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Social Touch Behavior in Same-Sex Female Friendships

Beatriz Gomes Lopes

Master's in Social and Organizational Psychology

Orientation:

David L. Rodrigues, PhD Auxiliary Researcher with Habilitation
Iscte- University Institute of Lisbon

October, 2025

CIÊNCIAS SOCIAIS
E HUMANAS

Department of Psychology

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Dedico este trabalho ao meu percurso académico.

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Durante seis anos passei por duas faculdades, centenas de pessoas, algumas com nome, outras sem. Foram seis anos de aprendizagens patrocinadas pelas minhas relações interpessoais, algumas amizades mais íntimas, outras menos íntimas, todas me ajudaram a crescer, e por isso um obrigada a cada um.

Resumo

O toque interpessoal é um comportamento prevalente em todas as culturas. Suscita emoções, facilita a persuasão e nutre relações interpessoais. No entanto, investigação aponta para diferenças individuais na adoção do comportamento de toque e na perceção do mesmo. Com o objetivo de investigar o comportamento de toque social, explorámos o papel da motivação de aproximação e evitamento como mediadora da associação entre a necessidade de toque interpessoal e o comportamento de toque social. Através de um design experimental de medidas repetidas entre participantes do sexo feminino (N = 212), com idades compreendidas entre os 18 e 29 anos. Após medir a necessidade de toque interpessoal e a motivação para o toque, os participantes responderam com que frequência adotavam sete comportamentos de toque (i.e., carícia na cara, braço e perna, beijo na cara e boca, abraço e deitar), com uma amiga mais íntima e com uma amiga menos íntima. Os resultados mostraram que em ambas as amizades, pessoas com maior necessidade de toque reportaram mais motivos de aproximação e evitamento, bem como mais comportamentos de toque social. No entanto, apenas os motivos de aproximação atuaram como mediadores da relação entre a necessidade de toque e o comportamento de toque em relações de amizade mais íntimas. Em relações de amizade menos íntimas as mediações em teste não foram significativas. Estes resultados evidenciam o papel do comportamento de toque como uma ferramenta de conexão em amizades mais íntimas.

***Palavras-Chave*:** processos sociais & problemáticas sociais; motivação & emoção; comportamento de toque social; comunicação não-verbal; intimidade; amizades

Abstract

Interpersonal touch is a prevalent behavior that transcends cultures, eliciting emotions, facilitating compliance, and nurturing interpersonal relationships. Nevertheless, research has shown that individuals vary in their predisposition for touching others and their perception of touch. To investigate individuals' social touch behavior, we explored whether approach-avoidance motives for touch mediated the relationship between need for interpersonal touch and social touch behavior. We employed a within-participants repeated measures experimental design with 212 female participants, aged 18 to 29. After measuring their need for interpersonal touch and motivation to touch, we asked themto report the frequency of seven touch behaviors (i.e., caress on the face, arm, and leg, cheek and mouth kiss, hug, and hand holding) with a more intimate friend and less intimate friend. Results showed that in both friendships, individuals with a higher need for social touch also reported more approach and avoidance motives for touch, and more touching behaviors. However, only approach motives mediated the association between the need for interpersonal touch and social touch behavior in more intimate same-sex friendships. In less intimate same-sex friendships, mediations failed to reach significance. These results evidence social touch as a behavior employed towards connecting with intimate friends.

***Key Words*:** social processes & social issues, motivation & emotion, social touch behavior, non-verbal communication, intimacy, friendships

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Introduction

The sense of touch is the first to fully develop and the main channel of communication with the world during the first months of life (Bremner & Spence, 2017). Some of the key moments of a newborn's development involve touch (e.g., breastfeeding, cuddling; Carozza & Leong, 2021). Moreover, infants' orientation toward grasping and manipulating objects throughout their development clearly shows the importance of touch on stimulation and development (Field, 2010). Later in life, adults rely on touch to physically explore and manipulate objects in their everyday life (Gallace & Spence, 2020), being essential to tasks such as driving, cooking, or typing. This refers to the discriminative role of touch. Through a class of stimulus receptors under the skin, and tactile afferents that conduct the information to the brain, individuals receive and process information about pressure, vibration, slip, and texture, thus providing necessary information to physically interact with the world (McGlone et al., 2007). In the context of interpersonal relationships, a simple touch, such as a gentle brush on the shoulder, allows individuals to convey and elicit in others intense emotions such as intimacy, which plays a crucial role in governing emotions (Gallace & Spence, 2010).

There are two relevant aspects of touch's important communication role. First, any communication happens in a historical and socioeconomical context, such that context and individual factors interact to shape communication. Additionally, verbal and non-verbal communication involves more than one sense simultaneously (i.e., individuals process input from the other senses, as well as internal thoughts and feelings). Hence, processing interactions encompasses an interplay of various factors that affect the exchange, as well as the cognitive and behavioral consequences for those involved. Second, there are two communication principles to keep in mind: the principle of equifinality, that is, various means may lead to the same communicative outcome; and the principle of equipotentiality, that is, the same message can have different communicative outcomes (Hertenstein et al., 2006). When considering touch, this means that several types of touch can convey the same message (e.g., both hugging and kissing can convey affection; principle of equifinality) and the same type of touch can convey different messages (e.g., a pat on the back can convey affection or dominance; principle of equipotentiality). Further on touch's communicative valence, research has shown that even in casual interactions between strangers, a gentle touch during an interaction favors not only prosocial behaviors on the person who is touched (e.g., increased compliance to requests) but also a more positive perception of the person who touched, when compared to the absence of

touch (Gallace & Spence, 2010; Hertenstein et al., 2006). Regarding social touch's consequences on behavior, a phenomenon extensively studied is compliance (Field, 2010). Several studies, employing a large diversity of experimental situations, have consistently found that a brief touch upon making a request is followed by a significantly larger compliance rate when compared to a control group that was not touched (Gallace & Spence, 2010). After a simple touch on the arm, professionals (e.g., library clerks, salespeople) are better rated (Fisher et al., 1976; Erceau and Guénguen, 2007). After being touched, people are more likely to lend money and are more generous when tipping (Kleinke, 1977; Crusco & Wetzel, 1984). Another type of experimental scenario shows that after being touched, people are more likely to assent to requests for help. Indeed, Willis and Hamm (1980) used an experimental design, and asked participants to fill out a questionnaire; the experimental group was touched on the upper arm, while the control group was not touched. Non-verbal cues remained the same in both conditions. Of the participants asked, 81% of the experimental group filled out the questionnaire, 55% of the control group did not. However, touch does not always lead to positive outcomes or sensations, as it can be painful, perceived as unpleasant, or even communicate an intention to harm or alienate (Sailer et al., 2024). As such, researchers must strive to continue investigating the implications of touch behavior.

