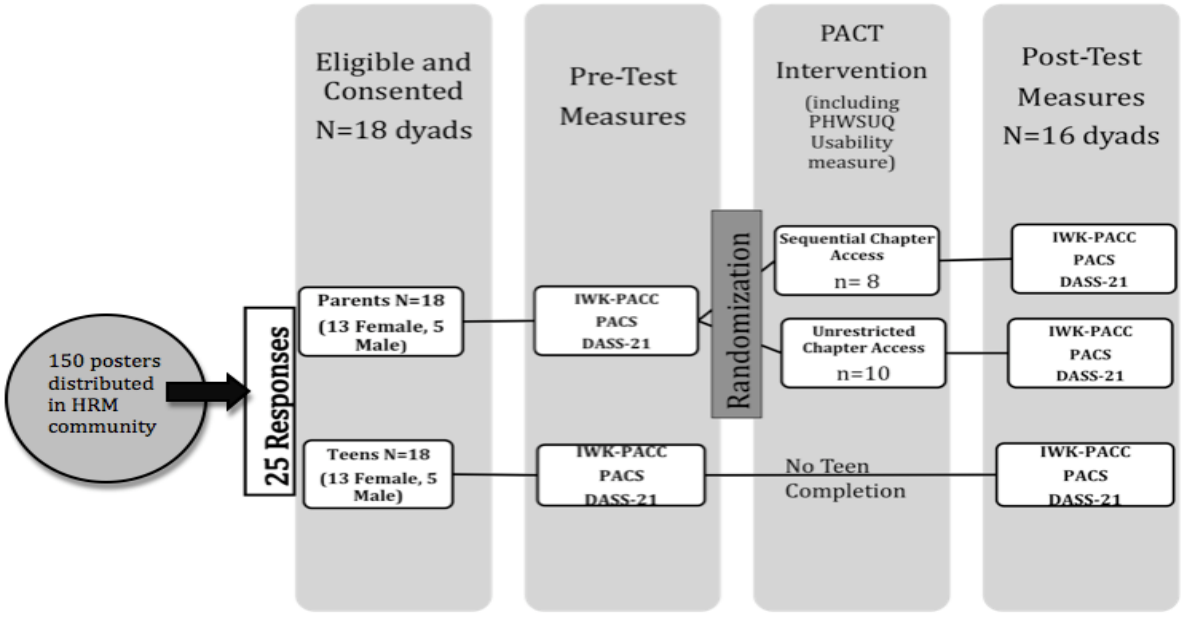

Figure 1. Participant Flow and Research Design Diagram.

Pre-test Data Collection. Participants (parents and adolescents) completed the first pretest questionnaires during a telephone appointment with the principal investigator. Parent participants completed the demographics questionnaire (Appendix F). Parent and adolescent participants completed in the following order, the IWK-PACC questionnaire (Appendix G), the PACS (Appendix H), and the DASS-21 (Appendix I) over the telephone. The pretest telephone interview was approximately 30 minutes. Parents and adolescents completed the measures individually, and independent of the other person to increase accuracy of responses. Data was recorded on paper questionnaires by the study investigator and entered into an Excel spreadsheet. Appendix J provides the telephone script for both the pre-test and post-test assessments.

Login and Study Randomization. Following consent, parent participants were randomized into one of two intervention delivery style categories, sequential module access or unrestricted module access. Randomization occurred using an online randomizer (Urbaniak & Plous, 2014), by creating one set of twenty numbers, with two coded values randomized. These values (1 and 2) were chosen to code for and represent each study condition with ten values in each respective condition.

Following participant module access randomization, an individual log in and password for the IRIS system was provided to each parent participant. This login enabled the participant to enter the PACT intervention IRIS site at their convenience for the correct program delivery style group participants were randomized to. The login name for the participant was the participant identification number that was previously assigned to each participant.

Parents completed identical PACT content, although the access to modules differed within the intervention delivery style categories. Parents completed either the sequential module access, with each module unlocked only after a previous module was finished or the parent had

unrestricted module access. Unrestricted module access provided more freedom to participants but may have affected how the participants learned the PACT skills, as the skills might not have been acquired in the pre-defined sequence.

Intervention Data Collection. Parent participants accessed the IRIS site, and completed both the PACT intervention content and the usability questionnaires. The Perceived Health Website Usability Questionnaire (Nahm, Preece, Resnick & Mills, 2004) (Appendix K), was administered following the completion of each intervention module and was combined with three open-ended usability questions. These open ended questions inquired about participant likes, dislikes and potential changes regarding each module. Participants could complete the PACT intervention and associated questionnaires at their own pace, and could log in and out of the system without losing previously entered data.

All parent participants had a maximum of six weeks to complete the intervention and associated questionnaires. To ensure that all parent and adolescent participants completed the study measures similarly and to reduce threats to internal validity, all post-test data collection occurred at a six week follow up for participants, regardless of when the parent participants finished the intervention.

Post-test Data Collection. After six weeks, both parent and adolescent participants completed the post-test questionnaires, over the telephone. These questionnaires were the same as the questionnaires administered in the pre-test, and were delivered in the same order. This phase lasted approximately thirty minutes per participant.

Materials

Website. The study was conducted using a web-based platform entitled Intelligent Research Intervention Software (IRIS). IRIS is designed to provide the participant with an

interactive and engaging intervention program. It was customized with the content for our study. IRIS administered the PACT content to participants in the different modes required by the study in a secure portal. All usability questionnaires and intervention content were presented to participants using IRIS, allowing parent participants to complete the usability study portion (content presentation, data collection and preliminary descriptive analyses) of the study entirely through the PACT IRIS website. Participant information (parent and adolescent first names, gender and adolescent age) were entered and stored in IRIS by each parent participant to personalize the intervention for each parent-adolescent dyad. Completing the PACT intervention, reading and answering all associated content, was estimated to take parent participants approximately five hours, allowing participants approximately 30 minutes per PACT module.

Assessment Tools. Four questionnaires were administered to participants during the study. They are described, in order of administration, briefly in Table 1 and in more detail below.

Table 1

Assessment Measures Used in Study Procedure in Order of Participant Completion

Assessment	Questionnaire Format	Administered To	Estimated Time to Complete
IWK- Parent Adolescent Communication Checklist (IWK-PACC)	101 Close ended questions (5 point Likert Scale)	Parent and Adolescent Participants in pre-test and post-test	15 minutes
Parent Adolescent Communication Scale (PACS)	20 Close ended questions (5 point Likert Scale)	Parent and Adolescent Participants in pre-test and post-test	5 minutes
Depression Anxiety Stress Scale (DASS-21)	21 Close ended questions (4 point Likert Scale)	Parent and Adolescent Participants in pre-test and post-test	5 minutes
Perceived Health Web Site Usability Questionnaire (PHWSUQ)	15 Close ended questions (5 point Likert Scale) 3 Open ended questions	Parent Participants during the PACT intervention	5-10 minutes

IWK-PACC. The IWK-PACC (Unruh, Bagnell, Huguet, & McGrath, unpublished data) assessed the strength of parent-adolescent communication between parent and adolescent dyads. The IWK-PACC was designed to determine the validity of applying the Gottman communication models on parent adolescent relationships. There are three scales in the IWK-PACC, entitled Building Relationships, Positive Communication and Negative Communication. Each of these scales consist of subscales that divide Gottman principles into subconcepts, so that when assessed with the IWK-PACC, can determine what specific behaviour of the parent or adolescent is problematic to the overall parent-adolescent communication. This scale has been previously correlated with the Parent-Adolescent Communication Scale (PACS) measure, with the results

indicating significant concurrent validity (unpublished data). The IWK-PACC was chosen because it uses the same model of parent-adolescent communication constructs as our intervention does. It provides a rating of the strength of each specific concept (each PACT module skill) for each parent-adolescent dyad. The IWK-PACC is found in Appendix G.

PACS. The Parent-Adolescent Communication Scale (PACS) (Barnes & Olsen, 1985) was used as a secondary measure of the quality of communication between and adolescent and their parent. It was chosen because the measure is widely used by researchers in parent-adolescent communication literature and is well established in family communication studies (Bandura, Caprara, Barbaranelli, Regali, & Scabini, 2011; Prado, Patin, & Huang, 2012; Forehand, Miller, Dutra, & Chance, 1997). PACS is designed such that both the parent and adolescent complete the questionnaire. A high score on the PACS indicates positive communication. The PACS has two scales, the open family communication and the problems in family communication. It has alpha reliabilities of 0.87 and 0.78, with test-rest reliabilities of 0.78 and 0.77 (Barnes & Olsen, 1985). This measure can be found in Appendix H.

DASS-21. The Depression Anxiety Stress Scale (DASS-21) measured depression, anxiety and stress, with seven items assessing each sub-scale for parent and adolescent study participants. The DASS-21 was chosen as a short measure with high internal consistency (Lovibond & Lovibond, 1995). The DASS-21 has been tested on a variety of clinical populations, and can be used with adolescents. Although the anxiety and depression constructs of the DASS-21 are comparable for adolescents and adults, the stress construct may require minor future revisions for adolescents. Despite these potential modifications, the scale was still considered to be an effective assessment tool (Szabó, 2010). This measure can be found in Appendix I.

PHWSUQ. The Perceived Health Web Site Usability Questionnaire (PHWSUQ) consists of four subscales, including ease of use, satisfaction, usefulness and logic of organization. Scores are obtained by summation of each subscale. The questions from this scale are obtained from combining two previous usability (Keinonen, 1997) and website questionnaires (Spool, Scanlon, Snyder, Schroedar & DeAngelo, 1999), with the measure authors selecting relevant questions from each. It has been modified and applied to a variety of health websites as it provides open and close ended website usability assessment. Although originally tested on a small population (n =10), three usability experts rated the face validity of the scale as high (Nahm et. al., 2004). This questionnaire was modified slightly (by changing the word "website" to "chapter") to meet this study's requirements. The PHWSUQ questionnaire is in Appendix K and is used with author permission. The PHWSUQ was chosen due to the primary goal of the scale being to assess usability of online health, the high quality of the questions, and the ease of modifications to tailor it for use of assessing PACT.

Consent

Parents or adolescents volunteered (verbally or via email correspondence with the principal investigator) to complete the study, and were then contacted by the principal investigator to set up a telephone appointment at a time of their convenience. An informational letter (Appendix L) was provided stating the necessity for the document to be reviewed by both the person who initially contacted the study investigator and the potential participant's parent or adolescent. When any parent or adolescent indicated interest in the study, he or she was provided with an informational letter via email, discussing the study procedure and inclusion criteria. After receiving and reviewing this letter, parents and adolescents had the opportunity to ask any

questions or address any concerns about the study procedures via telephone with the study investigator.

During the telephone appointment with the principal investigator, it was determined if the potential participant met the study inclusion criteria. The parent telephone consent script can be found in Appendix M and the adolescent telephone consent script is found in Appendix N. The consent call was only completed when it was established that both potential parent and adolescent participants in a dyad had reviewed the informational letter provided by the study investigator. Following responses to participant questions, participants were asked to describe what they understand the procedure and goals of the study to be. When it was determined that the potential participant understood the study procedure, the study investigator obtained formal verbal consent via the telephone, and answered any additional questions.

Following formal consent of the participant, the participant was asked to encourage their parent or adolescent to contact the primary investigator to determine if they wished to consent to participate in the study. The first participant was informed that the study could not be started if the parent/adolescent did not consent. If the second potential participant did not contact the primary investigator within a week, the primary investigator contacted the consented participant to determine if the secondary potential participant had interest in the study.

When the second potential participant contacted the primary investigator, the telephone consent call was completed. After consent, the pre-test assessments were administered. All telephone calls for either consent or study assessments were recorded for quality assurance and research purposes. The recordings were stored on a secure database at the IWK, held by the study administrator and will be destroyed five years after the study ends. The consent call took participants approximately fifteen minutes to complete.

If there was more than one adolescent present in the parent participant's household, the parent was asked to choose one adolescent to complete the study. Parents were informed that they could still apply the skills they learn to their other adolescents, although for study purposes and ease of data collection, the research team must focus on one adolescent in each home.

Participants

Eighteen parent-adolescent dyads completed the study. Adolescent participants were between the ages of 13 to 17 years and were a resident in their parent's home. Parent participants in the study agreed to commit to the six weeks required of the study. No parent had participated in any additional parenting or communication behavioural interventions in the last six months. Both parents and adolescents who participated were able to read, write and speak fluent English. All parent participants had access to the Internet. Parents who had completed any prior research or testing of PACT were excluded from participation. Only one parent and one adolescent from each family participated in the study.

Participants (both parent and adolescent) were typical in regards to social, emotional and cognitive functioning, with no reported psychological disorders. Parents who reported any severe psychological impairment for themselves or their adolescent, were excluded from the study. Parents or adolescents could also be excluded from the study if they sought the help of a health professional for a mental health concern within the last six months. The study investigator assessed these inclusion criteria during the consent call with the parent participant. All volunteers for participation met these study criteria with three parent volunteers excluded due to their adolescents being unwilling to participate.

Parent and adolescent participants were recruited from the Halifax Region Municipality, by notice board posters in community organizations such as grocery stores, community

recreational facilities, restaurants and pharmacies. A sample recruitment poster can be found in Appendix O. Participants were also recruited using word of mouth by the study principal investigator. Fathers were especially encouraged to participate, through word of mouth encouragement of father involvement and community recruitment posters specifically directed to fathers. A community recruitment poster specifically encouraging father participation is depicted in Appendix P. Although efforts were made to distribute posters in a variety of neighborhoods, the placement of posters (primarily in higher socio-economic status neighborhoods) may have limited the recruitment of a more diverse sample.

