

**Swiping, Stress, and Security:  
Attachment and Sexuality in Digital Dating**

Nicholas Carragher

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**Thesis declaration form**

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature:

Name: Nicholas Carragher

Date: 21<sup>st</sup> May 2025

## Overview

This thesis explores how sexual minority status influences relationships between adult attachment and online dating app use.

**Part One: Conceptual Introduction** – The conceptual introduction considers key concepts addressed in the empirical paper. Literature evaluating and integrating sexuality, attachment theory, and online dating is reviewed. The evaluation and application of existing literature resulted in a moderation effect of sexual minority status on the associations between adult attachment and dating app behaviours being proposed.

**Part Two: Empirical Paper** – The empirical paper quantitatively assesses whether sexual minority status moderates links between attachment anxiety / avoidance and dating app use. A series of regression analyses explored these relationships. Results are reported and discussed in their theoretical context, with some suggestions for the direction of possible future research. This was a joint project with Amber Korde (DClinPsy, 2025). The contributions of the authors are summarised in Appendix 4.

**Part Three: Critical Appraisal** – The critical appraisal adopts a reflective stance to discuss experiences learned through this process of research development and design.

## Impact Statement

The findings presented in this thesis offer useful insights for both academic and applied contexts. By examining how sexual minority status interacts and influences associations between adult attachment and dating app use, this research addresses a gap in the literature and provides a more inclusive perspective on digital health and modern relationships. Academically, the thesis contributes to psychological theory by evaluating the application of non-heteronormative models, such as the Integrated Attachment and Sexual Minority Stress Model (IASMS), and by highlighting the importance of considering sexual orientation as a nuanced, dimensional construct. The use of intersectional and context-sensitive methodologies may inform future research design and help improve the validity of studies in sexuality and relationship science.

Outside academia, the thesis has potential implications for mental health professionals and policy makers. By finding that sexual minorities are not at significantly higher risk for problematic dating app use than heterosexuals, the research encourages a move away from deficit-based or pathologising approaches. Instead, it supports the adoption of strengths-based, affirmative practices that recognise the resilience of sexual minority individuals. These findings may help psychologists and therapists to better understand the coping strategies of their clients and to develop more tailored, supportive interventions. At a policy level, the research could contribute to digital health initiatives and public health campaigns that address the needs of sexual minority populations, particularly where offline support is limited. Dissemination through academic publication and engagement with relevant organisations may help translate these insights into practical benefits, though the extent of impact will depend on further research and collaboration.

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## **Part One: Literature Review**

### **A Conceptual Introduction**

## Abstract

This conceptual introduction outlines a theoretical framework integrating sexuality, adult attachment, and online dating app use, with particular attention to the role of minority stress. It begins by defining sexuality as a construct shaped by both individual development and sociocultural factors, including minority stress. Literature on adult attachment theory is reviewed, highlighting evidence that attachment orientation influences dating app use, where anxious attachment is associated with increased use and avoidant attachment with reduced use. Findings suggest that sexual minority individuals who often face societal heterosexism may experience disruptions in attachment development, while secure attachments may facilitate exploration of diverse sexual identities. Online dating platforms are shown to serve as an important tool for connection, particularly among sexual minorities, who face structural barriers to community and intimacy. Existing models, such as the Integrated Attachment and Sexual Minority Stress Model (IASMS), link attachment and sexual minority stress with health outcomes but do not directly address dating app use. This introduction establishes a rationale for further empirical research investigating how sexual minority status may moderate the relationship between attachment style and online dating app use, with implications for mental health support and intervention.

## Introduction

Research conducted on Western, Educated, Industrialised, Rich, and Democratic (WEIRD) (Henrich et al., 2010) populations has repeatedly documented the significant disparity in health outcomes between heterosexuals and sexual minorities (i.e. non-heterosexuals); sexual minority individuals have been shown to have more negative experiences in terms of healthcare access, service uptake, and health outcomes, including psychological wellbeing (Burgard, Cochran & Mays, 2005; Meads et al., 2019; Meyer, 2003; Newcomb et al., 2012). These experiences have been shown to have a detrimental effect on both mental and physical health, as well as increasing the likelihood of engaging in behaviours associated with risk to health, such as substance misuse and compulsive behaviour. Meyer (1995; 2003) developed the Minority Stress Model to explain the associations between social circumstances, stress, and health outcomes. The model states that distal minority stressors—such as stigma, prejudice, and social inequality—undermine wellbeing by creating and reinforcing proximal stressors, including perceived public stigma, internalised homophobia, anticipated stigma, shame, and guilt (Liu et al., 2023). Contrary to problem-focused narratives (An & Batra, 2022), the model emphasises that sexual minority identity itself is not inherently detrimental; rather, it is the cumulative impact of these stressors, moderated by social support and coping resources, that shapes mental health outcomes (Meyer, 2003).

While there is significant evidence of the detrimental effect of minority stress, there is also evidence of sexually minoritised individuals positively relating to their identities. Studies have shown that for many, identifying as a sexual minority is associated with enhanced interpersonal relationships, resilience, and increased empathy (Riggle et al., 2011; Scales Rostosky et al., 2010). These studies also found that the sexual minority identity offered

minoritised individuals a connection to a community that embraces a positive, shared, and collective acknowledgement of their stigmatised identities. These positively perceived aspects of a stigmatised identity have been shown to act as a protective factor against distal minority stressors, with social connection and community being of particular note (Dickinson & Adams, 2014; Lambe et al., 2017).

Connection and community have always played an important role for minority groups (Baumeister & Leary, 2017) and sexual minority individuals were early adopters of the internet for pursuit of supportive networks and safe spaces (Groß et al., 2014). The internet has been particularly useful for those that face barriers in meeting others of the community in the offline world. Online platforms such as forums, social media and online dating applications (apps) offer connection to those living in remote or rural areas, those concerned about anonymity and safety, as well as those seeking convenience. These spaces foster encounters in a space where sexual orientation is already recognised and established with minimal effort and limited exposure to scrutiny or rejection from those outside of the community (Castañeda, 2015; Dodge, 2014; Taylor et al., 2017; White Hughto et al., 2017). The internet also provides a vital opportunity for sexual minority youth to learn about sexual desires, pursue partnerships which are otherwise publicly stigmatized, and stay connected with their community (Potârcă et al., 2015). While there seem to be many benefits to internet use in moderation, other studies have found harmful associations when the internet is used in excess. Persistent use of gay dating apps predicts feelings of loneliness, dissatisfaction and, conversely, a sense of disconnectedness from their community (Brubaker et al., 2016; Jaspal, 2017; Yeo & Fung, 2018). Zervoulis et al. (2020) suggested that in gay men, the relationship between online dating app use and psychological

wellbeing is moderated both by the intensity with which an individual uses dating apps, and by their motivation for using the dating apps.

Zervoulis et al.'s (2020) study did not identify factors thought to contribute to the intensity of dating app use amongst gay men. However, Chin et al. (2019) found that, in heterosexual individuals, adult attachment (Ainsworth et al., 1978; Bowlby, 1969; Hazan & Shaver, 1987) is associated with time spent using dating apps. Higher scores in the anxious attachment domain were associated with increased dating app use than people lower in anxious attachment. In addition, higher scores in the avoidant attachment domain were associated with reduced dating app use compared to people lower in avoidant attachment.

Adult attachment (Ainsworth et al., 1978; Bowlby, 1969; Hazan & Shaver, 1987), which is described in greater detail later on, is thought to affect many relational interactions across the life span (Ainsworth, 1985). Originally developed to explain the emotional bond between infants and caregivers (Bowlby, 1969), attachment theory was later extended to adult romantic relationships (Hazan & Shaver, 1987). Contemporary models describe attachment along two key dimensions: anxiety and avoidance. Anxiously attached individuals seek closeness but fear abandonment, while avoidantly attached individuals tend to resist intimacy. Those low in both dimensions are considered securely attached (Bartholomew & Horowitz, 1991; Brennan et al., 1998; Simpson, 1990). Additionally, attachment is linked with sexually minoritised individuals' capacity to cope with heterosexism, a form of distal minority stress (Elizur & Mintzer, 2003; Mikulincer & Shaver, 2007; Mohr, 2016). Secure attachment promotes sexual minorities' ability to foster a supportive environment that contests both proximal and distal minority stressors, including heterosexism. However, insecure attachment and minority stress may contribute to adverse health outcomes, potentially through unhelpful coping strategies such as substance

misuse, unprotected or otherwise ‘risky’ sex, or compulsive behaviours like excessive internet use (Burgard et al., 2005; Meads et al., 2019; Meyer, 2003; Newcomb et al., 2012).

Despite the evidence suggesting that there is a relationship between attachment and online dating app use, and therefore also between attachment and health outcomes for sexual minority individuals there is very little literature on the impact of attachment on sexual minority relationships, as most peer-reviewed research on relationship patterns focuses on heterosexual relationships (Thorne et al., 2021). The intention of this conceptual introduction is therefore to explain what is being meant and understood by terms such as sexuality and sexual minority, to explore the body of literature relating to attachment theory and patterns of online dating app use and introduce an understanding of how these concepts relate to each other. This introduction aims to draw together an idea of how these concepts may interact in preparation for an empirical study examining the role of sexual minority status in the associations between dimensions of attachment and online dating app use.

## Theoretical Foundation

### Sexuality

Ahead of describing the relationship between attachment and online dating apps, it seems important to preface this introduction by defining the understanding of sexuality and the term ‘sexual minority’ that is being used, in order to contextualise the framework of this study.

Sexuality is a broad term that is layered with nuance and has numerous definitions. It is therefore important to outline and define what is being discussed when identifying the role of sexual

minority status in relation to attachment and online dating apps. In this vein, it is also pertinent to describe the rationale for collapsing a topic with such breadth and richness into something as binary as sexual minority status. Beginning with what is meant by sexuality, Meyer (2010) uses the term to, individualistically, refer to a person's wants, desires and behaviours in relation to romantic and intimate partners. Jackson and Scott (2010), through a more sociological lens, use the term to refer not to an individual's innate traits but rather to a product of the social environment, encompassing all desires, practices and identities considered to be erotic. In this sense Jackson and Scott (2010) explain that sexuality is not limited only to 'sex acts' or 'sexual identities' nor is it something by which we define ourselves but rather a combination of these and the way in which we are defined as sexual by others, resulting in a complex trait that fluidly interacts with its environment. While an individualistic definition of sexuality, focusing solely on what an individual wants and how they act, is straightforward and therefore appears to be perhaps more sensible in terms of offering clarity, this runs the risk of oversimplifying sexuality into a di- or trichotomous categorical variable (i.e. heterosexual, homosexual, or bisexual) (Coleman, 1987). Various models of understanding complex traits, such as Engel's (1977) Biopsychosocial Model and Bronfenbrenner's (1989) Ecological Systems Theory, recognise that complex traits, such as sexuality, must be understood with reference to the wider societal and cultural norms in which the individual exists. Therefore, when referring to sexuality, this introduction is referring to the broader scope, sociological definition as described by Jackson and Scott (2010).

The formation of a sexual identity, given the complexity and nuance of sexuality as a concept, is therefore also complex and nuanced. Elizur and Mintzer (2001) described an understanding of this process in relation to attachment, stating there are three primary

components: *self-definition*, *self-acceptance* and *disclosure*. Self-definition involves the recognition of an individual identity narrative that involves same-gender or non-heterosexual feelings, separate from the, likely, heterosexual norm of the family and community expectations. Forming this alternative identity narrative involves processing denials and social pressure to conform, as well as working through fears of both real and imagined consequences. Internal and external conflicts surrounding this identity are said to be likely to persist after the initial self-definition and can lead to significant shifts in the individual's self-perception, though Elizur and Mintzer (2001) explain this is often due to distal minority stressors. Self-acceptance refers to the practice of addressing and overcoming the highly likely traumatic experiences, loss of social status, and the internalisation of heterosexism.

Self-acceptance is both an internal cognitive-emotional development and an interpersonal process (Fassinger & Miller, 1997). The process often benefits from engagement with other sexual minorities to contest the sense of isolation and stigmatisation, as well as providing sexual minority role models. The sharing of the individual's self-defined identity with significant heterosexuals is both a mark of, and an aid in the development of self-acceptance, with the goal of self-acceptance being to develop a positive relationship with the sexual minority identity.

Finally, though it is disputed as to whether this is attainable or even desirable for all individuals (Klein et al., 2015), disclosure refers to the long-term and constantly reflexive process of sharing the formed identity with others in society. In essence this refers to finding the most appropriate manner for one's culture and societal context, to exist in the world with others, which may also be through an act of non-disclosure. Elizur and Mintzer (2003) went on to state that the formation of a sexual identity is fundamentally associated with attachment, in that secure

attachment in sexual minority individuals requires positive experiences associated with their sexual identity.

Positive experiences with attachment figures that are thought to facilitate secure attachment include support with confusion about identity, education and help to understand and combat stigma, and identity affirming acts (Elizur & Mintzer, 2003; Mikulincer & Shaver, 2007). Through receiving meaningful support and developing a secure attachment, Elizur and Mintzer (2003) explain these individuals are better equipped to in turn offer social support, creating a caregiving environment that contests both proximal and distal minority stressors, including heterosexism. The caregiving environment that fosters secure attachments in childhood and young adulthood has been associated with increased openness with peers and romantic partners around sexual identity issues (D'Augelli et al., 2010; Rothman et al., 2012) and less internalised homophobia (Jellison & McConnell, 2004; Sherry, 2007), which encourages the self-definition process. The converse of this is increased shame, internalised homophobia, and decreased rates of sexual identity disclosure to family members and friends amongst those with more insecure attachment (Cook & Calebs, 2016).

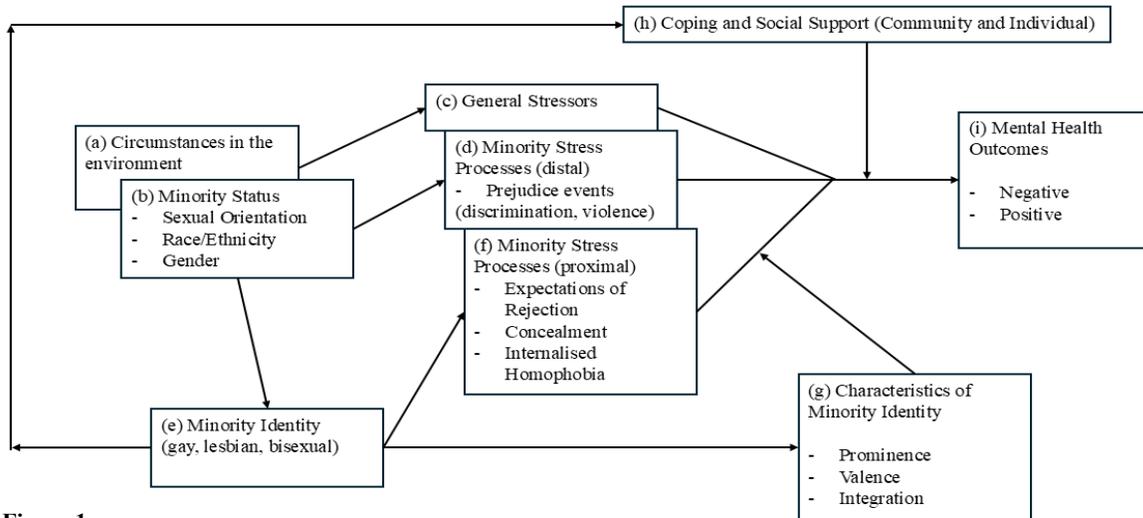
Although various terms such as 'sexuality', 'sexual identity' and 'sexual minority' have been used in this review, it is perhaps useful to explain the choice to use the term 'sexual minority' throughout this introduction. There is a two-fold reason that the term 'sexual minority' has been used over other, perhaps more inclusive or affirming terms, such as LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual and others). The first being specificity: while LGBTQIA+ may be more inclusive, it also alludes to gender diversity and although gender and sexuality are interrelated, the focus of this introduction and the subsequent empirical study is on the role of sexuality. The second is for simplicity and tone. As

has been touched on, sexuality is a complex and nuanced topic and many who consider themselves to not fit under the heterosexual umbrella, may not consider themselves to be part of the LGBTQIA+ community either, in which case a binary, though contentious due to the heteronormative messaging (to be discussed shortly), allows for an element of simplicity and inclusivity. The tone of the term ‘sexual minority’ also fits in line with previous research upon which much of the theory in this field is grounded and is therefore an acknowledgement to pioneers of activism and research in the area. Additionally, when referring to variations in sexuality, differences or distinctions will not be made in reference to sex but rather to gender differences, which are inherently interrelated with sexuality. In this introduction gender is referring to all aspects of variations and differentiations between men, women, non-binary, agender, transgender, cisgender and any other gender identity of individuals.

Sexuality and gender are associated, in that gender can be understood to be a framework for the social ordering of sexuality. Despite this, it is also recognised that sexuality has an impact on gender, and gender on sexuality (Jackson & Scott, 2010). One of the most notable intersections of gender and sexuality is in the institution and enactment of heterosexuality, which is both pervasive and normative in the current WEIRD environment (Farvid, 2015). As such, much of the literature within psychological research accepts heterosexuality as the *de facto* ‘given’ and ‘normal’, and therefore when considering sexuality has focused on sexualities that deviate from the ‘norm’ and are considered to be atypical (e.g. homosexuality, lesbianism, queerness) (Farvid, 2015). This effect can be referred to as heteronormativity (Warner, 1993). Heteronormative standards can be found across societal institutions including religion, family, education and the media (Robinson, 2016). These standards are enacted in many ways including but not limited to underrepresentation in the media, undervaluing relationships in families and

law, erasure within education and discrimination within religion. The almost omnipresent societal oppression of non-heterosexual individuals through heteronormativity and the subsequent impact on health outcomes was conceptualised in the Minority Stress Model (Meyer, 2023).

The Minority Stress Model (Figure 1) outlines the manner in which stigma, prejudice, and discrimination foster an adverse and taxing social environment that causes negative health outcomes. Minority stressors have been found to have both detrimental physical (Denton, 2012) and psychological (Hatzenbuehler, 2009) impacts on sexual minority individuals' wellbeing. The model describes stress pathways, including the experience of prejudice events, expectations of rejection, effortful hiding and concealment, internalised homophobia, and protective coping processes. In the context of the Minority Stress Model, many spaces hold a potential for a risk of rejection, harassment and even violence. Through this lens, the ability to curate your environment and who you surround yourself with can offer an element of sanctuary, which in the offline world may look like living, working and existing within LGBTQIA+ friendly districts or 'gaybourhoods' (Ghaziani, 2016). However, studies are finding that sexual minority youth are more frequently using online platforms to find community and curate the type of content they see in order to contest heteronormativity (Hanckel & Morris, 2014; Hanckel et al., 2019). These cyberspaces offer increased accessibility to those otherwise unable to access inclusive and safe spaces. Online platforms such as social media, forums and online dating apps offer socialising in an environment with both fewer distal minority stressors and triggers for proximal minority stressors (Castañeda, 2015; Dodge, 2014; Taylor et al., 2017; White Hughto et al., 2017). Sexual minority individuals such as those that live outside of metropolitan hubs or who feel it necessary to prioritise anonymity are able to find accepting and meaningful connections through social



**Figure 1.**

**Meyer's (2003) Minority Stress Model demonstrating minority stress processes in lesbian, gay, and bisexual populations.**

media which positively benefits wellbeing and mental health (Clark et al., 2018; Tibber & Silver, 2022).