Researchers have found evidence that culture is associated with different uses of touch to communicate (Gallace & Spence, 2010; Field, 2010; Suvilehto et al., 2019). For example, Sorokowska et al. (2021) examined social touching behavior across 45 countries, aiming to establish similarities and differences across a diverse range of sociocultural contexts. Results showed that the prevalence and diversity of touching behavior significantly differed across countries. Temperature (i.e., climate and its demands influence some cultural tendencies and customs) was found to be significantly and positively correlated with the prevalence of social touch behavior. Also, countries with higher scores of cultural conservatism (i.e., related to an affective and social disengagement with their social network) and religiosity (i.e., cultural adherence to religious beliefs and practices) were associated with a lower diversity of touch behavior. In another study, Burlsen et al. (2019) compared the comfort and acceptance of social touch between Mexican-American and European-American cultural contexts. Social norms, which differ across cultures, are likely to shape attitudes and behavior, along with other variables (e.g., individual differences). Because Latinx cultures are thought to be more welcoming to the expression of affection, researchers hypothesized and found a higher level of social touch acceptability among people in the Mexican-American sample. Even though personal comfort with social touch was not significantly different between both samples, a

lower level of (American) acculturation among Mexican-American participants was linked to a higher comfort and more positive attitudes toward social touch, highlighting a relationship between culture and attitudes toward touch. As shown in Sorokowska et al.'s (2021) results, individuals from Portugal tend to display high touch behavior indices. As such, the current study was conducted in this sociocultural context to expand the limited body of research focused on this thematic (i.e., social touch) in this sociocultural context.

Although there is variability in how humans behave, which is connected to several factors across different levels of analysis (e.g., who is the conversational partner at a relational level), the similarities and widespread prevalence of touch behavior support the argument that social touch has an important role in establishing and developing social bonds (Suvilehto et al., 2019; Sorokowska et al, 2023). Researchers have been interested in understanding the connection between social relationships and changes in health. The term "social relationships" is used as an umbrella term that encompasses psychosocial determinants (e.g., social integration, quality of social network). These determinants' association with health outcomes has consistently been positive (Umberson & Montez, 2010; Camilo et al., 2024). Specifically, the availability of a solid social network (e.g., social integration and social support) has been connected to individuals' better physical health (i.e., better cardiovascular, neuroendocrine, and immune functions) and longevity in comparison to those with weaker social networks (Holt-Lunstad et al. (2010); Holt-Lunstad, 2017). Additionally, social relationships greatly impact protective factors for mental health (e.g., subjective well-being, affective balance; Andersen et al., 2021; Camilo et al., 2024). Nevertheless, the quality of social connections is relevant to the health benefits. For example, ambivalent friendships (i.e., characterized by both supportiveness and avoidance or indifference) are associated with a greater cardiovascular reactivity to stress (Holt-Lunstad & Clark, 2014). Also, individuals who are unsatisfied in their romantic relationships tend to experience, to a lesser extent, the health benefits associated with being in a romantic relationship (Holt-Lunstad & Clark, 2014; Stadler et al., 2012). The Need to Belong Theory (Baumeister & Leary, 1995) provides an important framework for understanding how and why social relationships are crucial to psychological well-being. According to this theory, social relationships help fulfil peoples' need to belong- an internal drive to develop, establish, and maintain interpersonal relationships with others. The fulfilment of this need renders benefits to well-being. Congruently, Cohen and Willis (1985) highlighted the positive role of support provision from the social network, not only because it offers a sense of stability and predictability to individuals but also because it offers regular positive and rewarding interactions, which can help reduce the impact of stressful events. Indeed, the potential benefits

that close relationships bring to individuals' well-being seem to be explained by the fulfilment of basic needs (e.g., feelings of connection, love, intimacy) and by the provision of support through adversities (Pietromonaco & Collins, 2017). It is important to note that research has highlighted the prevalence of individual differences in how relationships, such as friendships, are managed and consequently how they are associated with positive outcomes (Pezirkianidis et al., 2023). For example, Pearce et al. (2020) reported behavioral differences in that individuals vary according to assigned sex in friendship traits that predict intimacy. The authors suggest women's priorities are more related to closeness in the relationship, while men are more related to engagement in social activities. However, Gillespie et al. (2014) reported more similarities than differences, such that both biological sexes incorporate in their network both types of friendships. This inconsistency advises carefulness when studying social relationships.

Social touch's direct and indirect impact on health and well-being accentuates the relevance of researching and further understanding the mechanisms associated with this behavior (Jakubiak & Feeney, 2016). The present study aimed to contribute to research on social touch behavior by examining individual and relational factors that may be associated with this behavior. Attending to touch's role in establishing and nurturing interpersonal relationships, our research was designed to address the questions: I) Are there individual differences in the need for interpersonal touch associated with variability in social touch behavior in same-sex female friendships? II) Is the association between need for interpersonal touch and social touch behavior explained by different motivational systems related to touch? III) Are there different patterns of touching behavior and different underlying use of motivational systems for touch, in same-sex female friendships, depending on their levels of intimacy?

CHAPTER 1

State of the Art

1.1. Social Touch

Social touch can be defined as a tactile behavior that happens between two people -it is interpersonal (Cascio et al., 2019). It is possible to identify two major functions for this behavior: 1) non-verbal communication and 2) emotional regulation (analyzed in subsection 1.3). Firstly, as a non-verbal communication behavior, social touch is used to convey feelings (Hertenstein et al., 2006; Hertenstein & Keltner, 2010) or enhance the message of other communication means (e.g., speech, eye contact; Gallace & Spence, 2010). Its study has two main approaches: the structural approach focuses on decoding the meaning of each type of touch (e.g., stroke, punch) and studying its dimensions (e.g., duration, frequency, and intensity); the functional approach focuses on the consequences of touch (Hertenstein et al., 2006). The consequences of social touch have been closely linked to how this behavior is perceived (Saarinen et al., 2021). As the person touched, one´s perception is influenced by more factors than the physical characteristics of the touch itself (e.g., pressure, temperature, speed; Ellingsen et al., 2016). Indeed, touch can be felt differently, depending on contextual factors (Harjunen et al., 2016). Research has found that characteristics of the person who touches (both physical and body language), their perceived intentions, their level of familiarity or closeness, and environmental clues (i.e., presence of other stimuli, such as odor) influence perception of touch (Saarinen et al., 2021). In summary, variance in both prevalence and perception of social touch behavior is explained by factors on cultural, situational, relational, and individual levels of analysis (Ellingsen et al., 2016), that together shape social touch's impact on oneself (Sailer et al., 2024) and their behavior (Cascio et al., 2019).

The next section highlights research on individual and relational factors that shape the prevalence and perception of touch behavior.

