The Development of a Biographical Scale to Predict Post Athletic Career Adjustment

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Abstract

The purpose of the current research was to develop a measure utilizing biographical data to predict adjustment post athletic career. A concurrent validation study was conducted with 146 participants to assess the relationship between a range of experiences and the transition after athletic retirement. Participants were ex collegiate or professional athletes who completed the biodata scale, and the two criterion scales (a sports loss grief scale and a satisfaction with sports life scale) online via Qualtrics. Biodata items were scored using the horizontal percentage method. Bivariate correlations were conducted between the scale items and the criterion measures. The final scale included 15 items. A regression model indicated significant variance accounted for by the post athletic career adjustment scale against the criterion variables; which may indicate that a portion of adjustment after retirement from an athletic career could be explained by the PACAS. Key limitations include a global pandemic, response bias and a relatively small sample size. Practical implications beyond this study include further knowledge in the realm of early life experiences influencing adult sports life. This study could also promote further encouragement to provide help to current and retiring athletes. The biodata scale in this study is unique and could be further validated and used as a tool for Universities and sports clubs alike.

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1 Introduction

Retirement is an inevitable part of an athletic career, and as such, every elite athlete will have to come to terms with the transition out of their sport. An athletic career is often shorter lived than an organizational occupation, and many elite athletes will be retired from their sports by their early 20's (Sinclair & Orlick, 1993). The focus of the following paper pertains to the experiences that may influence adjustment post athletic career; specifically, those from early life. The introduction begins by examining negative and positive adjustment from sport, specifically regarding issues of depression and anxiety, life satisfaction, body image and substance abuse. Biodata is then outlined for the purpose of guiding creation of a measurement tool for adjustment. Finally, the specific individual factors possibly linked to negative and positive adjustment are posited and the current research is addressed.

A significant amount of research has gone into studying the adjustment period or transition for athletes post athletic career; with a review by Park et al. (2013) identifying 126 studies that had been conducted up until 2010. The adjustment period post athletic career can be a difficult process. Literature suggests that it can cause grief, depression, anxious feelings and loss of identity (Sanders & Stevinson, 2017). Kerr and Dacyshyn (2000) indicated three phases of the transition period: the actual retirement, the 'nowhere land' and new beginnings. The adaptation process has been demonstrated to be a complex and personalized experience, unique to each individual (Kuettel et al., 2017). Reasons for retirement and experiences afterwards may be idiosyncratic, but the adjustment period is an influential life transition for all elite athletes regardless of nationality, gender or sport (Kuettel et al., 2017; Park et al., 2013; Sanders & Stevinson, 2017).

Some research has suggested that the adjustment period often lasts about a year, with retired athletes finding new identities and self-perception in that time frame (Park et al., 2013). However, other studies have found that retirement from sport is so poignant that some individuals may continue to struggle 10 years after the termination of their athletic career (Baillie, 1993). Most retired athletes will adjust within a couple of years; however, about 20% will continue to struggle for an extended period of time afterwards (Stambulova, 2017). Individuals can experience a range of negative emotions and occurrences; indicating what can be known as a 'crisis transition' (Stambulova, 2017).

Athletes are often viewed as highly trained, resilient people who have dedicated their lives to dealing with stressful situations and pressure (Schaal et al., 2011). Although resilience and mental toughness is often a key attribute of successful athletes, this does not mean they are immune or intolerant to an array of mental disorders or stress (Schaal et al., 2011). In fact, research has suggested that athletes are just as prone to mental disorders as the general population, and at higher risk for certain disorders (Gulliver et al., 2015). Alcohol abuse, eating disorders and general anxiety are not uncommon in elite athletes, in particular those who have other environmental or genetic risk factors (Schaal et al., 2011). Female elite athletes are more susceptible to psychological disorders than their male counter parts (Schaal et al., 2011).

The transition out of sport can result in an array of issues including; depression, anxiety, grief, disordered eating and substance abuse (Gouttebarge et al., 2019; Schaal et al., 2011). Menke and Germany (2018) reported athletes' feeling emotions of extreme loss and trauma following the transition out of their retrospective sport. Feelings of disorientation and confusion of personal identity have also been reported (Kerr & Dacyshyn, 2000). In the next section these post retirement issues are explored in more depth.

1.1 Common Experiences After Retirement

1.1.1 Depression, Anxiety and Life Satisfaction

Rates of depression and anxiety among retired athletes have been reported to be around 15-26% (Gouttebarge et al., 2019; Nixdorf et al., 2013; Schuring et al., 2017). In some sports, these outcomes have been recorded as high as 39% (van Ramele et al., 2017). Risk of depression and anxiety may be higher in athletes who were involved in individual sports over team sports (Nixdorf et al., 2013). Other risk factors for depression and anxiety amongst retired athletes may include previous injuries, concussions, dissatisfaction with career, previous depression/anxiety and high distress during the transition out of sport (crisis transition) among others (Schuring et al., 2017).

While a substantial amount of research supports some negative outcomes associated with retirement from sport, other work suggests the opposite. There has been conflicting evidence whether the transition period increases or decreases levels of depression and life satisfaction in elite athletes (Cavallerio et al., 2017; Giannone et al., 2017; Menke & Germany, 2018). Research by Weigand et al. (2013) has suggested that former athletes are less likely to experience depression than current athletes (Gouttebarge et al., 2019; Weigand et al., 2013). Weigand, Cohen and Merenstein (2013) also found that anxiety levels were lower in former athletes versus current athletes. Hypotheses on why ex elite athletes may be (on average) less depressed or anxious than current athletes often revolve around the levels of stress surrounding performance, prevalence of injury and expectations to perform from salient people in the athlete's life (Weigand et al., 2013).

Although there has been research that has demonstrated lower rates of depression and anxiety in ex athletes versus current athletes, this does not discredit the magnitude of sadness,

feelings of anxiousness or struggles with the changing of identity that many ex athletes may experience post athletic career (Menke & Germany, 2018; Stambulova et al., 2007). In conjunction, although the rates of depression and anxiety may be lower in retired athletes, this does not dismiss the individuals who continue to experience mental distress once retired (Gouttebarge et al., 2019). This may emphasize the importance of understanding the transition phase more thoroughly as it demonstrates the complexity of the entire process. Although some athletes may have more prevalence of depression and anxiety whilst participating in sport, it does not mean that the transition period can be disregarded (Gulliver et al., 2015).

1.1.2 Body Image

One of the biggest concerns and stressors for athletes post athletic career involves body image. Body image can be a strong influencer of an athlete's self-perception (Stephan et al., 2003). Many sports rely heavily on athletes being in peak physical condition to increase the chances of optimal performance (Schaal et al., 2011). Sports with particularly prolonged training sessions and/or emphasis on lean body types have a greater risk of athletes with disordered eating or overly controlled eating behaviors (Kong & Harris, 2015).

Schaal et al. (2011) demonstrated that there may be gender differences between the likelihood of developing eating disorders. Concurrently, the type of sport that an athlete participates in may leave individuals more at risk for certain disorders (Schaal et al., 2011). Women were shown to be more likely to develop eating disorders in aesthetic or racing sports, whereas men were more likely to develop eating disorders in combat or contact sports (Schaal et al., 2011). Gymnastics, amongst others, is particularly notorious for athletes with body image issues (Neves et al., 2017). However, regardless of the sport, elite athletes are more likely to

have a higher risk of negative body image and disordered eating than the general population (Torstveit et al., 2008).

The transition period post athletic career may influence the risk of developing disordered eating in ex-athletes (Buckley et al., 2019). The reason for retirement may have an impact on the risk for ex-athletes to develop disordered eating as well as a high level of athletic identity post career and previous pressure to fit a specific body ideal from sport (Buckley et al., 2019). Concurrently, body changes that ex-athletes experience may be comparable to other impactful events on the body, such as pregnancy (Buckley et al., 2019). The acceptance of one's 'new body' post athletic career can be a very difficult process and may lead to restrictive eating, compensatory behaviors as well as feelings of grief (Buckley et al., 2019).

1.1.3 Substance Abuse

Substance abuse has been indicated as a possible issue for retired athletes. Gouttebarge et al. (2019) demonstrated that nearly 20% of former athletes experience substance abuse. Stress from the transition period, chronic pain from previous injuries and learned behaviors during sports careers may all heighten the risk for substance abuse post athletic career (Gouttebarge et al., 2019). Similar to rates of depression however, current and retired athletes may be at a similar risk for substance abuse (Gouttebarge et al., 2019).

1.1.4 Positive Adjustment

It is important to note that not all elite athletes experience negative transitions out of sport. In fact, some elite athletes may adapt quickly to new roles or identities and may have a positive adjustment period into a 'new life' (Lally, 2007). Athletes that are able to detach from their athletic identities and connect with new identities may find that their retirement process is smooth and they are able to cope with the loss easier (Lally, 2007). Concurrently, some athletes

may feel a sense of relief or present higher life satisfaction with the transition (Weigand et al., 2013).

The process is complex, with some athletes finding it incredibly difficult to transition, with others adjusting easily. Thus, it demonstrates that the transition period is likely determined on a case-to-case basis, suggesting that there are several individual factors that may influence each athlete's ability to adjust post athletic career (Park et al., 2013). Given this proposition, it may be possible to develop a biodata scale which predicts post career outcomes for athletes.

1.2 Biodata

Biodata scales are generally developed with self-report questions, typically in a multiple-choice format, that refer to an individuals' past behavior, feelings or experiences (Dean, 2004; Stokes, 1999). It has been widely noted that past behaviour may be the best predictor for future behavior, which has further popularized biodata scales (Childs & Klimoski, 1986). The standard technique for a biodata scale involves utilizing questions and representative situations that require individuals to report their experiences, behaviours, values, personality or interests from earlier in their life (Mumford & Owens, 1987). Thus, the content of a biodata scale may include questions or items that tap into a variety of factors.

Biodata can capture a range of factors including personality, behaviour, skills and events (Stokes, 1999). It is commonly used for personal assessment and has been complimented as it encompasses more than just personality (Mount et al., 2000). The theoretical basis of biodata involves the process by which people make certain decisions or act in situations based upon their individual makeup (Gibson, 1979). How individuals react to experiences, make decisions or adapt to situations may create a basis for future behavior or performance (Gibson, 1979). Thus,

previous experiences may help develop skills to adjust to similar situations later on (Gibson, 1979).

Biodata was originally used as a tool for employee selection (Owens, 1976). In this realm, biodata has been demonstrated to successfully predict future job performance (Mumford & Stokes, 1992). Concurrently, biodata inventories have been shown to be valid predictors of criteria including satisfaction, adjustment and team performance (Mount et al., 2000). Biodata is often used in an organization's selection procedure, along with interviews, group assessment, application blanks and general mental abilities testing (Childs & Klimoski, 1986). Biodata has been shown to have similar criterion related validity to that of general mental ability tests; with an $r = .35$ (Dean, 2004; Schmidt & Hunter, 1998).

1.2.1 Biodata in the Current Research

The current research aimed to predict adjustment post athletic career by development of a biodata scale. To the authors knowledge, biodata has not been used in a sports setting other than Kniffin et al. (2015) who utilized a biodata inventory in order to aid in their examination of whether or not ex athletes made better employees than non-athletes. However, because biodata can effectively predict indicators such as performance and satisfaction, it could be a useful tool for sports organizations and coaches and should be taken advantage of more often (Mount et al., 2000). In the current research, it is hypothesized that the experience of certain events and situations in an athlete's past may help predict how the athlete will cope with the transition out of sport: predict their resilience to the negative aspects of retirement..

1.2.2 Resilience

Resilience can be thought of as an individual's ability to function, sustain and grow from a difficult or undesired experience (Bryan et al., 2017). Adversity, environmental influences and

personal resources have been shown to attribute to athletes' resiliency (Galli & Vealey, 2008). Factors such as self-efficacy and problem-solving skills can create a protective barrier against adverse life events (Galli & Vealey, 2008). In conjunction, the persistence and desire to work through difficult situations may then create a more positive outcome or learning curve to build mental toughness and resilience in athletes (Galli & Vealey, 2008).

Wadey et al. (2008) indicated that childhood had a strong impact on mental toughness, and was highly influenced by parents, coaches and peers. Mastery of skills and the perception of having the capabilities to perform a unique skill set was also demonstrated as a factor for mental toughness (Connaughton et al., 2008). Concurrently, childhood mental toughness was shown to be a base, which influenced the teenage and adult years of athletes' careers (Connaughton et al., 2008). The desire and motivation to succeed, through set-backs and negative experiences was shown to be a strong determining factor of mental toughness in athletes (Connaughton et al., 2008).

1.2.3 Early Life Experiences: Adversity

Research about childhood trauma influencing mental health in adulthood indicates that traumatic experiences in childhood can be salient throughout life (Stansfeld et al., 2016). Likewise, high levels of adversity over a lifetime is associated with lower life satisfaction (Seery et al., 2010). Although there are many other factors that may influence the mental state of an adult, childhood experiences remain poignant (Stansfeld et al., 2016).