Despite the positive findings of the impact of social media and online spaces for wellbeing, Clark et al. (2018) explain that there may also be negative impacts of social media on mental health and wellbeing. These can broadly be classified into two categories, feelings of isolation and social comparison, both of which are linked to reduced satisfaction of core needs for acceptance and belonging (Clark et al., 2018). More specifically to sexual minorities, Hawkins and Watson (2017) reported that sexual minority youth have a propensity to form an overreliance on social media, in that it is thought to be their main news source and form of community, often using avatars and false identities. While this protects anonymity, it can also lead to further feelings of isolation, exacerbating the minorities stressors experienced by sexual minority youth. This research is only a brief outline of some of the challenges that are understood by the Minority Stress Model and already they highlight the nuanced and precarious balance that must be sought in order for protective factors to remain protective.

Given the importance of meaningful connection as a protective factor in the context of sexual minority wellbeing, understanding factors that shape the way these connections are made, such as through online dating apps is relevant. Particularly, on the basis that there are already known differences between how heterosexual and sexual minority groups use dating apps, for example only 39% of heterosexual couples report having met through online dating apps as opposed to 65% of same-sex couples reportedly meeting the same way (Rosenfeld et al., 2019). Instead, however, Vaughan et al. (2014) identified that much of the peer-reviewed literature relating to sexual minorities and the LGBT community chooses to take a problem-saturated, risk-prevention view, most often focusing on substance misuse, HIV-prevention and how to encourage practising safe sex. Centring risk in LGBT research perpetuates a narrative that same-sex or relationships involving sexual minorities can be harmful, dangerous or are just less desirable than those involving heterosexual individuals (Liu et al.2023). This was backed by a comprehensive bibliometric analysis of LGBT related research (An & Batra, 2022) that demonstrated that despite a gradual increase in attention being paid to LGBT research since 2010, the main areas of study continue to consist of “male sexuality and risk”, followed by “sexual development”, “health care service”, “social experience”, and “intervention strategies”.

Perpetuation of this narrative confirms the anticipated stigma expected by sexual minorities of healthcare professionals and can contribute to the reported barriers to healthcare access and service uptake due to real and perceived stigmatisation and rejection (Burgard, Cochran & Mays, 2005; Meads et al., 2019; Meyer, 2003; Newcomb et al., 2012). It follows that repeated exposure to this stigmatisation and rejection would impact and individuals’ ability to secure form relationships with others (Cook at al., 2016; Keating & Muller, 2020). Key developmental milestones, such as the development of a self-identity that differs from the typical

heterosexual norm of the family and community, are particularly vulnerable (Elizur & Mintzer, 2001). Understandably then, attachment-related implications to an individual's sexuality are to be expected.

## Attachment

Attachment Theory (Ainsworth et al., 1978; Bowlby, 1969/82, 1973, 1980), initially developed by John Bowlby, has roots in psychoanalysis, cognitive-developmental psychology, control systems theory and primate ethology (Shaver & Mikulincer, 2009). This broad conceptual grounding, in addition to the concise directness with which Bowlby shared his theory, underpins the widespread appeal to developmental, clinical, social and even organisational psychologists alike (Shaver & Mikulincer, 2007).

Bowlby (1969/82) began by stating that all infants are born with innate, evolutionarily beneficial behaviours (*attachment behaviours*) that encourage proximity to caregivers (*attachment figures*). Attachment figures are those that are likely to keep the infant physically and psychologically safe, encourage safe exploration of their surroundings and the world, and teach infants to regulate their own emotions in a meaningful way. The adaptive collection of behaviours formed by these innate, proximity-seeking acts is called the *attachment behavioural system*. Bowlby (1988) later elaborated, saying that, while these behaviours are significant in infancy, the attachment system remains active across the lifespan, unconsciously shaping the individual's help-seeking thoughts and behaviours in times of need. This system of relating to care is called *adult attachment*.

Attachment figures in an individual's early life are likely to be their primary caregivers, such as their parent(/s), relatives or care workers (Shaver & Mikulincer, 2009). These primary caregivers are sought out when the infants are tired, ill or in need of emotional regulation (Ainsworth, 1973; Heinicke & Westheimer, 1966). However, across the lifespan the individual often forms attachments to romantic partners, close friends, teachers and supervisors, and in clinical settings, therapists (Shaver & Mikulincer, 2009).

For a relationship to be considered an attachment relationship, it must meet three criteria (Ainsworth, 1991; Hazan & Shaver, 1994; Hazan & Zeifman, 1994). First, in times of distress, the individual desires to seek proximity to the attachment figure and unwanted separation causes upset, evoking efforts to reunite. Second, the comfort, support, protection, and security in times of need offered by the person should be perceived as a real or potential refuge. Third, the person should offer the individual a secure base to pursue unrelated goals in a safe environment, encouraging exploration, risk taking, and self-development. These three conditions separate the attachment relationship from other social interactions.

Bowlby (1969/82) stated that the function of the attachment system is to reinforce an individual's real and felt sense of security, enabling confident engagement in exploration, and social and non-social tasks. During infancy, attachment behaviours consist of crying, various movements including crawling and pointing aimed to reestablish attachment figure proximity in the face of a threat (Ainsworth et al., 1978). In adulthood attachment behaviours become more sophisticated, involving direct communication with the attachment figure, or activation of soothing mental representations of either the attachment figures or a self-representation associated with attachment figures (Mikulincer & Shaver, 2004). Every attachment-interaction that is successful in affirming a sense of internal security both develops the attachment figure

relationship and plays a significant role in maturing the self-regulation and soothing techniques used to cope with negative emotions (Bowlby, 1973, 1980). Therefore, secure attachment figure relationships contribute to an individual's emotion regulation and resilience in the face of distress (Shaver & Mikulincer, 2009), such as those seen in the multitude of minority stressors seen in sexual minorities. However, while Bowlby's attachment theory offers an understanding of general social and emotional development, the differences in individual's attachment patterns and styles offer a clinical relevance to the theory.

In infancy, the caregiver's reaction either reinforces or suppresses attachment behaviours depending on whether the behaviour is rewarded with proximity (reinforcement) or punished with withdrawal (suppression) (Shaver & Mikulincer, 2009). However, in addition to this, the responses contribute to the infants *inner working model* of the self, others and the world (Bartholomew, 1990; Bowlby, 1969/1982). This inner working model holds the infant's understanding, beliefs and expectations of both their caregiver's likely reactions and their own effectiveness/ineffectiveness at achieving intended goals. Through the process of incorporating experiencing, consciously and unconsciously, into the inner working model, the individual learns to adapt their attachment system to the context in which it has developed.

When individuals are exposed to a history of specific attachment experiences, a relatively stable, habitual pattern of expectations, needs, emotions, and behaviours in interpersonal interactions and close relationships is formed, called *attachment styles* (Hazan & Shaver, 1987). The concept of identifying patterns of attachment behaviour was initially suggested by Ainsworth (1967) who used three discrete categories, *secure*, *anxious-ambivalent*, or *anxious-avoidant*, to describe the infant responses to the Strange Situation experiment. A fourth, *disorganised/disoriented*, was later added by Main and Solomon (1990).

In an effort to apply Bowlby and Ainsworth's ideas to adult populations, Hazan and Shaver (1987) described three attachment styles that mapped onto Ainsworth's original categories. Over time and with further methodological advancements, the resulting attachment styles were conceptualised into two dimensions: attachment-related *avoidance* and attachment-related *anxiety*. Those understood to be low in both avoidance and anxiety were referred to as secure or as having a secure attachment style (Bartholomew & Horowitz, 1991; Brennan et al., 1998; Simpson, 1990). As such, any reference in this introduction to attachment styles, unless otherwise stated, refers to attachment dimensions rather than categories.

Hazan and Shaver (1987) defined an individual with a secure attachment style as someone that found it easy and comfortable to be close and dependent on others, and to have others depend on them. This individual wouldn't be preoccupied with either worries of abandonment or of others becoming too close to them. Secure attachment has been associated with higher levels of self-contentment, self-expression and a felt sense of being loved, appreciated, and supported (Mende et al., 2019). This has been shown to translate in romantic relationships to securely attached individuals finding it easier to connect, feel more warmth and be more trusting of their partner than anxious and avoidantly attached individuals (Brennan et al., 1998; Campbell, & Marshall, 2011; Schaan et al., 2020).

Bartholomew and Horowitz (1991) stated that securely attached individuals are more likely to have a positive self-view and view of others, noting they are comfortable both on their own and in relationships. Further studies have found that a secure attachment style is a strong predictor of being able to maintain stable, committed and satisfied relationships (Hadden et al., 2018; Kajzer, 2023). It has been suggested that these findings are the result of higher levels of emotion regulation, self-worth, autonomy, self-efficacy, self-cohesion, and adaptability in their

romantic relationships (Coffey et al., 2022; Mikulincer et al., 2006; Toma, 2022; Vollmann et al., 2019). Online dating apps are thought to now be the most common way for romantic and sexual partners to meet (Duguay, 2017; Salon et al., 2019; Zlot et al., 2018). This seems to be in line with findings that secure attachment is positively correlated with online dating app use (George, 2024). In Europe, between 2019 to 2024 dating app users increased by one third from 60.8 million to 81.5 million users (Statista, 2024). Given this rapid increase in dating app use to a somewhat ubiquitous status, it seems the landscape of dating is ever increasingly shifting to online platforms. It follows then that securely attached individuals, thought to be the most comfortable in pursuing relationships (Bartholomew & Horowitz, 1991), may be pioneering the trend to search for romantic or sexual connections through online dating apps.

Avoidant attachment was defined by Hazan and Shaver (1987) to apply to people that were somewhat uncomfortable being close to others. These people were also said to find it difficult trusting others completely or relying on them. They were thought to feel anxious when others became too close and usually believed that others wanted more intimacy than they felt comfortable offering. Beliefs that any expressions of distress will go unresponded to tend to be characteristic of individuals with avoidant attachment styles; as a result, demographic often choose to self-soothe and isolate as a form of emotion regulation (Ferraro & Taylor, 2021). Chin et al. (2019) found that people who score higher in attachment avoidance were both less likely to use dating apps and less likely have dating app profiles. Further studies found that higher avoidance was associated with expectations of dating interaction failures, a more negative perception of commitment, and a preference for emotional distance (Bartholomew, 1990; Birnie et al., 2009; Campbell et al., 2005).

While, characteristically, avoidant individuals feel uncomfortable relying on others, there also seems to be a reciprocal effect in that others have been shown to find it challenging relying on *them* for support (Drouin & Landgraff, 2012). In romantic relationships, Drouin and Landgraff (2012) found that those who are avoidantly attached divulge less about themselves, send text messages less frequently, and are more likely to send texts and pictures containing sexual content (sexting). This supports findings that avoidant attachment is associated with increased rates of casual sexual (Brennan and Shaver, 1995, Feeney et al., 1993, Gentzler & Kerns, 2004). It was suggested that sexting is used to engage in sexual interactions that are devoid of physical intimacy in order to keep their partners at a distance (Drouin & Landgraff, 2012). One interpretation of this finding is that avoidance is associated with reduced dating app use because dating apps aim to foster connection, which may activate expectations of failure in dating or fear of possible romantic commitment.

The final dimension of attachment, as described by Hazan and Shaver (1987), is attachment anxiety. People with anxious attachments were described as imagining others rarely wanting as much intimacy as they would like. They were said to be preoccupied with thoughts that their partners don't truly love them or that they may actually intend to leave. Anxiously attached individuals are thought to often find that the intensity of a relationship in which they would feel comfortable unfortunately scares others away (Hazan & Shaver, 1987). Research has shown that, in contrast to more avoidant individuals, those high in anxious attachment do find enjoyment in physical intimacy but frequently experience distressing worries of abandonment (Brennan et al., 1998). An anxious attachment is also thought to be a predictor of approval seeking behaviour and of intense distress when attempts to seek proximity with attachment figures go unmet (Drouin & Landgraff, 2012).

One study found that higher anxious attachment individuals use online dating apps more than both avoidant and secure attachment individuals (Chin et al., 2019). The study noted that while the most frequently cited reason for using dating apps among anxiously attached people was to meet others, the main reason for *not* using apps was due to a difficulty in trusting people online. Holding in mind that anxious attachment has been associated with lower self-esteem (Lee & Hankin 2009), one suggested explanation as to why anxiously attached people use dating apps more is that these users believe online dating can offer a form of validation. This perhaps serves as positive social reinforcement that can increase the chances of continuing the use of online dating for extended periods, and potentially developing addictive-like patterns of use as has been seen in other social media platforms (D'Arienzo et al. 2019).

Attachment theory has been widely researched in the half a century since it was first proposed by Bowlby. The theory provides a foundational framework for understanding the development and manifestation of attachment patterns across the lifespan. Early caregiver interactions shape internal working models, which influence attachment behaviours and interpersonal dynamics into adulthood. Secure attachment fosters resilience, emotional regulation, and relational satisfaction, while avoidant and anxious styles highlight vulnerabilities in intimacy and trust. These dimensions of attachment continue to offer valuable insights into emotional functioning and relational behaviours, with implications for clinical practice and research, particularly in understanding contemporary phenomena such as online dating dynamics and the impact of attachment on digitally initiated relationships. Unfortunately, as previously stated, far less research has involved sexual minority groups when compared with the sexual majority (Cook & Calebs, 2016; Thorne et al., 2021). However, there is evidence that there are variations in attachment between sexual minorities compared with the sexual majority, possibly

due to differences in felt security (Feeney & Noller, 2004). Given that online dating apps have been associated with mental health difficulties, and that attachment has been associated with patterns of dating app use, it seems prudent to explore factors associated with variation in attachment.

## Online Dating Apps

Online dating has existed for several decades; however, since the rise of location-based smartphone dating applications, online dating became the second most popular industry for paid online content (Bonilla-Zorita et al., 2021). With more than 395 million individuals now using online dating apps worldwide (Statista, 2023), the landscape of dating has changed across the globe. Recently, over a third of the US population reported having used an online dating app at one point in their lives (Anderson et al., 2020; Gewirtz-Meydan, Volman-Pampanel et al., 2024) and several studies have identified online dating apps as the most common way to meet romantic and sexual partners (Duguay, 2017; Salon et al., 2019; Zlot et al., 2018).

The ubiquity of online dating apps has drawn significant attention from researchers interested in the interaction between technology and society (Wu & Trottier, 2022). The research examines everything from the demographics currently engaging with dating apps, to their motivations, and the risks involved (Bonilla-Zorita et al., 2021; Castro & Barrada, 2020; Holtzhausen et al., 2020). One attempt to categorise the research in this area has resulted in the development of the mediation framework proposed by Lievrouw (2014). The framework consists of (a) *Artefacts*, the actual devices or objects and their features, that are used by people to communicate others; (b) *Practices*, the ‘how’ and ‘why’ of individual and societal engagement

with the artefacts; and (c) *Social arrangements*, the social context in which the artefacts and practices occur.

Unfortunately, most research does not report differences in sexual orientation and therefore the focus is assumed to be on the heterosexual population (Thorne et al., 2021). This means that research understanding the nuances of the artefacts, practices, and social arrangements of online dating tends to apply to the general population, whereas research specifically involving sexual minorities tends to focus only on differences in the social arrangements (An & Batra, 2022). This not only leaves knowledge gaps within the field but is another perpetuation of sexual minority stigmatisation. This narrative maintains a stereotype known to contribute to proximal minority stressors, including internalised homophobia, anticipated stigma, shame and guilt (Liu et al., 2023).

Dating apps (*The Artefacts*) broadly fall into three categories (Wu & Trottier, 2022). The first allows users to start a private message conversation with any of the users visible on their grid of other nearby users, where other users are displayed in descending order of geographic proximity. The second category only allows private messaging conversations after users have mutually indicated their interest. The final category of dating app blends elements of both the previous two categories. Dating apps are largely used similarly across populations, though the two largest sexual minority-targeted dating apps (Blued & Grindr) fall into the first category and the two largest heterosexual-targeted apps (Tinder & Bumble) fall into the second (Wu & Trottier, 2022).

One study, which did not gather the sexual orientation of the participants, examined motivations (*The Practices*) for using the online dating app, Tinder. They found six key themes motivating the dating app use, which included love, casual sex, ease of communication, self-

worth validation, thrill of excitement, and trendiness (Sumter et al., 2017). Miller (2015) noted that in the men who have sex with men (MSM) population, there were additional drives. The study found that there was a drive for connectivity in MSM dating apps, though participants found that this connectivity was often superficial, suggesting a disparity between what was sought in using the applications and what was attained. This problematic feedback loop has been established in a trans-diagnostic, cognitive behavioural conceptualisation of the positive and negative roles of social media (Tibber & Silver, 2022). The conceptualisation explains that when gratifications sought through social media use do not align with gratifications obtained, a decreased sense of acceptance and belonging can be established. This can then lead to an amplification of the user's motivation to engage in order to seek connection. Despite this seemingly dissatisfying gratification seeking, sexual minorities are reportedly around twice as likely to use online dating apps than heterosexuals (Anderson et al., 2020). This indicates that sexual minorities may be vulnerable to Tibber and Silver's (2022) proposed feedback loop, not only on social media but also with respect to online dating app use.

The social context (*The Social Arrangements*) of sexual minorities' use of online dating apps may explain, at least partially, the incongruity between unmet gratification experienced by sexual minority dating app users and the increased likelihood and prevalence of dating app use by the community. The rise of online dating apps establishes digital safe spaces for sexually minoritised individuals to meet in a space where sexual orientation is pre-established (Potârca et al., 2015). At the same time, there has been the recent economic impact of the COVID-19 pandemic on many already struggling, sexual minority community venues (Miles, 2021). The combination of these factors has resulted in markedly fewer in-person safe spaces for the community, further driving the need to move to digital platforms despite their needs not being

fully met by this medium (Smith, 2022). From this perspective, it is understandable that sexual minorities find themselves relying on online dating apps to attempt to meet social, romantic and sexual needs. However, where this need is being unmet and often the connections made felt to be superficial, significant mental health impacts can occur (Fortuna et al., 2019).