Participant demographic characteristics are described in Table 2 for both the sequential module analysis and the unrestricted module access parent groups. Parent participants were primarily birth parents, relatively well educated (most achieved a 2 year college diploma or higher) and had a secondary parent in their family. No parents earned less than $20, 000 per year. Parent-adolescent dyads were primarily mother-daughter with the mean age of adolescent participants being 15 years old.

Table 2

Participant Demographic Information of Parent and Adolescent Participants

	Sequential Module Access Participant Frequencies n= 8 dyads	Unrestricted Module Access Participant Frequencies n= 10 dyads	Total Participant Frequencies N=18 dyads
Parent Gender			
Female	7	6	13
Male	1	4	5
Adolescent Gender			
Female	4	9	13
Male	4	1	5
Mean Age (sd)			
Parent Participants	45.5 (13.403)	43.5 (7.61)	44.389 (6.80)
Adolescent Participants	15.5 (1.309)	14.9 (1.269)	15.167 (1.339)
Relationship Dyad Type			
Mother-Daughter	3	6	9
Mother- Son	4	0	4
Father- Daughter	1	3	4
Father-Son	0	1	1
Parent Type			
Birth Parent	7	9	13
Step Parent	0	1	1
Adoptive Parent	1	0	1
Highest Level of Parent Education Completed			
Less than high school	1	0	1
High School Diploma	0	2	2
Some College		2	2
2 Year College Diploma	5	2	7
4 Year University Degree	2	3	5
Master's Degree	0	1	1
Mean Family Annual Income			
20 to 40 thousand dollars	1	0	1
40 to 60 thousand dollars	2	6	8
60 to 80 thousand dollars	3	2	5
Greater than 80 thousand dollars	2	2	4
Parent Status			
Two Parent Families	6	7	13
Single Parent Families	2	3	5
Mean Children Per Household (sd)	1.5 (0.787)	1.5(0.527)	1.5 (0.612)
Mean Teens Per Household (sd)	1.125 (0.354)	1.3 (0.483)	1.2 (0.428)

Attrition of Participants. Reminders to parent participants were sent when IRIS detected that the participant was not completing the intervention content. Due to modestly high attrition rate in the previous usability study (30% of participants) (Toombs, unpublished honours study), study investigators were concerned that attrition would be a problem for this study as well. To mitigate attrition rates of participants, occasional email reminders to parent participants were provided to encourage completion of the PACT intervention and associated questionnaires if participants had not completed any content in any week duration of the study. These reminders briefly summarized how much of the intervention parent had currently completed and encouraged parents to complete the remainder of the PACT content and associated usability questionnaires. If parent participants did not complete all of the PACT content, both the parent and adolescent participants were still contacted and asked to complete the post-test assessments.

Reimbursement. A gift card ($20 value) for Superstore was given to parents as a token of gratitude for study participation. A gift card ($10 value) to Cineplex Theatres was provided to the adolescent participants to give thanks for participating in the study.

Ongoing Intervention Modification. Participant completion times varied allowing the feedback that was provided by some parents to be collected before other participants began the study. Only technological issues within the PACT intervention (such as typos or broken links between pages) reported by parents were immediately fixed.

Ethical Considerations

There were minimal risks for participating in this study. The study was approved by the IWK Health Centre Research Ethics Board (Project #1014794) on October 23, 2013. Parent or adolescent participants were informed that if they offered any information at any time throughout the study that someone was at risk of harm (themselves, a family member or someone else), this

information would not be kept confidential. For example, the final question in the DASS-21 questionnaire asks if the participant feels that "life is meaningless". If the participant answered yes to this question and affirmed that they were at risk of harm, the participant would have been asked to seek professional assistance and informed that the appropriate authorities would be informed if necessary (e.g. in the case of children), and the participant would have been advised of emergency procedures. No participants in the study indicated risk of harm, and thus no events were reported.

Care was also taken by the research team when writing the PACT content to ensure that the skills presented to parents were as clear as possible. This was partly to ensure that parents understood the meaning of each skill and how to implement it correctly with their adolescent. If parent participants experienced confusion with the PACT intervention skills, they entered these concerns at the end of each PACT module. The principal investigator monitored this feedback and would have addressed these concerns via email communication with the participant although it was not necessary.

By introducing clear, pro-social skills with parents, it is theorized to reduce harm if parents did misinterpret the PACT content. Many parenting interventions addressed to meet population health needs take a similar approach. For example, although spanking is a legal practice with specific constraints (Criminal Code, 1985), Strongest Families prohibits this form of discipline in their child behavioural intervention, as parents may misunderstand the rules of spanking and cause harm to their child. This is highly unlikely in the PACT intervention, as care was taken during PACT development to drastically reduce the likelihood that parents would cause harm to their relationship with their adolescents if the skills they learned were implemented incorrectly. By clearly defining the PACT skills, providing many written and

audio-visual examples and keeping the skills pro-social, the development of PACT, the likelihood of misunderstanding resulting in serious harm to the parent-adolescent relationship was minimized.

Participant confidentiality. Participant confidentially was maintained by assigning participant numbers to all parent and adolescent participants at the beginning of the study during the consent process. In all telephone recorded interviews, data analysis and labeling of participant information, participants were referred to by their participant number or their first name. Any other identifying information was not used and first names were only used when the study investigator was communicating directly with the parent. During the intervention, parents had the option to enter participant information (such as first and last names, as well as adolescent ages) at their own discretion, and could choose a pseudonym if desired. The PACT intervention, hosted on the IRIS platform is a secure website, as deemed appropriate by the IWK Health Centre firewall protocols and the Research Ethics Board.

Risks of Participation. Although this was a low risk study, it is important to recognize the minimal risk that may have occurred. These risks included the uncompensated time lost completing the intervention and questionnaires, frustration or boredom when completing the study or minor eyestrain from computer use to access the intervention. If parent participants did experience distress as a result of the PACT program information or as a result of completion of the study, they could contact the study investigators via telephone or email although no participants reported any problems to study investigators. This contact information was provided in the informational letter given to all parent and adolescent participants, as well as located on the PACT IRIS webpage.

Benefits of Participation. Upon completing this study, participants could have become more aware of the importance of parent-adolescent communication. This study provided parents with the opportunity to learn new relationship building skills and to potentially improve the relationship they share with their adolescents. This study may have increased parents' awareness of the importance of their parenting behaviour and could have highlighted potential areas of concern for parents or adolescents.

Data Management and Analysis

All participant data was coded with identification numbers. The master coding sheet, with names and numbers matched, as well as the coding protocols was kept separate from all other study files to protect anonymity and confidentiality of the data. This file was encoded in an electronic copy that is held by the lab coordinator for Centre of Research in Family Health. Participant data will also be kept on site at the IWK Health Centre for five years time on secure Canadian servers behind a health system firewall in the Centre for Research in Family Health research team database. The study investigator or research coordinator, as per IWK Health Centre data management protocols, will then destroy all electronic and written files.

Analysis. Descriptive statistics were used to examine participant demographics. The usability ratings of each PACT intervention module were compared using descriptive statistics, and the overall usability mean for each was calculated. These means were compared using a one-way analysis of variance to determine if one module significantly differed from another, although it was expected that all module ratings would be relatively similar. Usability ratings were compared between the sequential module access and the unrestricted module access groups to determine if differences in ratings existed using a paired t-test.

Differences in parent-adolescent communication scores for the PACS and the IWK-PACC were assessed using paired t-tests, comparing the post-test parent and adolescent questionnaire scores to the pre-test scores. The concurrent criterion validity of PACS and the IWK-PACC was assessed using Pearson's correlations, with a moderately positive correlation expected. The DASS-21 pre-test and post-test ratings were compared using paired t-tests for parent and adolescent participants to determine if mood, anxiety or stress participant scores change upon administration of the PACT intervention.

Data Quality. Data quality was maintained to the best ability of the research team. The intervention website (IRIS) used for the study was password protected, allowing only the research team to have access to participant data. Data was obtained via the IRIS website as well as telephone interviews. Data was compiled using an Excel spreadsheet and was imported into the statistical analysis program, SPSS-20 which was used for the majority of analysis. When participant data was entered into Excel, it was checked for accuracy twice by the primary researcher. Descriptive statistics were calculated both in Excel and SPSS-20 to ensure accuracy. A second person reviewed advanced analyses to ensure they were completed correctly.

CHAPTER 4 RESULTS

This chapter will review the study findings and statistical analyses conducted to assess the four hypotheses of the current study. The hypotheses were to determine that parent usability ratings were high, if parents randomized to the sequential module access group would have higher completion rates and usability ratings than those in the unrestricted module access group, if parent and adolescent post-test communication and emotional functioning scores would be significantly higher than pre-test scores and if the IWK-PACC measure would be correlated with the established PACS measure. As the main purpose of the study is to assess the usability of PACT, the participant usability ratings will be described, and a comparison of participant attrition rates by module will be provided. The chapter concludes with results describing the preliminary effectiveness of PACT and correlations between the IWK-PACC and PACS measures. It should be noted that although 18 participants began the study, two dyads did not complete both the pre and post-test assessments and were omitted from analysis. Both participants who did not complete post-test assessments did not complete any of the PACT content. One participant could not be contacted after study pre-test assessments and the other participant stated personal reasons associated with work commitments for not wishing to continue the study after the six week duration. The analysis included the remaining 16 parent-adolescent dyads that completed all study assessments.

Hypothesis 1: Parent usability ratings of PACT would be high

Participant usability module ratings were rated highly by both participant groups with Table 3 depicting the mean module ratings for the sequential access and unrestricted access participant groups. The total ratings per module (obtained by averaging all participant scores for

each chapter) were analyzed using a one-way ANOVA and did not differ significantly from one another at the p <.05 level for the ten modules **[**F (9, 98) = 0.434, p =0.914)].

Table 3

Mean Usability Module Ratings by Participant Group and Total Scores

Module	Sequential Module Access M (SD) (n=6)	Unrestricted Module Access M (SD) (n=10)	Total (N=16) M (SD)
Module 1	73.20 (4.82)	61.56 (5.32)	65.71 (7.62)
Module 2	71.40 (8.20)	61.80 (7.19)	65.00 (8.63)
Module 3	73.20 (6.10)	60.90 (8.85)	65.00 (9.85)
Module 4	72.2 (10.73)	59.86 (9.89)	65.00 (11.65)
Module 5	72.00 (10.10)	63.30 (9.24)	67.8 (10.14)
Module 6	69.20 (10.96)	63.00 (7.00)	66.10 (9.27)
Module 7	76.00 (1.73)	66.00 (8.03)	69.75 (8.03)
Module 8	76.33 (1.15)	65.00 (7.84)	69.25 (8.36)
Module 9	76.00 (1.73)	63.80 (9.20)	68.38 (9.44)
Module 10	77 (0.00)	64.00 (7.78)	68.88 (8.94)

Participant Usability Feedback. Parent participants were provided the ability to provide written feedback following the end of each PACT module. Appendix Q provides a list of parent feedback responses by module that was obtained from parent participant input on the PACT intervention. These responses are organized by both the chapter access group for each parent and by participant number. The questions asked what the parents preferred about each module, what they found to be negative and what they would like to change. Few modifications were suggested. Instead, parents stated what they found most helpful about module skills. Parents found the Relationship Memory Bank and Being Specific with Praise skills to be useful. Many parents found maintaing smaller traditions to be helpful as well as recgonizing negative strategies of communication. In regards to negative feedback to PACT content, feedback from

parents indicated that the audio-visual content needs to be modified. The media did not work on all forms of technology (such as tablets or smart phones) and the quality was deemed to be poor. The Apply Your Knowledge sections of PACT should also be modified to reduce the number of questions asked to parents. Throughout PACT, the number of examples should be reduced as well as repetitive content within each module.

Hypothesis 2: Parents randomized to the sequential module access group would have higher completion and usability ratings than parents in the unrestricted module access group.

Two dyads did not complete the post-test study questionnaires and were removed from subsequent analyses. Parent participants who remained in the study varied in how many modules of PACT they completed, with 8 participants (50%) completing all ten modules of the intervention. These modules are dispersed within four sections of PACT, with 62.5% of participants completing the entire first section, and 50% of participants completing sections two, three and four. Participation decreased dramatically after Module 4. Table 4 depicts the percentage of parent participants who completed each module by randomization to the sequential or unrestricted module access groups.

Table 4

Percentage of Participant PACT Module Completion

Section of PACT	Module Number	Sequential Module Access n=6	Unrestricted Module Access n=10	Total N=16
One	Module 1	100% (6)	100% (10)	100% (16)
	Module 2	83.33% (5)	100% (10)	93.75% (15)
	Module 3	83.33% (5)	100% (10)	93.75% (15)
	Module 4	83.33% (5)	70% (7)	75% (12)
	Module 5	66.6% (4)	50% (5)	56.25% (9)
Two	Module 6	62.5% (4)	50% (5)	56.25% (9)
	Module 7	50% (3)	50% (5)	50% (8)
	Module 8	50% (3)	50% (5)	50% (8)
Three	Module 9	50% (3)	50% (5)	50% (8)
Four	Module 10	50% (3)	50% (5)	50% (8)

Participant global usability ratings by each access group were also analyzed to determine if the sequential module access group rated the content higher than the unrestricted module access group. These global ratings were obtained by adding participant scores across modules and dividing by the total score possible for how many modules each completed. The sequential and unrestricted module access groups were compared using an independent t test, and significant differences [$t(5) = 2.486$, $p=0.027$] were detected between the sequential ($M=0.9339$, $SD=0.09395$) and unrestricted module access groups ($M=0.8056$, $SD=0.09440$) at a $p<.05$ level of significance with an effect size of 0.86.

Hypothesis 3: Parent and adolescent post-test communication and emotional functioning scores would be significantly higher than pre-test scores

Although limitations are further discussed in Chapter 5, it is important to note that the results are considered preliminary effectiveness outcomes and obtained using a very small sample size. The measures used to assess this hypothesis were completed immediately before

and after the intervention, with no follow-up assessment. The statistical analyses used to obtain these results were completed using an assumption of parametric data, however when analyses were completed using non-parametric analyses, similar results were found. The non-parametric data results are provided in Appendix R.