Research suggests that although severe traumatic childhood events can increase the chances of mental disorders later in life, moderate exposure to adversity in childhood may actually build resilience and help individuals adapt to future stress (Ellis & Boyce, 2008; Shapero et al., 2015; Stansfeld et al., 2016). Stansfeld et al. (2016) indicated that experiences

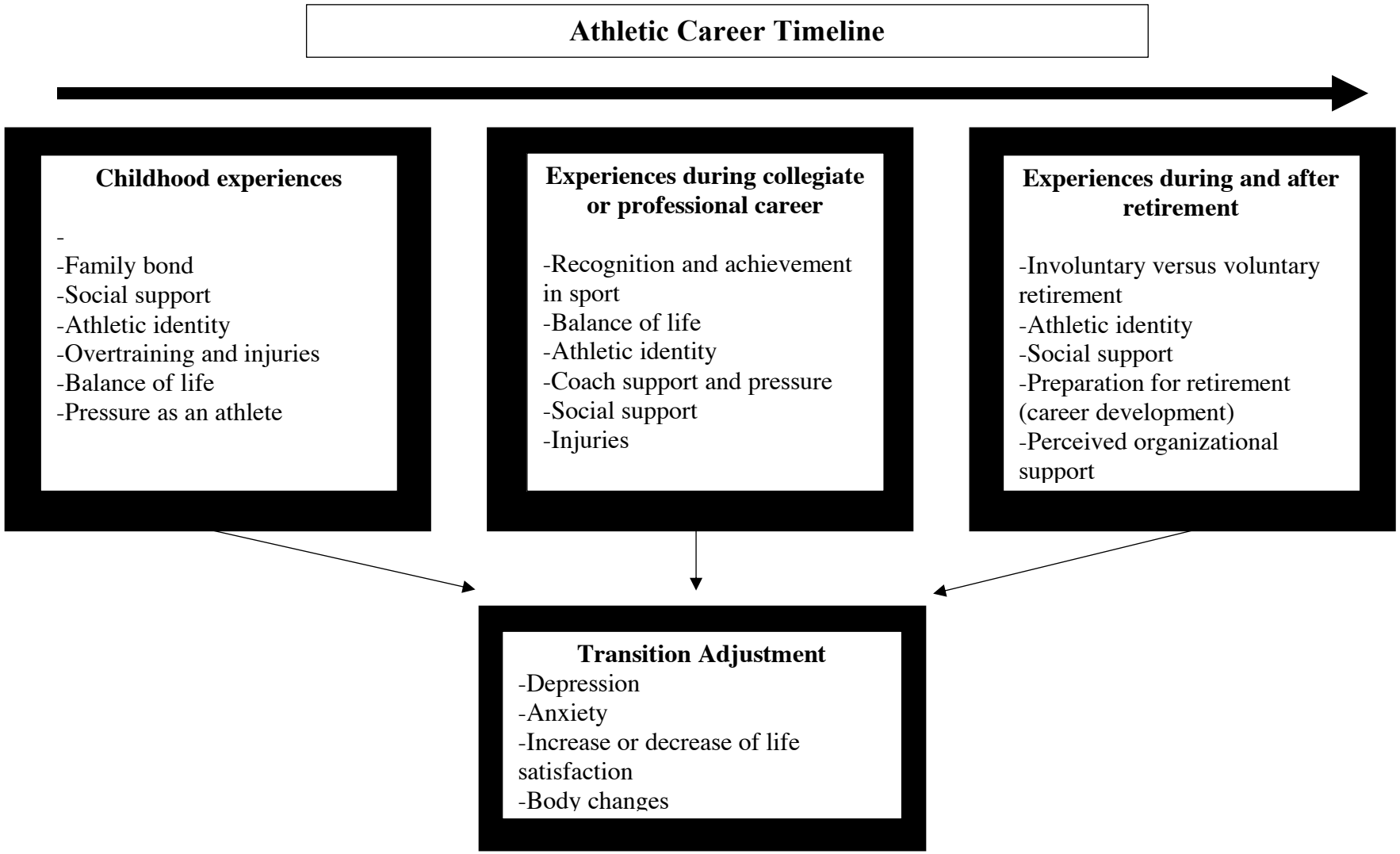
such as abuse, loss and neglect can increase the chances of developing depression and anxiety in adulthood. Violence and abuse in childhood can also lead to higher risk of chronic disease in adults (Al-Shawi & Lafta, 2015). In contrast, mild stressful events (i.e. homework) to moderate stressful events (i.e. failing a test, losing a competition, moving houses) may encourage the development of adaptivity (Shapero et al., 2015). Interestingly, moderate adverse childhood events may actually decrease the chances of depression in adolescents (Shapero et al., 2015). Concurrently, it has been found that moderate levels of adverse events throughout life may actually increase life satisfaction (Seery et al., 2010).

The difficulties for athletes transitioning from their sport to their next phase of life can be affected by a multitude of factors and experiences. Such factors can include athletic identity, career development, balance of life, and social support (Park et al., 2013). These experiences are hypothesized to either increase or decrease resilience and the ability to adapt to life post athletic career.

In order to understand the factors which might predict the degree of post sport career adjustment difficulties, the author has developed a temporal model (see Figure 1) of experiences that are predicted to influence the retirement process for athletes. Experiences from early life, the adult career, and finally during and after the actual retirement may all have a strong impact on how the transition process goes for the individual. While the model includes experiences all the way through an athletes' career that may affect the transition period outcomes, the focus for the biodata scale was primarily on early life experiences and the ability to predict post athletic career adjustment by concentrating on those early life factors. The next sections discuss the factors in further detail.

Figure 1

Possible indicators of post athletic career adjustment



1.3 Key Factors That May Affect Adjustment

The following sections examine the factors which might help build resilience to career retirement in further detail. The next section discusses the early life experiences or factors shown in the left-hand box of figure 1. Each factor may influence adjustment during the transition period post athletic career.

1.3.1 Family Bond

Protective barriers against highly stressful experiences may include a supportive environment as well as family bonding (Ellis & Boyce, 2008; Al-Shawi & Lafta, 2015). Family bond can be known as the connection and cohesiveness of a family; including communication and time spent interacting, particularly between parents and their children (as cited by Kuendig & Kuntsche, 2006). Strong levels of family bond may even decrease the chances of disease later in life (Al-Shawi & Lafta, 2015). In fact, a strong family bond may even cut chances of developing some chronic diseases by half (Al-Shawi & Lafta, 2015). Concurrently, a strong family bond and a supportive environment is one of the potent factors for building resilience (Al-Shawi & Lafta, 2015).

1.3.2 Social Support

Social support is important across the life span and an integral part of the transition period for retiring athletes. It has been demonstrated widely that perception of social support can make the adjustment post athletic career easier and smoother (Brown et al., 2018). The level of support is important, as well as who the support comes from. Support from family, peers and coaches/ mentors all have a strong impact on how well athletes transition post career (Brown, et al., 2018). The continuance of friendships of fellow athletes or teammates post retirement may

also be a strong positive influence in the transition period (Willard & Lavallee, 2016). Thus, even though friendships may fluctuate over time, the ability for the relationship to stay in-tact in some way can aid in the adjustment period (Willard & Lavallee, 2016).

Perceived organizational support is also influential; thus, feeling supported after retirement from the club, team or university (Brown & Potrac, 2009; Brown et al., 2018). Many athletes have indicated feeling like pawns or disregarded by organizations and coaches after their retirement (Sinclair & Orlick, 1993). Concurrently, athletes have often suggested that organizations, national bodies and coaches offer more support during the time as an athlete to experience other facets of life in order to cope and adjust with the transition after retirement (Sinclair & Orlick, 1993).

Feeling important or cared for, and the ability to ask for help have been shown to be two important concepts for athletes retiring from their sport (Brown et al., 2018). The feeling of not being able to ask for help has been demonstrated to be detrimental to mental health, especially in a particularly vulnerable time (Brown et al., 2018).

1.3.3 Athletic Identity

Athletic identity can be defined as to what degree the individual perceives themselves as an athlete (Brewer et al., 1993). Burns et al. (2012) found that athletic identity is multifaceted, with two prominent components being exclusivity and social identity. Exclusivity can be referred to as the all-encompassing side of athletic identity; thus, the level that the individual identifies themselves only as an athlete and disregards other roles they may hold (Burns et al., 2012). By giving up other identities, athletes may then exaggerate the importance of their athletic identity above all other roles (Lally, 2007). Their commitment and dedication to their

role as an athlete may therefore nearly or fully encompass them as a person (Lavallee et al., 1997).

Athletes often have to sacrifice many other aspects of life to excel in their sport. It is relatively clear then, that those with a limited idea or perception of their identity struggle more when that part of them is lost (Lavallee et al., 1997). Identity loss has often been indicated as an issue post athletic career and has been most associated with ex-athletes who had high levels of athletic identity (Willard & Lavallee, 2016).

Research has suggested that athletes with higher levels of athletic identity upon retirement may have more difficulties adjusting to life, post athletic career (Martin et al., 2014). A decrease in athletic identity after retirement has been shown to be associated with a greater likelihood of positive adjustment amongst former athletes (Lavallee et al., 1997). Lavallee et al. (1997) also demonstrated that even a minute increase in athletic identity was associated with negative consequences.

High levels of athletic identity have been found to be a significant predictor for depressive or anxious feelings after sport retirement (Sanders & Stevinson, 2017). Retirement caused by injuries, chronic pain after sport and high levels of athletic identity were associated with higher rates of depression amongst athletes (Sanders & Stevinson, 2017).

1.3.4 Overtraining and Injuries

Overtraining in sport (particularly in childhood) has been shown to be associated with injuries, burnout and mental distress (Brenner, 2007). Overtraining syndrome can be characterized by lack of rest or time off from sport and extreme training (Meeusen, 2013). It has been suggested by the American Academy of Pediatrics Council to have at least two to three months off sports training per year, and two full days off during each week (Brenner, 2007).

However, many child athletes, and particularly in sports such as gymnastics, do not get such luxuries.

Training distress has been shown to be a precursor and key indicator to overtraining syndrome (Madigan et al., 2017). Negative psychological responses to training (i.e. feelings of worthlessness or inadequacy) can be measured in order to capture training distress. It was found that perfectionism and perfectionistic concerns had a positive association with training distress and thus, could predict overtraining (Madigan et al., 2017).

Injuries are a common theme amongst reasons for retirement (Park et al., 2013). Likewise, it has been indicated that retirement due to injury may be associated with increased difficulties with adjustment (Lavallee et al., 1997). Because over training often leads to injuries, it is a factor in the retirement process for elite athletes (Brenner, 2007; Kaul, 2017). Elite athletes that retire primarily because of injury have reported feelings of anger, bitterness and frustration and may disassociate with people that they are close to (Kaul, 2017). Loss of interest in activities that were previously enjoyable as well as adverse coping strategies were also noted (Kaul, 2017). Ronkainen et al. (2016) indicated that athletes often listened to their coaches about training issues over medical professionals or their own instincts, which could then lead to injuries; primarily in female athletes.

1.3.5 Balance of Life

The commitment and extreme dedication that athletes must display to become successful can distance them from other aspects and experiences of life (Baillie, 1993). Research has identified that the balance between an athletes' sporting and non- sporting life can have a strong influence on how they transition post athletic career (Harrison & Lawrence, 2004). Harrison and Lawrence (2004) found that having a balance between academics, relationships and sporting

career can promote a healthier and happier adjustment after retirement from sport (Harrison & Lawrence, 2004). Having a healthy balance between sport and non-sport life can also aid in the well-being of athletes who are still competing (Pink et al., 2015).

1.3.6 Pressure to Succeed

An athlete's performance can be highly influenced by their mental state (Bebestos & Antoniou, 2012). Research has shown that social support may act as a protective barrier against transitions and stressful life events as indicated earlier (Al-Shawi & Lafta, 2015). However, there may be a fine line between support and pressure to succeed from key people such as parents, coaches and peers (Chan et al., 2010). Pressure to perform can lead to an athlete's fear of failure (Bebestos & Antoniou, 2012; Gustafsson et al., 2017). Fear of failure has been associated with anxiety, stress and burnout from sport (Gustafsson et al., 2017).

Competitive anxiety is commonly found with elite child athletes (Chan et al., 2010; Kaye et al., 2015). An increase in anxiety in athletes was associated with pressure to win from parents, coaches and the athlete themselves (Brustad, 1998; Kaye et al., 2015). Unrealistic expectations to succeed from both internal and external sources can also be detrimental to athlete's self-esteem (Collins & Barber, 2005; Lewthwaite & Scanlan, 1989). Children who had high achievement related goals have also been found to have higher levels of anxiety, which may also lead to more difficulty dealing with the transition out of sport (Kaye et al., 2015; Schuring et al., 2017). Research has shown that although parents were the most influential for an athlete's mental state when their children were young, peer influences became more significant into teenage years (Chan et al., 2010). In conjunction, the competitive atmosphere that coaches and parents promote can impact an athlete's self-esteem as well as levels of anxiety (Collins & Barber, 2005).

The next factor represents the middle box in Figure 1, indicating that it is more associated with later sports career aspects. Some factors mentioned in the first section can span across an entire athletic career, thus, affecting athletes in early life and adulthood. In example, factors such as athletic identity are expected to be impactful throughout every phase of a sports career.

1.3.7 Recognition and Achievement in Sport

It has been suggested that the notoriety and status of being an elite athlete may restrict individuals into defining their self-worth primarily or completely to their sports performance (McPherson, 1980). Sinclair and Orlikc (1993) indicated that a loss of status after retirement was a significant issue during the transition out of sport. The level of achievement an athlete feels during their sporting career may also impact their ability to adjust after retirement (Sinclair & Orlick, 1993). They also found that athletes who retired due to non-achievement of goals or decline in perception of performance were more likely to experience a loss of status (Sinclair & Orlick, 1993). The combination of feeling a loss of status and lack of achievement in sport was associated with a lower life satisfaction (Sinclair & Orlick, 1993). Thus, a perception of achieving one's goals and aspirations may lead to an easier adjustment post athletic career (Sinclair & Orlick, 1993).