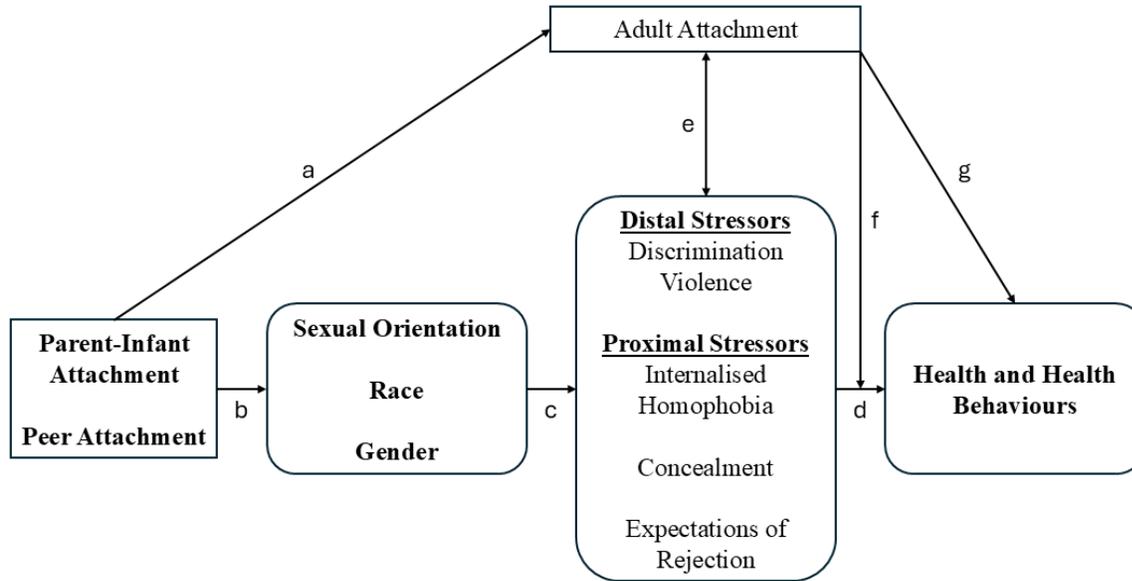
In sexual minority populations, previous studies have identified vulnerabilities to mental health difficulties due to, but not limited to, heteronormativity, minority stress, stigmatisation, deficiency of social support, victimisation, and exposure to violence (Meyer, 2003; see also Grant et al., 2014; Bränström, 2017). The poorer mental health outcomes in sexual minority individuals appear to be negatively correlated with dating app use, perhaps due to attempts to get needs met ending in dissatisfaction (Brubaker et al., 2016; Jaspal, 2017; Yeo & Fung, 2018; Zervoulis et al., 2020). In MSM specifically, increased dating app use is additionally associated with poorer life satisfaction, depression, poor sleep, and increased substance misuse (Obarska et al., 2020). Despite these findings, there are several studies indicating protective factors exist. Unsurprisingly, MSM who experience consistently successful interactions and intend to only use dating to seek sexual partners, can find that their self-esteem is actually positively impacted by increased dating app use (Zervoulis et al., 2020). Mohr (2016) found that attachment was associated with lesbian, gay and bisexual individual's ability to cope with daily heterosexism with securely attached individuals being better able to cope with associated anger and fear than avoidantly attached individuals. These findings further evidence there being a significant relationship between sexuality, attachment and online dating app use. In order to make use of these relationships it is essential that a conceptual model is explored that relates these three seemingly connected domains.

## Conceptualising Links between Sexuality, Attachment and Online Dating Apps

Findings from research involving attachment and health outcomes largely demonstrate secure attachment to be associated with positive health outcomes, while the reverse has been found for insecure attachment (Meyer, 2003; Ravitz et al., 2010; see also Ainsworth et al., 1978; Bowlby, 1969/82, 1973, 1980). However, most research exploring adult attachment both fails to report sexual orientation, and contains majority white, heterosexual adult samples (Magai et al., 2001; Thorne et al., 2021). This constrains our understanding of the role attachment plays among sexual minority groups who are known to experience additional stressors which are likely to influence both the ability to feel secure in relationships and impact health outcomes (Cook & Calebs, 2016). To conceptualise this relationship in boys and men, Cook and Calebs (2016) proposed the Integrated Attachment and Sexual Minority Stress Model (IASMS) (Figure 2).

Although there is some debate over whether attachment remains stable across the lifespan, both theoretical and, more recently, empirical evidence suggests that while there is an element of malleability from childhood to early adulthood and onwards, attachment remains relatively stable (Fraley, 2002; Fraley & Roisman, 2019; Sroufe et al., 1990), which aligns with Bowlby's (1969/1982; p. 208) statement that attachment is important "from the cradle to grave".

The IASMS Model describes this association between childhood attachment and adult attachment in pathway "a". However, as mentioned, relatively little research has been conducted on the role of attachment amongst non-white, sexual minority populations, and as such, understanding whether there is stability from childhood to adulthood among sexual minorities is not as well studied. It has been suggested that certain forms of distal minority stressors, such as discrimination and rejection by parents or loved ones, when exceeding what an attachment



**Figure 2.**

**The Integrated Attachment and Sexual Minority Stress Model (IASMS) (Cook & Calebs, 2016)**

system can tolerate, contributes to variation in an individual’s attachment style (Cook et al., 2016). This overexertion, depending on whether support is received from a reliable attachment figure at the time, may either result in the individual developing an even more secure attachment style, or if the support is not received, result in the individual experiencing greater attachment insecurity (Cook et al., 2016; Keating & Muller, 2020).

Pathway “b” reflects the reciprocal link between the development of an individual’s relationship to their sexual identity, and any other minoritised identities such as race and gender, in sexual minority men and boys and the nature of their attachment patterns. The acceptance or rejection of an individual’s sexual identity by an attachment figure will likely have an impact on this relationship, possibly overburdening the individual’s attachment system, and similarly resulting in either a more or less secure experience. However, Elizur and Mintzer (2003) also proposed that a secure attachment can facilitate the formation of a sexual identity narrative that is independent of cultural or societal norms, while an insecure attachment impedes an individual’s

ability to explore alternative sexual identities, possibly due to both the real and imagined expectations of traumatic experiences, loss of social status, and heterosexism.

Pathways “c” and “d” map the processes as outlined in the Minority Stress Model (Meyer, 2003) by which sexual minority individuals are marginalised via proximal and distal stressors, resulting in poorer health and health behaviours. However, the IASMS Model broadens the health outcomes from purely mental health, as identified in the Minority Stress Model, to both mental and physical health in line with more recent research (e.g. Denton, 2012).

Pathway “e” indicates the reciprocal moderating impact of attachment and minority stress. Research has shown that discrimination towards sexual minorities individuals who have experienced trauma can result in the development of greater attachment insecurity (Keating & Muller, 2020). In addition, the association between attachment anxiety and depression in gay men has been demonstrated to be partially mediated by discrimination (Zakalik & Wei, 2006). This suggests that anxiously attached individuals are more sensitive to sexual orientation-based discrimination than securely attached individuals, which over time may shape the individual’s attachment to experience greater insecurity. Similarly, a securely attached sexual minority individual, after repeated exposure to proximal stressors and without a sufficient attachment figure, may begin to experience more attachment insecurity. However, the reverse is also true in that a secure attachment has been demonstrated to function as a buffer against minority stressors through the development of adaptive emotion regulation and stress coping strategies (Mikulincer et al., 2003).

Pathway “f” distinctly distinguishes the effects of adult attachment on sexual minorities’ health and health behaviours, from the health and health behaviours on the general (i.e. assumed heterosexual) population (i.e. pathway “g”). While again, there is little research on the

relationship between attachment and health/health behaviours in sexual minorities (Cook & Calebs, 2016). However, more broadly, insecure attachment has been associated with poor sleep and general ill health (Maunder et al., 2011). Anxious attachment has been associated with strokes, heart attacks, high blood pressure and cardiovascular dysfunction and avoidant attachments have been linked with chronic pains and headaches (McWilliams & Bailey, 2010).

Particularly relevant findings in conceptualising the relationship between attachment, online dating app use and sexuality, have been the associations found between attachment and engaging in behaviours associated with risk to health, or rather coping mechanisms that are unhelpful in the long-term (pathways “f” and “g” in the IASMS Model). In the general population, several findings have demonstrated that alcohol and/or drugs are used more by insecurely attached individuals when compared to those with a more secure attachment, both recreationally and for as a method of coping with daily and event-based stressors (Borhani, 2013; Caspers et al., 2005; McNally et al., 2003). Similarly, insecure attachment has been linked with increased risk behaviours in relation to sex. Insecurely attached, sexual minority men have been found to be more likely to engage in and expect more positive outcomes from sex after using drugs [e.g. sexualised drug use (SDU) and chemsex] (Starks et al., 2015). Additionally, gay men high in avoidant attachment are thought to be more likely to engage in condomless casual sex than securely attached gay men (Shenkman et al., 2021). Again, these findings and the general theme of the research in this field involving understanding the attachment, health-related behaviours link in sexual minorities largely only occurs when exploring problems that perpetuate a risk narrative (Pingel et al., 2013).

Sexual minority focused research seems to oftentimes only occur when relating to issues that are thought to be inherently related to sexual minorities, such as prevention and control of

sexually transmitted infections (Savin-Williams, 2001; Vaughan et al., 2014). This leaves our understanding of differences between heterosexual and sexual minority groups woefully lacking in many other areas that are not directly related to ‘risky sex’ and substance misuse (Pienaar, 2018; Schroeder et al., 2022; Smith, 2022). Therefore, research exploring factors, such as sexual minority status, that impact the relationship between adult attachment and behaviours associated with risk to health, that are not related to ‘risky sex’ or substance misuse, such as online dating app use is essential. Research filling this gap in the literature, will support mental health clinicians to be able to accurately understand, mentalise and support their clients, particularly those from sexually minoritised backgrounds.

## Conclusion

This introduction has explored a definition of sexuality that includes one possible understanding of how sexuality is developed and the role of minority stress. Relevant literature within the field of adult attachment has been examined alongside a consideration of the research relating to online dating apps. A relationship has been established between each of these three concepts and between each of these concepts independently with health outcomes.

Research has demonstrated there is a relationship between an individual’s attachment and the extent to which they use online dating apps, with avoidantly attached individuals using dating apps less and anxiously attached individuals tending to use dating apps more (Chin et al., 2019). Attachment and sexuality have been shown to have a reciprocal relationship with securely attached individuals thought to be more open to experiences due to the safety their attachment figures provide, allowing them to explore alternative sexual identities. However, the

environmental and system response to an individual's alternative sexual identity can in turn shape their attachment systems (Cook et al., 2016; Keating & Muller, 2020). Meaningful connection and community have long been known to be important protective factors to any form of minority, though sexual minorities are thought to have been early adopters of the internet in pursuit of community (Baumeister & Leary, 2017; Grov et al., 2014). As such sexual minorities are known to be more frequent users of online dating apps than heterosexuals (Anderson et al., 2020). The internet and online dating apps offer a way for minoritised individuals to overcome barriers to connection, socially, romantically and sexually (Potârca et al., 2015). Each of these relationships have been established and researched to varying degrees.

The Integrated Attachment and Sexual Minority Stress Model (IASMS) could offer a general understanding of how these concepts could be related in gay men (Cook & Calebs, 2016). However, this model only links attachment and sexual minority status with health outcomes and health-related behaviours, rather than specifically with online dating app use. Research relating to health outcomes and health-related behaviours in relation to sexual minorities tends to have a problem focused lens concentrating primarily on risky sex and/or substance misuse (Savin-Williams, 2001; Vaughan et al., 2014). Unfortunately, this seems to have had a secondary effect of perpetuating a narrative that sexual minority lives, and in particular, the lives of men who have sex with men, are more dangerous and inherently risky than those of heterosexuals (Pingel et al., 2013). Despite this narrative, it seems that although there are associations that indicate sexual minorities often live lives that are significantly impacted by additional and unnecessary stressors that can be difficult to cope with, these are not inherently linked with sexuality but rather are a consequence of heterosexism.

Research involving attachment rarely reports sexuality and as a result there is currently very little research exploring the role of sexual minority status on the relationship between adult attachment and online dating app use. However, continuing to conduct research solely on risky sex and/or substance misuse perpetuates an unhelpful narrative. This threatens the safety of sexual minority individuals by setting up biases and expectations, both in others and in sexual minorities themselves, that can create a sense of hopelessness and dread (Pingel et al., 2013). Further research outside of the risky sex and substance misuse scope, may go some way towards developing an understanding of the different experiences that contribute to some of the perhaps more unhelpful coping mechanisms adopted by sexual minorities. Therefore, research that specifically elaborates on alternative factors that contribute to health outcomes in both sexual minority and heterosexual individuals may contest some of the ‘othering’ that is experienced by sexual minorities. In this context, research involving online dating app use, which is currently thought to be the most common way for both sexual minority and heterosexual romantic and sexual partners to meet, is a helpful field to explore.

Being better able to understand how these concepts interrelate may support mental health clinicians to empathise, engage and support sexually minoritised individuals. This would hopefully go some way towards reducing the minority stress experienced by these individuals and therefore improve health outcomes for both their mental and physical wellbeing. The findings from this introduction provide and support a rationale for additional research aimed at understanding how sexual minority status interacts with the relationship between attachment and online dating app use. In summary, this introduction has outlined in detail the rationale for an empirical study that would have three aims. The first to establish a replication of previous findings that anxious attachment is positively associated with increased dating app use and

avoidant attachment, negatively. Second, to explore the role, and any moderation effects, of sexual minority status on these relationships. Finally, the empirical study will determine whether these findings persist, or are altered, after controlling for relevant demographic characteristics.

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## **Part Two: Empirical Paper**

**Swiping, Stress, and Security: Attachment and Sexuality in Digital Dating**

## Abstract

The use of online dating apps has been linked to poorer health outcomes, with anxious attachment associated with increased app use and avoidant attachment with reduced use. Sexual minority status, as explained by the Minority Stress Model, is also correlated with adverse health outcomes, yet little research has explored how these factors intersect in online dating contexts. This study aimed to examine whether sexual minority status moderates the relationships between attachment styles and dating app use. A cross-sectional, anonymous online survey resulted in a sample of 470 adult English-speaking participants (65.53% sexual minority). Regression analyses revealed a small but significant negative association between anxious attachment and dating app use, while avoidant attachment and sexual minority status were not significantly related to app use. Contrary to expectations, sexual minority status did not moderate these associations. In conclusion, anxious attachment may reduce dating app use, and sexual minority status does not appear to influence the relationship between attachment and dating app engagement.

### Key Words:

Digital Health; Anxious Attachment; Avoidant Attachment; Attachment Theory, Sexual Minority, LGBT, Sexual Orientation, Minority Stress Model

## 1. Introduction

Discrepancies in health outcomes between heterosexual and sexual minority (i.e. non-heterosexual) individuals have been well established (Bränström, 2017; Burgard et al., 2005; Grant et al., 2014; Meads et al., 2019; Meyer, 2003; Newcomb et al., 2012). This research, which largely involves Western, Educated, Industrialised, Rich and Democratic (WEIRD) (Henrich et al., 2010) populations, demonstrates more barriers to healthcare access, less service uptake and worse health outcomes among sexual minorities. Both physical and mental health are thought to be directly, negatively impacted, and indirectly through health-risk associated behaviours, such as substance misuse and compulsive behaviours.

The Minority Stress Model (Meyer, 2003) describes the relationship between social circumstances, stress, and mental health outcomes. The model states that sexual minorities not only experience the *general stressors* of day-to-day life experience by all, but additional stressors related to their minoritised sexual orientation, as well as intersectional oppression from any additional minoritised identities, such as ethnicity and gender. The prejudicial events that result from discrimination, social inequality, stigma and violence, are called *distal stressors*. Sexual minorities also form an individual, internal minority identity (e.g. gay, bisexual, lesbian, queer, etc.) to which everyone will relate to differently. However, as a result of minoritisation, this identity is often associated with expectations of anticipated stigma, need for concealment, perceived public stigma, and rejection (Liu et al., 2023). These internalised additional difficulties are called *proximal stressors*.

The model posits that, contradictory to the problem-saturated narrative often espoused (An & Batra, 2022), there is nothing inherently detrimental within a sexual minority identity but

instead it is the combination of general, distal and proximal stressors, moderated by the individual's social support and ability to cope, that impacts mental health outcomes, either negatively or positively (Meyer, 2003). The prominence, valence and integration of the individual's minority identity moderate specifically the proximal stressor and mental health outcome relationship. The prominence of an individual's sexual minority identity moderates the relationship dependent on interactions with other parts of the individual's identity and community. If the individual exists within a community that values their identity, a prominent identity is beneficial to wellbeing, while the opposite seems to be true if their community responds poorly in which case a less prominent identity may be more helpful (Meyer, 2003). Valence refers to the individual's ability to self-evaluate this part of their being. Shame, guilt, and internalised homophobia exacerbate the proximal stressors' negative impact on wellbeing, while positively relating to the identity is associated with more beneficial outcomes (Meyer, 2003). Similarly, if the individual is able to integrate the minority identity within their other identities as a whole, the recognition that this identity is merely a facet of themselves positively moderates the stress and mental health outcome relationship (Eliason, 1996; Meyer, 2003).

Many factors are thought to contribute to an individual's ability to relate positively to their minoritised identity including engagement with other sexual minorities, sharing of the individual's minoritised identity with significant heterosexuals, and experiencing positive reception from important figures (Elizur & Mintzer, 2001). Further, adult attachment has been associated with sexual minority individual's ability to tolerate heterosexism (Mohr, 2016), the oppressive power structure that facilitates social inequality (Jun, 2024), impacting the prominence, valence and integration and an individual's identity. Securely attached individuals

are better able to cope with the associated anger and fear than avoidantly attached individuals (Mohr, 2016).

Attachment theory was initially developed to explain the emotional connection between an infant and their primary caregiver, as well as how infants react when separated from that caregiver (Bowlby, 1969). Later, psychologists expanded the theory to explore similarities between a child's attachment to their caregiver and their later relationships with romantic partners (Hazan & Shaver, 1987). Attachment is currently understood through two main dimensions: anxiety and avoidance. Individuals with high anxious attachment crave physical intimacy but worry about being abandoned, while those with high avoidant attachment often feel uncomfortable with both physical and emotional closeness in relationships. Those understood to be low in both avoidant and anxious attachment are referred to as securely attached (Bartholomew & Horowitz, 1991; Brennan et al., 1998; Simpson, 1990).

The development of a positive relationship with the minority identity is associated with enhanced interpersonal relationships, resilience, increased empathy, and connection to community (Riggle et al., 2011; Scales Rostosky et al., 2010). These experiences can act as a protective factor against poor mental health outcomes, and social connection and community are thought to be particularly important (Baumeister & Leary, 2017; Dickinson & Adams, 2014; Lambe et al., 2017).

Sexual minority communities were early adopters of the internet to explore sexuality and connection (Groves et al., 2014). The internet offers the convenience of a space where sexual orientation is pre-established, minimising exposure to discrimination, and improving accessibility to community for those that live in remote or rural areas, or those wishing to preserve anonymity (Castañeda, 2015; Dodge, 2014; Taylor et al., 2017; White Hughto et al.,

2017). Online platforms such as social media can support individuals to find accepting and meaningful connections, which can positively impact mental health and wellbeing (Clark et al., 2018). However, the converse has also been shown in that automatic and habitual social media use, can lead to feelings of isolation or social comparison, linked to reduced satisfaction of our core needs for acceptance and belonging, negatively impacting wellbeing (Clark et al., 2018; Tibber & Silver, 2022).

Online dating applications are one type of online platform that sexual minorities use more than heterosexual users (Anderson et al., 2020), possibly due to the perceived sense of safety from distal stressors that might be experienced from pursuing relationships in-person (Pingel et al., 2013). While this may be the case, online dating apps are not free from similarly harmful impacts on wellbeing and mental health as those found in social media use. In dating apps for men who has sex with men (MSM), several qualitative studies identified that excessive use was associated with feelings of loneliness, dissatisfaction and a felt sense of disconnectedness from community (Brubaker et al., 2016; Jaspal, 2017; Yeo & Fung, 2018). However, due to the cross-sectional nature of the studies, no causal links could be definitively stated. This association between increased online dating app use and poorer mental health appears to be moderated by user characteristics such as sexual orientation, intentions and frequency of use (Zervoulis et al., 2020). Zervoulis and colleagues' (2020) quantitative, cross-sectional study found a similar negative relationship between increased dating app use and mental health. Though, they also found that when the intention of dating app use was purely sex-seeking, the negative impact on mental health was diminished. Further, users that were looking to make friends, date, kill time or connect with the gay community had this negative relationship amplified. This resulted in low-(dating app)-use, sex-seeking users seeming to be associated with higher self-esteem and life

satisfaction and high-use users seeking relationships seemingly experiencing lower self-esteem and less life satisfaction (Zervoulis et al., 2020).