Adolescent Participant Outcomes. Paired t tests comparing pre-and post-test communication scores specifically for adolescent participants were not significantly different for either the IWK-PACC [t(15) = 1.626, p=0.125] (effect size 0.19) or the PACS [t(15) = 1.478, p=0.160] (effect size 0.22). The DASS scores for adolescent participant pre-test and post test ratings were also compared to determine if the emotional functioning of adolescent participants were affected by PACT. Paired t tests were used, and no significant differences were detected for depression [t(15)= 1.549, p=0.142] or stress [t(15)= 1.612, p=0.128]. Anxiety post-test scores were significantly lower than pre-test scores [t(15)= 2.394, p=0.03] with an effect size of 0.50.

Parent Participant Outcomes. When paired t-tests were conducted for parent participant communication scores, significant differences were detected for both the IWK-PACC [t(15) = 2.689, p=0.017] with an effect size of 0.36 and the PACS [t(15)= 3.168, p=0.006] with an effect size of 0.42. The pre-and post-test emotional functioning scores of parent participants were also analyzed, but no significant differences were found for anxiety [t(15)= -0.194, p=0.849], depression [t(15)= -0.831, p=0.419] or stress scores [t(15)= -1.263, p=0.226].

To assess preliminary effectiveness outcomes for the sequential or unrestricted chapter access groups, further analysis was carried out among parent participants randomized into each of these groups, however no significant differences were detected. A repeated measures analysis of variance (ANOVA) comparing pre-and post-test scores of the IWK-PACC produced no

significant differences [F(2,29)=1.736, p=0.194] between the sequential module access group and the unrestricted access parent randomization groups for parent participants. A repeated measures ANOVA comparing the PACS scores by group indicated no significant differences between these groups as well [F (2,29) = 0.520, p=0.600].

IWK-PACC Subscale Results. To obtain the preliminary effectiveness results previously described, the IWK-PACC was divided into three primary subscales, entitled Building Closeness and Admiration (BCA), Reducing and Repairing Conflict (RRC) and Increasing Conflict (IC). For the purpose of this analysis, the two positive communication scales, BCA and RRC, were combined and the negative IC was reverse scored to produce a total IWK-PACC communication total. The PACS subscales were combined, with the negative sub-scale reverse scored. The mean pre-test and post-test communication ratings for parent and adolescent participants are described in tables below. The mean participant scores for the IWK-PACC and the PACS are described in Table 5 and graphically in Figure 2.

Table 5

Mean Participant Communication Pre-Test and Post-Test Scores for the IWK-PACC and PACS Measures.

Measure (Max)	Parent Pre-Test M (SD)	Teen Pre-Test M (SD)	Parent Post-Test M (SD)	Teen Post-Test M (SD)
PACS Total Score (50)	15.13 (9.45)	9.94 (10.07)	20.06 (9.91)	13.00 (9.90)
IWK-PACC Total (204)	111.19 (52.41)	139.50 (50.10)	133.00 (43.21)	152.82 (50.08)

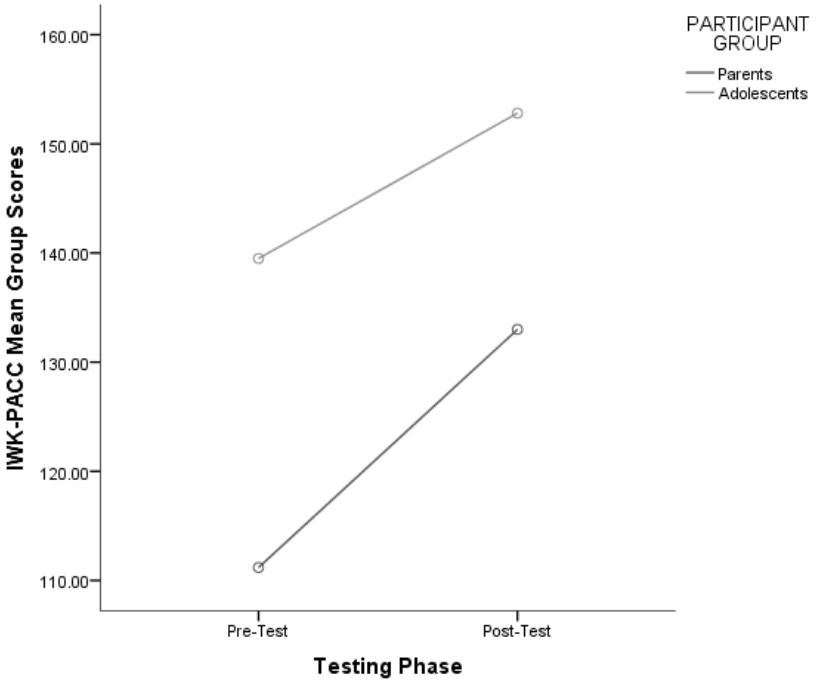

Figure 2. Changes in Pre-test and Post-test IWK-PACC Scores for Parent and Adolescent Participants.

These communication score totals are further described by individual measure subscale below. The mean communication ratings for pre-test and post-test scores by parent and adolescent participants for the IWK-PACC primary scales and further subscales are depicted for the BCA scale (Table 6), the RRC scale (Table 7) and the IC scale (Table 8). The PACS measure subscales can be found in Table 9.

Table 6

IWK-PACC Building Closeness and Affection Subscale Parent-Adolescent Communication Pre-Test and Post-Test Mean Scores.

IWK-PACC Scale	Sub-Scale (Max)	Parent Pre-Test M (SD)	Parent Post-Test M (SD)	Teen Pre-Test M (SD)	Teen Post-Test M (SD)
Building Closeness and Affection (152)	Turning Towards (24)	18.50 (4.52)	18.94 (3.66)	20.50 (4.08)	21.25 (3.92)
	Fondness and Admiration (24)	18.63 (4.91)	19.94 (3.73)	21.50 (3.33)	22.13 (3.32)
	Shared Meaning (24)	19.13 (3.83)	20.44 (3.01)	20.94 (3.12)	20.88 (4.19)
	Rituals of Connection (20)	15.63 (3.93)	16.69 (3.91)	16.19 (3.90)	16.38 (3.93)
	Making Dreams Come True (20)	15.06 (3.36)	15.56 (3.42)	17.06 (3.82)	18.06 (2.67)
	Accepting Influence (20)	14.06 (3.68)	14.38 (2.68)	15.31 (4.59)	16.06 (3.45)
	Accepting One Another (24)	20.00 (3.56)	21.19 (3.60)	22.13 (2.68)	21.63 (3.98)
Scale Total		121.00 (24.71)	127.13 (21.31)	133.63 (23.61)	136.38 (24.03)

Table 7

IWK-PACC Reducing and Repairing Conflict Subscale Parent-Adolescent Communication Pre-Test and Post-Test Mean Scores.

IWK-PACC Scale	Sub-Scale (Max)	Parent Pre-Test M (SD)	Parent Post-Test M (SD)	Teen Pre-Test M (SD)	Teen Post-Test M (SD)
Reducing and Repairing Conflict (52)	Compromise (12)	8.43 (2.28)	8.88 (2.00)	8.94 (2.89)	9.50 (2.37)
	Soft Startup (16)	10.00 (2.99)	10.56 (3.97)	10.63 (3.46)	11.00 (3.43)
	Repair and De-escalation (24)	15.94 (4.14)	17.50 (4.99)	17.25 (4.99)	18.38 (4.77)
Scale Total		34.38 (8.38)	36.94 (9.96)	36.81 (10.30)	38.88 (9.71)

Table 8

IWK-PACC Increasing Conflict Subscale Parent-Adolescent Communication Pre-Test and Post-Test Mean Scores.

IWK-PACC Scale	Sub-Scale (Max)	Parent Pre-Test M (SD)	Parent Post-Test M (SD)	Teen Pre-Test M (SD)	Teen Post-Test M (SD)
Increasing Conflict (-156)	Criticism (24)	6.81 (5.68)	6.19 (5.04)	5.31 (3.98)	3.75 (3.77)
	Contempt (24)	5.56 (4.40)	3.81 (3.49)	3.50 (3.50)	1.94 (2.59)
	Stonewalling (24)	8.67 (5.93)	6.25 (3.64)	3.31 (3.36)	1.50 (1.83)
	Defensiveness (24)	9.13 (5.34)	5.31 (4.32)	4.63 (5.39)	3.94 (5.74)
	Physiological Arousal (16)	6.38 (4.65)	4.75 (4.25)	5.50 (3.85)	4.88 (3.63)
	Harsh Start Up (24)	7.63 (5.58)	6.19 (5.88)	8.69 (6.47)	6.44 (5.74)
	Flooding (20)	5.38 (5.21)	3.75 (4.27)	5.19 (5.68)	3.50 (5.23)
Scale Total		44.19 (27.43)	32.50 (22.28)	30.94 (23.70)	22.44 (20.11)

Table 9

PACS Subscale Parent-Adolescent Communication Pre-Test and Post-Test Mean Scores.

PACS Sub-Scale (Max)	Parent Pre-Test M (SD)	Parent Post-Test M (SD)	Teen Pre-Test M (SD)	Teen Post-Test M (SD)
Positive Communication (50)	38.63 (5.52)	40.63 (5.26)	38.25 (5.96)	39.25 (6.35)
Negative Communication (-50)	23.50 (4.97)	21.19 (5.92)	28.31 (5.29)	26.25 (4.75)
PACS Total Score (50)	15.13	19.44	9.94	13

The three primary subscales of the IWK-PACC (Building Closeness and Affection, Reducing and Repairing Conflict and Increasing Conflict) were analyzed using a repeated measures ANOVA to determine if significant differences exist between pre-test and post-test scores for both parent and adolescent participants. It was found that there were no significant differences between the three IWK-PACC subscales for either parent [$F(2, 1) = 184.544$ $p = 0.745$] or adolescent participants [$F(2, 1) = 243.513$ $p = 0.137$] at a $p<0.05$ level of significance.

Hypothesis 4: The IWK-PACC will be correlated with the established PACS measure

The PACS and the IWK-PACC scales were found to be moderately correlated using Pearson's correlations, with the correlation coefficients ranging from 0.708 to 0.829. Due to possible variance in parent and adolescent ratings, these results are described separately by pre-test and post-test ratings, as well as by parent or adolescent participant. For parent participants, Pearson's correlations for the IWK-PACC and PACS measures were significant at a 0.01 alpha level for both pre-test ($r = 0.829$) and post-test (0.708). Adolescent participant correlations were also significant at a 0.01 alpha level for both pre-test ($r=0.814$) and post-test ($r=0.712$). Figures 3 and 4 depicting the correlation between the PACS and the IWK=PACC scales for the pre-test (Figure 3) and post-test (Figure 4) scores for parent and adolescent participants.

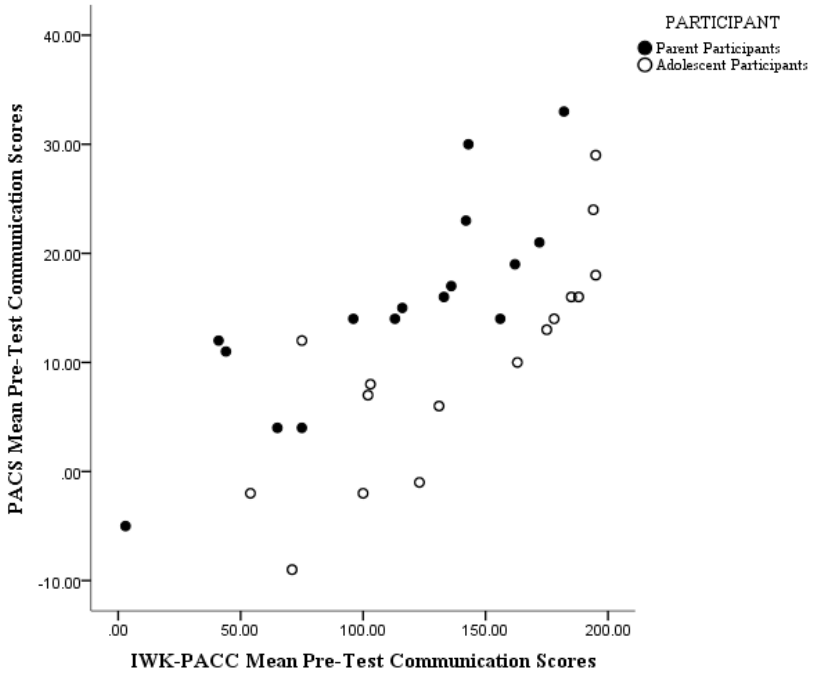

Figure 3. Mean Pre-Test Participant Communication Scores for the IWK-PACC and PACS Measures.