The next two factors are associated with retirement and the end of an athletic career (refer to the third box in Figure 1).

1.3.8 Involuntary Versus Voluntary Retirement

Adjustment during the transitional period may be impacted by whether or not the decision to retire was voluntary or involuntary. It has been demonstrated that athletes who did not choose to retire, but were forced to for various reasons, were more likely to experience negative outcomes (Ogilvie & Taylor, 1993). However, it may be difficult to identify whether

the decision was truly involuntary or voluntary, and may not fully encompass the complexity of the process (Kerr & Dacyshyn, 2000; Roberts et al., 2015). Athletes may be directed by coaches or mentors to decide to retire. This may make the actual decision to retire ambiguous in the way that it was not necessarily the athletes own free choice (Kerr & Dacyshyn, 2000; Roberts et al., 2015). Concurrently, many athletes retire at the end of their collegiate career and although it is not forced, the conclusion of that entity often signals an end to any further athletic journey. Thus, it may not appear that there are any further opportunities to engage in the sport which then leads to retirement (Kerr & Dacyshyn, 2000).

1.3.9 Preparation for Retirement (i.e. career development)

Career development has been shown to aid in the retirement process for athletes. It has been indicated that athletes who ignored their impending retirement, and who did not prepare for life post athletic career, had a much more difficult time during the transition period than those who did (Harrison & Lawrence, 2004). Athletes that explore other opportunities or career paths during their collegiate sports career are more likely to adjust to non-athletic life (Harrison & Lawrence, 2004).

It has been indicated that development of a holistic approach to sport can aid in the transition after retirement (Tekavc et al., 2015). Thus, encouraging both athletic career as well as educational or future job career (Tekavc et al., 2015). It was stated that because transitions are normal (in particular the one after athletic retirement), it is vital that athletes prepare properly for such experiences (Tekavc et al., 2015). Concurrently, it was found that athletes who pursued their athletic career simultaneously with an occupational or educational career were shown to have a higher perception of self-esteem (Tekavc et al., 2015).

It has been noted that both preventative (i.e. career development) as well as reactionary (i.e. coping strategies) measures should be taken to aid with the adjustment period after termination of athletic career (Park et al., 2013). Programs promoting financial, psychological and occupational planning have been indicated as ways to increase the likelihood of a positive transition after athletic retirement (Park et al., 2013). However, Park et al. (2013) did mention that there needs to be more research conducted on the longitudinal effects of such programs as well as the impact of such programs in non-western cultures.

1.4 The Current Research

Although there has been significant research dedicated to the transition period post athletic career, there is a lack of knowledge and research on how early life and within sport experiences can influence the adjustment period. It is commonly known that factors such as athletic identity, social support, voluntary versus involuntary retirement amongst many others can influence how athletes transition out of sport (Park et al., 2013). However, there is a gap in the research in terms of a measure which considers a broad range of factors on how early life and career experiences can influence the transition post athletic career. The current research aims to bridge this gap.

The potential traumatic transition for athletes post athletic career, and the lack of research involving the influence of early life experiences warrants the development of a new measure. The current study will draw on previous research listed above and the author's personal experiences in elite athletics to create a biodata scale.

By researching the link between early life and within career experiences and the post athletic career outcomes, the biodata scale developed in the current study may be able to give insight into athletes just starting their collegiate, semi or professional careers and act as a

predictor for those who may need more help before retirement becomes a reality. Thus, the scale could identify athletes who may struggle with the transition to retirement early on. Having the ability to identify which athletes may struggle with the retirement transition before their collegiate or professional careers even begin may promote coaches and organizations to intervene early on and aid in the care and encouragement of mental health and well-being of athletes.

2 Method

2.1 Design

The current study involved the development of a biodata scale and a concurrent validation study. The study developed and validated the post athletic career adjustment scale (PACAS) against two criterion measures: the sport loss grief scale (SLGS) and the satisfaction with sports life scale (SWSLS). Data was collected from collegiate, semi or professional athletes that were retired from their athletic careers. The current study was approved by the Ethical Committee at the University of Canterbury

2.1.1 Sampling/ Recruitment

Participants were sampled based upon their level of athletic achievement (i.e. collegiate or professional), and how long they had been retired from their perspective sport. In order to help ensure variance in the criterion measures, the aim was to recruit participants who had been retired from their sport for two years or less. Participants were recruited by multiple methods: 1) online social media groups for retired collegiate athletes, 2) via the author's personal connections with the United States Ski Association (USSA), the University of Denver Athletics Department and personal connections through competing in elite athletics. Requests for participants were

conducted via an online flyer demonstrating the approval of ethics from UC, an explanation of the research, and a link to follow if they were interested in participating. The measures were anonymous; therefore, any true identifying information was withheld.

Flyers were posted on social media pages and groups, with the link to the Qualtrics questionnaire attached. Emails were sent to the head coach of gymnastics at the University of Denver, the New Zealand Rugby Players Association, the head coach of the University of Utah gymnastics program, an athlete career and education manager of the United States ski and snowboard team, and relevant personnel at a variety of universities including North Carolina State, Boise State, Iowa State and South East Missouri State University. The flyer and links were then distributed to appropriate potential participants.

2.2 Participants

The above methods yielded 176 respondents. However, due to significant missing data or non-responses, 30 cases were removed. Therefore, the final number of respondents was N=146.

2.2.1 Demographics

Demographic questions were utilized in order to gather a more comprehensive view of the sample. Questions included ethnicity, gender, years of participation within their sport and time since their retirement from sport.

Participants were from multiple countries of origin; including New Zealand, Australia, Canada, Germany, France, England, Peru, China, Ecuador, Thailand, Argentina, Indonesia and the United States of America. There were substantially more female participants at N=136 versus males: N=31, and gender fluid: N=1. The variety of sport participation was vast and included athletes from artistic gymnastics, rhythmic gymnastics, tennis, swimming, diving, ski

jumping, water polo, dance, soft ball, rowing, baseball, cheerleading, soccer, trampoline, football, road cycling, basketball, rugby, pole vault, track and field, field hockey, skiing and fencing.

Years of participation in sport varied from 4 to 27 years (M= 14.5, SD= 5.3). Although the aim was to recruit individuals that were retired for two years or less, many respondents had been retired significantly longer. The number of participants who had been retired longer than two years was large enough to warrant an investigation to see whether length of time since retirement affected adjustment.

Although no monetary incentives were offered to participants, the desire to help future athletes seemed to be potent enough to motivate participants to volunteer in the study.

2.3 Materials

2.3.1 Biodata Scale (PACAS)

Standard development procedures described by Gunter et al., (1993) were followed to create the items for the post athletic career adjustment survey (PACAS). The biodata scale (PACAS) was heavily influenced by the authors past experiences of competing as an elite athlete in both gymnastics and aerials ski jumping. Questions were also influenced by the author's experiences as a coach in elite gymnastics, as well as time spent with NCAA, world cup and Olympic athletes in a multitude of sports. Therefore, the biodata questions do not just encompass the author's personal experiences, but included those of other athletes across a wide range of sports. Concurrently, a literature review was conducted in order to examine previous research on the topic. The process was conducted in order to establish identifying biographical factors from an athlete's past (early life) that would be the most salient to predict their adjustment response post athletic career.

Biodata scale development was done using themes that were identified as being important to the adjustment period including; balance of life, adverse life experiences, adaptability, family bond, social support, overtraining, athletic identity, pressure to succeed, injuries and recognition. Table 1 shows the distribution of these question across the categories.

Table 1

Biodata Categories and Associated Item/Question Numbers

Biodata Category	Item/question number
Balance of life	1, 12, 13, 14, 20, 21, 22, 23, 24, 25
Adverse life experiences	2, 6, 34
Adaptability	3, 4, 34
Family bond	5, 26, 27
Social Support	7, 8, 9, 10, 11
Overtraining	17, 32, 33
Athletic identity	15, 16, 18, 19
Pressure	28, 29
Injuries	30, 31
Recognition	35, 36

The biodata scale questions were presented in a multiple-choice format. Questions were varied, and had either four or five response options. Seven questions included an option to "click all that apply". The participants were asked to recall their childhood (up to 17 years old) when answering questions (a few questions are targeted specifically at teenage years (13-17 years old).

In order to demonstrate the layout, biodata question number 6 and 33 are presented in Figure 2 below. The entirety of the biodata scale is shown in Appendix A.

Figure 2

Biodata items 6 and 33 with response options

Q6 As a child, you: (Click all that apply)

- ☐ Experienced the death of a parent (1)
- ☐ Experienced the death of a sibling (2)
- ☐ Experienced the death of a grandparent or other close family member (3)
- ☐ Experienced the death of a close friend (4)
- ☐ None of the above (5)

Q33 Did you choose to continue training with an injury, even if a doctor or medical professional advised you not to?

- ○ Yes, always (1)
- ○ Often (2)
- ○ Sometimes (3)
- ○ Rarely (4)
- ○ Never (5)

Each biodata question was developed with a hypothesis. Athletes who did not take time off for injury would likely have had almost a compulsion with the sport, or high levels of athletic identity, making it more difficult to transition out. May also indicate high perfectionism or strict coaching.. Hypotheses for each question are shown in Table 2.

Table 2

Biodata Item Hypotheses

BD Item	Theme	hypothesis
1	Balance of life	The further away the training facility was, the more time they would be sacrificing for their sport and missing out on 'life experiences'.
2	Adverse life experiences	Moving house would increase resiliency.
3	adaptability	The more schools an athlete would attend would promote more experience in adjusting from friend group to friend group, town to town. Would therefore help with future adjustment and transition processes.
4	adaptability	The more distance there was when attending training camps, the more likely the athlete would have to transition or adjust to a new way of life; i.e. make new friends, adjust to a host family etc. Therefore, would help with future transitions.
5	Family bond	Divorce or being raised by a single parent could increase resiliency
6	Adverse life experiences	If a child had experienced loss of a family member or friend, it is likely that they would have dealt with some sort of transition into a new way of life and could build resilience for future transition periods.
7	Social support	Support from a coach would likely increase satisfaction, confidence and help with the transition.
8	Social support	Support from a coach would likely increase satisfaction, confidence and help with the transition.
9	Social support	Support from a coach for the outside life of an athlete would promote life balance and help with the transition
10	Social support	Support from a coach would likely increase satisfaction, confidence and help with the transition.
11	Social support	Pressure to succeed from a coach could go one of two ways; either instil confidence and honour or act as a stressor. Could aid or hinder adjustment.
12	Balance of life	Other hobbies would allow balance and flexibility for the athlete, it likely would make the transition out of sport easier if they had other hobbies to fall back upon.
13	Balance of life	It is hypothesized that the less time that the athlete had to spend with family, the more consumed they were by the sport. Once the sport is gone, they may struggle to manage time and fill it with things they enjoy.
14	Balance of life	It is hypothesized that the less time that the athlete had to spend with friends, the more consumed they were by the sport. Once the sport is gone, they may struggle to manage time and fill it with things they enjoy.
15	Balance of life	It is hypothesized that the more sports an athlete was involved with, the easier their transition out would be.
16	Balance of life	It is hypothesized that the more sports an athlete was involved with, the easier their transition out would be, especially if it was for fun. This would allow the athlete to pursue other enjoyable avenues once their main sport was finished.

17	Overtraining	Athletes who did not take time off when they needed a rest or break would likely have had almost a compulsion, or were over trained, and would make it more difficult to transition out.
18	Athletic identity	The more someone loved their sport, the harder the transition would be as they would reminisce on the 'good days' and struggle to move on.
19	Athletic identity	The more someone loved their sport, the harder the transition would be as they would reminisce on the 'good days' and struggle to move on.
20	Balance of life	The less time an athlete had off, the more consumed they would have been by their sport, which could encourage obsessiveness and fear of free time; making the transition more difficult.
21	Balance of life	The less days the athlete had off during the week, the more consumed they would be. I hypothesize that it would be very difficult to time manage once finished if everything was constantly structured in childhood.
22	Balance of life	The more time an athlete spent training, the less time they would have had to build other identities and roles. Would hurt in the adjustment period.
23	Balance of life	The more time an athlete spent training, the less time they would have had to build other identities and roles. Would hurt in the adjustment period.
24	Balance of life	The more typical or normal an athletes school was, the more likely they had balance between sport and non-sport life; therefore making the transition out easier.
25	Balance of life	The more friends that were involve in the same sport, the harder the transition as the athlete would have had limited exposure of other aspects and people of life
26	Family Bond	The more pressure that family put on the athlete to perform, the harder the transition as the athlete would likely feel less important and successful post athletic career.
27	Family Bond	The less support the athlete had from family, the harder the transition would be out of the sport later on.
28	Pressure	The more pressure an athlete would have put on themselves would likely be associated with loss of identity or importance once they retired from their sport.
29	Pressure	H1: The more perfectionistic the athlete was in other aspects of their life, the more likely they would be good at other things, and perhaps create opportunities once they finished. H2: The more perfectionistic the athlete was in other aspects of their life, the more likely they would be to deter from other activities once finished in fear of 'not being good enough'.
30	Injuries	The more major injuries the athlete had, the more they would have had to adjust during that period, therefore helping them in the transition out of their athletic career.
31	Injuries	The more minor injuries the athlete had, the more they would have built resilience that would help them in the adjustment post athletic career.
32	Overtraining	Athletes who did not take time off for sickness would likely have had almost a compulsion with the sport, making it more difficult to transition out. May also indicate high perfectionism or strict coaching.
33	Overtraining	Athletes who did not take time off for injury would likely have had almost a compulsion with the sport, making it more difficult to

		transition out. May also indicate high perfectionism or strict coaching.
34	Adverse life experiences	The more coaches an athlete would have had, the more transition time there would have been in between, and the more experience they would have had with adjustments.
35	Recognition in sport	The more media and recognition they had, the more important they likely felt, which may increase the difficulty of adjusting to the normality of regular life post athletic career.
36	Recognition in sport	The more recognition they had, the more important they likely felt, which may increase the difficulty of adjusting to the normality of regular life post athletic career.