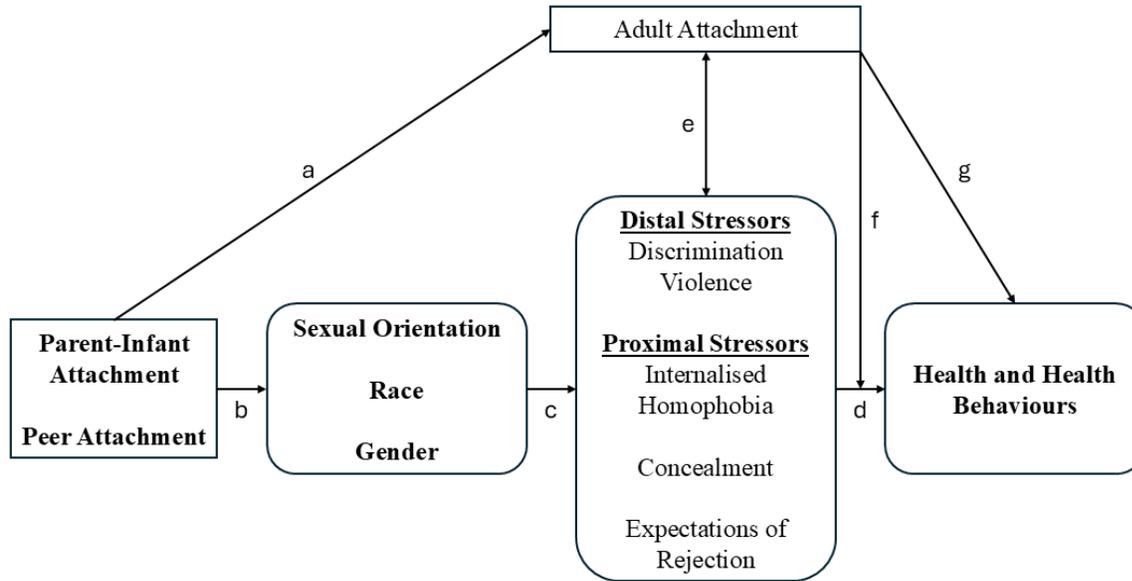
Zervoulis and colleagues (2020) did not explicitly explore why the MSM involved in their study chose to use dating apps over other methods to look for sex, make friends, date, or kill time but instead offered hypotheses based on previous research which suggested that dating apps offer both anonymity and safety from discrimination (DeLonga et al., 2011; Rosser et al., 2011). While using dating apps for their anonymity and safety from discrimination is characteristic of sexual minorities, excessive online dating app use is found across both heterosexual and minority orientations suggesting that various factors influence dating app use (Bonilla-Zorita et al., 2021; Chin et al., 2019; Thomas et al., 2023). One factor that has been identified is adult attachment (Chin et al., 2019; Coffey et al., 2022; RoCHAT et al., 2019; Topino et al., 2025).

Several studies have explored attachment and dating app use among the general population, though this study is unaware of any research to date with a specific focus on the role of sexual minority status (Chin et al., 2019; Coffey et al., 2022; RoCHAT et al., 2019; Topino et al., 2025). Anxious attachment has been shown to be positively associated with dating app use, while avoidant attachment has been found to be either negatively or non-significantly associated (Chin et al., 2019; Coffey et al., 2022; RoCHAT et al., 2019; Topino et al., 2025). Specifically, individuals high in anxious attachment have been found to report themselves to be hypothetically more likely to use dating apps than those low in anxious attachment; however, no significant difference was found when participants were asked if they were currently using a dating app (i.e. actual use) (Chin et al., 2019). Additionally, Chin and colleagues found (2019) those high in avoidant attachment reported themselves to be both less likely to hypothetically use a dating app

and were actively using dating apps less than those low in avoidant attachment. In another study (Rochat et al., 2019), an exploratory cluster analysis, exclusively of heterosexual, active users of the online dating app, Tinder, was conducted. It was found that those highest in anxious attachment used dating apps the most when compared with the avoidant and secure clusters. However, a fourth cluster found that those with only moderate anxious attachment actually had the lowest level of dating app use and were labelled the “regulated with low desire” cluster. This suggests that there may be moderating variables which alter the relationship between attachment and dating app use. A third study (Coffey et al., 2022), involving single, straight and bisexual participants, though orientation was not factored into the analysis, echoed these findings, in that anxious attachment was positively associated with increased dating app use; however, contrasting with Chin and colleagues (2019), no association was found between avoidant attachment and dating app use. Lastly, Topino and colleagues (2025) also found that increased problematic online dating app use was associated with anxious attachment, but did not explore avoidant attachment.

One interpretation of these findings links anxious attachment with lower self-esteem (Lee & Hankin 2009), and it has been suggested that for this group, relationships are used to fulfil a need for external validation (Evraire et al., 2014). This perhaps serves as positive social reinforcement that can perpetuate excessive use of dating apps and potentially lead to the development of addictive-like patterns of use as has been seen in other social media platforms (D’Arienzo et al. 2019). Conversely for avoidant attachment, it has been hypothesised that dating apps, designed to foster connection, activates expectations of failure in dating, or fear of possible romantic commitment and deters these individuals from engaging with dating apps (Chin et al., 2019).

Attachment is also thought to be particularly fundamental to sexual minorities as it impacts the capacity to form a positive relationship to their sexual identity (Cook & Calebs, 2016). This relationship is thought to be in some way reciprocal, as development of a secure attachment in sexual minority individuals is also thought to require positive interactions with attachment figures specific regarding their minoritised identity (Elizur & Mintzer, 2003). Further, and as stated, attachment is also associated with sexual minorities' ability to cope with heterosexism and heteronormativity, a form of distal minority stress, and insecure attachment (anxious and avoidant) has been negatively associated with this (Hanckel & Morris, 2014; Mohr, 2016). The Integrated Attachment and Sexual Minority Stress model (IASMS) (Figure 1) (Cook & Calebs, 2016), extends the Minority Stress model to describe this mutually reinforcing link between adult attachment and general, distal and proximal stressors, such that minority stress can cause the development of insecure attachment (Keating & Muller, 2020), and that anxiously attached individuals are more sensitive to minority stress (Zakalik & Wei, 2006). Additionally, secure attachment can act as a buffer against minority stressors through the development of adaptive emotion regulation and stress coping strategies (Mikulincer et al., 2003). The model also includes a moderating effect of attachment on the relationship between these stressors and health outcomes, whereby secure attachment acts as a protective factor, while anxious and avoidant attachments exacerbate negative health outcomes. Additionally, adult attachment is thought to independently impact health outcomes, potentially due to unhelpful coping strategies, such as



**Figure 1.**

**The Integrated Attachment and Sexual Minority Stress Model (IASMS) (Cook & Calebs, 2016)**

substance misuse, unprotected or otherwise ‘risky’ sex, or compulsive behaviours such as excessive internet use (Meyer, 2003).

Research has demonstrated associations between attachment, online dating app use and wellbeing in heterosexual populations. Despite knowing that sexual minorities are more vulnerable to poor health outcomes (Burgard et al., 2005; Meads et al., 2019; Meyer, 2003; Newcomb et al., 2012), very little research of this kind has involved sexual minorities. Instead, most peer-reviewed research either largely involves heterosexuals or does not report on sexuality (Thorne et al., 2021). Even among research involving largely heterosexual populations, few studies have explored attachment related differences in actual use of dating apps (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025). Therefore, this study has three aims, firstly to replicate previously established associations between adult attachment and online dating app use (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025). Secondly, the study intended to determine whether there is a moderation effect of

sexuality on this relationship. Finally, if moderating effects were found, the study aimed to determine whether these effects persisted or were altered after controlling for demographic variables. Six hypotheses were tested in total. The first three were referred to as an Anxiety Model and related to the anxious attachment to online dating app use relationship. The last three referred to an Avoidant Model relating to the avoidant attachment relationship with online dating app use.

#### Hypotheses:

H1: Higher self-reported anxious attachment traits will be significantly associated with more time spent using online dating apps.

H2: Sexual minority status will have a significant enhancing moderation effect on the positive relationship between anxious attachment traits and time spent using online dating apps, i.e. anxious attachment will have a stronger positive relationship with dating app use among sexual minority participants than heterosexual participants.

H3: The relationship between anxious attachment and online dating app use will persist after controlling for demographic covariates.

H4: Higher self-reported avoidant attachment traits will be significantly associated with decreased time spent using online dating apps.

H5: Sexual minority status will have a significant diminishing moderation effect on the negative relationship between avoidant attachment traits and time spent using online dating apps, i.e. avoidant attachment will have a weaker negative relationship with dating app use among sexual minority participants than heterosexual participants.

H6: The relationship between avoidant attachment and online dating app use will persist after controlling for demographic covariates

H1 & H4

Anxious attachment has been associated with increased online dating app use and, despite mixed findings, avoidant with decreased use (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025). These findings have been understood in an attachment framework. Anxiously attached people have been associated with a lower sense of self-esteem (Lee & Hankin 2009) and are thought to have a heightened need for emotional and social closeness (Mikulincer et al., 2014). It seems this group may be prone to using dating apps to seek connection and for a sense of external validation (Evraire et al., 2014). Unfortunately, increased dating app use is actually associated with feelings of loneliness and dissatisfaction (Brubaker et al., 2016; Jaspal, 2017; Yeo & Fung, 2018). This can then establish an unhelpful, positive feedback loop. Tibber and Silver (2022) identified that when gratification sought through social media use does not align with gratification obtained, feelings of acceptance and belonging are reduced. In turn, this can amplify the user's drive to connect and use social media, which in this scenario, is a dating app.

Avoidant attachment has been associated with beliefs relating to dating failures, negative views of commitment, and favouring emotional distance (Bartholomew, 1990; Birnie et al., 2009; Campbell et al., 2005). These individuals are known to share less about themselves and send text messages less frequently (Drouin & Landgraff, 2012). It is therefore understandable that platforms designed to foster connection used significantly less among this population compared with individuals low in avoidant attachment (Chin et al., 2019).

## H2 & H5

Sexual minority individuals often face structural and social barriers to in-person dating, including limited access to potential partners, especially in rural or conservative regions (Pingel et al., 2013). Moreover, experiences of stigma, discrimination, and rejection in offline social spaces may reduce the safety and accessibility of traditional dating environments (Castañeda, 2015; Dodge, 2014; Taylor et al., 2017; White Hughto et al., 2017). In contrast, online dating platforms offer a space where sexual identity is pre-disclosed and social norms may be more inclusive, reducing the likelihood of prejudice. These features contribute to a higher uptake of dating apps among sexual minority individuals, who are approximately twice as likely as heterosexual individuals to use such platforms (Anderson et al., 2020).

In addition, there is growing evidence that mental health difficulties are associated with increased dating app use (Brubaker et al., 2016; Jaspal, 2017; Yeo & Fung, 2018; Zervoulis et al., 2020). Among sexual minority populations, dating apps may serve as a coping mechanism to reduce loneliness and seek social or emotional connection (Pingel et al., 2013). However, the findings that extensive app use can exacerbate feelings of isolation and dissatisfaction, suggest that a maladaptive positive feedback loop when dating apps are used as a coping mechanism to remedy these feelings. This feedback loop may replicate the one that has been identified in social media use (Tibber & Silver, 2022). Given that sexual minority individuals are disproportionately affected by poorer mental health due to minority stress, they may be particularly susceptible to such cycles.

In light of these considerations, this study predicts that sexual minority status may moderate the association between adult attachment and dating app use. For individuals with higher levels of anxious attachment, characterised by heightened sensitivity to rejection and a

strong desire for closeness (Evraine et al., 2014; Lee & Hankin 2009; Mikulincer et al., 2014), dating apps may offer a particularly compelling means of obtaining reassurance and connection. Among sexual minority users, who may experience additional social or emotional stressors, the appeal of these platforms may be even stronger. Therefore, it is hypothesised that sexual minority status will enhance the positive association between anxious attachment and time spent using online dating applications. In other words, anxious attachment is expected to have a stronger positive relationship with dating app use among sexual minority participants compared to heterosexual participants.

Conversely, individuals with higher levels of avoidant attachment, typically marked by discomfort with closeness and emotional intimacy (Bartholomew, 1990; Birnie et al., 2009; Campbell et al., 2005), may be less inclined to use dating apps frequently or meaningfully. However, for sexual minority individuals, the structural and psychological advantages of online platforms (e.g., pre-disclosure of identity, reduced fear of rejection) may reduce the relevance of avoidant tendencies. As such, it is hypothesised that sexual minority status will offset the negative association between avoidant attachment and dating app use. That is, the inverse relationship between avoidant attachment and app use is expected to be weaker among sexual minority participants than among their heterosexual counterparts.

### H3 & H6

A systematic review of 70 studies (Castro & Barrada, 2020), evaluating the characteristics of dating app users found that age (e.g. LeFebvre, 2018), sex (e.g. Sumter & Vandenbosch, 2019), sexual orientation (e.g. Castro et al., 2020), relationship status (e.g. Timmermans et al., 2018), geographical context (Urban/Rural) (e.g. Lauckner, 2019) are all

thought to have a role in the frequency dating apps are used. Additionally, white populations have been shown to use dating apps more than black or other ethnicities (e.g. Ha et al., 2024) and transgender populations have described similar experiences to sexual minorities (Sharabi et al., 2023) suggesting that any variance explained by this model may actually be attributed to any of these variables instead. Therefore, to test the robustness of the model, it is important to take into account these covariates before it can be said with any confidence that it is sexual minority status that is moderating the relationship between attachment and dating app use.

## 2. Method

Please note there has been a deviation from this study's preregistration. Hypotheses H3 and H6 were previously stated in terms of 'persistence of effects between models'. However, 'persistence of the relationship between variables' more accurately reflects the aims of the research question and therefore the hypotheses have been updated above in line with this.

### 2.1 Participants and Data Collection

The study employed a cross-sectional, questionnaire design (Information sheet, Consent Form and Questionnaire included in Appendix 1). Participants were recruited through posters (Appendix 2) distributed via university email mailing lists, social media posts (e.g. Facebook, WhatsApp, Instagram, and LinkedIn), and third sector organisations (e.g. London LGBT Research Showcase). Inclusion criteria required participants to be English speaking, 18+ years old, have a smartphone, and to know what an online dating app was. Ethical approval (Appendix 3) was obtained from the UCL ethics committee (Approval No. 26999/001), and all data was anonymous from the point of collection. Information sheets, consent forms and study measures /

questionnaires were all presented on Qualtrics, an online survey platform. Participants were eligible to be included in a prize draw of ten £20 vouchers for participation. The study was pre-registered with Open Science Framework and can be viewed here, <https://osf.io/jw29k>. This was a joint project with Amber Korde, Trainee Clinical Psychologist. Korde (2025) evaluated the role of sexual orientation on the relationship between muscle dysmorphia and online dating app use (see Appendix A for a detailed summary of researcher involvement).

## 2.2 Study Measures

Data were collected in conjunction with another study, with some of the variables gathered not being intended for use in this study (i.e. the Muscle Dysmorphic Disorder Inventory, the Adult Rejection Sensitivity Questionnaire, and some demographic and online dating app use questions, which are highlighted later). Data gathered included the Adult Attachment Questionnaire (Simpson, 1990; Simpson et al., 1996), sexual minority status, age, gender, gender identity (in relation to transgender/cisgender identity), ethnicity, relationship status, geographical context (urban/rural), online dating app use (operationalised as weekly time spent using online dating apps), rejection sensitivity, muscle dysmorphia and partial postcodes.

### 2.2.1 Adult Attachment Questionnaire (AAQ)

The Adult Attachment Questionnaire (AAQ) (Simpson, 1990; Simpson et al., 1996) was used to assess two domains of individuals' attachment: attachment anxiety and attachment avoidance. The AAQ was selected for use based on a review of 29 attachment instruments (Ravitz et al., 2010), which found that the AAQ has strong psychometric properties, and is high in both reliability and validity. In addition, the AAQ has a short completion and scoring time

and yields dimensional attachment anxiety and avoidance scores. It is a well validated, 17-item self-report measure that asks individuals to score how they relate to romantic partners.

Participants are asked to rate how much they agree with sentences associated with either avoidant (e.g. “I am not very comfortable having to depend on other people.”, and “I do not like people getting too close to me.”), or anxious attachment domains (e.g. “Others often are reluctant to get as close as I would like.”, and “I often worry that my partner(s) do not really love me.”).

The rating consists of a seven-point Likert-type scale (one = “strongly disagree” to seven = “strongly agree”). Several items are reverse scored to reduce response bias. Each of the scores relating to avoidant attachment on the Likert items (i.e. a score of between one – seven) was added together, and similarly the scores for anxious attachment were added together, ensuring reverse coded items were accounted for. This created composite scores (treated as continuous variables) for avoidance and anxiety. Avoidant attachment related to eight items and had a minimum score of eight and a maximum score of 56. Anxious attachment related to nine items and had a minimum score of nine, maximum score of 63. Higher scores indicated greater avoidance/anxiety attachment, while lower scores indicated greater secure attachment.

### 2.2.2 Online Dating App Use

Online dating app use was operationalised as weekly time (mins) spent using online dating apps (TDA) and therefore when dating app use is referred to in this study, unless otherwise stated, this is the measure being used. As this is not a construct the questions were not validated but rather were selected based on previous research (Blake et al., 2022; Sumter et al., 2017). The study asked whether dating apps have ever been used (and if applicable, why not [for alternative study]), which dating apps have been used (for alternative study), motivations for

dating app use (for alternative study), logins per week, profile views per week, chats per week, meet ups per month, and TDA. For the TDA variable, participants were asked to provide the number of minutes spent using online dating apps as recorded by Screen Time (Apple/iOS smartphone users) or by the Digital Wellbeing Report (Android/Google smartphone users); if participants were unable to provide this, their best estimate was requested. Participants were asked to state whether this data was as recorded by their smartphone or a best estimate.

### 2.2.3 Demographic Variables

Participants were asked to select *lesbian, gay, bisexual, asexual, straight / heterosexual*, or *other* with a text box for self-identification, to identify their sexual orientation. *Age* was asked to be given as an integer. The gender variable gave options for participants to identify as *male, female, non-binary/third gender, other* with a text box for self-identification, or *prefer not to say*. Gender identity (in relation to transgender/cisgender identity) variable gave options for participants to identify as *transgender, cisgender, non-binary, or prefer not to say*. Individual's ethnicities were asked in categories as defined by the British Government's Race Equality Unit (formerly the Race Disparity Unit) (2021), this included *Pakistani, Bangladeshi, Chinese, any other Asian background, Caribbean, African, any other Black, Black British or Caribbean background, White and Black Caribbean, White and Asian, Any other Mixed or multiple ethnic background, Roma, Latino, Arab, and Any other ethnic group, English, Welsh, Scottish, Northern Irish, Irish, Gypsy or Irish Traveller, Roma, and Any other White background*. Participants' relationship status was recorded as *single - not looking, single - looking for hook ups, single - casually dating, single - looking for a relationship, in a relationship - exclusive, in a relationship - open, engaged – exclusive, engaged – open, married – exclusive, married – open*. The

geographical context of the participants was defined as either *urban* or *rural*. Finally, partial postcodes (i.e. the first four digits) were gathered for used in an alternative study.