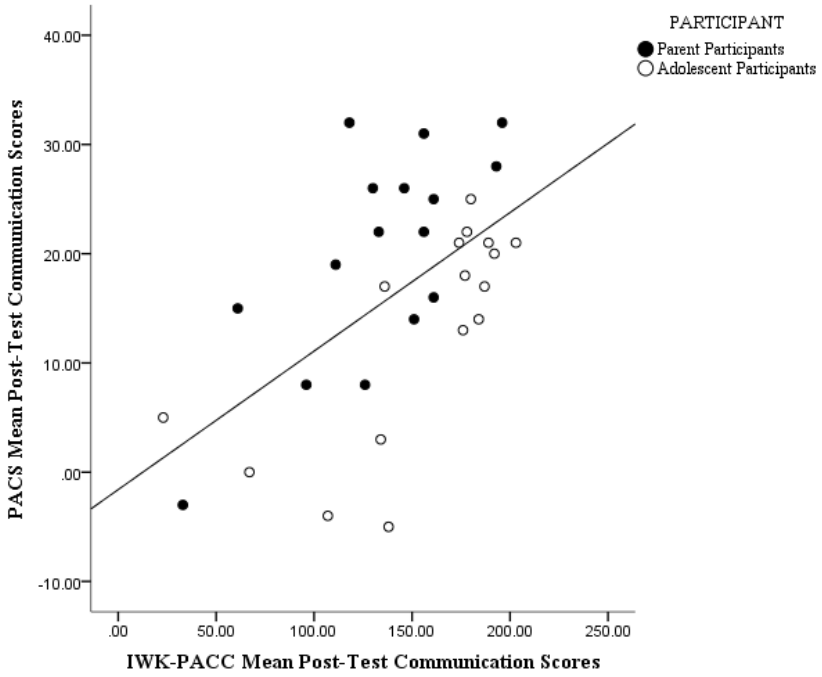

Figure 4. Mean Post-Test Participant Communication Scores for the IWK-PACC and PACS Measures.

CHAPTER 5 DISCUSSION

This chapter will review the outcomes pertaining to the study's hypotheses and their implications for future research. The limitations of the current study are outlined. A description of PACT content modifications is provided with an outline of the future of PACT, including new directions for PACT as a result of the usability and preliminary effectiveness outcomes. The chapter concludes with a discussion of dissemination of the current findings.

The usability participant data of PACT in this study was encouraging. It was hypothesized that the parent usability of the PACT intervention would be high. The results showed that parents rated all of the PACT modules quite highly, thus supporting Hypothesis 1, with a small decreased rating for the audio-visual content. Parents rated the intervention easy to use, found the information provided to be relevant to their lives and rated the information as easy to learn. There were no differences between module ratings, with all modules rated highly by participants. The only consistent feedback provided by parents was that the videos did not work on alternate forms of technology (e.g. tablets or smart phones) and prevented them from completing the intervention at their leisure or viewing the audio-visual content on these devices. The additional feedback was helpful to determine what skill content parents preferred, such as the Relationship Memory Bank and Being Specific With Praise. Parent suggestions were helpful to modify the intervention in the future, such as fixing some links that worked on research computers but did not work for some parents. Parent responses indicated that although they found the content useful, it was, at times, repetitive.

Hypothesis 2, stating that parents who were randomized into the sequential module access would complete more content and rate the usability of PACT higher than participants in the unrestricted module access group, was supported. The sequential module access group rated

the usability of the intervention content significantly higher. The high usability ratings by the sequential module access group provide support for the tunnel structure of the PACT intervention. The tunnel style of content delivery has additional learning benefits aside from participant preference, such as decreased distraction of the user and the insurance that the user completes all the necessary content (Danaher et al., 2005). Due to both high usability ratings and increased learning benefits, the sequential module access is the recommended style of information architecture for PACT participants.

Increased completion rates of the sequential module access also support the use of the tunnel design. Parents in the sequential module access group completed more of the PACT content than those randomized to the unrestricted module access group. Only 2 parents or 11% of participants did not complete all of the modules in comparison to a previous PACT study (unpublished data) in which 6 participants (30%) did not complete all modules. Nevertheless, participant retention should remain a priority for future studies of PACT.

In terms of attempted participation, it should be noted that there was a steep drop off of participation (50% of all participants) within the PACT intervention after module four. Many web-based interventions have similar attrition rates although the full impact of these rates on web-based interventions is only beginning to be understood (Eysenbach, 2005). Although PACT participant retention is similar to many additional forms of web-therapy, attempts should be made to decrease attrition rates. More email reminders from the study could be provided through an automated IRIS system. The steep drop off may be a result of perceived content repetition by parents, as noted by feedback provided during the study, especially for modules four and five. A review of the module material should occur to find any repetition of skill content in the modules and condense material where it is possible.

To decrease attrition rates, both the design of the study and the sample used should be reviewed in preparation for future studies. The study design, using a pre and post-test format, directly contributed to two parent-adolescent dyads data not being analyzed due to not completing the post-test assessments. Providing multiple methods for completion of the questionnaires (such as online or paper versions) may increase participation but still adhere to needs of traditional empirically based research studies of a pre-test post-test design. The design of PACT should also be considered. Half of participants did not completed content after module four of the intervention, despite it being rated equally as high as other modules. PACT is set up in such a way that easier, more basic skills are presented first before more challenging or detailed skills. Parents, especially those who have a positive relationship with their adolescent, may not find the intervention useful due to the simple nature of the first modules and thus may lose interest in completing further modules of PACT.

To increase applicability of PACT to all parent participants, the web-based platform IRIS that the intervention is delivered on can tailor the skills to meet individual parent needs. IRIS can modify what content is presented to parents based on how they respond to questionnaires using algorithms that display or hide module content. If parents completed pre-test assessments online, specifically the IWK-PACC (which directly assesses each of the PACT intervention module skills), IRIS can combine scores and determine internally what content is most suitable for each parent. It can suggest to parents which skills they should begin with in PACT, creating a customized intervention for each user.

Customization of the PACT content may increase participation, as parents would not have to experience unnecessary skill content, meaning that potential boredom, frustration or dissatisfaction could be reduced among users. It could encourage users to feel more connected

to PACT and thus could engage more in the intervention. By providing access to the essential PACT skills to parents at the beginning of the intervention, they can complete the skills that are more relevant to improving the communication with each parent-adolescent dyad. Parents would have information related to their strengths and their weaknesses in communication with their adolescent (as provided by the IWK-PACC) and then could complete skills related to their specific needs first before moving to PACT content that they are already proficient at. If attrition does occur among parent participants, they have received the most relevant skills necessary to improving their relationship with their adolescent first, thus increasing the likelihood that PACT will benefit their parent-adolescent dyad.

Increased customization may also decrease attrition rates when combined with the sequential chapter access tunnel design due to increase relevancy but also rigid content when PACT is disseminated for public use. A systematic review by Christensen, Griffiths and Farrer (2009), found that participation rates for randomized control trials were often much higher (ranging from 50-99% completion) than those for open access websites (ranging from 1% to 50%), specifically for web interventions aimed to reduce depression symptoms. The increased participation rates of RCT studies in comparison to open access websites raises the issues of future attrition in PACT when the intervention eventually becomes available to the public. Using the tunnel design can result in better organization of content and can provide more control for how the researchers present information despite the fact that the intervention would no longer be a controlled study. The tunnel design may result in a better user experience due to the increased relevance and structure of the content. PACT attrition rates are minimal compared to those found in the Christensen et al. (2009) review, however efforts should be made to prepare PACT for external use outside a research setting. By using the appropriate information

architecture combined with the appropriate content, it is theorized that PACT participation rates may increase.

Within a research setting, changing the participant sample may also decrease attrition. By using a sample of parents and adolescent that are experiencing a higher rate of negative communication, parent motivation for participating in a parent-adolescent communication intervention may increase. If parents are experiencing a poor relationship prior to beginning PACT, they may also demonstrate higher parent-adolescent communication outcomes upon completion of PACT than those dyads with relatively high pre-test communication scores.

Hypothesis 3, stating that parent and adolescent post-test communication and emotional functioning scores would be higher than pre-test scores, was partially supported. Emotional functioning was generally not affected by parent completion of PACT for either parents or adolescents. Communication scores, specifically for parents, on the IWK-PACC and PACS post-test communication measures were significantly higher than pre-test scores demonstrating preliminary effectiveness of PACT. Although the power of these analyses is low, these results, combined with the high usability ratings of parent participants are supportive to the future development of PACT. Parent perceptions of parent-adolescent communication can impact the way a parent will interact with their adolescent, and thus may change the way they communicate. Due to the many positive benefits of decreased conflict within a parent-adolescent dyad, these results are encouraging for PACT as a method to increase parent-adolescent communication for families and potentially improve family relationships.

When adolescent pre-test and post-test IWK-PACC and PACS scores were analyzed, there were no significant differences detected for these adolescent communication ratings. The lack of significant findings may be attributed to the high ratings in pre-test communication scores

for adolescents. There appears to be a ceiling effect. Most adolescents who participated in this study initially rated the communication with their parents quite high, as depicted in Figure 3. These initial high scores may shield possible differences in pre-test and post-test scores and make significant differences between rating time points possibly more difficult to detect. If initial pre-test communication scores were lower for participants, then it is possible that there may be more of a significant difference between pre-test and post-test groups for adolescent and even parent participants.

Despite the lack of effects detected for adolescent participants, these preliminary effectiveness outcomes are encouraging for the future of the PACT intervention. Perceived disparities in parent-adolescent communication are not uncommon (Weisskirch, 2011; Zhein et al., 2011), and thus a further examination is required to determine the mechanism behind the current study findings. At this point, it is unclear if the study findings are due to increased ceiling effects of the adolescent communication scores or if the parent-adolescent dyads perceive communication differently upon implementation of the PACT intervention.

The same concern may explain why significant differences were not found for an increase in emotional functioning of PACT participants. PACT did not affect the emotional functioning of parent or adolescent participants and there was no significant reduction of stress, anxiety or depression scores. Pre-test DASS-21 scores were relatively low and differences would have been difficult to detect. As PACT was not designed to specifically target stress, anxiety or depression, it is not surprising that reduction of these scores did not occur. Upon future testing of PACT, with parents and adolescents experiencing a higher level of poor communication may produce different results.

Hypothesis 4, stating that the IWK-PACC would be correlated with the PACS, was supported. The correlation of these ranged from moderate to high, providing support for a high concurrent criterion validity of the IWK-PACC measure. The difference in correlations computed is addressed further in the discussion of study limitations. Despite these small differences, the high correlations between the IWK-PACC and the PACS measure indicate that the IWK-PACC is a valid measure. These results suggest that the measure can continue to be used for PACT participant communication assessment. Due to the IWK-PACC assessing specific constructs that correspond directly to individual PACT modules, it is an ideal measure to use for assessing parent-adolescent PACT outcomes within dyads.

Additionally, father involvement in PACT was encouraging although small numbers did not permit analysis of gender differences. Through the parental feedback provided, fathers seemed satisfied with the content and felt that the intervention was helpful. These results, although informal, are important because fathers tend to be less willing to participate in parenting interventions and often have a much higher attrition rate and lower satisfaction than mothers (Lee & Feldgaier, 2013). More paternal involvement in PACT in the future is encouraged to provide more knowledge on gender differences within this intervention.

Study Limitations

It should first be stated that this study represents a necessary step in the development of PACT in planning the next trial of testing. Exploratory analyses were conducted in the study without taking into account experiment wide error. Therefore, it is recognized that a small sample size reduced the amount of power of the analysis, as well as the external validity of the findings, especially as a convenience sample was used in the study. Despite the low power, moderate effect sizes were found. Assumptions about the parametric nature of the data were also

made that could further reduce the power of analyses. The lack of control group prevented the comparison of participants who received the PACT intervention and a baseline group that did not receive treatment. An absence of a control group and lack of follow up measures (such as 3 month or 6 month follow up) limits the conclusions that can be drawn from the data obtained in regards to the effects of the intervention over a period of time. These statistical limitations are ignored in the present study due to the exploratory nature of the research.

The main limitation of the study was a participation bias of the specific parent and adolescent dyads that volunteered to complete the study. During the recruitment phase, approximately six parents expressed interest in completing the research study, although could not participate due to the unwillingness of their adolescent. Both parent and adolescent were required to participant, with parents often the first in the dyad to express interest and consent to the study. It is possible that parents and adolescents who volunteered to participate in the study may have increased parent-adolescent communication practices than those who could not participate due to the lack of a consenting adolescent. The high adolescent communication scores in comparison to initial parent scores provide support for this and indicate that care should be taken to ensure a more representative population of parents and their adolescents in the future.

There was also an error of implementing the IWK-PACC scale. The sub-scale items were not randomized upon implementation with participants, and therefore, a bias in participant responses may have occurred. The 96 item version of the scale was used, and not the reduced 61 item scale that was recommended by the scale creators. This error may have influenced the participant data, and may be why the correlations of the IWK-PACC measure with the PACS measure were not as high as expected.

PACT Content Modifications

According to parent usability feedback, small modifications to PACT are required before the next phase of testing. The primary concern for parents was the audio-visual content and how it did not work for alternative forms of technology such as tablets and smart phones. The format of the current videos on the PACT interface should be modified to ensure this problem does not arise in future studies. If this project receives additional funding, the PACT audio-visual components should be updated to a more professional format as well. Although this was not within the scope of the current study, higher quality videos could increase the professionalism and participant appeal of the intervention. Additional audio-visual components, depicting more families in various communication situations can increase the appeal of the intervention for more families as well. As the current videos depict communication within a mother-daughter dyad, increasing videos to include more genders and family types could make PACT more relatable to users.

Another way to make PACT more acceptable to participants is to include more topics in the 'Talk About Difficult Issues' section of the intervention. Currently, two topics, Sex and Relationships and Substance Use exist within PACT. These modules provide specific information about these issues for parent-adolescent dyads and encourage parents to use additional PACT skills to plan their conversations with their adolescent. More topics that should be included in PACT are Divorce, Sexuality, Grief, Financial Responsibility, and Bullying. It is important to provide additional information that is more specific for parents that may be struggling with these potentially difficult topics. These categories can provide information on how to apply the general PACT strategies to these individual topics to encourage maximum parent success.

An ‘Ask an Expert’ tool can also be included with the intervention, allowing parents to email the principal investigator with any comments or concerns with the skill content. This function was not originally included in the intervention due to time constraints and is theorized to help facilitate discussion and solve more difficult problems participants may be experiencing. The Strongest Families parenting intervention also includes a section entitled, ‘Ask Dr. Pat’ (Centre For Research in Family Health, 2013), which could easily be applied to PACT. This section allows parents to write anonymously to a clinical psychologist with parenting concerns they are experiencing. The problem is then posted with the psychologist response, allowing more parents access to information related to common parenting concerns. The CRFH centre has an archive of these responses, allowing researchers of PACT to post previous responses that relate to parent-adolescent communication. These previous postings could be included on the PACT website, as an additional resource for parents.