A formal pilot test was not conducted for the current research. However, a form of beta testing was implemented; fellow Master's degree participants looked over the biodata scale for clarity, grammar and over-all comprehension.

Biodata Scoring

A key aspect to using a biodata scale is to create a scoring criterion (Cucina, Caputo, Thibodeaux & Maclane, 2012). Because every biodata scale is unique, scoring may fluctuate depending on the criterion or the technique used (Cucina, Caputo, Thibodeaux & Maclane, 2012). Items in a biodata scale are given different weights, thus, certain responses are deemed more impactful than others (Stokes et al., 1994). Item responses can be rated with the criterion measures objectively (i.e. empirical relationship) or subjectively (i.e. hypothetical relationship) (Cucina, Caputo, Thibodeaux & Maclane, 2012). Therefore, weights are conducted by comparison and the relationship of the responses to the criterion measure (Stokes et al., 1994).

There are multiple ways to score biodata scales. A common method for scoring biodata items is the empirical keying method (Mumford, 1999). The empirical keying method gives weights to each item and determines individuals who will measure low or high on a specific criterion in relation to that item (Mumford, 1999). The Horizontal Percentage Method is a scoring technique that derives from the empirical keying method, that will be used in the current

study. The name derives from using rows of data to establish the probability of being in a low or high criterion group for each response (Sommerville, 2008).

2.3.2 Adapted Job Loss Grief Scale

The original job loss grief scale (van Eersel et al., 2019) was aimed to encompass the feelings and experiences of loss; including coping, distractions, and emotional responses. The job loss grief scale (JLGS) was adapted originally from a scale referring to grief from the death of a loved one (Boelen et al., 2003). The JLGS was slightly adapted in order to make it more applicable to a sporting career loss. Thus, the wording of 'job loss' was adapted to 'athletic career loss' or 'sport loss'. The scale used for the purpose of the current research will be called the sport loss grief scale (SLGS). For multiple reasons, eleven items of the JLGS were removed. For the purpose of time required by participants; duplicate items, items that were overly analogous, and/ or difficult to adapt to the context of an athletic career, were removed. The remaining 22 items were changed slightly in order to fit the aim of the study as indicated above. An example of a question is as followed: "I feel a strong longing for my sport". Participants were instructed to keep the loss of their athletic career in mind and rate their experience (within the last month) with each item on a 5-point Likert scale from 1 (never) to 5 (always). Van Eersel et al. (2019) indicated that all but three factor loadings for items were .60 or higher, and the lowest was .44. The internal consistency of the JLGS is strong, with a CR of .99 and a $r = .77$, $p < .001$ (van Eersel et al., 2019). Full questions are listed in Appendix B.

2.3.3 Adapted Satisfaction With Life Scale

The satisfaction with life scale (SWLS) was also utilized as a criterion measure. The SWSLS was derived from the SWLS. Similarly to the SLGS, a minor adaptation of the scale

was taken in order to make it be more congruent to an athletic setting. Thus, wording was changed to reflect a life post athletic career.

The SWLS is a short, five item scale that is used globally to measure life satisfaction (Diener et al., 2008). It is a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) Diener et al., 1985). The five responses are added together to create an overall score ranging from 5 (low life satisfaction) to 35 (high life satisfaction) (Diener et al., 1985). The internal consistency of the scale is high, ranging from α= .79-.89 (Pavot & Diener, 2008). Factor analyses of the scale also indicated a single factor that was shown to account for 66% of the variance (Diener et al., 1985). The scale has also been demonstrated to be generalizable to populations across cultures, and generations (Pavot & Diener, 2008). An example of a question includes: "In most ways my athletic life is close to my ideal". Full questions are listed in Appendix C.

2.4 Procedure

Participants were able to access the questionnaire from anywhere with internet access and were able to take their time completing the questionnaire. Participants were prompted with an introduction and given instructions on how to complete the surveys. Demographic questions were completed first. The three surveys (PACAS, SWSLS and SLGS) were presented in a random order, and questions within each survey were also randomized. At finalization of the questionnaire, participants were thanked for their time. Once the survey was closed, the data was downloaded into SPSS for analyses.

3 Results

3.1 Identifying the Criterion Variable for Biodata Scoring

One of the criterion variables needed to be utilized to create weights for the biodata items, these operate in opposite directions, with SWSLS being a marker of adjustment and SLGS a marker of adjustment difficulty.

Descriptive statistics and range restriction were calculated for both criterion variables as shown in Table 3. Inspection of the results was guided by Kim (2013) who suggested that skewness and kurtosis should be less than 3.29 for a sample size that is greater than 50. Skewness was identified for both the SWSLS and the SLGS which indicated that the data was not normally distributed. However, after looking through the data and responses, it was concluded that the data was skewed in an expected way. Thus, the nature of the questions of both the SWSLS and the SLGS and the response options likely provoked some of the more extreme responding. With that said, the SWSLS was far less skewed, which therefore looked to be a better variable for use in scoring the biodata scale.

Table 3

Descriptive Statistics and Range Restriction

						Skewness		Kurtosis			
	N	Min	Max	Mean	SD		SE		SE	skewness z score	kurtosis z score
SWSLS	142	1.00	7.00	4.89	1.25	-0.80	0.20	0.05	0.41	-3.97	0.13
SLGS	139	1.00	5.00	2.22	0.78	1.06	0.21	1.18	0.41	5.17	2.89

Note: SD represents standard deviation, SE represents standard error.

3.1.1 Time Since Retirement and the Criterion Variables

It was expected that difficulty adjusting after career retirement would fade with time. Examination of the time since retirement for the sample showed a mean of about three years, as demonstrated in Table 4. However, the range was large, between one month to 54 years. This indicated that some participants may have been outside of the range where the bio data scale could realistically predict post athletic career adjustment.

Table 4

Descriptive statistics for the time since retirement

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Time Since Retired	146	647.00	1.00	648.00	40.8185	79.40909

Note: the time since retirement is demonstrated in months

In order to further examine the relationship between the variables, correlations between the time since retired and both the criterion variables were calculated. Results are shown in Table 5. Inspection of Table 5 showed that the relationship between the SWSLS and the SLGS was significant, and strongly correlated in opposite directions (as expected). There was also a significant correlation between time since retired and the SLGS. This would indicate that as time progresses, sports loss grief decreases (again as expected). However, because a portion of the sample had been retired for over two years, the SWSLS was shown to be more comprehensive for the sample as a whole. Thus, a portion of the sample could have been outside the range that the SLGS could predict and therefore, the SWSLS was a better fit as the criterion variable used for biodata weighting.

Table 5

Correlation Between Time Since Retired and the Criterion variables

	SLGS	SWLS
SLGS		
SWSLS	**-.61****	
Time since retired	**-.20***	0.12

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.2 Biodata Scoring

As mentioned above, the SWSLS was determined to be the best criterion variable and was then utilized to create weights for each biodata item. Weights for every response option needed to be calculated for each biodata item (Mumford, 1999). Therefore, each biodata item was measured separately to determine whether each was a valid predictor of adjustment. As mentioned earlier, the horizontal percentage method (HPM) was utilized. The HPM involved weighting each item response based on participants' probability of being in either the high or low criterion group as determined by the variable (SWSLS) and what response options they chose (Mumford, 1999; Stokes et al., 1994).

The first step to assigning weights for each biodata item was to create high and low criterion groups based off of the SWSLS. A frequency table was created for the SWSLS (as shown in Table 6). The mean score on the SWSLS was 4.89. The low criterion group included any participant who scored between 1-4 on the SWSLS (which calculated out to about 23% of the cumulative percent of the sample) at N=33. The high criterion group was any participant who scored a 5 or higher on the SWSLS (as demonstrated in Table 6 at N=89.

Table 6

SWSLS Frequency table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	.7	.7	.7
	1.80	1	.7	.7	1.4
	2.20	5	3.4	3.5	4.9
	2.60	6	4.1	4.2	9.2
	2.80	2	1.4	1.4	10.6
	3.00	1	.7	.7	11.3
	3.20	4	2.7	2.8	14.1
	3.40	1	.7	.7	14.8
	3.60	4	2.7	2.8	17.6
	3.80	7	4.8	4.9	22.5
	4.00	1	.7	.7	23.2
	4.20	4	2.7	2.8	26.1
	4.40	10	6.8	7.0	33.1
	4.60	4	2.7	2.8	35.9
	4.80	2	1.4	1.4	37.3
	5.00	12	8.2	8.5	45.8
	5.20	16	11.0	11.3	57.0
	5.40	8	5.5	5.6	62.7
	5.60	14	9.6	9.9	72.5
	5.80	9	6.2	6.3	78.9
	6.00	9	6.2	6.3	85.2
	6.20	7	4.8	4.9	90.1
	6.40	8	5.5	5.6	95.8
	6.60	3	2.1	2.1	97.9
	6.80	2	1.4	1.4	99.3
	7.00	1	.7	.7	100.0
	Total	142	97.3	100.0	
Missing	System	4	2.7		
Total		146	100.0		

Table 7

SLGS Frequency Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	.7	.7	.7
	1.05	1	.7	.7	1.4
	1.09	1	.7	.7	2.2
	1.14	1	.7	.7	2.9
	1.18	1	.7	.7	3.6
	1.23	1	.7	.7	4.3
	1.27	3	2.1	2.2	6.5
	1.32	2	1.4	1.4	7.9
	1.36	3	2.1	2.2	10.1
	1.41	3	2.1	2.2	12.2
	1.45	2	1.4	1.4	13.7
	1.50	5	3.4	3.6	17.3
	1.55	2	1.4	1.4	18.7
	1.59	6	4.1	4.3	23.0
	1.64	5	3.4	3.6	26.6
	1.68	4	2.7	2.9	29.5
	1.73	5	3.4	3.6	33.1
	1.77	6	4.1	4.3	37.4
	1.82	2	1.4	1.4	38.8
	1.86	3	2.1	2.2	41.0
	1.91	3	2.1	2.2	43.2
	1.95	5	3.4	3.6	46.8
	2.00	4	2.7	2.9	49.6
	2.09	2	1.4	1.4	51.1
	2.14	6	4.1	4.3	55.4
	2.18	2	1.4	1.4	56.8
	2.23	4	2.7	2.9	59.7
	2.27	4	2.7	2.9	62.6
	2.32	1	.7	.7	63.3
	2.36	6	4.1	4.3	67.6
	2.41	1	.7	.7	68.3
	2.45	2	1.4	1.4	69.8
	2.50	1	.7	.7	70.5
	2.55	3	2.1	2.2	72.7

	2.68	5	3.4	3.6	76.3
	2.73	2	1.4	1.4	77.7
	2.77	1	.7	.7	78.4
	2.82	4	2.7	2.9	81.3
	2.86	1	.7	.7	82.0
	2.91	2	1.4	1.4	83.5
	2.95	2	1.4	1.4	84.9
	3.00	2	1.4	1.4	86.3
	3.05	1	.7	.7	87.1
	3.09	2	1.4	1.4	88.5
	3.18	1	.7	.7	89.2
	3.23	1	.7	.7	89.9
	3.27	1	.7	.7	90.6
	3.36	1	.7	.7	91.4
	3.41	1	.7	.7	92.1
	3.50	1	.7	.7	92.8
	3.55	1	.7	.7	93.5
	3.59	2	1.4	1.4	95.0
	3.82	1	.7	.7	95.7
	3.95	1	.7	.7	96.4
	4.00	1	.7	.7	97.1
	4.05	1	.7	.7	97.8
	4.32	1	.7	.7	98.6
	4.77	1	.7	.7	99.3
	5.00	1	.7	.7	100.0
	Total	139	95.2	100.0	
Missing	System	7	4.8		
Total		146	100.0		

Once the high and low criterion groups were determined, the next process was to calculate the probability of being in the high satisfaction with sports life criterion group dependent on what response option was chosen as demonstrated in Table 8 and guided by the horizontal percent method (Guion, 1965). In order to calculate the probability, the number of participants in the frequency of high SWSLS (column 3) was divided by the total number of responses for that particular option (column 4). This number was then turned into a percentage

on excel (column 5). This was then recreated for each response option for each biodata item. For biodata items that were "click all that apply", the process was conducted the same, except with every possible combination of response options that a participant could have possibly chosen (i.e. response option 1 and 2, response option 1, 2, 3, and 4 etc.…). The weight was then determined by multiplying each percentage by 10 and rounding the decimal point (column 6) (Mumford, 1999). Thus, each biodata item response had a possible weight range from 0-10. An example of the process is demonstrated in Table 8. A full scoring table for each biodata item is shown in Appendix D.