### 3. Analyses

#### 3.1 Univariate regression analyses

Separate univariate ordinary least squares regressions (Regressions 1 and 4), were run to assess zero-order associations between TDA (outcome variable) and anxious and avoidant attachment (predictor variables), testing H1 and H4 respectively. Homoscedasticity and linearity were assessed by plotting residuals against predicted residual scores, and normality of residuals was assessed using histograms of residual's distribution and the Shapiro-Wilks test. To adjust for violations to the assumptions of linearity and homoscedasticity, a natural log transformation was applied to the TDA outcome variable,  $\log(\text{TDA})$ . The  $\log(\text{TDA})$  outcome variable was used in each of the regressions 1-6. Assumption checks were subsequently only reported if a violation was found.

#### 3.2 Multivariate regression analyses

Multivariate linear regression analyses (Regressions 2 and 5) were run to test hypotheses H2 and H5. These regressions used the transformed variable  $\log(\text{TDA})$  due to the previously found violations. The first multivariate regression, Regression 2 testing H2, explored the associations between  $\log(\text{TDA})$ , anxious attachment, sexual minority status, and their interaction. The second, Regression 5 testing H5, explored the associations between  $\log(\text{TDA})$ , avoidant attachment, and

sexual minority status, as well as the interaction effect between avoidant attachment and sexual minority status on log(TDA).

Assumptions were checked using a histogram of the residuals and the Shapiro–Wilk test to assess normality of residuals, a scatter plot of residuals vs predicted values assessed linearity and homoscedasticity, multicollinearity was assessed via a correlation matrix, and independence of errors was assessed by eye-balling plots of residuals against independent variables.

### 3.3 Forward stepwise regressions with covariates

Hypotheses H3 and H6 were tested with multivariate regressions (Regressions 3 and 6). These regressions aimed to establish whether the relationships between anxious and avoidant attachment, sexual minority status, and online dating app use persisted or were altered after the inclusion of demographic covariates (i.e. age, ethnicity, gender, gender identity, relationship status, and geographical context). Fit parameters (AIC values) were determined for each of the covariates and only variables that were a significant fit were put forward to be included in the forward stepwise regression. This resulted in gender, relationship seeking, and age being assessed. Variables with the lowest AIC values were added first, and Likelihood Ratio tests (LRT) were used to evaluate each additional covariate's fit in the final model. Covariates were only retained if they significantly increased the percentage of variance explained (LRT) ( $p < 0.05$ ).

All analyses were undertaken in Stata (version 17; StataCorp LLC., Texas, USA). All variables were defined as continuous except the following: sexual minority status (categorical, with sexual minority defined as the baseline category), gender (categorical, with male defined as the baseline category, and two additional levels, female and other genders), gender identity

(categorical, with cisgender defined as the baseline category), ethnicity (categorical, with white defined as the baseline category), relationship seeking (categorical, with relationship seeking defined as the baseline category, and geographical context (categorical, with urban defined as the baseline category).

### 3.4 Power Calculation & Minimum Sample Size

Aguinis and colleagues (2005) evaluated a moderating multivariate regression analysis where the moderating variable had two categories, as in this study with sexual minority status. They determined that were each subgroup (i.e. heterosexual and sexual minority participants) to have sample sizes of 158, the power would be .80 to detect a small effect size of Cohen's  $f^2 = .02$ . Therefore, this study intended to recruit a minimum sample of 316 participants, with at least 158 participants in each subgroup.

### 3.5 Data Transformations

Several variables required transformation in order to meet the minimum recommended cell number for statistical analysis,  $n \geq 25$  (Jenkins & Quintana-Ascencio, 2020). Due to the number of participants that identified their *gender* as non-binary/third gender, 'other', or 'preferred not to say', these participants were grouped together for analysis purposes and analyses were run with gender at three levels, *male*, *female*, and *any other gender*. Gender identity faced a similarly low number of participants in the *transgender* and *prefer not to say* categories, therefore these participants were also grouped together with the *non-binary participants* for analysis, resulting in a gender identity variable with two levels, *cisgender* and *any other gender identity*. Ethnicity was the third variable that needed to be collapsed down in

order to run reliable statistical analysis. Several ethnicities were not well enough represented in this study for meaningful analysis, including *Pakistani, Bangladeshi, Chinese, any other Asian background, Caribbean, African, any other Black, Black British or Caribbean background, White and Black Caribbean, White and Asian, Any other Mixed or multiple ethnic background, Roma, Latino, Arab, and Any other ethnic group*. As with gender and gender identity, this meant ethnicity was collapsed into *white* and *any other ethnicity*. *English, Welsh, Scottish, Northern Irish, Irish, Gypsy or Irish Traveller, Roma, and Any other White background* were included in the white category as defined by the British Government's Race Equality Unit (formerly the Race Disparity Unit) (2021), with all other ethnicities being grouped into the any other ethnicity category.

*Sexual minority status* was a variable created from individual's self-reported sexual orientation. All non 'straight/heterosexual' responses were coded as sexual minority with a manual review of each response in the free text box to determine whether these would be coded as sexual minority or straight/heterosexual. Finally, participants were asked to best describe their relationship status, single - not looking, looking for casual sex, casually dating, or looking for a relationship, in a relationship – exclusive or open, engaged – exclusive or open, and married – exclusive or open. These were then coded to create a new binary variable called *relationship seeking* with four categories *single – seeking* (single - looking for casual sex, casually dating, and looking for a relationship), *single – not seeking* (single – not looking), *relationship – seeking* (relationship, engaged, and married – open), and *relationship – not seeking* (relationship, engaged, and married – exclusive).

### 3.6 Exploratory Analyses

Additional alternative measures for operationalising online dating app use were considered over TDA for potential use in future research. These variables included the weekly number of logins, profiles viewed and chats, and the monthly number of meet ups with people met through a dating app. A forward stepwise regression analysis was run to establish any associations between these variables and attachment or sexual minority status. In order to run a forward stepwise regression, data must come from the same sample and therefore a listwise deletion of the exploratory variables (weekly logins, profiles viewed, chats, and monthly meet) was conducted, with a final sample of  $N = 494$  for a complete case analysis (see Section 4.5 for details). However, given the purpose of the exploratory analyses were to assess the viability of alternative operationalisations of online dating app use, the cases that were removed from the main analyses were not necessarily removed from the sample for the exploratory analysis resulting in a different, and therefore not directly comparable, final sample size.

## 4. Results

### 4.1 Missing data

The study recruited 1,136 participants from June 2024 to March 2025. Data was discarded from 388 (34.15%) participants due to incomplete responses, 130 (11.44%) due to fraud detection, and nine (0.79%) due to not proving consent. Twenty (1.76%) participants were removed for not reporting either any weekly use or best estimate of historical usage. Two (0.18%) participants were removed for reporting an average of over nine or more hours of daily online dating app use. 67 (5.90%) participants were not considered in this study due to never

having used an online dating app. This resulted in a preliminary sample of 520 participants, representing 45.77% of the original data.

Unfortunately, in terms of gender, recruitment of non-binary / third gender ( $n = 20$ , 3.85%) and other participants ( $n = 2$ , 0.38%), even with grouping, was not large enough to meet the minimum recommended cell number for statistical analysis,  $n \geq 25$  (Jenkins & Quintana-Ascencio, 2020). Similarly, in terms of gender identity, too few transgender ( $n = 10$ , 2.01%), non-binary ( $n = 9$ , 1.81%), and participants who responded prefer not to say ( $n = 3$ , 0.60%) were recruited even after grouping ( $n = 22$ , 4.42%). Therefore, these participants ( $n = 42$ , 8.46%) were not included in the final sample. In addition, there were six (1.26%) cases where key variables had missing data (i.e. anxious attachment, avoidant attachment and TDA), where participants had responded too ambiguously to identify weekly dating app usage (i.e. “N/a” or “Haven’t used in years”), resulting in a final sample of  $N = 470$  for analysis, 41.37% of the original dataset, which was used for the main regressions (Regression 1 – 6). A different final sample was established for the exploratory analyses (described in 4.5).

#### 4.1.1 Sample characteristics and descriptive statistics of excluded participants

Demographics of the excluded participants are listed below, with percentages reported in relation to the total number of excluded participants ( $N = 666$ ). However, due to the significant missing data described above, this does not total 100%; the percentage of responses with missing data is highlighted also. Two-hundred and thirty participants identified as male (34.35%), 157 as female (23.57%), 36 as non-binary (5.41), 7 as ‘other’ (1.05%), and 1 preferred not to say (0.15%). Two-hundred and thirty-five (35.29%) excluded participants had missing gender data. Three-hundred and thirty-seven (50.60%) participants identified as cisgender, 43 (6.46%) as transgender, 37 (5.56%) as non-binary, and 12 (1.80%) preferred not to say. Two-hundred and

thirty-seven (35.59%) excluded participants had missing gender identity data. The median age was 26.5 years old (the inter-quartile range: 23-32 years). Two-hundred and thirty-eight (35.74%) excluded participants had missing age data. Two-hundred and forty-one participants identified as a sexual minority (36.19%) and 165 as heterosexual (24.78%). Two-hundred and sixty (39.04%) excluded participants had missing sexual minority status data. One-hundred and thirty-seven participants (20.57%) identified themselves as single – seeking a relationship, 64 (9.61%) identified as single – not seeking, 41 (6.16%) as in a relationship but seeking, and 174 (26.13%) as in a relationship and not seeking. Two-hundred and fifty (37.54%) excluded participants had missing relationship seeking data. Three-hundred and twenty-six (48.95%) participants lived in an urban geographical context and 53 (7.96 %) lived in a rural setting. Two-hundred and eighty-seven (43.09%) excluded participants had missing geographical context data. The ethnicities of participants can be seen in Table 1.

#### 4.2 Sample characteristics and descriptive statistics

Two-hundred and thirty-two participants of the final sample identified as male (49.36%), 238 identified as female (50.64%). The median age was 28 years old (the inter-quartile range: 24-32 years). Three-hundred and eight participants identified as a sexual minority (65.53%) and 162 as heterosexual (34.47%). One-hundred and sixty-seven participants (35.35%) identified themselves as single – seeking a relationship, 44 (9.36%) identified as single – not seeking, 40 (8.51%) as in a relationship but seeking, and 219 (46.60%) as in a relationship and not seeking. The individual ethnicities of participants can be seen in Table 1 and after grouping there were 375 (79.79 %) white participants, and 95 (20.21%) non-white participants for analysis. Four-

hundred and four (85.96%) participants live in an urban geographical context and 66 (14.04 %) lived in a rural setting.

Descriptive statistics for the key study variables (anxious attachment, avoidant attachment and TDA) and exploratory variables (weekly logins, profile views, chats, and monthly meet ups) are presented in Table 2. Statistics provided include number of responses (Obs), the mean, standard deviation, skewness, kurtosis and interquartile range.

**Table 1***Participants Ethnicities*

Demographic	Included Data (N = 470)		Excluded Data (N = 666)	
	Frequency	Percent (%)	Frequency	Percent (%)
English, Welsh, Scottish, Northern Irish	273	58.09	198	29.73
Any other White background	66	14.04	52	7.81
Irish	36	7.66	23	3.45
Indian	19	4.04	22	3.30
White and Asian	12	2.55	6	0.90
Latino	12	2.55	6	0.90
Any other Asian background	11	2.34	19	2.85
Chinese	8	1.70	37	5.56
Any other Mixed or multiple ethnic background	6	1.28	8	1.20
White and Black Caribbean	6	1.28	4	0.60
African	5	1.06	12	1.80
Any other ethnic group	4	0.85	6	0.90
Pakistani	3	0.64	5	0.75
Arab	3	0.64	4	0.60
Caribbean	3	0.64	2	0.30
White and Black African	1	0.21	7	1.05
Bangladeshi	1	0.21	3	0.45
Any other Black, Black British, or Caribbean background	1	0.21	3	0.45
Roma	0	0.00	2	0.30
Gypsy or Irish Traveller	0	0.00	0	0.00
<b>Total</b>	<b>470</b>	<b>100</b>	<b>419</b>	<b>62.91</b>

**Table 2***Descriptive Statistics of continuous variables in the initial and final samples*

		Original Sample (N = 1,136)							Final Sample (Main Sample, N = 470, Exploratory Sample, N = 494)					
	Variable	Obs	Mean	SD	Skew	Kurtosis	IQR	Missing (%)	Obs	Mean	SD	Skew	Kurtosis	IQR
Main Analysis	Anxious Score	803	37.72	9.72	-0.05	2.66	31 - 45	29.31	470	37.47	10.06	-0.06	2.51	30 - 45
	Avoidant Score	803	34.17	8.56	-0.14	2.47	28 - 40	29.31	470	34.20	8.43	-0.14	2.45	28 - 40
	TDA (mins)	662	290.99	290.60	5.49	45.86	70 - 330	41.73	470	279.54	309.54	2.25	8.59	80 - 330
	Age	897	29.52	9.29	1.65	6.00	24 - 32	21.04	470	30.00	9.12	1.79	6.71	24 - 32
Exploratory Analysis	Anxious Score	803	37.72	9.72	-0.05	2.66	31 - 45	29.31	494	37.40	9.88	0.01	2.43	30 - 44
	Avoidant Score	803	34.17	8.56	-0.14	2.47	28 - 40	29.31	494	34.16	8.64	-0.15	2.34	28 - 41
	Age	897	29.52	9.29	1.65	6.00	24 - 32	21.04	494	29.93	9.30	1.89	7.43	24 - 32
	Weekly Logins	641	13.30	23.19	6.81	73.30	4 - 14	43.57	494	13.19	23.20	7.40	85.43	4 - 14
	Weekly Profile Views	650	64.29	105.03	5.68	45.16	17.5 - 80	42.78	494	60.00	92.53	5.94	51.85	20 - 70
	Weekly Chats	655	6.92	15.15	12.37	218.79	2 - 6	42.34	494	6.67	16.17	13.16	225.33	2 - 5
	Monthly Meet Ups	662	2.06	3.34	6.75	77.08	1 - 2	41.73	494	1.95	3.46	7.61	88.73	0.5 - 2

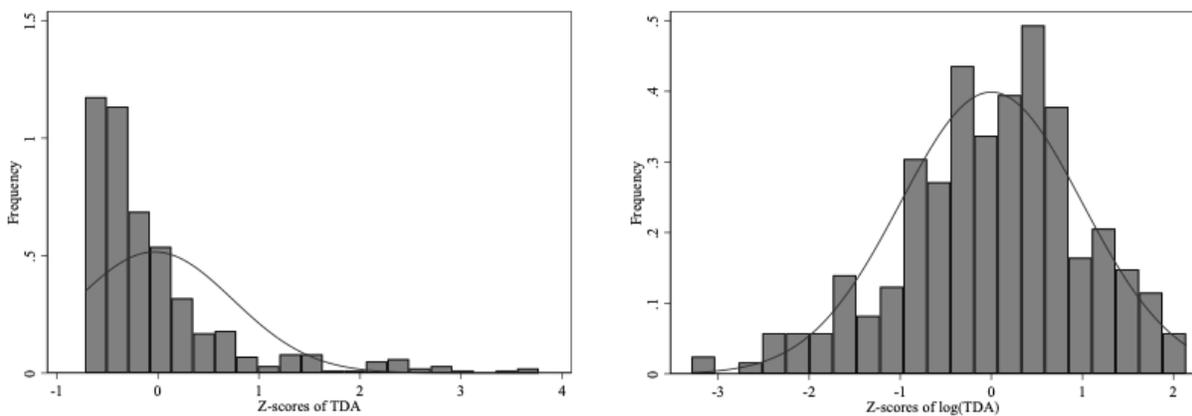
### 4.3 Anxious Attachment Analyses

#### Regression 1

To assess whether higher self-reported anxious attachment was significantly associated with more time spent using online dating apps, H1, a univariate regression analysis between anxious attachment and TDA was run. The assumption checks indicated violations to both linearity and homoscedasticity (Figure 2). A log transformation to the outcome variable, TDA, was used to resolve these violations, producing the variable  $\log(\text{TDA})$  which was used throughout the regressions 1- 6. A regression of  $\log(\text{TDA})$  against anxious attachment was then re-run. The results indicated that the model did not significantly explain the variance in  $\log(\text{TDA})$ ,  $R^2 = .00$ ,  $adjusted R^2 = 0.00$ ,  $F(1, 468) = 2.23$ ,  $p = .136$ ,  $RMSE = 1.12$ . Results of individual coefficients, all of which were also non-significant, can be seen in Table 3. H1 stated that anxious attachment would be positive associated with increased online dating app use, which was not supported by these findings.

**Figure 2**

*Distribution of TDA scores before and after log-transformation to correct for violations to assumptions of linearity and homoscedasticity.*



## Regression 2

To assess whether sexual minority status and its interaction with anxious attachment significantly improved the model, H2, a multivariate regression was run of log(TDA) against predictors anxious attachment, sexual minority status, and their interaction. The model was overall insignificant,  $R^2 = 0.01$ , *adjusted*  $R^2 = 0.01$ ,  $F(3, 466) = 2.11$ ,  $p = .127$ , RMSE = 1.12. Results of individual coefficients were non-significant and can be seen in more detail in Table 3. H2 stated that sexual minority status would have a significant enhancing moderation effect on the positive relationship between anxious attachment traits and time spent using online dating apps. This hypothesis was also not supported.

## Regression 3

To assess whether the relationship between anxious attachment, sexual minority status and online dating app use persisted or was altered after controlling for relevant demographic covariates, H3, a forward stepwise regression was undertaken. Relevant possible covariates included age, ethnicity, gender, geographical context, and relationship seeking. Only three covariates, relationship, gender, and age, were put forward for likelihood ratio testing based on Akaike Information Criterion (AIC) values. The Likelihood ratio tests (LRTs) determined that only relationship seeking ( $\chi^2 = 34.47$ ,  $p < .001$ ) and gender ( $\chi^2 = 20.38$ ,  $p < .001$ ) should be retained in the forward stepwise regression. The final regression model was log(TDA) against predictors anxious attachment, sexual minority status, their interaction, and included covariates relationship seeking, and gender. This resulted in a highly significant model that explained 12% of the variance in log(TDA),  $R^2 = 0.12$ ,  $F(7, 462) = 9.08$ ,  $p < .001$ , RMSE = 1.06. In this regression, anxious attachment was found to be highly significantly, negatively associated with

log(TDA) (standardised coefficient,  $B = -0.18$ ,  $CI = -0.03 - 0.01$ ,  $p = .002$ ). However, sexual minority status and its interaction with anxiety remained non-significant. Complete results of individual coefficients of this final model can be seen in Table 3. H3 states that the effects seen in H1 and H2 would persist after controlling for demographic covariates. As the anxious attachment coefficient became significant after controlling for relationship seeking and gender variables, the null hypothesis also must be accepted as the results from H1 and H2 were altered.

#### 4.4 Avoidant Attachment Analyses

##### Regression 4

To assess whether higher self-reported avoidant attachment was significantly associated with decreased time spent using online dating apps, H4, a univariate regression analysis between avoidant attachment and log(TDA) was run. The results indicated that the model explained no statistically significant variance in log(TDA),  $R^2 = .00$ , *adjusted*  $R^2 = 0.00$ ,  $F(1, 468) = 0.141$ ,  $p = .235$ ,  $RMSE = 1.12$ . Results of individual coefficients were non-significant and can be seen in more detail in Table 4. H4 stated that avoidant attachment would be negatively associated with increased online dating app use which was not supported.