Another additional support resource for parents would be an online forum for communication between participants. A discussion board could facilitate learning in an additional modality, allowing for peer support in a community of parents. Social support, and providing a community for parents has been effective way to provide increased resources for a variety of parent types including parents of children living with disabilities and those residing rural communities (Mickelson, 1997). Single mothers have reported higher rates of social supports through the use of discussion boards and chat forums and a deceased feeling of isolation (Dunham, Hurshman, Litwin, Gusella, & Ellsworth, 1998).

Online social support online has been a positive resource for parents and has been assessed in a variety of research settings (Scharer, 2005). Discussion boards have demonstrated to enhance participant learning (Harman & Koohang, 2005) and provide peer support to

participants. Discussion boards are often more effective if program administrators moderate them and support participant discussions (Levine, 2007). Levine (2007) outlines 10 strategies to facilitate a successful discussion board for participants. Program administrators should begin by posting discussion questions that encourage discussion among participants. Active monitoring of the board should be continuous, and moderators should respond to participant questions in a timely manner, but also allow participants themselves to respond to other participant questions, allowing the contribution of their own knowledge to the discussion.

In regards to PACT, an online forum should only be included if there is a substantial amount of parents partaking in the intervention at the same time, as not all participants will engage in discussion threads and participants must have the ability to respond continuously in conversations with other parents. Discussion boards should also only be included in PACT if there is a moderator assigned to review posts occasionally. For research purposes, discussion boards can also be used to collect qualitative focus group data (Moloney, Dietrich, Strickland, & Myerburg, 2003), and could be useful to analyze further usability preferences of PACT as the intervention undergoes further testing. Although online forums possess more logistical challenges for success, parents might benefit from this resource, and thus if these concerns are met, should be included in the next version of PACT.

The Future of PACT

It is important that the effectiveness assessment of PACT continues following the content modifications previously depicted. Figure 5 illustrates the stages of PACT development in relation to the past, current and future studies related to the intervention.

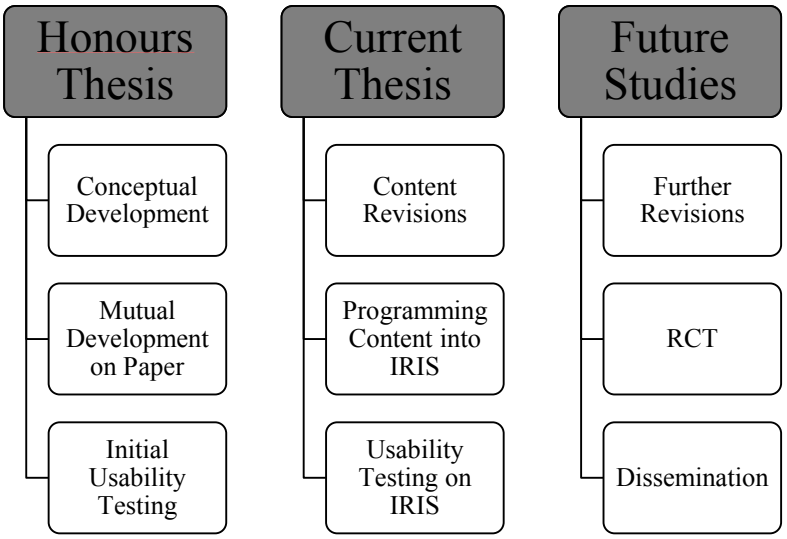

Figure 5. Stages of PACT Development

To address the lack of control group and other methodological issues, a randomized control trial (RCT) should be conducted to detect if differences exist between participants using the PACT intervention and those who are not. Eligibility criteria for the next study should include a communication score cut off to determine if potential participants have existing positive communication practices. Extremely high scoring parent-adolescent dyads on the pre-test IWK-PACC should be omitted from participating in the study as it is theorized that these pairs may make it more difficult to detect differences in the use of PACT and reduce the potential for ceiling effects of these communication scores. Those who have a positive parent-adolescent relationship may not use PACT in a similar way as those who dyads who consistently use more negative communication. By encouraging parent-adolescent dyads with lower positive communication scores to participate, parent participants may have more motivation to complete PACT and thus this eligibility criteria may decrease attrition rates of these parents. If PACT is found to be an effective method to increase parent-adolescent communication using a more rigorous scientific method such as an RCT, it can then be offered as an empirically assessed tool to parents.

Dissemination and Knowledge Translation

These research findings will be disseminated in both academic and lay communities. Data obtained from this study will be used for the thesis requirement for the Health Promotion MA program. Following this thesis defense, study findings will be disseminated in academic conferences as a poster presentation or symposium discussion. Appropriate pieces of the study will be submitted for publication in scientific journals, specifically the results to the usability and preliminary effectiveness of PACT. Dissemination of the study results will be provided for the research participants who indicated interest in the findings. Participants will have access to the final thesis document and will be emailed a study description fact sheet illustrating the main research outcomes in an appropriate, easy to read format. Participants will be given the opportunity to ask questions about the outcomes of the study and engage in a discussion with the researcher if desired.

Knowledge translation (KT) is an important step in the process of research in the Health Promotion discipline. As per the Canadian Institute of Health Research (CIHR) website (retrieved June 2, 2014), KT is defined as he "dynamic and interactive process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products that strengthen the health care system." The PACT intervention aims to provide an effective evidence based program as a method to increase health behaviours of its users. Through usability testing, the study facilitated the interaction of expertise and parent knowledge to potentially increase the empirical validation of the intervention. PACT has the long term potential for increased KT and community benefits, as the intervention takes expertise and funnels that knowledge into a resource that can eventually be more widely accessible to layperson communities.

Conclusion

This study provided a necessary step to further the development of the PACT intervention. It marked the conclusion of usability assessment of the intervention and beginning of the preliminary effectiveness testing. Participants rated the intervention usability as high and valuable content modification strategies were established based on study results. The study demonstrated preliminary effectiveness of increasing parent-adolescent communication scores by parent participants despite a small sample size. Although more assessment is required before PACT can be offered as a public health initiative, this study is a valuable contribution to the development of PACT. This study encouraged practical research that aims to provide strategies to increase parent-adolescent communication and promote healthy relationships among families.

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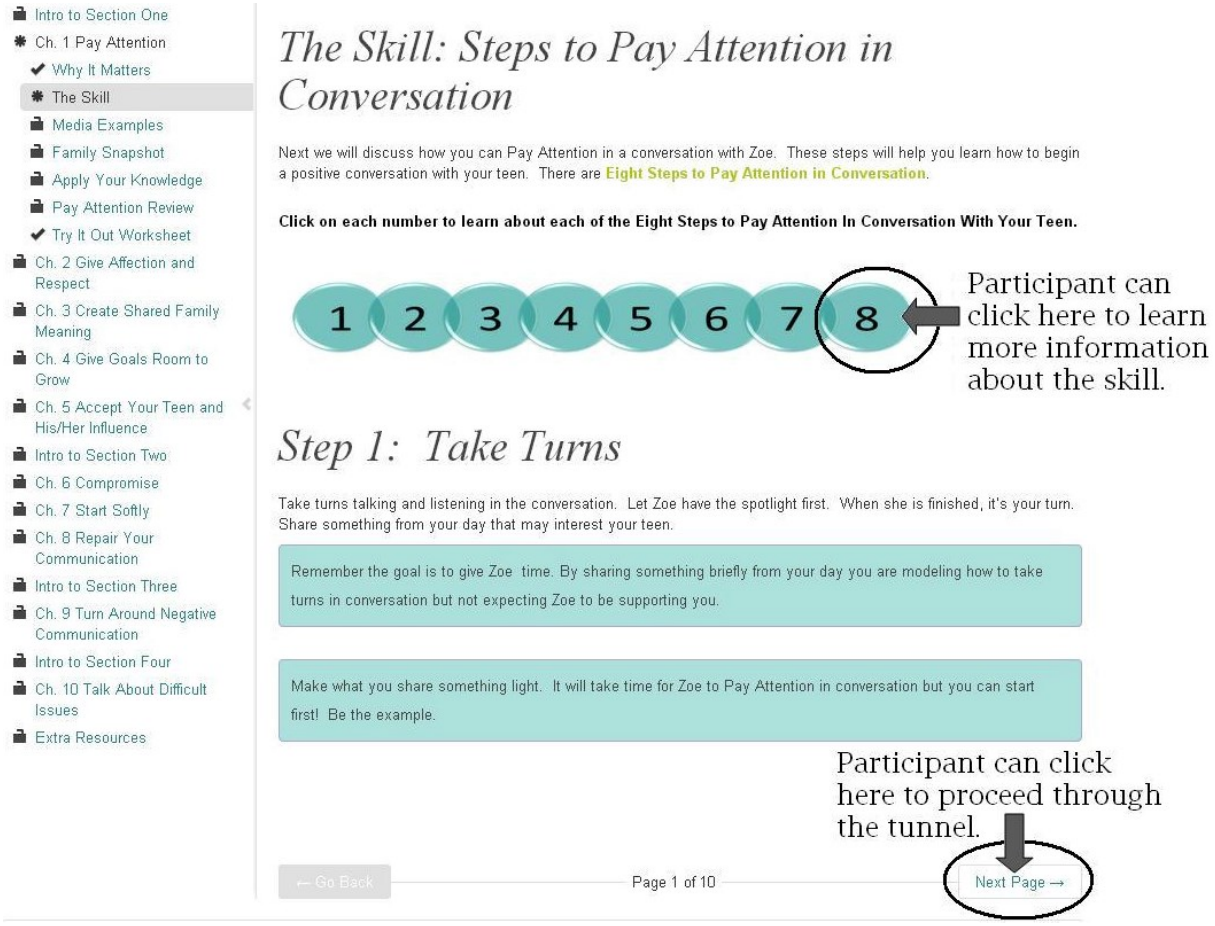
Appendix A: Summary of IA design features adapted from Danaher, McKay & Seeley (2005)

IA Design	Strengths	Constraints	Best Use
Matrix	• Can move freely through content • Encourages discovery learning • Offers maximum content	• Links may not anticipate user's search pattern • User can become disoriented and miss information • Does not help users become familiar with new content area	• Best for websites that have a small amount of information but also highly educated and experienced users.
Hierarchical	• Familiar top-down organization • Provides a simplified view allowing for more detailed access • Easy to retrace steps	• Deeply nested information may be difficult to find • Labels may not correspond to how user defines area	• Best for general users with minimal time, and varying degrees of interest in the information provided.
Tunnel	• Familiar step-by-step flow through content • Can control timing and amount of exposure to content • Ensures participants experience all content. • Eliminates potential distractions from additional content.	• Does not follow familiar website navigation conventions • May cause frustration and increase attrition rates. • Many specific features required to improve outcomes (progress bar, next/prior buttons)	• Reduced complexity for new users or those unfamiliar with the technology used to provide the intervention. • Good for academic courses and specific learning of skill sets.
Hybrid	• Uses multiple IA designs that best fit content and purpose • Reduce attrition of users due higher customizability and relevant experience.	• Moving between Web pages with different IA designs may present usability challenges	• Best for websites that they tunnel design may be too inflexible.

Appendix B: Non-Essential Skill Information Delivery Forms Within PACT



Appendix C: Parent-Adolescent Communication Intervention Module Template

Introduction

- Purpose and why it matters to parents
- Identify Lesson
- How lesson fits into real life
- Identify Goals

The Skill

- Purpose/Description
- Core of the lesson with specific skill
- Content
- Text on how to use the skill

Case Study

- Written situation about the problem or strategy, also can include questions based on this.

Media Examples

- Video or audio examples of both positive and negative behaviour.
- Written explanations in between to fully explain media examples.

Questions

- Assess knowledge of user
- Offered in a simple multiple choice format or applying knowledge to real life.

Try Out Page

- Strategies for applying what was learned by participants to everyday life
- Offers three problem behaviours about the chapter and how to counteract them

Review

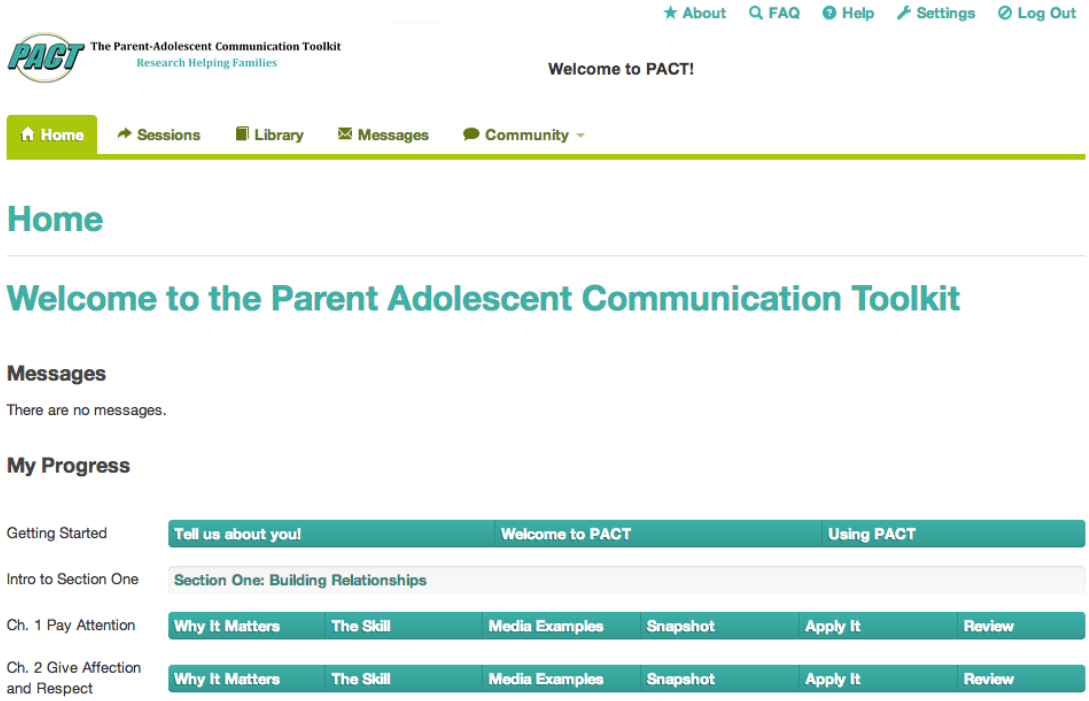
- Short summary of session
- Summary of goals.
- Content

Appendix D: Topics of Parent-Adolescent Communication Intervention, with Intervention Skill Modules in Bold, Listed in Order of Skill Presentation.