1.2 Individual and Relational Factors

In their study, Dorros et al. (2008) investigated how personality differences were associated with people´s perceptions of social touch by their romantic partners. Results showed that people who scored higher on agreeableness and openness to experience perceived being touched more positively. More recently, Bowling et al. (2024) also investigated associations between personality and social touch attitudes (employed several measures in which the relationship to

the toucher varied). Results showed that people who scored higher on extraversion also reported more positive attitudes toward social touch. Sailer et al. (2024) experimentally examined whether individual differences in need fulfilment were associated with the perception of being touched (i.e., if the experience was positive or negative). Participants were asked to recall and describe either their most positive touch experience or their most negative touch experience. In addition to collecting data about touch experience (e.g., relationship to the interaction partner, touch type, and touch characteristics), researchers also assessed individual differences in need fulfilment, aiming to establish determinants that influence the perception of an interpersonal touching experience. The relationship with the interaction partner was significantly related to the touching experience: for participants, being touched by a friend, family member, or romantic partner was more likely to be experienced as positive. Also, when the perception of initiative to touch was mutual, it was significantly more likely to be associated with a positive touch experience. Overall, need fulfillment was associated with more positive affect and less negative affect toward the touch experience. Most interestingly, the fulfilment of the need for relatedness was significantly correlated with a positive touch experience. This suggests that touch behavior is closely linked to the satisfaction of the need for relatedness.

In a different experimental setting, Harjunen et al. (2016) used virtual reality to investigate how individual characteristics shaped the perception of touch. Participants were exposed to a virtual character showing different emotional facial expressions (i.e., affective manipulation), while a tactile glove delivered stimuli to the participant's hand to simulate social touch. The individual characteristics assessed were gender and the behavioral inhibition system (BIS) sensitivity, a neurobiological trait associated with the motivational system of avoidance of negative or unpleasant experiences. Touch perception, both physical characteristics of touch (i.e., intensity) and affective evaluations (i.e., pleasantness), was measured using self-reports and the cardiac orienting response, that is, a biological response activated when one feels threatened. Results showed that participants exposed to facial expressions representing anger, fear, and happiness significantly reported a more intense touch. Participants reported perceiving the simulated touch as less pleasant when exposed to the anger facial expression, but the simulated touch was reported as more pleasurable when the participant was exposed to the happiness facial expression. These findings help establish that affective stimuli (manipulated by the facial expressions) influence the perception of touch and its affective value. Crucially, this research showed that individual differences influence touch perception, as participants with higher BIS sensitivity perceived the touch as more intense when exposed to anger, fear, and happiness. They also exhibited increased cardiac rate response upon touch, independently of

the virtual character's facial expression. Results were only significant in males; however, the authors advise not to discard the influence of individual traits on women's touch perception.

An extensively studied individual variable is attachment (Thompson et al., 2022). Attachment refers to trait-like tendencies that stem from infant-caregiver interactions and develop throughout their lives, impacting how individuals interact within their interpersonal relationships (Walker et al., 2021). Carmichael et al. (2020) found that attachment insecurity is significantly associated with self-reported feelings about touch. Those who scored higher in anxiety attachment reported positive feelings about touch, whereas those scoring higher on avoidant attachment reported negative feelings about touch. Particularly, reports of self-initiation significantly varied. Those with an anxious attachment style reported that they perceived themselves as showing more initiative for touch than their partners. Conversely, those with an avoidant attachment style reported that they perceived themselves as initiating touch less often than their partners. Researchers also examined whether these perceptions translated into reported prevalence of touch behavior (e.g., caressing, cuddling, kissing). Contrary to the hypothesis, no association was found between attachment anxiety and touch behavior. In contrast, attachment avoidance was found to be significantly and negatively associated with touch behavior. Analysis further revealed that attachment anxiety acted as a moderator of the association between avoidant attachment and touch behavior, which was only significant when attachment anxiety was low.

The research reported unveils a close link between individual variables and both physical and affective perceptions of touch, potentially influencing touching behaviors. In the current study, we decided to examine the need for interpersonal touch, a variable that describes the extent to which an individual relies on information collected via touch. An individual scoring higher can be described as more sensitive to interpersonal touch and subject to a higher influence of its perception on ongoing judgements (Nuszbaum et al., 2013).

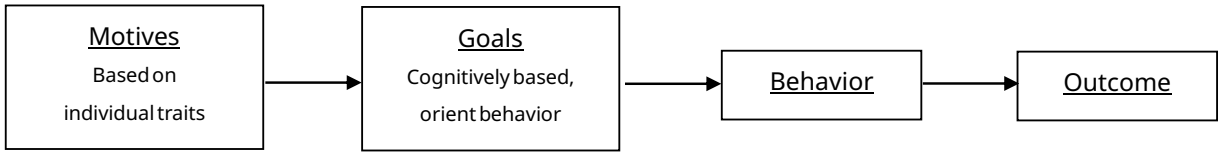
1.3. Motivation for Social Touch

Social touch is intrinsically connected to emotional regulation (Fotopoulou et al., 2021). For example, when exposed to stressors or aversive situations (e.g., seeing the picture of a deceased loved one), social touch has been shown to relieve negative emotional experiences (Dagnino-Subiabre, 2021; Saarinen et al., 2021). Research has also shown that touch behavior is associated with the improvement of the emotional state of both romantic partners (Debrot et al., 2013a; Debrot et al., 2013b; Jakubiak & Feeney, 2018). Massaccesi et al. (2020) illustrated

touch's regulatory function by showing that individuals who were induced into aversive affective states reported wanting to be touched. As a regulatory mechanism, it is proposed that social touch behavior can be employed to seek a sense of balance (Schirmer et al., 2022). For example, individuals are more likely to embrace their partner if they wish to offer comfort. Therefore, regulation can be understood as the motivation to adopt a certain behavior that seeks to shorten the distance between one's current emotional state and the desired state (Gable & Impett, 2012). However, the underlying mechanisms through which this occurs vary. The Hierarchical Model of Approach-Avoidance Motivation (Elliot, 2006) accounts for two different pathways of motivation (i.e., approach and avoidance). This framework's basic premise is that individuals establish goals for their daily lives based on their dispositional tendencies (i.e., motive dispositions). Motives are general, affectively based tendencies that create momentum for the individual to fulfill their needs. Motives are then the basis for the goals one establishes. Goals are cognitively based, involve planning, and direct the individual's behavior. The individual's tendency to move towards a desired outcome or away from an undesired outcome distinguishes the motivation pathway as either approach or avoidance, respectively. In summary, by employing the approach motivation mechanism, one incorporates approach goals to adopt a behavior that leads them towards the desired outcome. The avoidance mechanism is characterized by avoidance motives that generate avoidance goals; the behavior is adopted to lead the individual away from an undesired outcome (Gable, 2005).

Figure 1.1

The Hierarchical Model of Approach-Avoidance Motivation



Note: Figure developed based on *Elliot et al.'s (2006) theoretical* premises.