##### Regression 5

To assess whether sexual minority status and its interaction with avoidant attachment significantly improved the model, H5, a multivariate regression was run of log(TDA) against predictors avoidant attachment, sexual minority status, and their interaction. The regression was also non-significant,  $R^2 = 0.01$ ,  $F(3, 466) = 1.63$ ,  $p = .181$ ,  $RMSE = 1.12$ . Again, results of individual coefficients were non-significant and can be seen in more detail in Table 4. H5

predicted that sexual minority status would have a significant diminishing moderation effect on the negative relationship between avoidant attachment traits and time spent using online dating apps; this was not supported.

#### Regression 6

A forward stepwise regression was undertaken to assess whether the relationship between avoidant attachment, sexual minority status and online dating app use persisted or was altered after controlling for relevant demographic covariates, H6. As with Regression 3, relevant possible covariates included age, ethnicity, gender, geographical context, and relationship seeking. However, only three covariates relationship, gender, and age, were put forward for likelihood ratio testing based on AIC fit. The Likelihood Ratio tests indicated that only relationship seeking ( $\chi^2 = 25.66, p < .001$ ) and gender ( $\chi^2 = 18.16, p < .001$ ) should be retained in the forward stepwise regression model. The final model was of log(TDA) regression on avoidant attachment, sexual minority status and their interaction, and included covariates relationship seeking, and gender. This resulted in a highly significant model that explained 10% of the variance in log(TDA),  $R^2 = 0.10, F(7, 462) = 7.21, p < .001, RMSE = 1.08$ . However, unlike in Regression 3, the avoidant attachment variable remained non-significant even after controlling for covariates (standardised coefficient,  $B = 0.00, CI = -0.01, 0.01, p = .977$ ). Sexual minority status and its interaction with avoidance also remained non-significant. Complete results of individual coefficients of this final model can be seen in Table 4. H6 hypothesised that the effects seen in H4 and H5 would persist after controlling for demographic covariates. While the model did become significant, the avoidant attachment, sexual minority status and their interaction coefficients remained non-significant and therefore the null hypothesis was accepted.

**Table 3***Showing the Anxiety Models Regression Results*

Predictor	Level	Univariate			Multivariate			Advanced Multivariate Model (with person-related covariates)		
		Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value
Anxiety score	-	-0.01(-0.02, 0.00)	-0.07(0.01)	.136	-0.01(-0.02, 0.00)	-0.09(0.01)	.120	-0.02(-0.03, -0.01)	-0.18(0.01)	.002
Sexual minority status (ref: sexual minority)	Heterosexual	-0.20(-0.41, 0.02)	-0.08(0.11)	.072	-0.50(-1.32, 0.32)	-0.21(0.42)	.233	-0.43(-1.21, 0.35)	-0.18(0.40)	.281
Anx*SMS (ref: sexual minority)	Heterosexual	-	-	-	0.01(-0.01, 0.03)	0.14(0.01)	.439	0.01(-0.01, 0.03)	0.16(0.01)	.357
Relationship Seeking (ref: s - seeking)	S n. seeking	0.09(-0.28, 0.46)	0.02(0.19)	.632	-	-	-	0.06(-0.30, 0.41)	0.02(0.18)	.748
	R seeking	0.41(0.03, 0.79)	0.10(0.19)	.034	-	-	-	0.39(0.02, 0.77)	0.10(0.19)	.041
	R n. seeking	0.55(0.32, 0.77)	0.24(0.11)	<.001	-	-	-	0.75(0.53, 0.98)	0.33(0.12)	<.001
Gender (ref: male)	Female	-0.37(-0.57, -0.17)	-0.16(0.10)	<.001	-	-	-	-0.49(-0.70, -0.28)	-0.22(0.11)	<.001
Age	-	0.01(0.00, 0.03)	0.12(0.01)	.012	-	-	-	-	-	-
Ethnicity (ref: white)	Non-white	0.17(-0.08, 0.43)	0.06(0.13)	.185	-	-	-	-	-	-
Geographical Context (ref: urban)	Rural	0.00(-0.29, 0.30)	0.00(0.15)	.993	-	-	-	-	-	-

*Note:* Anx\*SMS = The anxiety score and sexual minority status interaction, S – seeking = Single, seeking a relationship, S n. seeking = Single, not seeking a relationship, R seeking = In a relationship and seeking additional relationship(s), R n. seeking = In a relationship and not seeking.

**Table 4***Showing the Avoidance Models Regression Results*

Predictor	Level	Univariate			Multivariate			Advanced Multivariate Model (with person-related covariates)		
		Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ (95% CIs)	<i>B</i> (SE)	<i>p</i> value
Avoidance score	-	-0.01(0.00, 0.02)	0.05(0.01)	.235	0.01(-0.01, 0.02)	0.06(0.01)	.307	0.00(-0.01, 0.01)	0.00(0.01)	.977
Sexual minority status (ref: sexual minority)	Heterosexual	-0.20(-0.41, 0.02)	0.08(0.11)	.072	-0.21(-1.14, 0.69)	0.10(0.46)	.624	-0.15(-1.04, 0.72)	-0.07(0.45)	.731
Avd*SMS (ref: sexual minority)	Heterosexual	-	-	-	0.00(-0.03, 0.03)	0.01(0.01)	.956	0.00(-0.02, 0.03)	0.02(0.01)	.907
Relationship Seeking (ref: s - seeking)	S n. seeking	0.09(-0.28, 0.46)	0.02(0.19)	.632	-	-	-	0.07(-0.29, 0.43)	0.02(0.18)	.698
	R seeking	0.41(0.03, 0.79)	0.10(0.19)	.034	-	-	-	0.29(0.09, 0.67)	0.07(0.19)	.137
	R n. seeking	0.55(0.32, 0.77)	0.24(0.11)	<.001	-	-	-	0.65(0.43, 0.88)	0.29(0.12)	<.001
Gender (ref: male)	Female	-0.37(-0.57, -0.17)	0.16(0.10)	<.001	-	-	-	-0.46(-0.68, -0.25)	-0.21(0.11)	<.001
Age	-	0.01(0.00, 0.03)	0.12(0.01)	.012	-	-	-	-	-	-
Ethnicity (ref: white)	Non-white	0.17(-0.08, 0.43)	0.06(0.13)	.185	-	-	-	-	-	-
Geographical Context (ref: urban)	Rural	0.00(-0.29, 0.30)	0.00(0.15)	.993	-	-	-	-	-	-

*Note:* Avd\*SMS = The anxiety score and sexual minority status interaction, S – seeking = Single, seeking a relationship, S n. seeking = Single, not seeking a relationship, R seeking = In a relationship and seeking additional relationship(s), R n. seeking = In a relationship and not seeking.

## 4.5 Exploratory Analyses

Of the 1,136 participants, data were discarded from 388 (34.15%) participants due to incomplete responses, 130 (11.44%) due to fraud detection, and nine (0.79%) due to not proving consent. Sixty-seven (5.90%) participants were not considered in this study due to never having used an online dating app. After interpretation of non-numerical responses to numerical in the weekly logins, profile views and chats, and the monthly meet ups variables, any cases that did not have responses across all four variables were removed to ensure model comparison took place within the same sample. This resulted in 48 (4.23%) participants being removed and a final sample size of 494, representing 43.49% of the original sample. Descriptive statistics for the exploratory study variables (weekly logins, profile views, chats, and monthly meet ups) are presented in Table 2.

A series of univariate linear regressions were conducted to examine associations between exploratory indicators of online dating app use (weekly logins, weekly profile views, weekly chats, and monthly meet ups) and the attachment dimensions (anxious and avoidant attachment). Additionally, logistic regressions were used to assess associations between these indicators and sexual minority status. Across all models, none of the exploratory variables significantly predicted anxious attachment, avoidant attachment, or sexual minority status (all  $p$  values  $> .05$ ). Full model estimates are presented in Table 5 and coefficients in Table 6.

**Table 5***Showing model estimates of the exploratory analyses*

Predictor	Anxious Attachment			Avoidant Attachment			Sexual Minority Status	
	$R^2$	RMSE	$p$ value	$R^2$	RMSE	$p$ value	$Pseudo R^2$	$p$ value
	( $F$ )			( $F$ )			( $x^2$ )	
Weekly logins	0.00 (1.75)	23.18	.186	0.00 (0.44)	23.21	.510	0.00 (0.00)	.946
Weekly profile views	0.00 (0.31)	92.60	.581	0.00 (0.03)	92.63	.866	0.04 (1.52)	.218
Weekly chats	0.00 (0.40)	16.18	.529	0.00 (0.86)	16.17	.354	0.02 (3.28)	.070
Monthly meet ups	0.00 (1.00)	3.46	.317	0.00 (0.00)	3.46	.996	0.00 (1.74)	.178

**Table 6***Showing the Coefficient Results of the Exploratory Univariate Regression Analyses*

Predictor	Anxious attachment			Avoidant attachment			Sexual Minority Status		
	Coefficient $\beta$ [95% CIs]	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ [95% CIs]	<i>B</i> (SE)	<i>p</i> value	Coefficient $\beta$ [95% CIs]	<i>B</i> (SE)	<i>p</i> value
Weekly logins	-0.14 [-0.35, 0.07]	-0.06 (0.11)	.186	0.08 [-0.16, 0.32]	0.03 (0.12)	.510	-0.06 [-1.77, 1.65]	- (0.87)	.946
Weekly profile views	-0.23 [-1.06, 0.60]	-0.02 (0.42)	.581	0.08 [-0.87, 1.03]	0.01 (0.48)	.866	-1.45 [-3.86, 0.95]	- (1.23)	.236
Weekly chats	-0.05 [-0.19, 0.10]	-0.03 (0.07)	.529	0.08 [-0.09, 0.24]	0.04 (0.08)	.354	-0.90 [-1.88, 0.07]	- (0.50)	.068
Monthly meetups	0.02 [-0.02, 0.05]	0.05 (0.02)	.317	0.00 [-0.04, 0.04]	0.00 (0.02)	.996	-0.30 [-0.74, 0.14]	- (0.23)	.185

## 5. Discussion

### 5.1 Interpretation and Theoretical Context

The present study contributes to the relatively novel and growing body of literature that examines the associations between attachment and online dating app use both among heterosexual, and in particular, sexual minority populations. The main study addressed three questions that were formed on the basis of previous findings (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025): (a) what is the relationship between the anxious and avoidant attachment domains and online dating app use?; (b) what is the role of sexual minority status on the associations between attachment domains and online dating app use?; and (c) do the relationships between anxious and avoidant attachment, sexual minority status and online dating app use persist or alter when relevant demographic variables are controlled for?

This study expected to find that anxious attachment positively predicted increased dating app use while avoidant attachment would be negatively associated. Sexual minority status was expected to have an enhancing moderation effect on the relationship between anxious attachment and dating app use, and to have a diminishing moderation effect on the avoidant attachment relationship. Finally, this study believed that the relationships between anxious and avoidant attachment, sexual minority status and online dating app use would persist after controlling for covariates. Anxious and avoidant attachment were treated independently, and for each, three regression models were run to answer the three questions. An additional exploratory element of the study addressed a fourth question: (d) can measures of weekly logins, profile views, or chats,

or monthly meet ups offer viable alternative operationalisations of online dating app use? No hypotheses were offered for this question due to the exploratory nature.

Initially, no significant relationship was found between anxious attachment and the weekly amount of time the participants spent using online dating apps, and this did not change with the inclusion of sexual minority status or the interaction of sexual minority status and anxious attachment. However, after controlling for the covariates ‘relationship seeking’ and ‘gender’, a significant relationship was found between anxious attachment and dating app use suggesting that these covariates were perhaps confounding variables, though sexual minority status remained non-significant. Contrary to previous research though (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025), this was a negative association. It is possible that the covariates, ‘relationship seeking’ and ‘gender’, have a negative confounding effect. However, the effect size is small and only explains a minimal portion of the variance within time spent using dating apps. Further, while there is a good model fit, it is not infallible, therefore it is more likely this is merely an anomaly in the data and the following interpretation is done so cautiously, though future research may wish to explore this further. As the outcome variable needed to be log-transformed in order to correct for violations to linearity, the coefficients needed to be exponentiated to be interpreted as real-world effects. Once covariates were controlled for there appeared to be a 2.03% decrease in weekly time spent using online dating apps for every one unit increase in anxious attachment.

In the context of Attachment Theory (Bowlby, 1969), this negative relationship between anxious attachment and online dating app use is theoretically coherent. Hazan and Shaver (1987) explained that those high in anxious attachment are characterised by preoccupations that their partners do not truly love them and are fearful of rejection. In this light, it would make sense that

those high in anxious attachment would be too fearful to use a platform designed to facilitate romantic or sexual connection. This interpretation of the results must be employed cautiously though as the findings were not immediately present in a univariate model / only emerged after inclusion of covariates.

The difference in findings between this study and previous research in terms of anxious attachment could be due to various reasons. This study assumed a linear relationship between attachment and dating app use based on previous research (Chin et al., 2019; Coffey et al., 2022; Topino et al., 2025). Of the previous research that this study is aware of, only Rochat and colleagues (2019) used non-linear modelling (i.e. cluster analysis). Rochat and colleagues' (2019) found that the highest users of online dating apps were those highest in anxious attachment, while the lowest users were those with middling anxious attachment, and those lowest in anxious attachment were actually average users of dating apps. Linearity between these variables was assessed and deemed to not be violated in this study, and therefore this apparently non-linear relationship between anxious attachment and dating app use instead indicates that there may be other, more significant, moderating variables which were not examined in this study. Additionally, online dating app use has increased by one third in Europe, from 60.8 million to 81.5 million users (Statista, 2024), since the initial research was conducted in 2019 (Chin et al., 2019; Rochat et al., 2019), suggesting the landscape has changed drastically. Therefore, so too might have the relationship between anxious attachment and dating app use changes, as dating apps become ever more normalised and ubiquitous. It's possible that where anxious attachment was previously a driving force for going outside of social norms and disproportionately using dating apps, in the present day, with dating apps being so normalised, the anxiously attachment population may not be so different from the general population in this

regard any longer. Given this study did not categorise participants into clusters and possibly excluded some significant moderating variables, and that the difference between anxiously attached and the general population's dating app use seems to be reducing, the effects of attachment may persist in some sense, but when taken as a whole, without considering all factors, trends towards the negative.

Similarly, the findings of this study indicate that there is no association between avoidant attachment and online dating apps, nor does sexual minority status have a moderating role in their relationship, even after controlling for relevant covariates. This is contrary to findings by both Chin and colleagues (2019) and Rochat and colleagues (2019), who found avoidant attachment was associated with increased dating app use. However, it is in line with findings by Coffey and colleagues (2022) which also found no association with online dating app use. The mixed findings by the previous research also may be due to various reasons, including the shifting landscape when it comes to dating. However, perhaps the most likely is due to the operationalisation of how dating app use was measured.

In Chin and colleagues' (2019) study, participants were simply asked whether they currently use a dating app. This doesn't specify frequency or intensity of use, nor does it clarify whether participants merely had previously downloaded an app and perhaps had a profile but didn't ever regularly use the app. This operationalisation is a very reductive measure, that collapses complexity of something like this to one binary question (i.e. it does not capture any of the nuance of engagement or any of the possible ways / reasons for using. It is, therefore, very limited in its ecological validity and the implications cannot be extrapolated much beyond a rationale for further study. Coffey and colleagues (2022) operationalised dating app use by daily log ins, with responses ranging from 0 to 10+. Rochat and colleagues (2019) examined the

number of meet ups in the previous 6 months and the number of current matches in the app. Finally, Topino and colleagues (2025) gathered categorical data on the daily amount of time spent using dating apps, *Up to 1 h*, *From 1 to 2 h*, *From 2 to 5 h*, *More than 5 h*. This was the most similar approach to the current study, however unfortunately, their research did not examine avoidant attachment. The exploratory analysis of this study did not find associations between log ins, chats, meet ups (which roughly correlate with the previous research operationalisations) and attachment variables and it's therefore possible that these operationalisations are all measuring slightly, but significantly, different constructs.

The predicted moderation effect of sexual minority status on anxious attachment was not supported by the findings in this study. This can perhaps also be explained by the near ubiquity of present-day dating app use. Historically, the internet has been used as a safe space for sexual minority individuals, as distal minority stressors can make offline dating appear more threatening to sexual minorities than heterosexuals (Castañeda, 2015; Dodge, 2014; Taylor et al., 2017; White Hughto et al., 2017). While previous studies have acknowledged that sexual minorities do use dating apps more than heterosexuals (Anderson et al., 2020), it seems as though this gap is closing as more and more people rely on online dating apps. It is likely that a reduction in variance between heterosexual and sexual minority populations would also reduce the any potential moderation effect on the role of anxious attachment. In the context of the Integrated Attachment and Minority Stress Model (IAMSM) (Cook & Calebs, 2016), these non-significant findings support the idea that there is nothing inherently different or harmful about a sexual minority identity, but rather it is the way in which the world treats those with these identities that shape their health outcomes. Where it seems as though heterosexuals are more commonly using online dating apps to form romantic and sexual connections now, the divergences between sexual

minorities and heterosexuals, in one dimension at least, has reduced. The IAMSM model suggests that it is only the world's admonishment of difference that creates variation in attachment and health outcomes for sexual minorities, and therefore, where difference is reduced, it is understandable that so too would the strength of this hypothesised relationship, perhaps into non-significance at least in regard to the role of online dating app use.

The research method also varied between studies, which may explain differences in findings. While this study used the AAQ for its, reliability, validity and brevity, others used the Experiences in Close Relationships (ECR) —Revised questionnaire (Brennan et al., 1998; Fraley & Shaver, 2000) (used by: Coffey et al., 2022; Rochat et al., 2019), Attachment Style Questionnaire (Simpson et al., 1992) (used by: Chin et al., 2019), and the Reciprocal Questionnaire (RQ) (Bartholomew & Horowitz, 1991) (used by: Topino et al., 2025). While each of these are similar in reliability and validity (Ravitz et al., 2010) there will be variations in the specific conceptualisations of the constructs being assessed which may have contributed to the variation in the findings. Other variations in method included the sample and operationalisations of dating app use. Chin and colleagues (2019) exclusively used single participants and operationalised dating app use as both self-reported likelihood of using a dating app and *yes / no* to currently using a dating app. Coffey and colleagues (2022) also exclusively used single participants but operationalised as number of daily logins. Rochat and colleagues (2019) included both single and partnered participants and used the total number of online and offline contacts in the previous six months. While Topino and colleagues (2025) also used time spent using a dating apps they only included single participants who were using dating apps daily. These variations in the specific constructions of adult attachment and online dating app use,

while supposedly minor, may be significant enough to attain different findings and render these studies not directly comparable.