Section	Module Title/Topic	Description
Introduction	What this program is about	Outlines the program and the major features.
Assessment of the problem	Taking the Parent Adolescent Communication Test	How to determine where your conversations go wrong. Tape a discussion with your adolescent and see if/when things go wrong.
Building Relationships	**Pay Attention**	How to react positively to your adolescent's attempts at emotional connection
	Give Affection and Respect	Expressing good feelings about your adolescent through compliments, praise, and positive observations.
	Create Shared Meaning	Finding shared Creates greater stability in relationships, allows pursuit of goals together. Create rituals to connect, have symbolic and emotional meaning.
	Give Goals Room to Grow	Recognize and honour the dreams and feelings within your adolescent.
	Accept Your Teen and His/Her Influence	Be open to persuasion from your adolescent without giving in.
	Accept One Another	Accept your adolescent for who he or she is, not the person you want him/her to be
Positive Communication	**Compromise**	Avoid gridlocking by working out a decision that both you and your adolescent can agree upon and be happy with.
	Start Softly	Learn to start talking about a complaint without

		criticizing or insulting.
	Repair Your Communication	Deescalate negative feelings during a difficult encounter with your adolescent.
Turn Around Negative Communication (*This is all one module)	Criticism	Avoid attacking your adolescent's personality or character rather than specifics
	Contempt	Avoid insulting and psychologically abusing your adolescent.
	Stonewalling	Avoid removing yourself from the conversation mentally.
	Defensiveness	Avoid defending yourself from insults. 9 main strategies.
	Flooding	Avoid overwhelming your adolescent with too many complaints
Talk About Difficult Issues		Using the intervention skills to talk to your adolescent about sex, drugs, divorce and mental health. Offers additional resources based on these.
Summary and problem solving		Summarize the program and how to problem solve when things go wrong

Appendix E: Screenshots of PACT



Appendix F: Socio-Demographic Parent Questionnaire

1. What gender do you identify with? Male/ Female,
2. What is your current age?
3. What is your highest level of education?
    i. Less than high school
    ii. High school Diploma/ GED
    iii. Some College/University
    iv. Two Year College Degree
    v. Four Year University Degree
    vi. Master's Degree
    vii. Doctoral Degree

4. What is your estimated total household income?
    i. Below $10 000
    ii. $10 000 to $15 000
    iii. $ 15 000 to $ 20 000
    iv. $20 000 to $40 000
    v. $40 000 to $60 000
    vi. $60 000 to $80 000
    vii. Greater than $80 000
5. What is your current marital status?
    i. Single
    ii. Married
    iii. Separated
    iv. Divorced
    v. Widowed
    vi. Other
6. How many children (below the age of 18) are in your household?
7. How many teens (ages 13 to 17) are in your household?
8. What is the name of the teenager who potentially will be completing this study?
9. What gender do they identify with? Male/ Female
10. How old are they?
11. What item best describes the relationship you have with your teen?
    i. Birth Parent
    ii. Step parent
    iii. Adoptive Parent
    iv. Grandparent
    v. Foster Parent
    vi. Other
12. Are you in a single or two parent family? Single/two parent

If you are in a two parent family, please provide some information about your second parent:

13. What is their gender? Male/Female
14. What is their age?

15. What is their education level?
    i. Less than high school
    ii. High school Diploma/ GED
    iii. Some College/University
    iv. Two Year College Degree
    v. Four Year University Degree
    vi. Master's Degree
    vii. Doctoral Degree

16. What best describes their relationship with your teenager?
    i. Birth Parent
    ii. Step parent
    iii. Adoptive Parent
    iv. Grandparent
    v. Foster Parent
    vi. Other

Appendix G: The IWK-Parent Adolescent Communication Checklist

The IWK- Parent Adolescent Communication Checklist (101 Items)

The rating scale is as follows:

0 Not True
1 A Little True
2 Sometimes True
3 Often True
4 Always True

32. My *** is often very critical of me	0	1	2	3	4
86. My *** cuts me down	0	1	2	3	4
46. I am often criticized when I am discussing things with my ***	0	1	2	3	4
15. When we talk, my *** is quite nitpicky	0	1	2	3	4
29. My ** blames me for everything	0	1	2	3	4
82. My ** finds fault with my personality	0	1	2	3	4
57. My ** raises issues in an insulting manner	0	1	2	3	4
85. My *** talks to me in a smug or superior way	0	1	2	3	4
63. My ** is disrespectful in our discussions	0	1	2	3	4
31. My *** is often sarcastic about my ideas	0	1	2	3	4
66. My *** tell me I am no good	0	1	2	3	4
38. I don't think my *** respects me	0	1	2	3	4
54. My ** will not discuss things with me	0	1	2	3	4
37. When important things come up, my *** changes the topic	0	1	2	3	4
50. My *** refuses to talk about some things	0	1	2	3	4
9. My ** won't listen to what I want to say	0	1	2	3	4
8. My ** wants to end the conversation before I do	0	1	2	3	4
93. Talking to my *** is like talking to a wall	0	1	2	3	4
33. Whenever I say anything, my *** feels put down	0	1	2	3	4
39. When I bring things up with ***, he/she always thinks I am criticizing him/her	0	1	2	3	4
59. My *** acts as if I am attacking him/her even if I am not	0	1	2	3	4
6. When we talk, my ** is defensive	0	1	2	3	4
53. My ***'s feelings are too easily hurt	0	1	2	3	4
77. My ** feels picked on when I try to talk about things	0	1	2	3	4
79. My ** enjoys spending time with me	0	1	2	3	4
60. There are things my ** likes to do with me	0	1	2	3	4
41. I can talk to my *** about things that are important to me	0	1	2	3	4

16. My *** shows me that he/she loves me	0	1	2	3	4
27. My *** shows me that he/she trusts me	0	1	2	3	4
2. My *** makes time to do things with me	0	1	2	3	4
5. My ** could say three things he/she admires about me	0	1	2	3	4
20. My *** likes and accepts me	0	1	2	3	4
13. My *** is proud of me	0	1	2	3	4
25. My *** enjoys my achievements and my accomplishments	0	1	2	3	4
49. My ** thinks there are many good things about me	0	1	2	3	4
43. My *** shows me physical affection	0	1	2	3	4
51. My ** shares my values	0	1	2	3	4
67. I can have fun with my ***	0	1	2	3	4
36. My *** is interested in my life	0	1	2	3	4
78. My *** likes my friends	0	1	2	3	4
68. I enjoy doing some things with ****	0	1	2	3	4
65. My *** understands what is important to me	0	1	2	3	4
72. My *** connects with me everyday	0	1	2	3	4
62. My *** and I have family traditions that I enjoy	0	1	2	3	4
61. I like the way my *** and I celebrate things	0	1	2	3	4
12. My ** and I eat meals together	0	1	2	3	4
11. There are special things that my *** and I do together	0	1	2	3	4
24. My *** helps me accomplish what I want to in life	0	1	2	3	4
84. My *** supports my achievements	0	1	2	3	4
90. My *** believes in me	0	1	2	3	4
3. My ** helps me follow my dreams	0	1	2	3	4
45. My *** helps me overcome obstacles	0	1	2	3	4
22. My *** considers my ideas, even if he/she doesn't agree with me	0	1	2	3	4
80. Sometimes I can change my ***'s opinion	0	1	2	3	4
30. My *** thinks I have a lot of common sense	0	1	2	3	4
14. My opinion matters to my ***	0	1	2	3	4
94. My *** often sees my point of view	0	1	2	3	4
4. My ** is willing to compromise	0	1	2	3	4
26. There is give and take with my ***	0	1	2	3	4
95. My *** often co-operates with me	0	1	2	3	4
21. My *** accepts me for who I am	0	1	2	3	4
81. My *** allows me to be who I am	0	1	2	3	4
83. My ** does not try to change my personality	0	1	2	3	4
92. My *** accepts that I am not perfect	0	1	2	3	4

34. My *** is comfortable with me	0	1	2	3	4
71. My *** is pleased with how I turned out	0	1	2	3	4
69. My *** gets very worked up	0	1	2	3	4
40. My ** can't calm down once he/she gets upset	0	1	2	3	4
28. My ** is easily upset	0	1	2	3	4
73. My *** gets flushed and red in the face when we discuss things	0	1	2	3	4
74. My *** is able to start discussions calmly	0	1	2	3	4
70. My *** often says something calming or positive before discussing something difficult	0	1	2	3	4
35. My *** tries to make sure disagreements don't turn into fights	0	1	2	3	4
7. My *** starts gently when we have a discussion	0	1	2	3	4
87. My *** tries to make up after an argument	0	1	2	3	4
1. When my *** makes mistakes he/she apologizes	0	1	2	3	4
10. My *** usually accepts my apologies	0	1	2	3	4
89. My ** can say that he/she is wrong	0	1	2	3	4
88. When our arguments get going, my ** can calm things down	0	1	2	3	4
18. My *** sees when she/he is too critical and eases up	0	1	2	3	4
19. Arguments with *** often seem to come out of the blue	0	1	2	3	4
56. Before I know it, my ** and I are arguing	0	1	2	3	4
42. My *** gets negative really easily	0	1	2	3	4
76. I can't have a conversation with my *** without him/her getting angry right away	0	1	2	3	4
58. With my ***, small things quickly become big things	0	1	2	3	4
52. My *** flies off the handle when I do something wrong	0	1	2	3	4
75. My *** gets too angry when we talk about things	0	1	2	3	4
64. When my ** and I argue, he/she quickly gets out of control	0	1	2	3	4
91. My *** gets too emotional when we talk about things	0	1	2	3	4
17. My *** gets so upset he/she can hardly speak when we argue	0	1	2	3	4
44. My ** gets too tense when we argue	0	1	2	3	4
55. I am satisfied with the communication I have with my **.	0	1	2	3	4
48. My ** and I communicate effectively.	0	1	2	3	4
47. My ** and I could improve the way we discuss things.	0	1	2	3	4
23. My ** and I are pretty good at talking with each other.	0	1	2	3	4

Appendix H: The Parent-Adolescent Communication Scale

(Barnes and Olsen, 1985)

Using the scale below, please indicate how much you agree or disagree with EACH of the following statements about the general communication between you and your ***.
Response choices:

Strongly Disagree (Coded as 1)
Disagree (Coded as 2)
Neither Agree Nor Disagree (Coded as 3)
Agree (Coded as 4)
Strongly Agree (Coded as 5)

1. I can discuss my beliefs with my *** without feeling restrained or embarrassed.	1	2	3	4	5
2. Sometimes I have trouble believing everything my *** tells me.	1	2	3	4	5
3. My *** is always a good listener.	1	2	3	4	5
4. I am sometimes afraid to ask my *** for what I want.	1	2	3	4	5
5. My *** has a tendency to say things to me which would be better left unsaid.	1	2	3	4	5
6. My *** can tell how I'm feeling without asking.	1	2	3	4	5
7. I am very satisfied with how my *** and I talk together.	1	2	3	4	5
8. If I were in trouble, I could tell my ***.	1	2	3	4	5
9. I openly show affection to my ***.	1	2	3	4	5
10. When we are having a problem, I often give my *** the silent treatment.	1	2	3	4	5
11. I am careful about what I say to my ***.	1	2	3	4	5
12. When talking to my ***, I have a tendency to say things that would be better left unsaid.	1	2	3	4	5
13. When I asked questions, I get honest answers from my ***.	1	2	3	4	5
14. My *** tries to understand my point of view.	1	2	3	4	5
15. There are topics I avoid discussing with my ***.	1	2	3	4	5
16. I find it easy to discuss problems with my ***.	1	2	3	4	5
17. It is very easy for me to express all my true feelings to my ***.	1	2	3	4	5
18. My *** nags/bothers me.	1	2	3	4	5
19. My *** sometimes insults me when she/he is angry with me.	1	2	3	4	5
20. I don't think I can tell my *** how I really feel about some things.	1	2	3	4	5

Appendix I: Depression-Anxiety-Stress Scale 21

DASS21	*Name:*	*Date:*			

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Appendix J: Pre-test and Post-test Assessment Telephone Script

Hi, may I speak to <participant's name> please?

Hi, it's Elaine, calling from the PACT study. We have an appointment to complete the assessment questions. Is now still a good time?

NO: REBOOK.
YES: continue with script.

Great. The appointment will take approximately 30 to 45 minutes. For quality assurance and research purposes, all telephone calls will be recorded however anything that you say will be kept completely confidential, unless there is any indication that someone is at risk of harm.

The questions will ask about your communication with your (mom/dad/son/daughter) and although some of the questions may not apply, we'd like if you could answer them all to your best knowledge for any events that have occurred in **the last four weeks.**

Do you have any questions before we start?