The empirical test of this model applied to the social domain has been successful by Gable (2005) and Elliot et al. (2006). Elliot et al. (2006) tested the full Hierarchical Model of Approach-Avoidance Motivation in friendships, using subjective well-being and physical symptoms as outcomes. Results showed hope for affiliation (approach motive) as significantly and positively related to friendship approach goals (e.g., "deepen relationships with friends", "share many fun and meaningful experiences with my friends"), which was then established as

proximal predictors of positive subjective well-being (e.g., life satisfaction). On the other hand, fear of rejection (avoidance motive) was significantly and positively associated with avoidance goals (e.g., "avoid disagreements and conflicts with my friends", "avoid getting embarrassed, betrayed, or hurt by any of my friends"), which was then established as proximal predictors of physical symptoms (e.g., headaches, acne, and upset stomach). Approach and avoidance mechanisms are thought to be independent and complementary. When activated, both systems can lead to beneficial outcomes for the individual (Gable 2005; Nikitin & Freund, 2008). Schoch et al. (2015) examined the role of approach and avoidance motives after social acceptance and rejection. Researchers found that social approach motives were significantly and positively associated with attributions following social acceptance; whereas social avoidance motives were significantly and positively associated with attributions following social rejection. These results contribute to the view that these mechanisms are independent, suggesting they are employed in different contexts.

The application of approach-avoidance motivation in research can be observed in a series of three studies by Jakubiak et al. (2020). Researchers examined if attachment style (as an individual variable) was associated with motives for touch and if motives influence daily relationship well-being. Results from Study 1 showed that attachment avoidance was significantly and negatively associated with approach motives for touch, but positively and significantly associated with avoidance motives for touch. In contrast, attachment anxiety was positively and significantly associated with both approach and avoidance motives. Study 2 employed a different methodology by asking both romantic partners to individually answer a questionnaire to measure baseline attachment style and relationship quality and then, over 28 days, answer a questionnaire that included measures for motives for touch and relationship quality. Results corroborated the directions from Study 1; however, some were not significant. This was the case for the association of avoidant attachment with avoidance motives and the association of anxiety attachment with approach motives. Nevertheless, there was a significantly positive association between anxiety attachment and avoidance motives and a positive marginal association with approach motives. A greater avoidant attachment was associated with a more aversive posture towards touch, showing disinterest in the behavior (Carmichael et al., 2020), which can reflect on non-significant results related to motivation to touch. We built upon this evidence to explore whether individual differences in need for interpersonal touch are associated with motivation to touch, and how motives are linked to social touch behavior.

1.4. Social Touch Behavior and Interpersonal Relationships

At the interpersonal level, it is relevant to highlight a key factor for social touch perception and behavior. Suvilehto et al. (2015) asked participants to indicate, on a human silhouette, which body parts they would allow different network members (i.e., partner, parents, relatives, friends, and acquaintances) to touch them. Results showed distinct patterns, depending on the network member. For example, strangers were only allowed to touch hands, whereas friends were allowed to touch hands, arms, head, and shoulders. The authors also found that allowance for touch positively varied according to the level of emotional bond. That is, a stronger emotional bond with the toucher was associated with a larger area of the body that participants allowed to be touched. Specifically, partners had the highest emotional bond scores across the sample, and participants reported they were allowed to touch any part of their body.

More recently, Sorokowska et al. (2021) conducted a study aimed at examining differences in touch behavior. Participants were asked to report which behaviors they enacted (i.e., kiss, stroke, embrace, and hug) during the previous week with different members of their network (i.e., partner, own child, female or male friend). Researchers found that the prevalence of touch was not only significantly related to the type of relationship (see also Suvilehto et al., 2015) but also to the type of touch. Across the different network members, partners and own child had an overall higher prevalence of touch and a larger diversity of types of touch. All touch types (i.e., hugging, embracing, kissing, and stroking) with these network members were significantly more prevalent in comparison to friends. The latter were routinely hugged and embraced but the remaining types of touch (i.e., kissing and stroking) were rarely prevalent. Both studies show that the level of intimacy is closely associated with social touch behavior and that, for different relationships, there are different ways to communicate through touch behavior.

Intimacy is presented as a major aspect of social relationships' development and maintenance (Clark & Reis, 1988). To describe these processes, Reis and Shaver (1988) proposed The Interpersonal Process Model of Intimacy (also see Laurenceau et al., 2004). The researchers' first step consisted of drawing a model of an intimate exchange between a dyad. In these exchanges, influenced by their dispositional factors, one adopts a disclosing behavior via verbal or non-verbal communication channels—initiating the intimacy process—and giving some insight into one's inner self. The partner and their behavior in response will be vital to proceed with the intimacy process (Laurenceau et al., 2005). The disclosing behaviors (verbal or non-verbal) adopted by each individual within the dyad will influence both individual factors (i.e., cognitive schemas, expectations, motivation, goals; Reis & Shaver, 1988) and relational

factors (e.g., commitment; Coy et al., 2019) within both actors of the dyad. Overall, intimacy is nurtured with responsiveness leading to feelings of support, understanding, and decreased defensiveness on both actors, culminating in a climate prone to further intimate exchanges (Laurenceau et al., 1998). Given the interconnectedness between social touch behavior and intimacy, we argue that it is relevant to explore how social touch behavior varies across intimacy levels.

Close relationships are associated with physical and psychological well-being by providing support and satisfying the need for human bonding (Pezirkianidis et al., 2023; Gómez-López et al., 2019). In their study, Camirand and Poulin (2022) assessed three dimensions of psychological well-being (i.e., self-esteem, depressive symptoms, loneliness) and the level of intimacy and conflict in participants' relationships with their partner and their best friend. Results showed that both relationships have an independent and complementary impact on people's well-being. For example, higher intimacy scores with a best friend were significantly associated with less loneliness, and higher intimacy with a romantic partner was significantly associated with fewer depressive symptoms. Additionally, a high level of intimacy with the best friend was associated with a higher self-esteem, particularly when individuals' intimacy level with the romantic partner was low/medium, and there was a medium/high level of conflict with the partner. This result points to a protective role of best friendships when individuals are in low-quality romantic relationships. Langheit and Poulin (2024) found a similar link, such that a greater friendship quality and intimacy were associated with less loneliness and higher self-esteem. Aligned with this evidence, the current study focused on friendships to better understand touch behavior in this context.

Friendships are relational bonds established with people outside the family network. Generally, friendships involve time spent while engaging in social activities, sharing interests, personal information, and support (Gillespie et al., 2014). These relationships are considered fundamental to the social support network through both number and quality. Hence, friendships are highly relevant to well-being outcomes such as happiness and health (Holt-Lunstead, 2010; Camilo et al., 2024). Friendships' composition and characteristics are diverse, encompassing various levels of intimacy (i.e., from the most superficial friend to a long-term confidant in a close friend) that shape how people behave (Field, 1999). For instance, shared time with a close friend is more frequent and more deliberate than with a casual friend (Hays, 1989; Oswald, 2004). Also, more intimate friendships have a stronger association with personal happiness when compared to less intimate friendships (Demir et al., 2015).