Table 8

Example of Scoring Process for Biodata Item 13

PACAS Item 13 response options for: "With reference to time spent with family, you"	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1 (Felt like you had generous time to spend with family)	0	12	12	100%	10.0
2 (Felt like you had adequate time to spend with family)	11	37	48	77%	7.7
3 (Felt like you had minimal time to spend with family)	18	33	51	65%	6.5
4 (Felt like you had no time to spend with family)	4	7	11	64%	6.4

3.3 Selection of Biodata Items

A new variable was produced in SPSS replacing all scores with the new weights (the final column shown in Table 8). Therefore, each participant's answer for every biodata item was assigned the new adjusted weight dependent on what response they made. Correlations were then conducted to examine the relationship between each biodata item and the criterion variables. It was expected that because these weights were based on the probability of being high on the SWSLS that each item would positively correlate with the SWSLS and therefore negatively

correlate with the SLGS. Biodata items that were shown to be significantly related (on either the $p<.01$ or $p<.05$ level) in a positive direction with the SWSLS and a negative direction with the SLGS, were retained for the biodata scale. Biodata items that were either not correlated at all, correlated in the opposite direction or only correlated with one criterion variable, were removed for the final scale. Table 9 shows the correlations of the biodata items with the criterion variables, and retained items are shown in bold.

Table 9

Correlations between Biodata items with the SLGS and SWSLS

Item	SLGS	SWLS
BDQ1 (balance of life)	-0.172	0.045
BDQ2 (adverse life experiences)	0.014	0.052
BDQ3 (adaptability)	**-.209***	**.200***
BDQ4 (adaptability)	**-.237****	**.348****
BDQ5 (family bond)	-0.131	**.237****
BDQ6 (adverse life experiences)	-0.104	0.137
BDQ7 (social support)	**-.189***	**.244****
BDQ8 (social support)	**-.183***	**.227****
BDQ9 (social support)	**-.240****	**.176***
BDQ10 (social support)	**-.252****	**.186***
BDQ11 (social support)	**-.187***	**.190***
BDQ12 (balance of life)	**-.297****	0.082
BDQ13 (balance of life)	**-.281****	**.183***
BDQ14 (balance of life)	**-.315****	**.211***
BDQ15 (athletic identity)	-0.093	**.177***
BDQ16 (athletic identity)	-0.019	0.116
BDQ17 (overtraining)	-0.035	0.081
BDQ18 (athletic identity)	-0.067	0.125
BDQ19 (athletic identity)	**-.186***	**.205***
BDQ20 (balance of life	-0.138	**.190***
BDQ21 (balance of lie)	**-.187***	0.103
BDQ22 (balance of life)	**-.234****	**.172***
BDQ23 (balance of life)	**-.188***	**.180***
BDQ24 (balance of life)	**-.270****	**.307****
BDQ25 (balance of life)	**-.224****	0.140
BDQ26 (family bond)	**-.193***	0.125

BDQ27 (family bond)	-0.021	0.099
BDQ28 (pressure)	**-.211***	0.138
BDQ29 (pressure)	**-.196***	**.230****
BDQ30 (injuries)	-0.023	0.100
BDQ31 (injuries)	**-.171***	0.108
BDQ32 (overtraining)	-0.124	0.097
BDQ33 (overtraining)	-0.135	0.125
BDQ34 (adverse life experiences)	-0.047	0.156
BDQ35 (recognition in sport)	**-.344****	**.319****
BDQ36 (recognition in sport)	-0.079	**.212***

Note. ** indicates significance at the p<0.01 level. * indicates significance at the p<0.05 level. BDQ represents biodata item question.

3.3.1 Correlation Analyses

Once the biodata items that demonstrated to be insignificant were removed, the next step was to correlate the biodata items to each other to check for multicollinearity. Multicollinearity would be demonstrated at a correlational level of .7 or higher (Dormann et al., 2013). Multicollinearity would indicate that perhaps certain items were too similar and it would be more beneficial to remove one. The correlational matrix shown in Table 10 indicated that there were many items that were significantly correlated to one another, however none of the items were correlated at .7 or higher. Looking at the biodata items, it made sense that the items were correlated as they fell into the same category (i.e. 'balance of life' etc.), so no items were removed at this stage.

Table 10

Correlation Matrix for Biodata Items

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. BDQ3	Pearson Correlation	1														
2. BDQ4	Pearson Correlation	**.203***	1													
3. BDQ7	Pearson Correlation	**.165***	-0.034	1												
4. BDQ8	Pearson Correlation	0.144	**.171***	**.389****	1											
5. BDQ9	Pearson Correlation	**.246****	0.096	**.247****	**.315****	1										
6. BDQ10	Pearson Correlation	0.037	0.159	**.377****	**.610****	**.427****	1									
7. BDQ11	Pearson Correlation	-0.105	-0.025	**.200***	**.181***	**.314****	**.167***	1								
8. BDQ13	Pearson Correlation	0.084	0.060	**.324****	**.337****	**.377****	**.212***	**.301****	1							
9. BDQ14	Pearson Correlation	0.045	**.250****	**.266****	**.333****	**.295****	**.291****	**.260****	**.624****	1						
10. BDQ19	Pearson Correlation	0.060	0.125	**.204***	0.067	0.148	**.192***	0.139	0.108	0.098	1					
11. BDQ22	Pearson Correlation	0.086	0.117	0.146	0.158	**.254****	0.129	**.183***	**.423****	**.394****	0.094	1				
12. BDQ23	Pearson Correlation	0.079	**.169***	0.005	0.136	**.204***	0.022	0.134	**.373****	**.272****	0.151	**.507****	1			
13. BDQ24	Pearson Correlation	**.291****	**.312****	0.127	0.098	0.131	0.106	0.031	0.073	**.236****	**.172***	0.149	0.144	1		
14. BDQ29	Pearson Correlation	-0.080	0.102	0.104	0.014	0.075	0.060	0.109	0.149	**.287****	0.089	**.207***	**.273****	0.148	1	
15. BDQ35	Pearson Correlation	0.117	**.244****	0.100	0.015	**.272****	0.158	**.325****	**.165***	**.184***	0.152	**.236****	0.157	0.140	**.227****	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

3.4 The PACAS Scale

At this point the PACAS was formed. 15 items were retained from the initial pool of 36. The full PACAS can be viewed in Appendix A. The descriptive data for the PACAS is shown below in Table 11. The range of scores for the final biodata scale was 0-129.6, although the maximum score for any participant was 119.20.

Table 11

Descriptive statistics of the final PACAS

	N	Range	Minimum	Maximum	Mean	Std. Deviation
PACAS	144	48.50	70.70	119.20	102.4063	8.14982

3.4.1 Regression Analyses

In order to examine the predictive validity of the PACAS, a regression analysis was run. A final PACAS score was calculated for each participant. The SWSLS and the SLGS were regressed onto the final biodata scale in order to determine the variance accounted for by the PACAS. The regression analysis indicated a significant relationship between the PACAS and the SWSLS at $F(1, 138)= 40.4$, $p< .001$, with an R^2 of .23. It also indicated that the relationship between the PACAS and the SLGS was also significant at $F(1, 135)= 42.5$, $p< .001$, with an R^2 of .24. Separately, the PACAS accounted for 23% of the variance with the SWSLS and 24% of the SLGS. With the SWSLS and the SLGS together, it was demonstrated that the PACAS accounted for 29% of the variance, which may be due to the scales being highly correlated and thus, may slightly increase the predictive ability. The regression results are shown in Table 12.

Table 12

Regression Analyses for SWLS and SLGS onto overall biodata scale

Predictor	SWSLS			SLGS		
	β	R^2	F	β	R^2	F
Biodata Scale	**3.1****	.23	**40.5****	-5.2	.24	**42.5****

Note: SWSLS df= 1, 138. SLGS df= 1, 135. ** indicates significance at the p<0.01 level.

3.4.2 Practical Interpretation of Biodata Scale

For the PACAS to be useful in a practical sense, it would important to identify a cutoff score for those who would adjust or transition smoothly, versus those who would not; thus, creating a distinction between the two groups. Taking the previous research into account, it would be expected that most of the participants would transition smoothly out of sport (Park et al., 2013). However, it would be expected that there would be a small but relevant percentage of those that were struggling to adjust (Park et al., 2013).

A version of an expectancy chart was created for both the SWSLS and the SLGS. Expectancy charts are often used as a way to examine the relationship between predictor scores and criterion variables (Cucina et al., 2017). The SWSLS and SLGS were plotted on the y axis and each participants' final biodata score on the x axis.

Cutoff scores were aimed to asses adjustment with an emphasis on predicting those who would struggle. The cutoff for the PACAS was determined first. The mean for the PACAS was 102 with a SD of 8 and 70 as the minimum score. Because the PACAS was aimed to predict adjustment, the cutoff was decided at 95, thus attempting to capture those who fell below the mean.

Next the cutoff's for both the SWSLS and the SLGS were determined. The mean of the SWSLS was 4.8, thus, a cutoff score of 4 would suggest that anyone below the mean would be less likely to be satisfied with sports life. The SLGS mean was 2.2; thus, the cutoff was determined at 2 which would suggest that scores higher than 2 could indicate greater sports loss grief. Calculations suggested that with the current cutoffs, the PACAS correctly predicted 88% of those who could be less satisfied with sports life as determined by the SWSLS. Thus, out of the 17 participants that fell below the PACAS cutoff, only two would not fall into the cutoff for the SWSLS. Concurrently, calculations suggested that the PACAS correctly predicted 89% of those who could have had higher sports loss grief as determined by the SLGS. Thus, out of the 18 participants that fell below the PACAS cutoff, two would not fall into the cutoff for the SLGS. As shown in the expectancy charts, increasing the cut offs would result in increasing the number of erroneous exceptions (Cascio, 1991). Figure 3 and 4 demonstrate the cutoffs for both the SWSLS and the SLGS with the final biodata cutoffs.

Figure 3

Expectancy Chart of SWSLS

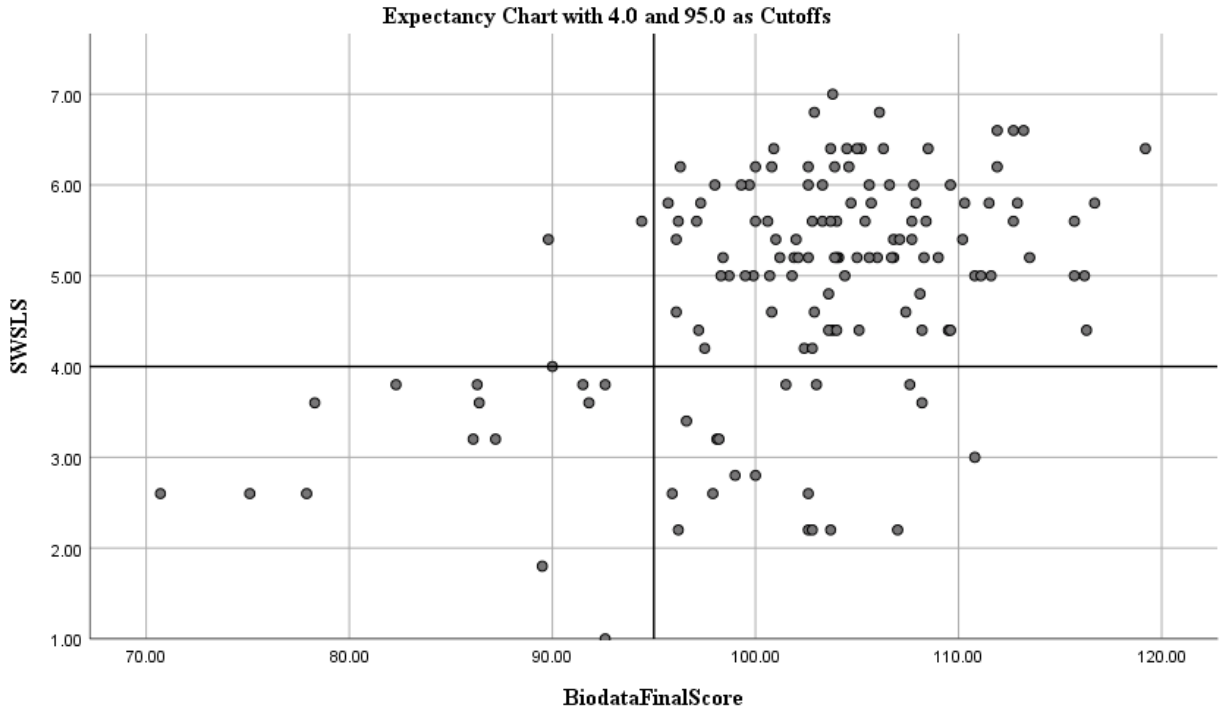
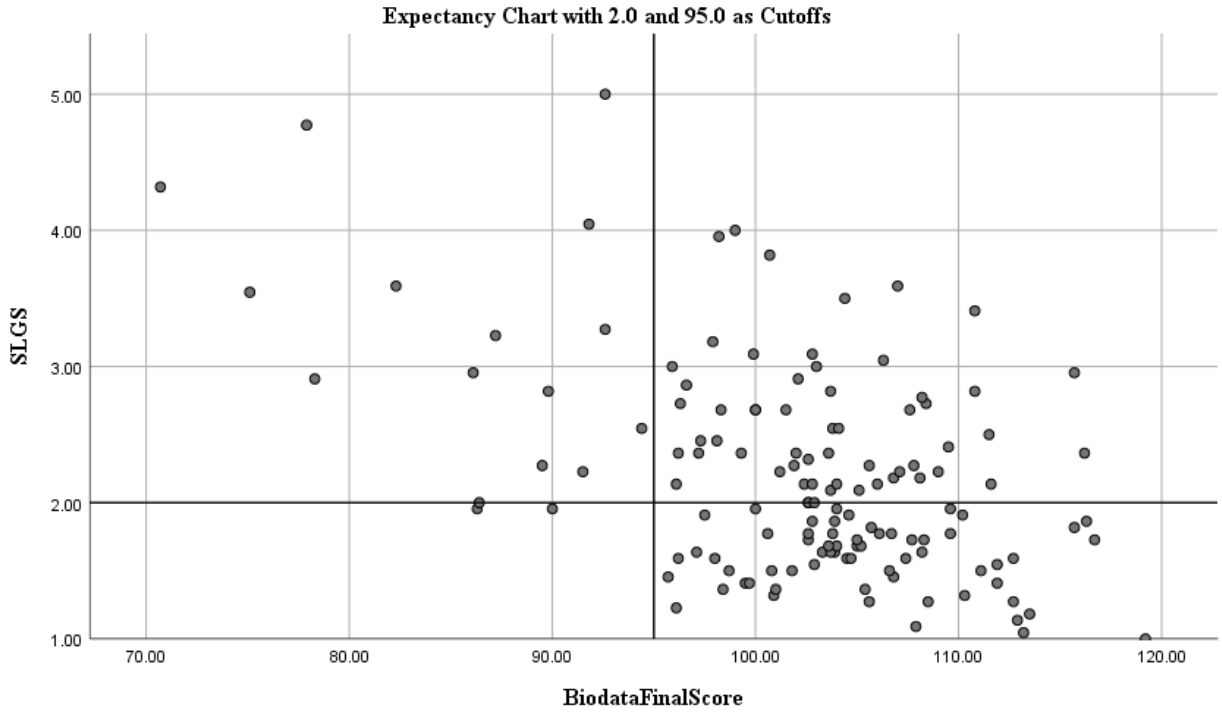