QUESTIONNAIRES WILL BE ASKED IN THE FOLLOWING ORDER:

- IWK-Parent Adolescent Communication Checklist
- Parent-Adolescent Communication Scale
- Depression-Anxiety-Stress Scale

Okay, so that was my last question. Thank you so much for your time today, if you have any questions, please don't hesitate to contact us.

END CALL.

Appendix K: Perceived Health Web Site Usability Questionnaire (PHWSUQ)

This questionnaire examines your satisfaction with the PACT chapter you have just completed. Please indicate the number that matches your experience.

1. It is easy to find information in the PACT chapter.
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. It is easy to read the information provided
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. It is easy to use the video provided
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4. The overall appearance of the chapter makes it easy to use
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5. The information I found on the PACT chapter was relevant to my health at this time
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

6. The information presented on the PACT chapter is useful
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

7. I have confidence in the material presented in the PACT chapter
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

8. Overall I found it easy to learn to use this PACT chapter
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

9. The PACT chapter information website will improve my knowledge about communication.
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

10. This information on the PACT chapter will help me maintain better communication with my adolescent.
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

11. I would recommend the PACT chapter website to others who are seeking reliable parenting communication information
   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

12. What parts of this PACT chapter will be most helpful to you?
13. What parts will not useful or difficult to use?
14. What changes would you recommend?

Appendix L: Informational Letter to Potential Participants

To < potential parent and adolescent participants' names>

Thank you for your interest in our study regarding parent-adolescent communication. We really appreciate your support for the Parent-Adolescent Communication Toolkit (PACT).

Before we complete any screenings or you agree to take part in our study, there are a few things you should know.

Introduction and Purpose:
This is a voluntary research study that is examining strategies to help parents communicate with their teenagers. Skills about improving communication between parents and their adolescents are presented in web based format using both text and videos. This study aims to assess the usability and preliminary effects of the PACT intervention. Before PACT can be given as a public health intervention, we want to determine if it is effective at improving parent-adolescent communication in a small population of parents and adolescents.

Parent responses and suggestions will be used to improve the intervention to make it as user friendly as possible. This feedback will allow the researchers to make the necessary changes to the PACT intervention to improve it before further testing of the intervention occurs.

How will the researchers do the study?
Twenty parent-adolescent pairs will complete this study, located at the IWK Health Centre. Parent and adolescent participants will be asked to complete **two** assessments that measure parent-adolescent communications. These assessments are six weeks apart and ask questions about participant parent-teenager communication and relationships. Parents will also complete an online intervention, in a process that is outlined below.

For Parent Participants: The PACT Intervention Information

If parent participants choose to participate in the study, they will be provided with access to the PACT intervention. Participants will have six weeks to complete the intervention, and will be asked questions about how easy the intervention is to use, how much they like it, how easy it is to read and understand, as well as any suggestions you have to make it better. You would also be asked questions about basic demographic information, such as your first name, your teen's first name and your teen's age. This information will be kept confidential.

The intervention consists of chapters that focus on a specific skill. Each chapter is broken into information about the skill, a case study and suggestions on how to use that skill in every day life. There are also videos and additional resources included for parents to use as well. There are ten chapters total in the PACT intervention, allowing two chapters to ideally be completed per week.

The intervention is completed entirely online. If you choose to participate you will be given a login ID and password for the study website. It is there that you would complete the PACT intervention, which will take approximately five hours. You don't have to complete the intervention all at once, you can read a section and go back to it at any point. The study can be completed wherever you have access to the Internet.

Parent participants will be randomly assigned to have either sequential access to the intervention modules or free, unrestricted access. The sequential access group (with ten parents) must complete each module in order. For example, module one must be completed before module two. The unrestricted access group (total of ten parents) can complete the modules in any order they wish.

The study does not have to be completed in one sitting, entering and exiting out of PACT is allowed. You can complete the questions at your own pace, at any location where you have access to the Internet. As a participant, you will have six weeks to complete the PACT intervention, starting from the day you and your teen completes the first assessment questions.

Questions will be asked about the ease of use, how clear the intervention skills were presented and if the intervention was easy to understand. Parent participants are not obligated to answer every question; they may skip questions they do not wish to answer.

Assessments and Time Constraints
The assessments that are used to collect information from both parents and teenagers are outlined below. The total estimated time for parent and teen participant telephone assessments is 25 minutes.

Assessment	Questionnaire Format	Administered To:	Estimated Time to Complete
IWK- Parent Adolescent Communication Checklist (IWK-PACC)	101 Close ended questions (5 point Likert Scale)	Parent and Adolescent Participants	15 minutes
Parent Adolescent Communication Scale (PACS)	20 Close ended questions (5 point Likert Scale)	Parent and Adolescent Participants	5 minutes
Depression Anxiety Stress Scale (DASS-21)	21 Close ended questions (4 point Likert Scale)	Parent and Adolescent Participants	5 minutes
Perceived Health Web Site Usability Questionnaire (PHWSUQ)	15 Close ended questions (5 point Likert Scale) 3 Open ended questions	Parent Participants during the PACT intervention	5-10 minutes per Chapter

Potential Harms and Burdens.
There are no expected harms to parents or teenagers who participate in this study. Although unlikely, answering the questionnaires may be upsetting to participants, and if stress occurs, parents or teens may stop the questionnaires at any point throughout the study. They can be provided with Taking part in this study may not benefit you personally, however it may help you learn about and reach an understanding of parent teenage communication. It is hoped that what is learned from this study will be of future benefit to others who use the PACT intervention.

Can I participate in the study without my parent/adolescent?
Unfortunately, due to the nature of the study, we require both a parent and an adolescent participant from each family to complete the PACT study. If your parent or adolescent does not consent to participate, you will not be able to participate in the PACT study.

It is important that both parent and adolescents in the study participate of their own free will. Please do not pressure your parent/adolescent to complete the study- it must be their individual

decision. At any point, you may stop the study if you wish, and any information you have provided to us can be withdrawn.

Can I withdraw from the study?
You may withdraw from the study if you wish any time. If you do wish to withdraw, please contact the primary investigator, Elaine Toombs by email at Elaine.toombs@dal.ca

If you chose to withdraw from the study, the information already collected at can be withdrawn as well.

Costs and reimbursements.
There will be no costs to you to complete the study. If you choose to participate, as a token of thanks for completing the study, parents will be provided with a twenty dollar gift card from Loblaws or Empire Theatres. As a token of thanks for teenage participants, a ten dollar gift card will be provided.

How will my privacy be protected?
Any information we learn in the study will be kept private and confidential within our research team. The only identifying information we collect about you is your name, which will only be affiliated with an assigned participant number on a master list held by study investigators. For the duration of the study, your participant number will be associated with any information you provide, allowing all of your answers to be de-identified and confidential. Published reports of the data will refer only to group, averaged data, and thus will not refer to you in an individual or identifying manner.

It is important for you to know however, that if, during the course of the study, there is any indication of self-harm, child abuse, or dangers posed to others provided by you or you adolescent, the researchers will be obligated to report this information to the appropriate authorities.

You as a participant will not have access to the information that you or your parent/teenager provides and your parent/teenager will not have access to the information you provide either. Confidentiality will be maintained unless someone reports that they or someone else is at risk of serious harm (abuse or suicide for example). If that occurs the information will be given to the study supervisors and the appropriate authorities will be notified.

The study records will be kept in a locked area at the IWK for 5 years following publication of the results. Only study staff will have access to these records.

What are my Research Rights?

Return of this form indicates that you have agreed to take part in this research and for your responses to be used. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institution(s) from their legal and professional responsibilities.

If you have any questions at any time during or after the study about research in general you may contact the Research Office of the IWK Health Centre at (902) 470-8520, Monday to Friday between 8:00 a.m. and 4:00 p.m.

Please remember that you have the right to withdraw from this study at any time. You are more than welcome to ask any questions throughout the study. You may contact myself, the Primary Investigator, by telephone at 902-223-1175 or one of my supervisory committee members, Dr. Patrick McGrath at 1 877 341-8309.

How will I be informed of study results?

If you wish, you can receive a summary of the study results. These results will be available by May 1, 2014.

Thanks so much for your time. Feel free to contact me if you have any questions. Please respond back to this letter if you have interest in participating in this study. Please ask your parent/teenager to read this letter and respond separately as well if they have not already done so and have interest in participating.

Sincerely,
Elaine Toombs
MA Health Promotion Student, Dalhousie University

In conjunction with,

Anita Unruh, PhD, and Patrick McGrath, PhD,
Respective affiliates of Dalhousie University and the IWK Health Centre

Appendix M: Parent Telephone Consent Script

Hi, may I speak to ___ please?

Hi _____, my name is Elaine Toombs, and I'm calling from the Centre for Research in Family Health at the IWK Health Centre in Halifax.

I'm calling you today because we have briefly discussed the Parent-Adolescent communication study we are completing here at the IWK, as part of the thesis requirement for my MA degree at Dalhousie.

Is this a convenient time to talk? The phone call will take approximately fifteen minutes.

IF NO: Are you interested in the study?
If YES, than rebook a time to call.
If NO: Thank you for your time, have a great day.

If YES:

Great. Just so that you are aware, all calls are being recorded for both quality assurance and research purposes. The recordings are stored in a securely at the IWK, with only the Strongest Families research time team having access to them.

For this call, I will be providing you with more information about the study, and give you a chance to ask any questions that you may have about participating in it. Please don't hesitate to interrupt me throughout, I'm more than happy to answer questions that you have.

First, I have a few questions to ask you.

1. Do you have an adolescent aged 13-17 living in your home?
2. If your teen hasn't already agreed, do you feel that they would consider participating in this study?
3. Do you have access to the Internet?

If NO to any of these questions:
I'm sorry but you do not meet the requirements to take part in our study. Thank you for your interest and time.

IF YES: continue.

4. Do you have any cognitive or psychological impairments that you have sought professional help for in the last six months that would prevent you from participating in the study?

IF YES: I'm sorry but you do not meet the requirements to take part in our study. Thank you for your interest and time.

If NO: Move on to obtaining consent.

Have you read the informational letter about the study that was provided to you?

IF YES: Continue. If NO: Reschedule call for when the parent has read the informational letter.

Can you please tell me what you understand the purpose and procedure of the study to be?

Ensure that the parent understands their role as a potential participant including:

- *completing the pre-test and post-test study assessments,*
- *the adolescent role of completing pre-test and post-test assessments,*
- *the randomization into either the sequential module access and the unrestricted access groups*
- *the role of completing and applying the PACT intervention content in a six week time frame.*
- *And the role of answering questions about the usability and likeability of the intervention content.*

If parent does not mention all of the above criteria when answering this question, explain the study procedures that were forgotten and clarify the parent understands the study.

Do you have any questions about the study so far from what you have read in the informational letter?

Are you willing to participate in our study?

If No… Could you please provide us with the main reason that you have decided not to participate?

If YES, TIME OF CONSENT WILL BE NOTED BY PRIMARY RESEARCHER.

_____ _____

Participant Date Consent Obtained

_____ _____

Investigator

Regarding contacting you for study purposes, how do you prefer to be contacted? I can contact you by either telephone or email.

NOTE WHICH. Great. As a secondary method of contact however, can I collect both your telephone number and your email address?

NOTE PARTICIPANT CONTACT INFORMATION.

If you wish to be informed about the results of the study, we can also send you the study final results when they are made available. Do you wish to be informed of the study results?
NOTE YES/ NO.

IF FIRST IN DYAD TO CONSENT: Before we begin the first set of assessments, your adolescent must also consent to participate in the study. If you could please ask them to read the informational letter as well, and then contact me to set up a time to review the letter and answer any questions they may have.

Due to the nature of the study, and the need for parent-adolescent pairs, if your teen does not volunteer to take part in the study, unfortunately you will not be able to take part either.

Your teen should feel free to make their own choice if they wish to participate in the study, and like all study participants, has the ability to opt out of the study at any time. If (Teen's Name) does volunteer to participate in the study, I will be contacting you again to complete the first set of assessments and provide you with your study log in information. When would be a good time for that appointment to occur?

MAKE APPOINTMENT. IF THE TEEN HAS ALREADY CONSENTED, THE PRE-TEST ASSESSMENTS CAN BEGIN. AT THIS POINT, DEMOGRAPHIC QUESTIONNAIRE CAN BE COMPLETED.

Great, thank you so much for your time today. I look forward to speaking with you shortly! If you have any questions, please do not hesitate to contact me.

Appendix N: Adolescent Telephone Consent Script

Hi, may I speak to ___ please?

Hi _____, my name is Elaine Toombs, and I'm calling from the Centre for Research in Family Health at the IWK Health Centre in Halifax.

I'm calling you today because we have briefly discussed the Parent-Adolescent communication study we are completing here at the IWK, as part of the thesis requirement for my MA degree at Dalhousie.

Is this a convenient time to talk? The phone call will take approximately fifteen minutes.

IF NO: Are you interested in the study?
If YES, than rebook a time to call.
If NO: Thank you for your time, have a great day.

If YES:

Great. Just so that you are aware, all calls are being recorded for both quality assurance and research purposes. The recordings are stored in a securely at the IWK, with only the Strongest Families research time team having access to them.

For this call, I will be providing you with more information about the study, and give you a chance to ask any questions that you may have about participating in it. Please don't hesitate to interrupt me throughout, I'm more than happy to answer questions that you have.

First, I have a few questions to ask you.

1. How old are you?
2. If your parent hasn't already agreed, do you think they would be willing to participate in this study?
3. Do you currently live at home with this parent?

If NO to any of these questions, or if the adolescent age does not meet study requirements: I'm sorry but you do not meet the requirements to take part in our study. Thank you for your interest and time.

IF YES: continue.

4. Do you have any cognitive or psychological impairments that you have sought professional help for in the last six months that would prevent you from participating in the study?