Felmlee et al. (2012) studied gender differences in the perception of unspoken social norms in friendships. Women were more critical than men of friendship violations committed by their friend (e.g., as cancelling plans, not publicly defending them). Additionally, when a woman transgressed trust, she was judged more harshly than men, suggesting female friends were held to higher standards than male friends. Regarding touch norms, the condition in which male participants were kissed on the cheek by male friends was reported as significantly less appropriate than when female participants were kissed on the cheek by a male friend. On the other hand, the condition in which a female participant was kissed on the cheek by a male friend was perceived as significantly less appropriate than when it was a female friend initiating the kiss on the cheek. These results suggest that it was more acceptable for females to show physical affection. Not only is gender associated with different evaluations of norm violations, the gender of the partner is also associated with different evaluations. Through the observational method, Major et al. (1990) investigated the variance of touch behavior within same-sex and different-sex dyads. Researchers reported that different-sex social touch was twice more frequent than same-sex touch. Additionally, whether either gender is more likely to initiate or receive touch is highly dependent on the sex of the partner. For example, men were significantly more likely to initiate touch in different-sex dyads. Using an experimental setting, Hertenstein & Keltner (2010) assessed if women and men differed in their effectiveness in communicating emotion via touch. Participants (one acted as the person who touched and the other as the person who was touched) were only allowed to communicate with each other through touch on the forearm. The person who touched received a series of emotions they were instructed to convey to the other participant using any type of touch they thought would help them succeed. Results showed gender differences in decoding sympathy, anger, and happiness through a touch in the forearm. For sympathy to be consistently and accurately communicated, there had to be at least one female on the dyad. In contrast, for anger to be consistently and accurately communicated, there had to be at least one male in the dyad. Happiness was only consistently and accurately communicated in same-sex female dyads. Given the inconsistent data about gender differences in the processes involved (e.g., management of intimacy and social touch behavior) and the possibility of variability of behavior in same-sex and different-sex dyads (Schirmer et al., 2022), our study focused on same-sex female friendships in order to control for possible parasite effects of gender variability.

Recently, Langheit & Poulin (2022) conducted a longitudinal study on gender differences in the quality of best friendships among same-sex dyads in their emerging adulthood. Emerging adulthood is a stage of development that involves the transition to adulthood, between the ages

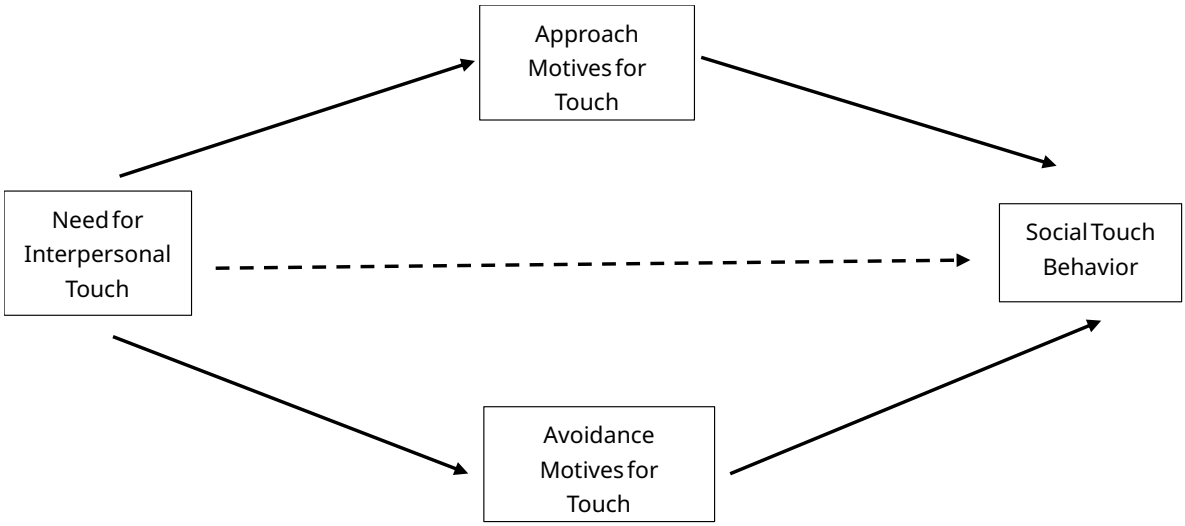
of 18 and 29, integrating the last years of education and the beginning of a professional career (Arnett, 2014). It is characterized by the motivation to engage in exploring behaviors, both towards the world and inward, into the person's identity, their desires, and goals (Layland et al., 2017). This openness to experience and exploration facilitates the establishment of friendships (Arnett et al., 2014; Wood et al., 2017), in a stage also known for instability and changes in the person, their environment, and relationships (Lapierre & Poulin, 2020; Camirand & Poulin, 2022). Langheit & Poulin (2022) found that at 19 years old, women reported higher intimacy and companionship, and lower conflict than men in friendships. The development of the relationship also varied according to gender; women's intimacy with their best friend decreased through their 20's, while men's remained stable. These results highlight emerging adulthood as a highly interesting stage to investigate social touch behavior.

1.5. Current Study

The present study aimed to investigate mechanisms that might help explain why some people desire and enact more social touch with their same-sex friends, whereas others refrain from it. A larger body of research on social touch focuses on its consequences, but the mechanisms that lead to this behavior are still largely uncovered. Drawing from the hierarchical model of approach-avoidance motivation(Elliot, 2006), we propose that differences in the need for interpersonal touch—as an individual disposition—are the basis of approach and avoidance motives, which can emerge as underlying psychological mechanisms to explain different social touch behaviors. Based on the research reviewed, we expected the need for interpersonal touch to be positively associated with the frequency of social touch behavior (H1). Furthermore, based on Jakubiak et al.'s (2020) results, we expected a positive association between the need for interpersonal touch and both approach (H2a) and avoidance motives for social touch (H2b). We also propose that approach and avoidance motives explain the higher frequency of social touch behavior associated with those scoring higher on need for touch in more intimate (H3a) and less intimate same-sex female friendships (H3b). Given that a closer emotional bond is associated with more permission to touch (Suvilehto et al., 2015), we expected results from the mediation model to be stronger in more (vs. less) intimate same-sex friendships (H4).

Figure 1.2

Theoretical Model Tested



Note: Theoretical model tested for more and less intimate same-sex friendships separately.

CHAPTER 2

Method

2.1 Participants and Design

A total of 233 participants completed the online survey. We removed responses from participants with ages above 29 years (i.e., outside the emerging adulthood age range; n = 3), who reported a sex assigned at birth other than female (n = 3), failed the attention checks (*n* = 14), and failed to answer all measures under analysis (*n* = 2). The final sample included 212 participants, assigned female at birth, with ages between 18 and 29 years old (M = 23.12, SD = 3.35). Most participants identified as heterosexual (65.1%), reported being in a committed relationship (53.6%), and reported having completed higher education courses (63.3%). All sociodemographic characteristics are summarized on Table 1.

This study had a within-participant repeated measures experimental design, such that participants were asked to report their touching behavior with more and less intimate same-sex friends.