## 5.2 Limitations and Future Direction

Although the study had several strengths, such as the sample size and utilisation of smartphone recorded data, there were several limitations. First, while the study was hypothesis driven and proposed that anxious attachment predicts dating apps use, the study was cross-sectional / correlational so causality could not be tested. It is possible that dating app use impacts on attachment. A decrease in dating app use and a resultant limited dating life could cause an individual to feel less valued and shift their attachment towards something more anxious; a relationship reflected in pathway 'e' of the IASMS model (Figure 1), the reciprocal relationship between adult attachment and minority stress. Conversely, using dating apps could protect an individual from discrimination and heteronormativity, allowing them to fit in and feel as though they are part of a social norm, leading to developing a more secure attachment. In future research, a longitudinal approach or a study that included interviews assessing early life attachment, such as the Adult Attachment Interview (George, Main & Kaplan, 1996), may be able to give insight into variations over time that allow causation to be established.

Further, this study assumed a linear relationship between attachment and dating app use. It's possible that Rochat and colleagues' (2019) seemingly non-linear findings that the highest dating app users were high in anxious attachment, the lowest app users were average in anxious attachment, and moderate app users were lowest in anxious attachment was not due to the action of moderating variables. Instead, it is possible that there is a more complex relationship (not related to sexual minority status), that better fits this data. In a similar vein, it was not only

disappointing but also perhaps misleading to collapse several variables down into larger and less specific categories. It has been well established that a black, transgender, lesbian woman may both engage with the world, and be engaged with, very differently to a white, cisgender, heterosexual man due to the intersectionality of the power structures impacting their lives (Crenshaw, 1991). Future studies should explore these relationships either by deliberately oversampling minoritised demographics, or by recruiting a large enough sample to power an analysis of variables with more levels, such that nuanced interpretations can be made.

Finally, as with much research, the study was liable to bias. Information was not explicitly gathered on whether dating apps were currently being used or whether the use was historical, this could lead to recall biases where their memory had become less reliable. Additionally, participants were given the options for reporting their best estimate of time spent on dating apps rather than the actual smartphone recording, which allows scope for social desirability bias to have an effect. Social desirability bias may have also played a role in the self-report measures of attachment. However, data were anonymous from the point of collection which should have gone some way towards offsetting this bias. Without long-term, expensive and intensive longitudinal data gathering, there is currently, perhaps, a limit to what can be achieved regarding recall bias if future research intends to also include participants no longer using dating apps. However, it may be possible to set up a study that only accepts smartphone recordings to reduce desirability bias.

## 6. Conclusion

Individuals with a minoritised sexual identity have long been associated with poorer health outcomes. The current study added to the growing body of research that examines associations between attachment and online dating app use, with a particular focus on how sexual minority status factors into this relationship. While a small but significant, negative association between anxious attachment and time spent using online dating apps was found, there were no significant associations between avoidant attachment, or sexual minority status and dating app use. These results, though unexpected, in the context of the rapidly closing gap between heterosexual and sexual minority dating app use, seems to support the Minority Stress Model's belief that there is nothing inherently problematic with a minoritised sexual identity. Instead, in the case of digital health and dating app use, it appears to be that poorer health outcomes happen *to* those with minoritised identities rather than *because of* minoritised identities.

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## **Part Three: Critical Appraisal**

## Introduction

This appraisal will begin by outlining elements of my professional and personal background, and of the research itself that drew me to the project. I will then reflect on the process of identifying and defining a research question, both for the literature review and the empirical study, followed by the experience of designing the research and lessons learned. While reflecting on these experiences, I will identify challenges and critical considerations in the hopes that this can offer guidance that may be helpful to potential researchers within this field. Throughout this reflective process, I intend to highlight issues that relate specifically to conducting research involving sexual minority individuals, including my thoughts and suggestions to future researchers.

## Researcher Background

As a gay man who grew up in the 90s, Section 28 of the Local Government Act (1988) remained a significant presence throughout my education, even after it was repealed in 2003. Section 28 stated that local authorities could not promote alternative sexual identities or teach acceptance of homosexuality (Wise, 2000). While this was supposedly something that came to an end in the early 2000s, it was not my experience that there was an immediate and noticeable change in the messaging. Instead, throughout much of my childhood and adolescence, the messaging remained silence first and foremost. However, the instances when gay men were referred to, whether in the media, school, or in social settings, the narrative that I experienced was one of fear and caution, and at best pity. Alternative sexual identities were often referred to by those in my environment as ‘lifestyle choices’, and latterly, as the nature versus nurture

debate and the hunt for the ‘gay gene’ occurred, as something someone was someone was born with.

It was perhaps in trying to better understand identities and their origin that I chose to study genetics for my undergraduate degree. Here, I came to understand some of the nuances of the interactions between nature and nurture, and the role of psychology in the development of complex traits became something I found myself drawn to. Pivoting from genetics and into clinical psychology, I continued to pursue a deeper understanding of the role of sexual identities. In my final year of the Doctorate of Clinical Psychology, I opted for a specialist placement at a sexual health clinic, working with sexual risk, individuals diagnosed with HIV, and psychosexual difficulties. In this placement, the narrative around sex and sexuality was, to me at least, radically different from societal norms. By comparison, it became even more evident that in day-to-day life, a problem-saturated, risk-focused narrative persists when it comes to sexually minoritised individuals.

When the time came to choose a doctoral thesis project, I was keen to be involved in sexual minority research. I hoped to add a piece of literature to the field that brought a strengths and resilience lens to an otherwise, seemingly incredibly negative body of work. Therefore, I joined Dr Mauricio Alvarez-Monjaras’ research lab, where he offered supervision of a project exploring attachment and patterns of dating app use among sexual minority individuals. After Dr Alvarez-Monjaras moved full-time into clinical work, Dr Marc Tibber took over as internal supervisor of the project.

## The Literature Review

Adult attachment was first presented as a concept by John Bowlby in 1969. As such, there has been over half a century of related literature. It seemed like conducting a systematic literature review was a reasonable place to start to become familiar with at least a subsection of this body of work. Several research questions were posed for this literature review, including “Are there differences in attachment across sexual orientations?”, “What role does attachment have in online dating app use?”, and “What are the differences in the way in which sexual minorities use online dating apps when compared with heterosexual users?”. Many permutations linking each of the three main components of the project (i.e. adult attachment, sexual orientation, and dating app use) were considered. Unfortunately, searches across PsychInfo, Web of Science and PubMed databases resulted either in incredibly broad results, such as when exploring attachment and dating apps, or a relative scarcity of results when sexuality related search terms were included. Of the papers that were returned when searching for sexuality, the themes of the research were so varied that there was very little comparable data between the studies. This meant that trying to establish a research question that would amount to any form of meaningful implication, was considerably impaired.

While the initial plan had been to conduct a systematic review or metaanalysis of the research in this field, due to the inconsistency of the results, a scoping review was then suggested. This may have been a valid option for a literature review, as it would have identified that there was a significant dearth in the literature, and therefore have generated a rationale for further empirical study. However, even this felt limited in the terms of what may have actually been helpful towards understanding the relevant body of research. Instead, it was agreed upon

that a conceptual introduction may be more meaningful as attachment, dating apps and sexuality were all incredibly broad with several definitions and have individual inspired doctoral theses in their own right (e.g. Cadman, 2015; Pidoux, 2021; Zeniou, 2024).

Although shifting from a possible systematic review to a conceptual introduction felt like a natural progression, the disparate underrepresentation of sexual minority related research did not go unnoticed. This was perhaps the first point at which I began to notice the relative academic silence relating to sexual minorities that echoed my experiences at a societal level. It raised questions for me about who was deemed valid and worthwhile to include in research, what the general population, and more specifically academics, thought was relevant when designing studies, and even perhaps, what about research caused sexual minorities to seemingly keep a distance. These questions remained in my mind throughout the process of conducting this research and will continue to be commented on throughout this appraisal.

A significant, personal, benefit to electing for a conceptual introduction over a systematic review was the power to be somewhat selective of the research being included. So much of the research that involved sexual minorities was risk-focused and problem saturated (An & Batra, 2022) that it seemed to me, that at some point, it must become a self-fulfilling prophecy. The Minority Stress Model (Meyer, 2003), in-short, proposes that there was nothing inherently harmful with an alternative sexual identity, but rather it is the way in which sexual minorities are treated and therefore learn to navigate the world that causes harm. It seems inevitable that this cycle will be perpetuated if future research continues to largely ignore this population, or only focus on how they may be at risk (both from others and themselves). Instead, a conceptual introduction allowed for a balanced inclusion of research that highlighted the strengths and

resilience of sexual minorities, which may have otherwise not been included. This was in line with the epistemological stance that I held when designing this study.

## Designing the Empirical Paper

Establishing a research question occurred relatively quickly, as the general area of research was suggested by the research lab and the conceptual introduction provided a clear rationale for a moderation analysis. However, developing a study design and deciding how to operationalise dating app use took significantly longer. In an ideal scenario this study would have utilised secondary longitudinal data as this would both enable identification of a causal relationship and have been a research project that fit within the scope of a time-limited doctoral programme. Unfortunately, a pre-existing dataset was not identified, and this narrowed the available options down. Gathering primary longitudinal data would have exceeded the timeframe available to this study. Therefore, the decision lay between an interview-based design that identified changes in attachment across the lifespan, or a cross-sectional, questionnaire design that would not have been able to identify causality. Given that an interview-based design would have limited the number of participants drastically and would have likely been unable to collect reliable data on online dating app use due to recall bias, a cross-sectional study was selected.

The next challenge came in the operationalisation of dating app use. Other studies used measures of whether participants currently used dating app, number of interactions and number of log ins (Chin et al., 2019; Coffey et al., 2022; Rochat et al., 2019; Topino et al., 2025). However, each of these variables seemed to measure slightly different constructs. For example, whether participants were currently using a dating tells us nothing about how they *use* this dating

app; whether they ever log in or just have an app downloaded; whether they have a profile but only swipe once in a blue moon; or whether they are prolific users with several hours of daily use. Therefore, this seemed too reductive for the main analysis of a study. Similarly, a user's number of interactions doesn't reflect the actual amount of time spent using a dating app as it is more than possible that a user sinks hours into app use but rarely chooses to match / connect with another user and therefore has minimal interactions. Conversely, some users with very popular profiles may spend very little time on a dating apps relative to the number of people that are connected with. Finally, while the number of log ins at least gives some indication of the intensity with which a user is engaging with the apps, it could be misrepresentative with some users binge using apps for extended lengths of time per log in, and others only briefly logging in to respond to notifications and spending very little actual time on the app. As each of these measures were evaluated it became clearer that time spent using dating apps seemed to be the standard by which other operationalisations were being measured, though, this is by no means a flawless measure. Users may have their phone open while engaging in other activities (i.e. watching television) or use the app purely for the messaging element after making a connection, and therefore despite a high dating app use, may not be engaging in the dissatisfying cycles others have identified (Obarska et al., 2020). In an attempt to make a quantitative comparison between these possible operationalisations, I decided to take measures of each operationalisation and include the additional exploratory analysis.

## Ethics and Recruitment

After identifying key variables and settling on a design for the study, the proposal was sent to the University College London Research Ethics Committee. As the study intended to gather information relating to sexuality and gender, it was deemed to be high-risk as it was said to fall under the ‘Sensitivity’ high risk category. The criteria states that research exploring sensitive topics and / or where participation may induce stress, anxiety, humiliation or other negative consequences should be considered high-risk. The guidance for identifying whether a topic should be deemed sensitive explains that it is dependent on both cultural norms and values. It goes on to give examples of what might be sensitive and includes explorations of participants’ sexual behaviour, and protected characteristics under the Equality Act 2010, for which this study seemed to meet criteria.

While having a framework to ensure protection is available to those that need it is judicious, it must also be considered what this protection conveys to the wider community when anonymous questions relating to sexuality are considered “high-risk” and “sensitive”. At the very least, it creates more hoops for researchers to jump through and instils additional barriers to the conducting of sexual minority focused research. At worst, this requirement pathologises minority identities, reifies a hierarchy of acceptability, and silences through procedural gatekeeping. This raises concerns of legitimising exclusion, silencing research, and perpetuating systemic inequality, particularly in the context of the UK Supreme Court’s recent 2025 ruling that the legal definitions of “*man*” and “*woman*” do not include transgender men and transgender women in the Equality Act 2010.

The legal constriction of identity risks entrenching a binary understanding of sex and gender, undermining both the lived experiences and legal recognition of transgender individuals. When coupled with ethical procedures that frame sexuality and gender as inherently sensitive or risky topics, a feedback loop may be created whereby marginalised identities are not only excluded from legislative protection but also from scholarly inquiry. This may limit the scope and inclusivity of psychological research and perpetuate the very forms of marginalisation and erasure that such research often aims to address. Therefore, while ethical oversight is not only prudent, but necessary for safeguarding participants, its application must be critically examined to ensure it does not inadvertently reinforce the stigmas and inequalities it seeks to prevent.

Despite the study being deemed to be addressing such sensitive topics that it required high-risk ethical approval, this was not something that was reflected in the recruitment of participants. A study that is thought to be this sensitive, might be expected to be off-putting for individuals to take part in, therefore making recruitment a challenge. Instead, it was found in this study that recruitment was remarkably smooth and easy process. The power analysis indicated that a minimum of 158 sexual minority and heterosexual participants each was required for the study, which felt like a daunting task initially. Fortunately, recruitment, which occurred via physical posters, posts to online platforms, and distribution to university mailing lists, met the minimum sample size months ahead of projected timelines with sexual minorities accounting for around two thirds of the final sample and heterosexuals, only one third. This experience of the recruitment process calls into question stereotypes that sexual minorities are ‘hard to reach’. Instead, it suggests that the apparent underrepresentation of minoritised individuals in psychological research may not be due to reluctance on the behalf of the participant. Instead, it

may be more due to systemic barriers, possibly including those mentioned earlier, such as overly cautious ethical scrutiny and subsequent lack of researcher engagement.

## Conclusion

In conclusion, this critical appraisal has highlighted the complexities and challenges inherent in conducting research focused on sexual minority populations. The process highlighted the persistent gaps and biases in the existing literature, as well as the systemic and procedural barriers that can hinder inclusive and meaningful research in this area. The shift from a systematic review to a conceptual introduction was both a pragmatic and epistemologically aligned decision, enabling a more nuanced exploration of strengths and resilience within sexual minority communities, rather than perpetuating deficit-based narratives. The study's design choices were shaped by practical constraints but also by a commitment to methodological rigour and relevance. Notably, the ease of participant recruitment challenges prevailing assumptions about the accessibility of sexual minority individuals for research, suggesting that institutional and procedural factors may play a more significant role in their underrepresentation. Overall, this appraisal demonstrates the importance of critical reflection at each stage of the research process and advocates for ongoing scrutiny of ethical and institutional practices to ensure that research not only protects but also empowers marginalised groups. The lessons learned here provide valuable guidance for future researchers aiming to contribute to a more equitable and representative evidence base.

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**Appendix 1**  
**Questionnaire**

# An Investigation into Understanding Patterns of Online Dating App Use

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Start of Block: Captcha

Before you proceed to the survey, please complete the captcha below.

End of Block: Captcha

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Start of Block: Information and Consent

**Information Sheet** This study has been approved by the UCL Research Ethics Committee (26999/001). Name and Contact Details of the UCL Data Protection Officer: Alexandra Potts data-protection@ucl.ac.uk UCL Ethics Project ID Number: 26999/001 Data Protection Registration Number: Z6364106/2024/01/103 Social Research This study is being run by: Nicholas Carragher Amber Korde Under the supervision of: Dr Marc Tibber Dr Georgina Krebs Dr Elizabeth Hogg Dr Mauricio Alvarez

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**Information Sheet** We would like to invite you to participate in this research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to read the following information carefully and discuss it with others if you wish. Please contact the researchers by email if anything is not clear, if you have questions, or if you would like more information about the study. You can also contact the researchers with any queries or concerns related to this study after completion. This study will involve anonymously completing a questionnaire. **It will require no more than 20 minutes of your time.** You will be asked questions relating to your demographics (including Age, Gender, Ethnicity and Relationship status), sexual orientation, attachment domains, body image, and the frequency with which you use online dating apps. This research invites individuals of all genders and sexualities to participate. However, as non-cisgender populations may experience significantly different relationships to their bodies than cisgender participants, some questions relating to self-image will not be asked of non-cisgender participants. We will be gathering quantitative data in this study on your demographics, relationship to (romantic) partners, self-image, how you might act in certain situations, and your online dating app use. **We will be using this data to better understand what factors play a role in how individuals engage with dating apps.** This study asks some questions which could be considered distressing. The questionnaire will ask questions relating to sexual orientation, gender, body image, use of dating apps, and attachment style. Some people may find the questions triggering or intrusive. We are acknowledging before you

choose to take part so that you can make an informed decision about your participation. If you do choose to take part, there will therefore be signposting on the wellbeing sheet for support available on completion of the study. If you would like access to this wellbeing sheet but would not like to participate, then please contact the researchers using the details at the top of this page.

**If you do choose to participate, then you will be able to enter a prize draw for a chance to win a £20 voucher.** Contact information for this prize draw will be stored separately to your questionnaire responses, ensuring anonymity remains. You will also be contributing to the wider societal benefits of improving our understanding of the relationship between sexual orientation, gender, body image, attachment, and online dating app use. It is up to you to decide whether or not to take part. **If you choose not to participate, you won't incur any penalties or lose any benefits to which you might have been entitled.** If you do decide to take part, you will be asked to sign a consent form. Even after agreeing to take part, you can still withdraw at any time and without giving a reason, simply by closing your browser. **Unfortunately, as all data is anonymous, once you have submitted your responses it will not be possible to withdraw from the study** however, you are welcome to withdraw from the prize draw at any time by contact the researchers at the top of this information sheet. If you would like an update on the outcome of the study, then please contact the researchers and inform them of this. We will be able to share a brief summary of the results from each thesis. If there are any issues that arise while participating in this study, please feel free to contact the researchers. We will be more than happy to respond to any difficulties. If you would like to make a formal complaint about the research study, you are able to view the UCL complaints procedure in full at the following

location: [https://www.ucl.ac.uk/joint-research-office/sites/joint-research-office/files/UCL\\_policy\\_for\\_complaints\\_from\\_research\\_subjects.PDF](https://www.ucl.ac.uk/joint-research-office/sites/joint-research-office/files/UCL_policy_for_complaints_from_research_subjects.PDF)

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**Data Protection & Consent** Data Protection Privacy Notice: The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at [data-protection@ucl.ac.uk](mailto:data-protection@ucl.ac.uk). This ‘local’ privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our ‘general’ privacy notice: [For participants in research studies, click here.](#) The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the ‘local’ and ‘general’ privacy notices. The lawful basis that will be used to process your personal data is: ‘public task’ and ‘research purposes’ will be the lawful basis for processing special category data. Your data will be provided anonymously, from the point of data collection, therefore your responses in the survey cannot be linked back to you. Contact details for the entry to the prize draw and any subsequent payment will be gathered and stored separately. After we have used this separate data for this purpose, this information will be deleted. The remaining data will continue to be stored anonymously, such that your individual responses will not be traceable back to you. If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the

first instance at data-protection@ucl.ac.uk. ----- If you wish to take part in

this study, please tick ALL of the following boxes:

I have read the information above and understand I can email the researchers with any questions. (1)

I understand that my personal information will be used for the purposes explained to me. (2)

I understand that according to data protection legislation, ‘public task’ will be the lawful basis for processing and ‘research purposes’ will be the lawful basis for processing special category data. (3)

I understand that all personal information will remain confidential and that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications. (4)

I understand that my anonymised research data may be shared with, and used by, others for future research (no one will be able to identify you when these data are shared). (5)

I understand that I am free to withdraw from the study without penalty if I so wish, simply by closing my browser but as the data is anonymous I will not be able to withdraw my responses after submission. However, I understand that I can request to have my contact details withdrawn and deleted from the prize draw at any time by contacting the researchers. (6)

I confirm that I am over the age of 18 years old. (7)

I am aware of what an online dating app is. (8)

I have a smart phone, tablet or computer. (9)

I speak English. (10)

I consent to take part in the study. (11)

Start of Block: Demographics

This study relates to patterns of online dating app use. To check that you are eligible for this study, please let us know whether you are aware of what an online dating app is?