IF YES: I'm sorry but you do not meet the requirements to take part in our study. Thank you for your interest and time.

If NO: Move on to obtaining consent.

Have you read the informational letter about the study that was provided to you?

IF YES: Continue. If NO: Reschedule call for when the adolescent has read the informational letter.

Can you please tell me what you understand the purpose and procedure of the study to be?

Ensure that the adolescent understands their role as a potential participant including:

- *completing the pre-test and post-test study assessments,*
- *the parent role of completing the same pre-test and post-test assessments,*
- *The six week time duration in between assessments,*
- *And the role of the parent completing the PACT content.*

If the adolescent does not mention all of the above criteria when answering this question, explain the study procedures that were forgotten and clarify the adolescent understands the study.

Do you have any questions about the study so far from what you have read in the informational letter?

Are you willing to participate in our study?

If No… Could you please provide us with the main reason that you have decided not to participate?

If YES, TIME OF CONSENT WILL BE NOTED BY PRIMARY RESEARCHER.

_____ _____

Participant Date Consent Obtained

_____ _____

Investigator

Regarding contacting you for study purposes, how do you prefer to be contacted? I can contact you by either telephone or email.

NOTE WHICH. Great. As a secondary method of contact however, can I collect both your telephone number and your email address?

NOTE PARTICIPANT CONTACT INFORMATION.

If you wish to be informed about the results of the study, we can also send you the study final results when they are made available. Do you wish to be informed of the study results?
NOTE YES/ NO.

IF FIRST IN DYAD TO CONSENT: Before we begin the first set of assessments, your parent must also consent to participate in the study. If you could please ask them to read the informational letter as well, and then contact me to set up a time to review the letter and answer any questions they may have.

Due to the nature of the study, and the need for parent-adolescent pairs, if your parent does not volunteer to take part in the study, unfortunately you will not be able to take part either.

Your parent should feel free to make their own choice if they wish to participate in the study, and like all study participants, has the ability to opt out of the study at any time. If (Parent's Name) does volunteer to participate in the study, I will be contacting you again to complete the first set of assessments and provide you with your study log in information. When would be a good time for that appointment to occur?

MAKE APPOINTMENT. IF THE PARENT HAS ALREADY CONSENTED, THE PRE-TEST ASSESSMENTS CAN BEGIN.

AT THIS POINT, DEMOGRAPHIC QUESTIONNAIRE CAN BE COMPLETED.

Great, thank you so much for your time today. I look forward to speaking with you shortly! If you have any questions, please do not hesitate to contact me.

Appendix O: Community Recruitment Poster (one full page in poster format)

Parents & Teens Needed

For a study on Parent-Adolescent Communication

We are looking for parent and teen volunteers to take part in a six week study of a new online intervention that teaches parents strategies on how to better communicate with their teenagers.

* As a thank you for your time, parents will receive a $20 gift card and teens will receive a $10 gift card to Superstore or Empire Theatres.

The Parent-Adolescent Communication Toolkit (PACT)

DALHOUSIE UNIVERSITY *Inspiring Minds*

IWK Health Centre

For more information, please contact:
elaine.toombs@dal.ca

Elaine.toombs@dal. PACT Study

Appendix P: Community Recruitment Poster addressed specifically to fathers
(one full page in poster format)

Fathers & Teens Needed

For a study on Parent-Adolescent Communication

We are looking for parent and teen volunteers to take part in a six week study of a new online intervention that teaches parents strategies on how to better communicate with their teenagers.

* As a thank you for your time, parents will receive a $20 gift card and teens will receive a $10 gift card to Superstore or Empire Theatres.

The Parent-Adolescent Communication Toolkit (PACT)

DALHOUSIE UNIVERSITY
Inspiring Minds

IWK Health Centre

For more information, please contact:
Elaine.toombs@dal.ca

PACT Study | Elaine.toombs@dal.ca | PACT Study | PACT Study | PACT Study | PACT Study | PACT Study | PACT Study | PACT Study | PACT Study | PACT Study

Appendix Q: Parent Module Feedback

This feedback was provided by parent participants and is labeled by participant number and each module access group, the sequential module access group (S) and the unrestricted module access group (A). The table lists all feedback provided by parents. Any identifying information has been removed.

Module Number	Feedback About What Was Helpful	Feedback About What Was Not Helpful	Suggested Modifications
1	**S01-** Communication with Spencer. Leading questions. The positive deposits and to try to eliminate the negative withdrawals. **S02-** memory bank **A04-**remembering to make deposits **A06-**How to deal with problems that can come up. **A07-**Hints on what to say Taught how to deal with problems that come up. **A08-**The deposit bank **S10-** The positive deposits and to try to eliminate the negative withdrawals. **A11-**8 skills and how to phrase thoughts **A12-**Being aware of how to better communicate and how important it is **S17-** I don't think there was anything in the chapter that I did not already know or I have heard before - but that doesn't mean I have been actively using the advice! It was a great reminder of how powerful our actions and words are in a relationship. **A18-**Keeping in mind the "relationship memory bank"	**S02-** N/A Some of these skills I already use. **A03-** Media **A04-**the 5 chapter over view buttons did not work and neither did the 8 skill number buttons. **A06-**Just some of them that I already use. It made me feel guilty at some points. That kind of detracted from the information. **S10-**nothing **A12-**N/a	**S01-** I think we need to learn how to ask leading questions. **S02-** N/A **A03-** No **A06-**No We get better answers if we ask better questions. Not one word answers. **S10-** no **A12-**I was unable to see the videos using my iPad. **A16-**It made me feel guilty at some points. That kind of detracted from the information. **S17-** video example
2	**S01-** I think it is helpful to remember to say things. Not just think them! I think it is helpful to remember to say things. Not just think them! **S02-** Giving more thanks and respect. **A03-** Why it matters. I didn't realize some of the things that I wasn't saying to her that I should be saying.	**S02-** nothing I was unable to see the videos using my iPad. **A03-** Media **A06-**It was all good. Some parts were a bit redundant, was difficult to not repeat myself in some of the	**S01-** No. **S02-** No **A03-** No **A06-** nothing **A07-** no **S10-** I find when going back to review something I lose information or it

	A04-Ways to communicate with my daughter. **A05-**Acknowledging specific traits. **A06-**I didn't realize some of the things that I wasn't saying to her that I should be saying. **A07-**How to appreciate TEEN more and letting her know **S10-** the When -then part **A12-**The information **S17-**I liked the page that asked me to give specific examples - I am proud . . . I appreciate . . **A18-**Reinforcement of positive comments.	answers. **A07-**Answering every question **S10-** it all was fine **A12-** N/a **A16-**some parts were a bit redundant, was difficult to not repeat myself in some of the answers **S17-** all were useful **A18-** the 12 second video.	changes. This is more a technical issue **A12-**nothing **S17-** none
3	**S01-** I need to include TEEN in the planning stage of events. He needs to put more input into the things we do. **S02-** all **A03-** Creating shared meaning,. **A04-**Learning to keep the family traditions going **A05-** Smaller traditions. **A06-** It made me think of all the things we do and don't do as a family. **A07-**Family tradition I think getting the family together to discuss traditions and what traditions they may want to incorporate or lose is a great idea. **A08-** Remembering to save our family traditions I need to include my teen in planning stages. **S10-** To start up some old traditions that I did as a kid **A12-** Never thought of how traditions could increase family relationships **A16-**The different ideas about ways to create memories. **S17-** I think getting the family together to discuss traditions and what traditions they may want to incorporate or lose is a great idea **A18-**Maintaining traditions.	**S02-** nothing **A03-** Media The media quality was a bit poor. **A04-** Nil **A06-** None **A16-**The story of the knitting. **S17-** my past experiences - but that's not your fault that I did not have anything to draw from	**S01-** no changes **S02-** nothing **A03-** No **A04-** Nil, this was very good information **A06-** None **A07-** videos a very slow, but it could be the internet conection **S10-** The media quality was a bit poor. I couldn't hear. **S17-** no

4	**S01-** We need to talk to our children. We need to know what they are thinking. **S02-** how to deal with child It is a good way of breaking it down to discuss her goals. **A05-**Goal setting. **A06-** It is a good way of breaking it down to discuss her goals. I know that everyone has goals but to be honest I have never had a specific conversation about this topic with my teen - it was great motivation to do that! **A08-** Remembering to try and compromise **A11-** how to realize my goals as apparent for my child may not be the same as his goals as a teen and that his goals may change with time **A16-**the summary points **S17-** I know that everyone has goals but to be honest I have never had a specific conversation about this topic with TEEN - it was great motivation to do that!	**S01-** Kids don't like compromise. If I asked NAMEto give a solution to a problem, His answer would be to let him get his own way. ie... stay out till 2 AM. **S02-** helping her with her goals **A06-** None **A16-** media clips **S17-** nothing	**S02-** no Perhaps condense the lesson a bit, make this survey shorter **A06-** None **A16-** perhaps condense the lesson a bit, make this survey shorter **S17-** no
5	**S01-** Acceptance, know that we are very different. **S02-** Giving kids options. **A05-**Decisions that do not matter in the long run. **A06-** It shows me that letting my teen help make some choices is a good thing. It shows me that letter TEEN help make **A16-**some choices is a good thing. media clips **S17-** All were good Decisions that do not matter in the long run.	**S02-** N/A The 5 chapter over view buttons did not work and neither did the 8 skill number buttons. **A05-** N/A **A06-** None **A16-**examples **S17-** I did not feel the need to fill out 5 ways I could let TEEN make decisions - 2 or 3 would have been enough. If you make it too cumbersome people won't want to do it	**S01-** No. **S02-** no **A05-** N/A **A06-** None I did not feel the need to fill out 5 ways I could let my teen make decisions - 2 or 3 would have been enough. If you make it too cumbersome people won't want to do it **A16-**Too repetitive in some places. **S17-** no
6	**S01-** Compromise is good but not always doable. **S02-** all **A05-**Doing the circles. Makes it much	**S01-** You can't always find a compromise. **S02-** nothing **A05-** N/A	**S01-** Sometimes a parent has to put thier foot down and say No

	more clear. **A06-** learning how to compromise **A16-**examples	**A06-** None **A16-** None	**S02-** no **A05-** N/A **A06-** None **A16-** no
7	**S01-** I yell, I will try not to . **S02-** Being less combative in difficult situations. **A06-** I realize how much better a soft start sounds. **A16-** everything	**S01-**Was all useful **S02-** nothing **A06-** None **A11-**be careful when assigning electronic gender my son is not a she he is a he check your programing please **A16-** nothing	**S01-**none **S02-** no **A06-** None **A16-** no
8	**S01-** One should always take time before talking with children. Not in the heat of the moment. **S02-** Ways to deal with issues with my child in calm manner and non judgmental tone **A06-** Learning how to better communicate my frustrations. **A07-** How to approach TEEN when she forgets certain chore Just as a note if you have mastered the other skills presented in this training you should rarely have to use these repair skills **A08-** The videos are always helpful to demonstrate the right and wrong way to interact with your child **A11-** just as a note if you have mastered the other skills presented in this training you should rarely have to use these repair skills **A16-** the specific strategies were helpful **S17-** Most of the material I knew but it was very helpful to read it and reinforce it - it's easy to get lazy with communications	**S01-** all were useful **S02-** no **A06-** None **A16-** none **S17-** It was all good but i don't enjoy the worksheets - you list solutions above and then we have reiterate it below - I don't find that useful	**S01-** None. **S02-** nothing **A06-** None **A07-** The videos seem to stop every 3 seconds. This may be the internet connection I am not sure? **A11-** More stress on the positive foundations of entering into a conservation with your teen we all naturally can find fault with almost anything comes naturally positive emotions and thoughts go hand in hand **A16-** no **S17-** no
9	**S01-** Better communication. Positive words are best **S02-** all **A06-** How not to speak to her when I am angry **A08-** Breaking down the four types and	**S01-** all were useful **S02-** nothing **A06-** None **A16-** The repeated negative statements about taking out the garbage.	**S01-** none **S02-** no **A06-** None **A16-** reduce the number of practice garbage statements

	providing media examples of each was quite helpful. It helped distinguish between them. **A11-** being able to recognize NAMES errors when he spoke to his son and how he could have done it differently **A16-** the negative talk stratadgy	**S17-** apply your knowledge was too long one page would have been enough	The apply your knowledge page was too long. One page would have been enough.
10	**S01-** All parts were helpful, I think it was to stress communication about drugs and alcohol **S02-**How to deal with difficult conversations. **A06-** How to break down the way to talk to her about sex. **A11-** exercise…how to use solver …plan a perceived difficult conversation **A16-** was all good	**S01-** No parts Asking why the skill would not work. I believe that they will all work with this type of conversation. **S02-** nothing **A06-** None **A08-** Asking why the skill would not work. I believe that they will all work with this type of conversation **A16-** none	**S01-** I have talked with TEEN many times about drugs. It is a topic I know will go back to many many times. At 15 years old I know we have only touched on the topic. **S02-** no **A06-** None **A16-** none at the moment. Change the teen name to be more specific to only include the first name and not the last.

Appendix R:
Non-Parametric Preliminary Outcome Analyses Using Wilcoxon's Tests

These results were obtained by using Wilcoxon signed rank non-parametric tests to compare pre-test and post-test scores for participants. The table below illustrates p values of these comparisons for each measure used to assess the study hypotheses. Significance is illustrated with an *.

When assuming the data is non-parametric, the same alternative hypotheses are retained as those when assuming the data is parametric.

Measure	Parent Critical Values (* Signifies rejection of null hypothesis)	Adolescent Critical Values (* Signifies rejection of null hypothesis)
PACS	0.10*	0.170
IWK-PACC	0.17*	0.224
DASS-21		
Anxiety	0.622	0.14*
Depression	0.539	0.181
Stress	0.322	0.362