Table 2.1

Sociodemographic Characteristics

	n	%	*M*	*SD*
Age	212	—	—	3.35
Sexual identity	—	—	—	—
Heterosexual	138	65.1	—	—
Lesbian	18	8.5	—	—
Bisexual	40	18.9	—	—
Queer	2	.9	—	—
Pansexual	10	4.7	—	—
Rather not answer	4	1.9	—	—
In a committed romantic relationship	120	56.6	—	—
Highest educational level	—	—	—	—
Primária	1	.5	—	—

Highschool or equivalent	74	34.9	—	—
Bachelor's degree	90	42.5	—	—
Master's degree	44	20.8	—	—
Other	3	1.4	—	—

2.2. Measures

2.2.1. Need for Interpersonal Touch

We used the Need for Interpersonal Touch Questionnaire (Nuszbaum et al., 2013) to assess individual predispositions toward touching behavior in interpersonal interactions (e.g., "During a conversation, it may well happen that I touch the arm of my conversational partner."). The measure was translated into Portuguese using the translation-back translation method (Brislin, 1970). Two people whose native language is Portuguese and are proficient in English translated, independently, the original English to Portuguese and compared versions. Disagreements were settled through discussion. Upon agreement, they proceeded to independently translate the Portuguese version back to English. Again, disagreements were discussed and settled to finalize the translation process. Responses were given on 7-point rating scales (from 1 = *Not at all true* to 7 = *exactly true*). A single score was computed by averaging scores across all items (α= .86), such that higher scores indicate a greater need for interpersonal touch.

2.2.2. Motives for Touch

We used the Touch Motives Scale (Jakubiak et al., 2020) to assess approach motives (four items; e.g., In general, I touch my friend because I want to feel comforted or taken care of) and avoidance motives for touch in friendships (four items; e.g., In general, I touch my friend because I want to avoid feeling bad or stressed). This measure was also translated to Portuguese using the translation-back translation method described above. Responses were given on 7-point rating scales (from 1 = *Does not apply at all to* 7 = *Applies very much*). Scores for each subscale were computed by averaging responses, such that higher scores indicate more approach motives (α = .86) and avoidance motives (α = .89).

2.2.3. Social Touch

This measure was developed based on Sorokowska et al. (2021) affective touch questionnaire, aimed at assessing the prevalence of different types of touch. Specifically, we asked participants to indicate how frequently they enacted seven touching behaviors: caress in

the face, caress in the arm, caress in the leg, kiss on the cheek, kiss on the mouth, hug, and holding hands. Note that caress and kiss touches were assessed according to location, to include variants of this behavior that differed in intimacy level. This assessment was supported by Suvilehto et al.'s (2015) research, which found that emotional bond was significantly associated with allowance for touch on thehead, torso, legs, and feet. Hence, caress on the face and leg were characterized as high intimacy behaviors. In contrast, caressing the arm was characterized as a low intimacy behavior, as well as kissing on the cheek and hugging, which are common greeting rituals observed in various contexts and types of relationships (Chapelain et al., 2016; Payne-Allen & Pfeifer, 2022). Lastly, kiss on the mouth and hand holding are touching behaviors more associated with romantic relationships, therefore associated with high intimacy relationships (Afifi & Johnson, 1999; Jolink et al., 2021). Participants answered this measure twice, once for the more intimate same-sex female friendship and for the less intimate same-sex female friendship. Responses were given on 7-point rating scales (from 1 = *I never do* 7 = *I always do*).

We ran a Confirmation Factor Analysis, see Table 2.2. Taking these results into account we chose to compute two scores for more and less intimate same-sex female friendship (as suggested by the analysis in the less intimate same-sex friend), allowing for a more detailed analysis, by averaging the scores for the more intimate social touch (i.e., caress on the face, caress on the leg, kiss on the mouth, hand holding; $\alpha = .79$) and for the less intimate social touch (i.e., caress on the arm, kiss on the cheek, hug; $\alpha = .79$).

Table 2.2

Results From the Confirmation Factor Analysis of the Social Touch Measure

More intimate friend		Less intimate friend		
Item	Factor loading	Item	Factor loading	
	1		1	2
Factor 1		Factor 1: More Intimate Social Touch		
2. Caress on the arm	**.84**	5. Mouth kiss	**.93**	−.27
1. Caress on the face	**.82**	3. Caress on the leg	**.87**	−.05

3. Caress on the leg	**.76**	1. Caress on the face	**.70**	.22
7. Hand holding	**.75**	7. Hand holding	**.50**	.41
4. Cheek kiss	**.68**	Factor 2: Less Intimate Social Touch		
6. Hug	**.67**	6. Hug	−.01	**.89**
5. Mouth kiss	**.43**	4. Cheek kiss	−.23	**.88**
—	—	2. Caress on the arm	.37	**.52**

2.2.4. Intimacy

Intimacy served as our manipulation check. We used an adapted version of the intimacy subscale from the Short Version of Sternberg's Triangular Love Scale (TLS-15; Kowal et al., 2023) to assess intimacy in the friendships assessed (e.g., "I have a warm relationship with my friend."). Responses were given in a 5-point scale (from 1 = not at all to 5 = extremely). The original measure was previously translated and validated with a Portuguese sample (Kowal, 2023). Scores were computed by averaging the responses for the more intimate same-sex friend ($\alpha = .83$) and for the less intimate same-sex friend ($\alpha = .86$).

2.3 Procedure

Data was collected online through a questionnaire located on the platform Qualtrics and shared via social media. The post consisted of the inclusion criteria (i.e., between 18 and 29 years old, female sex, and Portuguese speaker), a QR code, and a hyperlink that, when accessed, presented prospective participants with the consent page. This page included information about who was running the study, the inclusion criteria, and the expected duration (i.e., 10 minutes). Individuals were informed that participation was confidential and voluntary, and that they could leave the survey at any time without penalization.

After giving their consent, participants were presented with sociodemographic questions, followed by the need for interpersonal touch and motives for touch measures. The first attention check was then presented in the form of an instructional manipulation check (Oppenheimer et al., 2009). Participants were asked to choose the word "Central" in a list of four other words that started with the letter "C". Then, participants were asked to think of a same-sex friend (more intimate and less intimate; presented in random order) and to report the prevalence of

social touch behaviors and their perceived level of intimacy with the same-sex friend (i.e., manipulation check). When answering about the more intimate same-sex friend, participants were presented with the prompt "Think about you and how you behave with same-sex people whom you are friends with. Specifically, think about how you behave with a very intimate friend, for example, someone who is important to you, with whom you feel close to and spend a lot of time with.". When answering about the less intimate same-sex friend, participants were presented with the prompt "Think about you and how you behave with same-sex people whom you are friends with. Specifically, think about how you behave with a not-so-intimate friend, for example, someone who is not particularly important to you, with whom you don't feel close, and spend time occasionally.". At the end, participants were asked to indicate their levels of attentiveness while answering the questionnaire (1 = No attention *at all* to 5 = *Full attention*; answers < 4 were removed from the sample). Lastly, participants were asked if they wanted their answers to be considered for analyses (1 = *Yes, I wish for my answers to be considered for analysis*, 2 = *No, I wish for my answers to be disregarded*). The questionnaire concluded by thanking participants and explaining the aim of the study. Data was collected from March to July 2024.