- Yes (1)
  - No (2)
- 

Thank you for agreeing to take part in this survey. Unfortunately, the questions in this survey are aimed at understanding what might influence the way in which we use online dating apps and you have indicated that these are not something you are familiar with. As such, this survey may not be relevant to you and there is no need for you to participate. Thank you again for your time. If this is not the case, and you previously marked 'No' incorrectly, please indicate this below. Can you confirm you are not familiar with online dating apps?

- Correct, I have no knowledge or experience of using online dating apps and this questionnaire is not relevant to me. (1)
  - No, I marked the previously question incorrectly, I do have some experience or understanding of what an online dating app is. (2)
-

## Demographics

---

What is your age (in years):

---

---

Thank you for agreeing to take part in this survey. Unfortunately, the questions in this survey are aimed at understanding what might influence the way in which adults use online dating apps and you have indicated that you are under 18 years old. As such, this survey may not be relevant to you and there is no need for you to participate. Thank you again for your time. If this is not the case, and you previously marked your age incorrectly, please indicate this below. Please confirm your age:

---

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Page Break

What is your gender?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)
- Other (5) \_\_\_\_\_

---

Page Break

As body dysmorphia, which is known to impact the way in which we engage with online dating apps, is a common experience in people that do not identify with the gender they were assigned at birth, it is helpful for us to know whether this may apply to you. Could you tell us whether you identify as trans- or cis-gender?

- I am transgender (different to the gender I was assigned at birth) (1)
- I am cisgender (the same as the gender I was assigned at birth) (2)
- I am non-binary (gender identities that are not solely male or female) (4)
- Prefer not to say (3)

---

Page Break

Which of the following best describes your ethnicity

Indian (1)

Pakistani (2)

Bangladeshi (3)

Chinese (4)

Any other Asian background (5)

---

Caribbean (6)

African (7)

Any other Black, Black British, or Caribbean background (8)

---

White and Black Caribbean (9)

White and Black African (10)

White and Asian (11)

Any other Mixed or multiple ethnic background (12)

---

English, Welsh, Scottish, Northern Irish or British (13)

Irish (14)

Gypsy or Irish Traveller (15)

Roma (16)

Any other White background (17)

---

Latino (18)

Arab (19)

Any other ethnic group (20)

---

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Page Break

Please choose which of the below best describes your current relationship status

Not looking (1)

Looking for hook ups (2)

Casually dating (3)

Looking for a relationship (4)

Exclusive (5)

Open (6)

Exclusive (7)

Open (8)

Exclusive (9)

Open (10)

---

Page Break

Please choose which of the following best describes your sexual orientation

- Lesbian (1)
- Gay (2)
- Bisexual (3)
- Asexual (4)
- Straight / Heterosexual (6)
- Other (5) \_\_\_\_\_

---

Page Break

For further understanding of patterns in online dating app use, we are intending to explore regional and socioeconomic factors and are therefore asking for optional disclosure of where you live. Please provide your postcode **removing the final two letters** and leaving a partial postcode, to ensure anonymity. For example, UCL's postcode is WC1E 6BT but you would write "WC1E 6", including the appropriate spacing. **(Optional)** If you are a university student with a term-time address, please provide your home postcode. However, if your home address is outside the UK, please use your UK, term-time post code.

\_\_\_\_\_

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Page Break

Please choose whether 'urban' or 'rural' best describes where you currently live.

Urban (1)

Rural (2)

End of Block: Demographics

---

Start of Block: Adult Attachment Questionnaire (AAQ)

Please indicate how you typically feel toward romantic (dating) partners in general. Keep in mind that there are no right or wrong answers. Use the 7-point scale provided below and mark the appropriate number for each item.

	Strongly Agree (1)	Agree (2)	Somewhat Agree (3)	Neutral (4)	Somewhat Disagree (5)	Disagree (6)	Strongly Disagree (7)
I find it relatively easy to get close to others. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
I'm not very comfortable having to depend on other people. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
I'm comfortable having others depend on me. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
I rarely worry about being abandoned by others. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

I don't like  
people getting  
too close to  
me. (5)

I'm somewhat  
uncomfortable  
being too  
close to  
others. (6)

I find it  
difficult to  
trust others  
completely.  
(7)

I'm nervous  
whenever  
anyone gets  
too close to  
me. (8)

Others often  
want me to be  
more intimate  
than I feel  
comfortable  
being. (9)

Others often  
are reluctant  
to get as close  
as I would  
like. (10)

I often worry  
that my  
partner(s)  
don't really  
love me. (11)

I rarely worry  
about my  
partner(s)  
leaving me.  
(12)

I often want  
to merge  
completely  
with others,  
and this desire  
sometimes  
scares them  
away. (13)

I'm confident  
others would  
never hurt me  
by suddenly  
ending our  
relationship.  
(14)

I usually want  
more  
closeness and  
intimacy than  
others do.  
(15)

The thought  
of being left  
by others  
rarely enters  
my mind. (16)

I'm confident  
that my  
partner(s)  
love me just  
as much as I  
love them.  
(17)

End of Block: Adult Attachment Questionnaire (AAQ)

---

Start of Block: Muscle Dysmorphic Disorder Inventory (MDDI)

Please indicate how you typically feel toward your self-image *in general*. Keep in mind that there are no right or wrong answers. Use the 5-point scale provided below and mark the appropriate number for each item.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I think my body is too skinny/slender. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wear loose clothing so that people can't see my body. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hate my body. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I could be heavier. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find my chest to be too small. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my legs are too thin. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I have too much body fat. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I wish my arms  
were stronger.

(8)

I am  
embarrassed to  
let people see  
me without a  
shirt or t-shirt.

(9)

I feel anxious  
when I miss one  
or more days of  
exercise. (10)

I cancel social activities with friends (e.g. watching football, invitations to dinner, going to the movie theater, etc.) because of my workout/exercise schedule. (11)

I feel depressed when I miss one or more days of exercise. (12)

I miss opportunities to meet new people because of my workout schedule. (13)

End of Block: Muscle Dysmorphic Disorder Inventory (MDDI)

---

Start of Block: Adult Rejection Sensitivity Questionnaire

The items below describe situations in which people sometimes ask things of others. For each item, **imagine that you are in the situation, and then answer the questions that follow it. You ask your parents or another family member for a loan to help you through a difficult financial time.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not your  
family  
would  
want to  
help you?  
(1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
agree to  
help as  
much as  
they can.  
(2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

**You approach a close friend to talk after doing or saying something that seriously upset them.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not your  
friend would  
want to talk  
with you?  
(1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
want to talk  
with me to  
try to work  
things out.

(2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

**You bring up the issue of sexual protection with your significant other and tell them how important you think it is.**

How  
concerned  
or anxious  
would you  
be over  
their  
reaction? (1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would expect that they would be willing to discuss our possible options without getting defensive.

(2)

Very Likely (1)

Likely (2)

Somewhat Likely (3)

Somewhat Unlikely (4)

Unlikely (5)

Very Unlikely (6)

**You ask your supervisor for help with a problem you have been having at work.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not the  
person  
would want  
to help you?  
(1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
want to try  
to help me  
out. (2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

**After a bitter argument, you call or approach your significant other because you want to make up.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not your  
significant  
other would  
want to  
make up  
with you?  
(1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
be at least as  
eager to  
make up as I  
would be.  
(2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

**You ask your parents or other family members to come to an occasion important to you.**

<p>How concerned or anxious would you be over whether or not they would want to come? (1)</p>	<p><input type="radio"/> Very Unconcerned (1)</p>	<p><input type="radio"/> Unconcerned (2)</p>	<p><input type="radio"/> Somewhat Unconcerned (3)</p>	<p><input type="radio"/> Somewhat Concerned (4)</p>	<p><input type="radio"/> Concerned (5)</p>	<p><input type="radio"/> Very Concerned (6)</p>
<p>I would expect that they would want to come. (2)</p>	<p><input type="radio"/> Very Likely (1)</p>	<p><input type="radio"/> Likely (2)</p>	<p><input type="radio"/> Somewhat Likely (3)</p>	<p><input type="radio"/> Somewhat Unlikely (4)</p>	<p><input type="radio"/> Unlikely (5)</p>	<p><input type="radio"/> Very Unlikely (6)</p>



**At a party, you notice someone on the other side of the room that you'd like to get to know, and you approach them to try to start a conversation.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not the  
person  
would want  
to talk with  
you? (1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
want to talk  
with me. (2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

**Lately you've been noticing some distance between yourself and your significant other, and you ask them if there is something wrong.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not they still  
love you and  
want to be  
with you?  
(1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would expect that they will show sincere love and commitment to our relationship no matter what else may be going on.  
(2)

Very Likely (1)

Likely (2)

Somewhat Likely (3)

Somewhat Unlikely (4)

Unlikely (5)

Very Unlikely (6)



**You call a friend when there is something on your mind that you feel you really need to talk about.**

How  
concerned  
or anxious  
would you  
be over  
whether or  
not your  
friend would  
want to  
listen? (1)

Very  
Unconcerned  
(1)

Unconcerned  
(2)

Somewhat  
Unconcerned  
(3)

Somewhat  
Concerned (4)

Concerned  
(5)

Very  
Concerned  
(6)

I would  
expect that  
they would  
listen and  
support me.  
(2)

Very  
Likely (1)

Likely (2)

Somewhat  
Likely (3)

Somewhat  
Unlikely (4)

Unlikely  
(5)

Very  
Unlikely  
(6)

End of Block: Adult Rejection Sensitivity Questionnaire

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Start of Block: Dating App Use

The following question is to verify you are a real person. Which of the following is a vegetable?

- Fish (1)
  - Broccoli (2)
  - Pizza (3)
  - Milk (4)
- 

The next set of questions relate to how you engage with online dating apps.

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Have you ever used a dating app?

- Yes (1)
  - No (2)
- 

Page Break

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Could you tell us briefly why you have never used a dating app?

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Page Break

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Which dating apps have you used

- Hinge (1)
- Bumble (2)
- Tinder (3)
- Grindr (4)
- Plenty of Fish (5)
- eHarmony (6)
- Match.com (7)
- Uniform Dating (8)
- Muzz (Formerly MuzMatch) (9)
- JSwipe (10)
- Christian Mingle (11)
- Muddy Matches (12)
- Chappy (13)
- The Circle (14)
- EliteSingles (15)
- OkCupid (16)
- Coffee Meets Bagel (17)
- Thursday (18)

Happn (19)

Other (please specify) (20)

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Page Break

The next questions relate to patterns of online dating app use. If you currently use online dating apps, please answer the following questions as they would best apply to you at this point in time. **If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.**

---

What do you use dating apps for? If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.

- Casual Sex (1)
  - ʘ Ease of communication (2)
  - ʘ For a sense of validation (3)
  - ʘ Thrill and excitement (4)
  - ʘ Because everybody else does (5)
  - ʘ To look for love (6)
  - Other (please specify) (7)
- 

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Page Break

Please select four to show that you are still paying attention.

- 1 (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
-

Page Break

---

How many times in a typical week do you open/log into an online dating app? If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.

---

Page Break

---

How many profiles do you view in a typical week on an online dating app? (Please provide your best estimate). If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.

---

Page Break

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How many people do you speak to in a typical week on an online dating app? If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.

---

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Page Break

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How many people that you met through an online dating app do you then go on to meet in person in a typical month? If you are not currently using dating apps but have done so in the past, please answer the following questions as they would have applied to you at the most recent time in your life when you were using them.

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Page Break

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How much time do you spend on dating apps per week, as reported by your smartphone? - - For Apple/iOS users, you can access this information using Screentime. To access Screentime data, go to Settings > Screen Time > See All App & Website Activity. - - For Android/Google users, you access this information using your Digital Wellbeing report. To access your Digital Wellbeing report, go to Settings > Digital Wellbeing & Parental Controls > The chart shows your device use today. For more info, tap the chart. (If you were unable to access your screen time on dating apps, please provide your best estimate and state that it is an estimate)

---

Hours

---

---

Minutes

---

---

Is this time the actual recorded use, or your best estimate?

- Actual time, as recorded by your smartphone (1)
- Best estimate (2)

End of Block: Dating App Use

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Start of Block: Wellbeing Sheet

## **Research Wellbeing Support Sheet**

### **An Investigation into Understanding Patterns of Online Dating App Use**

Thank you for completing the study questionnaires. We know that questions regarding your sexual orientation, relationship to carers, and patterns of dating app usage can be confronting and raise difficulties that can be hard to address. Please see below a list of resources, which we recommend accessing for further wellbeing support. **Researchers:** Nicholas Carragher

Amber Korde

**UCL, University of London Student Resources UCL Student Support and Wellbeing**

The Mental Health Practitioners provide mental health support to students who require support in primary care and, alongside the NHS GP surgery, form a common point of entry for triage, assessment, and referral (where needed) on to specialist mental health services.

Tel: +44 (0)20 3108 8836 **The CUBE Clinic** Provides support for students struggling with compulsive or addictive behaviours, including excessive digital use.

<https://www.clubdrugclinic.cnwl.nhs.uk/cube-clinic> **Counselling** Counselling can provide an opportunity to explore any underlying issues that may be impacting your mood or overall wellbeing. [https://www.ucl.ac.uk/students/support-and-wellbeing/counselling/register-](https://www.ucl.ac.uk/students/support-and-wellbeing/counselling/register-counselling)

[counselling](https://www.ucl.ac.uk/students/support-and-wellbeing/counselling/register-counselling) **UCL 24/7 Student Support Line** This team can support you with general wellbeing concerns and refer you to Royal Holloway's clinical and specialist services. Tel: +44 (0) 808 238 0077

**General Resources Talking Therapies (NHS service)** Talking Therapies helps adults aged 18+ from anywhere in the UK with anxiety, depression, and stress. The Talking Therapies service that you can refer to will depend on your GP Surgery. You can find the Talking Therapy Service that will be able to offer you support using the below link.

<https://www.nhs.uk/mental-health/talking-therapies-medicine-treatments/talking-therapies-and-counselling/nhs-talking-therapies/> **Hub of Hope** The Hub of Hope can help you to

identify local mental health services. <https://hubofhope.co.uk> **Samaritans** This free helpline is available 24-hours a day, seven days a week on: 116 123.

<https://www.samaritans.org> **Shout** Shout can provide mental health support by offering free and confidential 24-hours a day, seven days a week text support on: 85258.

<https://giveusashout.org> **Switchboard LGBT+ Helpline** Switchboard provides a one-stop listening service for LGBT+ people on the phone, by email and through Instant Messaging.

Find out more here: <https://switchboard.lgbt/> **London Friend** London Friend offers support for mental health, sexual health, to address concerns about alcohol and drug use or just someone to talk to. Their services are developed to improve the health and mental well-being of Lesbian, Gay, Bisexual, Transgender, Intersex or Queer people and are delivered by trained LGBT volunteers and staff. <https://londonfriend.org.uk/> **Crisis Support** If you're in immediate danger of hurting yourself or others: - Go directly to the Accident & Emergency (A&E) department of your local hospital. - Call 999 to request an ambulance if you are unable to reach the hospital yourself. - If you're feeling distressed and need urgent support: Contact your GP surgery to request an emergency appointment. If your GP surgery isn't open, call 111 for free out-of-hours NHS medical support. **If you require immediate support or have any concerns regarding the mental health of someone else, we advise that you go to your nearest Accident & Emergency department, call 999 or speak to your GP.** If you have any questions, feel free to ask them now or contact us using the details below.

Supervisors:

Dr Mauricio Alvarez Monjaras

Dr Marc Tibber

Dr Georgina Krebs

Dr Elizabeth Hogg

Researchers:

Nicholas Carragher

Amber Korde

End of Block: Wellbeing Sheet

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**Appendix 2**  
**Recruitment Poster**



# RESEARCH PARTICIPANTS WANTED



Take part in an online study investigating **Patterns of Online Dating App Use** among university students

Research conducted by University College London.

PARTICIPANTS MAY OPT INTO A PRIZE DRAW TO WIN ONE OF 10 X £20 GIFT VOUCHERS!

TO PARTICIPATE: CONTACT US OR SCAN THE QR CODE BELOW

Amber Korde:

[amber.korde.22@ucl.ac.uk](mailto:amber.korde.22@ucl.ac.uk)

Nick Carragher:

[nicholas.carragher.22@ucl.ac.uk](mailto:nicholas.carragher.22@ucl.ac.uk)

PARTICIPANTS MUST:  
BE 18 YEARS +  
SPEAK ENGLISH  
HAVE A SMARTPHONE  
BE OF ANY SEXUALITY

AN INVESTIGATION INTO UNDERSTANDING **PATTERNS OF ONLINE DATING APP USE**



**Appendix 3**  
**Ethical Approval**

Dr Mauricio Monjaras Alvarez  
Clinical, Educational and Health Psychology  
UCL

Cc: Nicholas Carragher and Amber Korde

26 April 2024

Dear Dr Mauricio Monjaras Alvarez

**Notification of Ethics Approval**

**Project ID/Title: 26999/001 An Investigation into Understanding Patterns of Online Dating App Use**

Thank you for submitting the above high-risk research ethics application for review by the UCL Research Ethics Committee (UCL REC).

Further to your satisfactory responses to the review feedback, I am pleased to confirm in my capacity as Chair of UCL REC that your study has been approved until **1st October 2024**.

Ethics approval is subject to the following conditions:

**Notification of Amendments to the Research**

Please seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued approval by completing an 'Amendment Approval Request Form' <https://www.ucl.ac.uk/research-ethics/responsibilities-after-approval>

**Adverse Event Reporting – Serious and Non-Serious**

It is your responsibility to report to the REC any unanticipated problems or adverse events involving risks to participants or others. The REC should be notified of all serious adverse events via the Research Ethics Service ([ethics@ucl.ac.uk](mailto:ethics@ucl.ac.uk)) immediately after the incident occurs. Where the adverse incident is unexpected and serious, the Chair will decide whether the study should be terminated pending the opinion of an independent expert.

For non-serious adverse events, the Chair should again be notified via the Research Ethics Service within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Chair will confirm that the incident is non-serious and report to the REC at the next meeting. The final view of the REC will be communicated to you.

**Final Report**

At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes issues relating to the ethical implications of the research i.e., any issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

In addition, please:

- ensure that you follow all relevant guidance as laid out in [UCL's Code of Conduct for Research](#);
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.

Yours sincerely



**Professor Sarah Edwards**  
Chair, UCL Research Ethics Committee

**Appendix 4**  
**Contributions to the Research Project**

## Contributions to the Research Project

Both Amber Korde and Nicholas Carragher completed the ethics application and designed the project, including questionnaire design. Participant recruitment initially occurred jointly until the minimum sample size was met for Carragher's (2025) study. At this point an ethics amendment was requested by Korde for targeted recruitment of men and sexual minorities and Korde conducted this targeted recruitment independently. Analysis of results, and the write-up of the theses were carried out individually.