Figure 4

Expectancy chart of SLGS with cutoff score of 95.0



4 Discussion

4.1 Overall findings

The aim of the current research was to create a biodata scale that could predict post athletic career adjustment. Potential factors that could influence adjustment were identified utilizing previous research and the author's personal experience with retirement from elite athletics. The final scale consisted of 15 items. Biodata items were analyzed using the horizontal percentage method (Guion, 1965). Important themes were identified that included; adaptability, social support, balance of life, athletic identity, pressure and recognition in sport. A concurrent validation study was done in order to examine the relationship between the post athletic career adjustment scale (biodata scale) and the criterion variables; the satisfaction with

sports life scale and the sports loss grief scale. The regression analysis from this research suggested that nearly 30% of post athletic career adjustment could be predicted by using the PACAS. Thus, the results indicated that the PACAS may be able to account for a significant amount of variance in an individuals' ability to adjust to life post athletic career.

4.1.1 Theoretical linkages

Many experiences and events throughout an athletes' life can shape the way that they adjust or transition after retirement from sport (Park et al., 2013). Themes such as adverse experiences, family bond, social support, athletic identity, overtraining and injuries, balance of life and pressure as an athlete may have an effect on how athletes transition post athletic career. These themes can occur across an entire athletic career, including early life, during their adult athletic career and subsequently during and after their retirement (Park et al., 2013).

Each biodata item in the PACAS was formulated to reflect one of the themes indicated above.

Two of the biodata items were formulated to measure adaptability. Research has found that minor to moderate adversity or experience with having to work through times of transition may build resilience for future adjustment (Ellis & Boyce, 2008; Galli & Vealey, 2008). The current research demonstrated a positive relationship between attending multiple schools and training camps both nationally and internationally with an increase of satisfaction with sports life after retirement. Although moving schools or attending a training camp overseas may be a stressful situation for a child, it may increase the ability to adapt to a new situation and build resilience (Shapero et al., 2015). Thus, the act of having to adapt to new environments and perhaps make new friends and a support system may increase the chances that someone will be able to transition again to a new situation later in life.

It is commonly known that having support from key people including family, coaches and peers can make the adjustment after athletic career retirement easier (Brown et al., 2018). Five biodata items were centered around the theme of social support, specifically with regards to coaches' support. All five of those biodata items demonstrated a significant relationship with the criterion variables. This may demonstrate the importance of social support for athletes throughout their athletic careers.

The current research suggested that a coaches' support for their athletes during early life influential. The results indicated a significant relationship between satisfaction with sports life and having early life coaches that encouraged life outside of sport. Concurrently, the results demonstrated a negative association with sports loss grief and supportive coaches in early life. Thus, results suggested that it is important for coaches to support their athletes within their sport, but also support their athlete's non-athletic lives.

Four of the items were designed to measure balance of life between participants athletic and non-athletic career in early life. The items involved the time spent training sport, the time that participants had to spend with family and friends, and the degree to which their training interfered with their schooling. The results demonstrated that there was a positive relationship between having more time to spend with family and friends with satisfaction with sports life. It was also demonstrated that there was a negative relationship between sports loss grief and time to spend with loved ones. This may indicate that balance is key; that athletes are training enough hours to master their sport, while still having time to designate to other aspects of their lives (Harrison & Lawrence, 2004).

Research has indicated that athletic identity can have an impact on how athletes transition post athletic career (Willard & Lavallee, 2016). Only one biodata item in the final scale targeted

athletic identity. However, it is likely that the themes of athletic identity and balance of life are similar as they tap into the ability for an athlete to associate themselves with other aspects of life besides their sport. Results indicated a significant relationship between enjoyment competing sport with higher satisfaction with sports life and lower sports loss grief.

Pressure to perform or win from external people in a child athletes' life may lead to anxiety (Chan et al., 2010). Concurrently, internal expectations of perfection or high achievement related goals has also been associated with higher rates of anxiety (Kaye et al., 2015). Results from the PACAS demonstrated an association with higher satisfaction with sports life and lower sports loss grief if participants did not expect perfection from themselves in their life outside of athletics (such as school work).

Recognition or status during elite athletics may be associated with over-all perception of self-worth (McPherson, 1980; Sinclair & Orlick, 1993). It has also been suggested that athletes who felt a loss of status upon retirement were more likely to experience lower life satisfaction (Sinclair & Orlick, 1993). The current research demonstrated a relationship between participants who either had no recognition from media or recognition from media in just their city or region and higher satisfaction with sports life upon retirement.

4.2 Applied and Practical Value

The experience of retirement from elite sport is impactful, and is life-changing whether or not the transition is positive or negative (Kuettel et al., 2017). The adjustment period after athletic retirement varies, with most athletes adapting to their new lifestyles within a year (Park et al., 2013). However, some athletes will find the transition period much more distressful. Issues that can occur post athletic career can include depression, anxiety, low life satisfaction, substance abuse and disorderly eating (Gouttebarge et al., 2019; Sanders & Stevinson, 2017).

The current rates of depression, anxiety and substance abuse amongst retired athletes warrants the need for increased support and care (Gouttebarge et al., 2019).

Often, negative experiences near the end of a sports career are associated with poor adjustment during the transition from athlete to non-athlete (Park et al., 2013; Tekavc et al., 2015). Involuntary exits, lack of social support and lack of preparation for the future may all increase the likelihood of poor adjustment post athletic career (Harrison & Lawrence, 2004; Park et al., 2013; Tekavc et al., 2015). However, there appears to be a lack of knowledge on how early life experiences influence the transition period. Most of the focus around factors that may impact the adjustment appeared to pertain to events and situations associated more with end of career.

Career development and early preparation for retirement has been indicated as a protective factor against a traumatic transition out of sport (Harrison & Lawrence, 2004). In a medical setting, the early identification of issues is often associated with more positive outcomes. The same should apply in the context of retirement from sport. Thus, not only preparing athletes for the adjustment period, but attempting to predict those individuals who would be more likely to struggle with the transition should be high priority for Universities and professional teams alike. The ability to identify athletes who would struggle with the transition early on would provide a proactive approach to increasing the wellbeing of current and retired athletes. Therefore, at risk athletes would be able to get help earlier rather than later and ideally be less likely to experience negative transitions.

The PACAS could add practical value to the research and knowledge about experiences that may influence adjustment post athletic career. The biodata scale focused only on the experiences of early life and not of the participants' professional or collegiate careers. The

results indicated a significant relationship between the early life experiences outlined in the biodata items with satisfaction with sports life and sports loss grief after retirement; thus, contributing unique research to the issue of athletic retirement.

Cutoff scores were utilized to suggest contrast between participants who were more likely to have struggled post retirement from sport and those who had not. Thus, with further testing, the PACAS could aid in the ability to predict which athletes may experience a negative transition. Therefore, it could potentially be used as a tool to predict adjustment post athletic career with further validation.

4.3 Limitations

Although the current study could have potential practical value, there are also a number of limitations.

The first limitation to mention of the current study has to do with the weighting process of biodata items. The weighting and biodata scoring process was conducted using the sample's responses to the satisfaction with life scale. Thus, it was to be expected that the final biodata scale correlated with the SWSLS as it was derived from it. The technique and weighting of the response options for each biodata item were determined utilizing the high and low satisfaction with life groups. Thus, the biodata items are not realistically independent of the satisfaction with sports life scores. It would therefore be important to have the biodata scale validated again with another sample that was not involved in the scoring process.

Another limitation of the study is the relatively small sample size. The nature of the weighting process for each response option could have distorted results. Thus, a response option for a biodata item where there were zero participants in the low SWLS group and one participant in the high SWLS would have yielded a 100% probability of obtaining a high satisfaction with

life score. Concurrently, a response option for a biodata item where there were larger numbers in both the high and low SWLS groups could have yielded a much lower probability of obtaining a high satisfaction with life score; but would have been much more representative of the data. Having more participants in the sample size could have helped with the distribution of each response option.

Because the PACAS and both the SLGS and SWSLS were self-report surveys, response bias is an important limitation to note of the current study (Arnold & Feldman, 1981). Recall bias involves participant's ability to remember events or experiences. Episode omission can occur when participants forget or fail to recall events or experiences in the allotted time frame (Sudman & Bradburn, 1973). Whereas telescoping can occur when participants attribute experiences or events to the wrong time frame (Sudman & Bradburn, 1973). Participants were asked to recall experiences and situations from childhood, which would have been years prior to the study. It is entirely feasible that both episode omission or telescoping could have occurred. Thus, participants could have answered questions with the wrong time line in mind, or forgotten the severity or impact of certain events due to the passing of time since occurrence. If either of the recall biases occurred, it could indicate that the current study is not entirely accurate.

Concurrently, the unique experience of retirement that participants endured could have slightly or heavily altered how they remembered their early life sporting careers. It is feasible that an athlete who left their sport on a positive note, with supportive coaches, could be more likely to recall their early life experience with optimism. On the contrary, participants who experienced a negative transition after retirement could have remembered their early life career with a more pessimistic lens.

The current study could have also been prone to social desirability bias, even with measures taken to prevent it. Although the research was anonymous and online, there is a chance that participants answered questions in a way that would make them feel good about themselves. Thus, it could reflect the participants 'ideal self' rather than their 'real self' (Brenner & DeLamater, 2016).

The last limitation to note is the world-wide Covid-19 pandemic. The participants were targeted in relation to the time since their retirement from sport. The Covid-19 pandemic caused many American universities to stop competitive seasons early, which could have impacted the way that some athletes transitioned out. Thus, many last year student/athletes would have had an inorganic or 'forced' early retirement and missed their last competition(s); and it has been demonstrated that involuntary retirement can be associated with a higher chance of experiencing a negative adjustment post athletic career (Ogilvie & Taylor, 1993). Because the current study utilized a satisfaction with sports life measure, those athletes that finished their sports careers this year could have had a skewed result due to the effects of Covid-19 on their retirement. Thus, participants who had been influenced by the effects of the pandemic could have experienced lower life satisfaction and more sports loss grief than they would have if they could have finished their careers as intended; which would alter the results of this study.

4.4 Future research

Although there are significant limitations to the current study, there is still practical value and potential for future research. Not enough research has been conducted investigating the relationship between early life careers and their impact on adult athlete psychology. The PACAS demonstrated a relationship between early life experiences and the adjustment period

post athletic career. This may suggest that more in-depth research into the effects of early life on sports retirement is warranted.

Thus far, the PACAS has only provided relationships between early life experiences and retirement from sport. The main direction for future research involving the PACAS could be to provide more causal nature of the relationships. Replication of the current study would provide further evidence of both the strength and validation of the PACAS, as well as increased knowledge on the importance of early life experiences in conjunction with athletic retirement. Concurrently, if replication indicated similar results, it could provide further evidence that the relationships of the study were not simply associative.

The sample was aimed towards a specific population. All of the participants were either ex collegiate or professional athletes. Although the study was conducted with a targeted population, there could be a possibility that the research would be generalizable to other similar populations. The majority of the participants originated from the United States and New Zealand. Although a handful of other countries were represented, the sample size was not big enough to investigate comparisons between populations. It would be beneficial to conduct the same study in other countries to investigate if the influence of early life experiences on adult athletic retirement is unique to certain cultures. Would the PACAS be representative of underdeveloped countries? Are the biodata items heavily influenced by a westernized view of sport?

Concurrently, the PACAS could also be tested on other samples, such as high school athletes who did not reach professional or collegiate careers. It would be interesting to examine contrasts between young adult athletes who did not further their athletic careers into adulthood and the current sample for multiple reasons. Firstly, this would minimize the effects of recall

bias as time since early life would be lessened. Investigation into athletic retirement on 'amateur' athletes could provide increased information on how serious of a topic it is. If results suggested that teen or even child athletes were experiencing significant, negative experiences with adjustment, perhaps more help would be given to those who needed it. To the author's knowledge, most of the aid available for retiring athletes is for professional and collegiate competitors. The lack of programs and support for athletes who gave significant portions of their lives, yet did not quite make it to a professional or elite level warrants further investigation into the subject.