2.4. Analytic Plan

Data was analyzed with IBM SPSS, version 29. First, correlations between variables were examined. We then tested for *a priori* differences according to age and sexual orientation (recoded as 1 = heterosexual, 2 = sexual diversity). We correlated age with all other variables and tested for sexual orientation differences using *t*-tests. Lastly, we used Model 4 of the PROCESS macro for SPSS (Hayes, 2022), with 10,000 bootstrap samples. Specifically, we tested our hypotheses using a parallel mediation in which need for interpersonal touch was the predictor variable (X), and approach motives and avoidance motives were the mediators (M1 and M2, respectively). The outcome variables were more intimate social touch and less intimate social touch with more intimate and less intimate same-sex friends, tested separately. As such, we computed four mediation models.

CHAPTER 3

RESULTS

3.1. Preliminary Analysis

Overall descriptive statistics and correlations are presented in Table 4.1. Most variables were significantly and positively associated with each other. As an exception, less intimate social touch with a less intimate same-sex friend was not significantly correlated with motivation to touch (i.e., approach and avoidance motives for social touch) and intimacy towards a more intimate same-sex friend.

Table 3.1.

Descriptive Statistics and Correlations for Study Variables

Variable	*M (SD)*	1	2	3	4	5	6	7	8
1. Need for social touch	4.00 (.83)	—							
2. Approach motives	4.68 (1.39)	.53***	—						
3. Avoidance motives	2.94 (1.54)	.45***	.45***	—					
4. Intimacy (more intimate friend)	4.27 (.74)	.38***	.45***	.21**	—				
5. More intimate social touch (more intimate friend)	2.24 (1.21)	.49***	.46***	.36***	.38***	—			
6. Less intimate social touch (more intimate friend)	4.53 (1.49)	.58***	.51***	.35***	.46***	.66***	—		
7. Intimacy (less intimate friend)	3.33 (.64)	.35***	.36***	.13	.82***	.30***	.40***	—	
8. More intimate social touch (less intimate friend)	1.23 (.56)	.27***	.01	.09	.09	.48***	.31***	.21**	—
9. Less intimate social touch (less intimate friend)	2.50 (1.19)	.43**	.24**	.15*	.28***	.42***	.51***	.43***	.61***

*$p < .05$; **$p < .01$; ***$p \leq .001$

Confirming H1, those with a higher need for interpersonal touch reported more intimate social touch, r = .49, p < .001, and less intimate social touch, r = .58, p < .001, with their more intimate same-sex female friend. Also, those with a higher need for interpersonal touch reported more intimate social touch, r = .27, p < .001, and less intimate social touch, r = .43, p < .001, with their less intimate same-sex female friend.

3.2. Demographic Differences

Age was significantly and negatively correlated with need for touch, r = -.17, p = .014, avoidance motives for social touch, r = -.18, p = .009, and more intimate social touch with a more intimate same-sex friend, r = -.18, p = .009. Additionally, as shown in Table 3.4, the t-test for independent samples showed significant differences with several variables. For example, need for interpersonal touch was significantly different in both populations, t(124.76) = −2.58, p = .011, d = .80. As our results indicate significant differences in age and sexual orientation across some of our tested variables, both variables were included in the main analyses as covariates.

Table 3.2.

Significant Results of the T-test Independent Samples for Differences with Sexual Orientation as Factor

Note. Het = heterosexual, Div = sexual diversity

		M (SD)	*t*	*df*	*p*	*Cohen's d*
Need for interpersonal touch	Het	3.90 (.77)	−2.58	124.76	.011	.80
	Div	4.22 (.87)				
More intimate touch-More intimate same-sex friend	Het	1.97 (1.01)	−4.62	107.42	<.001	1.15
	Div	2.76 (1.39)				
Less intimate touch-More intimate same-sex friend	Het	4.37 (1.43)	−2.22	126.49	.028	1.48
	Div	4.88 (1.59)				
More intimate touch-Less intimate same-sex friend	Het	1.11 (0.28)	−3.36	81.73	.001	0.45
	Div	1.39 (.66)				

3.3. Manipulation Check

Participants reported more intimacy for their more intimate same-sex friend (M = 4.27, SD = *.74*) compared to their less intimate same-sex friend (M = 2.38, *SD* = .79), $t(213) = 32.40$, $p < .001$, $d = 2.21$. This supports the success of our intimacy manipulation.

3.4. Main Analysis

As expected, results showed that need for interpersonal touch was significantly and positively associated with both approach motives (H2a), $b = 0.93$, $t(207) = 9.20$, $p < .001$, and avoidance motives (H2b), $b = 0.82$, $t(207) = 6.80$, $p < .001$. In the more intimate same-sex female friendship, approach motives were associated with a higher frequency of both more intimate social touch, $b = 0.27$, $t(207) = 4.01$, $p < .001$, and less intimate social touch, $b = 0.31$, $t(207) = 3.87$, $p < .001$. Partially confirming H3a, the indirect association between need for interpersonal touch and more intimate social touch occurred only through approach motives, $b = 0.25$, $SE = 0.07$, 95% CI [.11, .39], and not through avoidance motives, $b = 0.02$, $SE = 0.06$, 95% CI [−.09, .13]. The indirect association between need for interpersonal touch and less intimate social touch was also significant through approach motives $b = 0.29$, $SE = 0.10$, 95% CI [.12, .50], but not through avoidance motives $b = -0.02$, $SE = 0.07$, 95% CI [−.15, .11]. Rejecting H3b, the indirect effect between need for interpersonal touch and more and less intimate social touch in the less intimate same-sex female friendship was not significant through approach or avoidance motives.

Table 3.3.

Mediation Analysis for More Intimate Same-Sex Female Friend: Approach and Avoidance Motives

	More intimate social touch				Less intimate social touch			
Direct effect	B(SE)	*t*	*p*	95% CI	B(SE)	*t*	*p*	95% CI
Need for interpersonal touch	.41 (.10)	4.05	<.001	[.21, .61]	.83 (.12)	6.80	<.001	[.59, 1.07]
Approach Motives	.27 (.07)	4.01	<.001	[.14, .40]	.31 (.08)	3.87	<.001	[.15, .47]
Avoidance Motives	.03 (.06)	.52	.603	[−.08, .14]	−.02 (.07)	−.32	.747	[−.15, .11]
Age	−.02 (.02)	−.96	.336	[−.06, .02]	.02 (.03)	.86	.392	[−.03, .07]
Sexual Orientation	.56 (.14)	3.89	<.001	[.28, 84]	.18 (.17)	1.06	.292	[−.16, .53]
Indirect effect								
Approach Motives	.25 (.07)	—	—	[.11, .39]	.29 (.10)	—	—	[.12, .50]
Avoidance Motives	.02 (.06)	—	—	[−.09, 13]	−.02 (.07)	—	—	[−.15, .11]

Table 3.4.