Another suggestion for future research could include giving the measures multiple times (repeated measures), or having a partner or close family member/ friend fill out the surveys on the participants behalf. Giving the survey more than once, or having someone else answer the questions could help minimize the effects of response bias. Taking the same survey twice, with time in between would likely promote more accurate or truthful responses (Brenner & DeLamater, 2016). Likewise, having someone else fill out the questions on behalf of the participant could be a form of verification to the responses done by the participant themselves.

4.5 Conclusion

A concurrent validation study was conducted in order to develop the post athletic career adjustment survey (PACAS). Biodata items were created via informed literature review and the author's personal experience in elite athletics. Biodata items were scored utilizing the horizontal percentage method. The sports loss grief scale (SLGS) and satisfaction with sports life scale (SWSLS) were used as criterion variables. Correlations were run in order to determine which biodata items to discard. The final scale consisted of 15 items, and 29% of the variance accounted for in predicting adjustment after athletic retirement with early life experiences. Final

cutoff scores were determined and may provide a suggestion of distinguishing between athletes who may thrive and struggle with the transition out of sport. The PACAS may provide a practical and useful tool in predicting post athletic career adjustment in retiring athletes. Although more research is necessary on the topic, and further testing is necessary, the current study may help inspire future examination about the transition period after a sports career.

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6 Appendices

6.1 Appendix A: PACAS

Q1 Your club/ training facility was:

- 0-10 minute drive from home (1)
- 11-20 minute drive from home (2)
- 21-30 minute drive from home (3)
- 31-40 minute drive from home (4)
- More than 40 minutes drive from home (5)

Q2 With reference to moving house, you:

- Moved houses 1 time (1)
- Moved houses 2 times (2)
- Moved houses 3 times (3)
- Moved houses 4 or more times (4)
- Did not move houses (5)

Q3 Most students attend more than one school as they go up in years. How many schools did you attend up to 18 years old? (Click all that apply)

- ☐ Between 1-3 (1)
- ☐ Between 4-6 (2)
- ☐ Between 7-9 (3)
- ☐ Home schooled (4)
- ☐ Boarding school (5)

Q4 Training camps can be known as training with a group of athletes from other clubs/ areas for development purposes. With reference to training camps, you: (Click all that apply)

- ☐ Did not attend any training camps (1)
- ☐ Attended training camps in your city (2)
- ☐ Attended training camps in other cities within your region (state) (3)
- ☐ Attended training camps in other regions (states) (4)
- ☐ Attended training camps internationally (5)

Q5 As a child, your parenting situation was: (Click all that apply)

- [ ] Your parents were together (either married or in a De Facto relationship- long term but without being officially married) (1)
- [ ] Your parents were separated, but not legally divorced (2)
- [ ] Your parents were divorced (3)
- [ ] You were raised by a single parent (4)
- [ ] You were raised by other family members or friends (5)

Q6 As a child, you: (Click all that apply)

- [ ] Experienced the death of a parent (1)
- [ ] Experienced the death of a sibling (2)
- [ ] Experienced the death of a grandparent or other close family member (3)
- [ ] Experienced the death of a close friend (4)
- [ ] None of the above (5)

Q7 Did you feel supported by your coach(es) when you failed a task?

- Yes, always (1)
- Often (2)
- Sometimes (3)
- Rarely (4)
- No, Never (5)

Q8 Did you have kind coaches growing up?

- Yes, all of my coaches were kind (1)
- Most of my coaches were kind (2)
- Some of my coaches were kind (3)
- Most of my coaches were unkind (4)
- No, all of my coaches were unkind (5)

Q9 Do you feel like your coach(es) encouraged your life outside of sport? (I.e. school, friendships, other sports)

- Always (1)
- Often (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

Q10 With reference to coach(es) support in your sport, you felt as though:

- ○ Your coach(es) always supported you (1)
- ○ Your coach(es) sometimes supported you (2)
- ○ Your coach(es) rarely supported you (3)
- ○ Your coach(es) never supported you (4)

Q11 With reference to coach(es) pressure to succeed, you felt as though:

- ○ Your coach(es) always pressured you to succeed (1)
- ○ Your coach(es) sometimes pressured you to succeed (2)
- ○ Your coach(es) rarely pressured you to succeed (3)
- ○ Your coach(es) never pressured you to succeed (4)

Q12 With reference to your time spent doing hobbies outside of your sport, you:

- ○ Felt as though you had more time than needed to spend doing hobbies (1)
- ○ Felt as though you had generous time to spend doing hobbies (2)
- ○ Felt as though you had minimal time to spend doing hobbies (3)
- ○ Felt as though you did not have time to spend doing hobbies (4)

Q13 With reference to time spent with family, you:

- ○ Felt like you had generous time to spend with family (1)
- ○ Felt like you had adequate time to spend with family (2)
- ○ Felt like you had minimal time to spend with family (3)
- ○ Felt like you had no time to spend with family (4)

Q14 With reference to time spent with friends, you:

- ○ Felt as though you had generous time to spend with friends (1)
- ○ Felt like you had adequate time to spend with friends (2)
- ○ Felt like you had minimal time to spend with friends (3)
- ○ Felt like you had no time to spend with friends (4)

Q15 With reference to other sports, you:

- ○ Played/ participated in 1 other sport competitively (1)
- ○ Played/ participated in 2 other sports competitively (2)
- ○ Played/ participated in 3 or more other sports competitively (3)
- ○ Did not play/ participate in any other sports competitively (4)

Q16 With reference to other sports, you:

- ○ Played/ participated in 1 other sport for fun (1)
- ○ Played/ participated in 2 other sports for fun (2)
- ○ Played/ participated in 3 or more other sports for fun (3)
- ○ Did not play/ participate in any other sports for fun (4)

Q17 How frequently did you choose to take training sessions off to rest or relax?

- ○ Weekly (1)
- ○ Every couple of weeks (2)
- ○ Monthly (3)
- ○ Every couple of months (4)
- ○ Never (5)

Q18 With reference to your training for your sport, you:

- ○ Always loved training for your sport (1)
- ○ Often loved training for your sport (2)
- ○ Often did not love training for your sport (3)
- ○ Did not love training for your sport (4)

Q19 With reference to your competitions, you:

- ○ Always loved competitions (1)
- ○ Often loved competitions (2)
- ○ Often did not love competitions (3)
- ○ Did not love competitions (4)

Q20 How many weeks per year did you have designated time off from your sport (including off season)?

- ○ 1 week off a year (1)
- ○ 2 weeks off a year (2)
- ○ 3 weeks off a year (3)
- ○ 4 weeks off a year (4)
- ○ More than 4 weeks off a year (5)

Q21 As a teenager, during your peak of training, how many designated days off did you have during your normal week?

- ○ Had 0 designated days off from sport during the week (1)
- ○ Had 1 designated day off from sport during the week (2)
- ○ Had 2 designated days off from sport during the week (3)
- ○ Had 3 designated days off from sport during the week (4)
- ○ Had 4 or more designated days off from sport during the week (5)

Q22 As a teenager, during your peak of training, how many hours on average, did you train your sport per day?

- ○ Trained 1 hour per day (1)
- ○ Trained 2 hours per day (2)
- ○ Trained 3 hours per day (3)
- ○ Trained 4 hours per day (4)
- ○ Trained 5 or more hours per day (5)

Q23 As a teenager, during your peak of training, how many hours did you train your sport per week?

- ○ Trained 5-8 hours (1)
- ○ Trained 9-12 hours (2)
- ○ Trained 13-16 hours (3)
- ○ Trained 17-20 hours (4)
- ○ Trained more than 20 hours (5)

Q24 With reference to the impact of your sport on your schooling, you: (Click all that apply)

- ☐ Felt that sport did not interfere with school (1)
- ☐ Attended school, but left early or came late to class for sport (2)
- ☐ Attended school, but missed 1 or more entire classes for sport (3)
- ☐ Were home schooled to allow for sport (4)

Q25 With reference to friendships growing up:

- None of the friends you had were involved in the same sport as you (1)
- Most of the friends you had were not involved in the same sport as you (2)
- Some of the friends you had were involved in the same sport as you (3)
- All of the friends you had were involved in the same sport as you (4)

Q26 With reference to family pressure to succeed, you felt as though:

- Your family never pressured you in your sport (1)
- Your family sometimes pressured you in your sport (2)
- Your family often pressured you in your sport (3)
- Your family always pressured you in your sport (4)

Q27 With reference to family support, you felt as though:

- Your family always supported you in your sport (1)
- Your family often supported you in your sport (2)
- Your family sometimes supported you in your sport (3)
- Your family never supported you in your sport (4)

Q28 With reference to your personal expectations in your sport, you:

- Always expected perfection (1)
- Sometimes expected perfection (2)
- Did not expect yourself to be perfect (3)
- Expected failure (4)
- Did not care how you performed (5)

Q29 With reference to your personal expectations outside of sport (i.e. school work), you:

- Always expected perfection (1)
- Sometimes expected perfection (2)
- Did not expect yourself to be perfect (3)
- Expected failure (4)
- Did not care how you performed (5)

Q30 In regard to major sports injuries (breaks/ tears/ dislocations/ fractures/ major concussions) that required surgery, you:

- Had no major injuries that required surgery (1)
- Had 1 major injury that required surgery (2)
- Had 2 major injuries that required surgery (3)
- Had 3 or more major injuries that required surgery (4)

Q31 In regard to minor sports injuries (sprains/ strains/ overuse/ growing) as a child, you:

- Had no minor injuries (1)
- Had 1 minor injury (2)
- Had 2 minor injuries (3)
- Had 3 minor injuries (4)
- Had 4 or more minor injuries (5)

Q32 Did you choose to take training sessions off for sickness?

- Yes, always (1)
- Often (2)
- Sometimes (3)
- Rarely, usually still trained when sick (4)
- No, always trained when sick (5)

Q33 Did you choose to continue training with an injury, even if a doctor or medical professional advised you not to?

- Yes, always (1)
- Often (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

Q34 With regards to different coaches throughout your sporting career, you:

- ○ Had 1 coach (1)
- ○ Had 2 coaches (2)
- ○ Had 3 coaches (3)
- ○ Had 4 coaches (4)
- ○ Had 5 or more coaches (5)

Q35 As a child with regards to media (TV, social media, local/ national/ international news), you: (Click all that apply)

- ☐ Did not receive recognition for your accomplishments in sport from media (1)
- ☐ Received recognition for your accomplishments in sport from media in your city/ town (2)
- ☐ Received recognition for your accomplishments in sport from media in your state or region (3)
- ☐ Received recognition for your accomplishments in sport from media nationally (4)
- ☐ Received recognition for your accomplishments in sport from media internationally (5)

Q36 As a child with regards to recognition from your sport, you: (Click all that apply)

- [ ] Received recognition from your family (1)
- [ ] Received recognition from your friends (2)
- [ ] Received recognition from your peers (3)
- [ ] Received recognition from your coaches (4)
- [ ] Received recognition from other clubs (5)

6.2 Appendix B: SLGS

Please keep the loss of your athletic career in mind. Please rate the extent to which you have experienced the reactions represented in the items during the past month. Rating is on a 5-point scale from 1 ("never") to 5 ("always")

	Never (1)	Rarely (2)	Occasionally (3)	Often (4)	Always (5)
The loss of my athletic career feels like a personal disaster. (1)	○	○	○	○	○
I think about my athletic career so much that it is hard for me to do the things I normally do. (2)	○	○	○	○	○
Memories about my athletic career upset me. (3)	○	○	○	○	○
I can't accept the loss of my athletic career. (4)	○	○	○	○	○
I feel a strong longing for my sport. (5)	○	○	○	○	○
I feel drawn to places and things associated with my sport. (6)	○	○	○	○	○

I feel stunned and dazed over the loss of my athletic career. (9)	○	○	○	○	○
Ever since the loss of my athletic career, I feel distant from the people I care about. (10)	○	○	○	○	○
I go out of my way to avoid being reminded of my sport. (12)	○	○	○	○	○
I think about my sport all the time. (14)	○	○	○	○	○
I feel like I have become numb since the loss of my sport. (16)	○	○	○	○	○
I feel envious of others who do have an athletic career. (18)	○	○	○	○	○

I feel lonely since the loss of my athletic career. (20)	○	○	○	○	○
I feel like my life can only be meaningful with my athletic career. (21)	○	○	○	○	○
I feel a part of myself vanished by the loss of my athletic career. (22)	○	○	○	○	○
I feel that the loss of my athletic career has smashed my view of the world. (23)	○	○	○	○	○
I have lost my sense of security, safety and control. (24)	○	○	○	○	○
I have felt on edge, jumpy or easily startled since the loss of my athletic career. (25)	○	○	○	○	○

My social functioning has been seriously weakened as a result of the loss of my athletic career. (26)	○	○	○	○	○
My sleep has been bad since the loss of my athletic career. (27)	○	○	○	○	○
I go out of my way to avoid being reminded of the loss of my athletic career. (28)	○	○	○	○	○
Memories about the loss of my athletic career upset me. (30)	○	○	○	○	○

6.3 Appendix C: SWSLS

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. Please keep your life after sport in mind when responding to the questions.

	Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Neither agree nor disagree (4)	Slightly agree (5)	Agree (6)	Strongly agree (7)
In most ways my life after sport is close to my ideal. (1)	○	○	○	○	○	○	○
The conditions of my life after sport are excellent. (2)	○	○	○	○	○	○	○
I am satisfied with my life after sport. (3)	○	○	○	○	○	○	○
I have gotten the important things I want in life in regards to my athletic career. (4)	○	○	○	○	○	○	○
If I could live my athletic life over, I would change almost nothing. (5)	○	○	○	○	○	○	○

6.4 Appendix D: Biodata Scoring

PACAS Item 1	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	5	24	29	83%	8.3
2	15	27	42	64%	6.4
3	7	19	26	73%	7.3
4	3	11	14	79%	7.9
5	3	8	11	73%	7.3

PACAS Item 2	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	9	22	31	71%	7.1
2	4	8	12	67%	6.7
3	4	8	12	67%	6.7
4	4	13	17	76%	7.6
5	12	38	50	76%	7.6

PACAS Item 7	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	5	8	13	62%	6.2
2	6	32	38	84%	8.4
3	9	30	39	77%	7.7
4	9	15	24	63%	6.3
5	4	4	8	50%	5.0

PACAS Item 8	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	4	15	19	79%	7.9
2	12	46	58	79%	7.9
3	12	19	31	61%	6.1
4	4	9	13	69%	6.9
5	1	0	1	0%	0.0

PACAS Item 9	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	2	8	10	80%	8
2	5	22	27	81%	8.1
3	8	22	30	73%	7.3
4	9	27	36	75%	7.5
5	9	10	19	53%	5.3

PACAS Item 10	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	10	41	51	80%	8.0
2	15	40	55	73%	7.3
3	6	8	14	57%	5.7
4	2	0	2	0%	0.0

PACAS Item 11	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	19	44	63	70%	7.0
2	8	35	43	81%	8.1
3	3	9	12	75%	7.5
4	3	1	4	25%	2.5

PACAS Item 12	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	0	1	1	100%	10.0
2	3	15	18	83%	8.3
3	15	40	55	73%	7.3
4	15	33	48	69%	6.9

PACAS Item 13	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	0	12	12	100%	10.0

2	11	37	48	77%	7.7
3	18	33	51	65%	6.5
4	4	7	11	64%	6.4

PACAS Item 14	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	0	12	12	100%	10.0
2	3	20	23	87%	8.7
3	21	48	69	70%	7.0
4	9	9	18	50%	5.0

PACAS Item 15	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	6	23	29	79%	7.9
2	2	8	10	80%	8.0
3	5	5	10	50%	5.0
4	20	53	73	73%	7.3

PACAS Item 16	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	7	20	27	74%	7.4
2	7	10	17	59%	5.9
3	3	9	12	75%	7.5
4	16	50	66	76%	7.6

PACAS Item 17	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	1	2	3	67%	6.7
2	1	1	2	50%	5.0
3	1	5	6	83%	8.3
4	4	14	18	78%	7.8
5	26	67	93	72%	7.2

PACAS Item 18	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	6	18	24	75%	7.5
2	19	57	76	75%	7.5
3	7	13	20	65%	6.5
4	1	1	2	50%	5.0

PACAS Item 19	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	12	25	37	68%	6.8
2	11	51	62	82%	8.2
3	8	12	20	60%	6.0
4	2	1	3	33%	3.3

PACAS Item 20	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	13	29	42	69%	6.9
2	8	32	40	80%	8.0
3	6	10	16	63%	6.3
4	4	4	8	50%	5.0
5	2	14	16	88%	8.8

PACAS Item 21	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	2	5	7	71%	7.1
2	24	49	73	67%	6.7
3	0	29	29	100%	10.0
4	5	4	9	44%	4.4
5	2	2	4	50%	5.0

PACAS Item 22	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight

1	1	3	4	75%	7.5
2	1	11	12	92%	9.2
3	5	15	20	75%	7.5
4	11	33	44	75%	7.5
5	15	27	42	64%	6.4

PACAS Item 23	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	2	4	6	67%	6.7
2	0	8	8	100%	10.0
3	2	9	11	82%	8.2
4	6	17	23	74%	7.4
5	23	51	74	69%	6.9

PACAS Item 25	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	1	6	7	86%	8.6
2	4	16	20	80%	8.0
3	16	44	60	73%	7.3
4	12	23	35	66%	6.6

PACAS Item 26	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	11	42	53	79%	7.9
2	16	33	49	67%	6.7
3	5	7	12	58%	5.8
4	1	7	8	88%	8.8

PACAS Item 27	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	24	70	94	74%	7.4
2	6	16	22	73%	7.3

3	3	3	6	50%	5.0
4	0	0	0	0%	0.0

PACAS Item 28	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	26	56	82	68%	6.8
2	6	23	29	79%	7.9
3	1	10	11	91%	9.1
4	0	0	0	0%	0.0
5	0	0	0	0%	0.0

PACAS Item 29	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	24	46	70	66%	6.6
2	6	23	29	79%	7.9
3	3	16	19	84%	8.4
4	0	0	0	0%	0.0
5	0	4	4	100%	10.0

PACAS Item 30	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	8	36	44	82%	8.2
2	8	21	29	72%	7.2
3	10	15	25	60%	6.0
4	7	16	23	70%	7.0

PACAS Item 31	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	1	8	9	89%	8.9
2	3	8	11	73%	7.3
3	5	11	16	69%	6.9
4	2	6	8	75%	7.5

5	22	56	78	72%	7.2

PACAS Item 32	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	0	1	1	100%	10.0
2	1	8	9	89%	8.9
3	10	29	39	74%	7.4
4	18	44	62	71%	7.1
5	4	7	11	64%	6.4

PACAS Item 33	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	11	20	31	65%	6.5
2	11	28	39	72%	7.2
3	7	24	31	77%	7.7
4	1	12	13	92%	9.2
5	3	5	8	63%	6.3

PACAS Item 34	Frequency Low SWL	Frequency High SWL	Total	Probability of High SWL	Weight
1	1	1	2	50%	5.0
2	2	4	6	67%	6.7
3	3	11	14	79%	7.9
4	5	23	28	82%	8.2
5	22	50	72	69%	6.9

PACAS Item 3	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	20	59	79	75%	7.5
only2	9	22	31	71%	7.1
only3	1	1	2	50%	5.0
only4	1	1	2	50%	5.0

only5	1	1	2	50%	5.0
1&2	0	0	0	0%	0.0
1&3	0	0	0	0%	0.0
1&4	1	5	6	83%	8.3
1&5	0	0	0	0%	0.0
2&3	0	0	0	0%	0.0
2&4	0	1	1	100%	10.0
2&5	0	0	0	0%	0.0
3&4	0	0	0	0%	0.0
3&5	0	0	0	0%	0.0
4&5	0	0	0	0%	0.0
1,2&3	0	0	0	0%	0.0
1,2&4	0	0	0	0%	0.0
1,2&5	0	0	0	0%	0.0
1,3&4	0	0	0	0%	0.0
1,3&5	0	0	0	0%	0.0
1, 4&5	0	0	0	0%	0.0
2,3&4	0	0	0	0%	0.0
2,3&5	0	0	0	0%	0.0
2,4&5	0	0	0	0%	0.0
3,4&5	0	0	0	0%	0.0
1,2,3&4	0	0	0	0%	0.0
1,2,3&5	0	0	0	0%	0.0
2,3,4&5	0	0	0	0%	0.0
1,2,3,4,5	0	0	0	0%	0.0

PACAS Item 4	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	3	10	13	77%	7.7
only2	1	7	8	88%	8.8
only3	2	13	15	87%	8.7
only4	9	20	29	69%	6.9
only5	3	1	4	25%	2.5
1&2	0	0	0	0%	0.0
1&3	0	0	0	0%	0.0
1&4	1	1	2	50%	5.0

1&5	0	0	0	0%	0.0
2&3	0	4	4	100%	10.0
2&4	0	0	0	0%	0.0
2&5	0	1	1	100%	10.0
3&4	2	15	17	88%	8.8
3&5	0	2	2	100%	10.0
4&5	2	1	3	0%	0.0
1,2&3	0	0	0	0%	0.0
1,2&4	0	0	0	0%	0.0
1,2&5	0	0	0	0%	0.0
1,3&4	0	0	0	0%	0.0
1,3&5	0	0	0	0%	0.0
1, 4&5	0	0	0	0%	0.0
2,3&4	3	11	14	79%	7.9
2,3&5	0	0	0	0%	0.0
2,4&5	1	0	1	0%	0.0
3,4&5	2	2	4	50%	5.0
1,2,3&4	1	0	1	0%	0.0
1,2,3&5	0	0	0	0%	0.0
2,3,4&5	4	2	6	33%	3.3
1,2,3,4,5	0	0	0	0%	0.0

PACAS Item 5	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	31	76	107	71%	7.1
only2	1	7	8	88%	8.8
only3	2	20	22	91%	9.1
only4	9	22	31	71%	7.1
only5	3	1	4	25%	2.5
1&2	1	0	1	0%	0.0
1&3	0	0	0	0%	0.0
1&4	1	1	2	50%	5.0
1&5	0	0	0	0%	0.0
2&3	0	0	0	0%	0.0
2&4	0	0	0	0%	0.0

2&5	0	0	0	0%	0.0
3&4	0	3	3	100%	10.0
3&5	0	0	0	0%	0.0
4&5	0	0	0	0%	0.0
1,2&3	0	0	0	0%	0.0
1,2&4	0	0	0	0%	0.0
1,2&5	0	0	0	0%	0.0
1,3&4	0	0	0	0%	0.0
1,3&5	0	0	0	0%	0.0
1, 4&5	0	0	0	0%	0.0
2,3&4	0	0	0	0%	0.0
2,3&5	0	0	0	0%	0.0
2,4&5	0	0	0	0%	0.0
3,4&5	0	1	1	100%	10.0
1,2,3&4	0	0	0	0%	0.0
1,2,3&5	0	0	0	0%	0.0
2,3,4&5	0	0	0	0%	0.0
1,2,3,4,5	0	0	0	0%	0.0

PACAS Item 6	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Raw Weight
only1	0	0	0	0%	0.0
only2	0	1	1	0%	0.0
only3	19	37	56	66%	6.6
only4	1	2	3	67%	6.7
1&2	0	0	0	0%	0.0
1&3	0	1	1	100%	10.0
1&4	0	0	0	0%	0.0
2&3	19	37	56	66%	6.6
2&4	0	0	0	0%	0.0
3&4	2	5	7	71%	7.1
1,2&3	0	0	0	0%	0.0
1,2&4	0	0	0	0%	0.0
1,3&4	0	1	1	100%	10.0
2,3&4	0	0	0	0%	0.0
1,2,3&4	0	0	0	0%	0.0

PACAS Item 24	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	8	29	37	78%	7.8
only2	8	22	30	73%	7.3
only3	5	12	17	71%	7.1
only4	5	3	8	38%	3.8
1&2	1	0	1	0%	0.0
1&3	0	4	4	100%	10.0
1&4	0	0	0	0%	0.0
2&3	6	11	17	65%	6.5
2&4	0	1	1	100%	10.0
3&4	0	1	1	100%	10.0
1,2&3	0	2	2	100%	10.0
1,2&4	0	1	1	100%	10.0
1,3&4	0	0	0	0%	0.0
2,3&4	0	3	3	100%	10.0
1,2,3&4	0	0	0	0%	0.0

PACAS Item 35	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	12	35	47	74%	7.4
only2	6	21	27	78%	7.8
only3	1	8	9	89%	8.9
only4	3	0	3	0%	0.0
only5	0	0	0	0%	0.0
1&2	3	0	3	0%	0.0
1&3	0	0	0	0%	0.0
1&4	0	0	0	0%	0.0
1&5	0	0	0	0%	0.0
2&3	3	14	17	82%	8.2
2&4	0	0	0	0%	0.0

2&5	0	0	0	0%	0.0
3&4	1	0	1	0%	0.0
3&5	0	0	0	0%	0.0
4&5	0	0	0	0%	0.0
1,2&3	0	0	0	0%	0.0
1,2&4	0	0	0	0%	0.0
1,2&5	0	0	0	0%	0.0
1,3&4	0	0	0	0%	0.0
1,3&5	0	0	0	0%	0.0
1, 4&5	0	0	0	0%	0.0
2,3&4	3	5	8	63%	6.3
2,3&5	0	0	0	0%	0.0
2,4&5	0	0	0	0%	0.0
3,4&5	1	0	1	0%	0.0
1,2,3&4	2	0	2	0%	0.0
1,2,3&5	0	0	0	0%	0.0
2,3,4&5	2	1	3	33%	3.3
1,2,3,4,5	1	0	1	0%	0.0

PACAS Item 36	Frequency Low SWL	Frequency High SWL	Total	Probability of high SWL	Weight
only1	1	1	2	50%	5.0
only2	1	0	1	0%	0.0
only3	1	1	2	50%	5.0
only4	0	0	0	0%	0.0
only5	1	0	1	0%	0.0
1&2	0	1	1	100%	10.0
1&3	0	1	1	100%	10.0
1&4	0	5	5	100%	10.0
1&5	0	0	0	0%	0.0
2&3	0	0	0	0%	0.0
2&4	0	0	0	0%	0.0
2&5	0	0	0	0%	0.0
3&4	0	0	0	0%	0.0

3&5	0	0	0	0%	0.0
4&5	0	0	0	0%	0.0
1,2&3	0	4	4	100%	10.0
1,2&4	1	8	9	89%	8.9
1,2&5	0	1	1	100%	10.0
1,3&4	1	0	1	0%	0.0
1,3&5	0	0	0	0%	0.0
1, 4&5	1	2	3	67%	6.7
2,3&4	0	0	0	0%	0.0
2,3&5	0	0	0	0%	0.0
2,4&5	0	0	0	0%	0.0
3,4&5	0	1	1	100%	10.0
1,2,3&4	7	23	30	77%	7.7
1,2,3&5	1	0	1	0%	0.0
2,3,4&5	0	1	1	100%	10.0
1,2,3,4,5	11	24	35	69%	6.9