Mediation Analysis for Less Intimate Same-Sex Female Friend: Approach and Avoidance Motives

	More intimate social touch				Less intimate social touch			
Direct effect	B(SE)	*t*	*p*	95% CI	B(SE)	*t*	*p*	95% CI
Need for interpersonal touch	.18 (.05)	3.94	<.001	[.09, .27]	.63 (.11)	5.72	<.001	[.41, 84]
Approach Motives	−.03 (.03)	−.92	.359	[−.09, .03]	.09 (.07)	1.26	.211	[−.05, .23]
Avoidance Motives	.01(.03)	.57	.569	[−.04,.06]	−.05 (.06)	−.89	.375	[−.17, .07]
Age	.00 (.00)	.31	.757	[−0.2, .02]	.05 (.02)	1.99	.048	[.00, .09]
Sexual Orientation	.23 (.06)	3.51	.001	[.10, .35]	.01 (.16)	.06	.951	[−.30, .32]
Indirect effect								
Approach Motives	−.03 (.03)	—	—	[−.09, .02]	.08 (.07)	—	—	[−.07, .22]
Avoidance Motives	.01 (.02)	—	—	[−.03, .05]	−.04 (.05)	—	—	[−.15, .07]

CHAPTER 4

Discussion

A large body of research on social touch has been developed to understand how people are susceptible to contextual factors (e.g., input from other senses), relational factors (e.g., degree of familiarity with the touch partner), and even their own needs and feelings (such as perceived intentions; Sailer et al., 2024) to process this behavior (Cascio et al., 2019) and evaluate it as positive or negative. The relevance of this theme resides in social touch's impact on individuals' daily lives, as a mechanism for emotional regulation (Dagnino-Subiabre, 2021), and social network (Pietromonaco & Collins, 2017), indirectly impacting their well-being (Jakubiak & Feeney, 2016). We aimed to explore whether the individual need for interpersonal touch was associated with social touch behavior and whether approach and avoidance motives explained variability in this behavior. There are two innovative aspects of our research: first, the perspective we take, as we question the mechanisms through which one adopts social touch behavior; second, our focus on friendships. We chose to explore friendships given this relationship's relevance to the social network (Gillespie et al., 2014; Camirand & Poulin, 2022). Additionally, attending to intimacy's connectedness with social touch behavior (Suvilehto et al., 2015), the model was tested in the context of both more and less intimate same-sex female friendships.

We aimed to illustrate the mechanisms through which individuals act on the need for interpersonal touch (i.e., describes the importance individuals attribute to the information they receive through touch; Nuszbaum et al., 2013) and how it translates to prevalence in touch behavior, operationalized into two outcome variables of different intimacy levels (i.e., more intimate social touch and less intimate social touch). We drew on the Hierarchical Model of Approach-Avoidance Motives (Elliot, 2006) to explain individuals' adoption of social touch behavior. Specifically, we proposed that individuals' need for touch and consequent motivation for social touch explained variance in social touch behavior – frequency and degree of intimacy - and that the intimacy of the relationship also factored in the variance of social touch behavior.

We first hypothesized that the need for interpersonal touch would be positively associated with both more intimate social touch behavior and less intimate social touch (H1). This hypothesis was confirmed by our data, thus indicating that this individual characteristic is associated with variability in touch behavior. This is aligned with past studies, showing that individual characteristics are not only associated with different perceptions of touch (Dorros et al., 2008; Bowling et al., 2024; Harjunen et al., 2016) but with differences in social touch

behavior, as Carmichael et al. (2020) found that individuals with an avoidant attachment displayed fewer behaviors of touch provision with their romantic partners. We also hypothesized that individuals with a higher need for touch would report more approach and avoidance motives for social touch. As expected, we found positive correlations between need for interpersonal touch and both approach motives (H2a) and avoidance motives for social touch (H2b). These hypotheses are aligned with the Hierarchical Model of Approach-Avoidance Motivation (Elliot, 2006), which proposes that individual dispositions, operationalized as the need for interpersonal touch in the current study, inform individuals' approach and avoidance motives. Similarly to our results, Jakubiak et al. (2020) reported that individuals with an anxious attachment style (i.e., can be characterized as having a higher desire for touch) report more approach and avoidance motives for touch. Furthermore, tested whether approach and avoidance motives mediated the association between need for interpersonal touch and social touch behavior for more intimate (H3a) and less intimate same-sex female friendships (H3b). Our results offered mixed-support for these hypotheses. Specifically, in more intimate same-sex female friendships, approach motives (but not avoidance motives) mediated the association between need for interpersonal touch and both more and less intimate social touch. In less intimate same-sex female friendships, however, the mediation model was not significant, thus rejecting our hypothesis. Only approach motives were revealed as drivers of social touch behavior, suggesting that individuals touch their intimate friends oriented towards positive outcomes. This aligns with previous research, such that social touch is intrinsically connected with intimate interpersonal relationships and in nurturing the social bond (Debrot et al., 2013a; Suvilehto et al., 2015; Jakubiak & Feeney, 2016), and that approach motives are intrinsically linked to positive individual and relational outcomes (Elliot et al., 2006, Gable & Gosnell, 2013; Jakubiak et al., 2020). To the best of our knowledge, the association between avoidance motives and prevalence behavior has not yet been directly explored, particularly in friendships. However, Carmichael et al. (2020) found that avoidance attachment (i.e., is related to negative feelings towards touch) is negatively associated with social touch behavior. Furthermore, on Jakubiak et al.'s (2020) research, employing avoidance motives in social touch behavior with a romantic partner was negatively associated with relationship quality. Possibly, the relational context in our study (i.e., friendship) does not create enough momentum for the individual to act on the avoidance motives, therefore, not employing social touch behavior to avoid negative outcomes.

Lastly, we hypothesized that the mediation models would be stronger in the more intimate same-sex female friendship (H4), which was confirmed. Aligned with previous research

(Suvilehto et al., 2015; Sorokowska et al., 2021), which suggested that variance in touch behavior was associated with the intimacy of the relationship, individuals reported more social touch behavior with their more intimate same-sex female friend in comparison with their less intimate same-sex female friend.

Regarding the sociodemographic differences, age's significant negative correlations with need for touch, avoidance motives for touch, and more intimate social touch with more intimate same-sex female friend could be connected to developmental changes during the emerging adulthood life stage. Langheit and Poulin (2022) found changes in the management of best friendship during this life stage. Throughout their 20's, women reported a significant decrease in intimacy which can be directly connected to the frequency of more intimate social touch with the more intimate same-sex female friend. Furthermore, companionship (i.e., related to quality time spent) decreased significantly after 22 years old, which is suggested to happen due to the entrance into professional life and more responsibilities (Langheit & Poulin, 2022). This evidence suggests individuals may lose time available to spend with friends, such that, when they are able to connect, it is possible they would be less inclined to employ motivation to avoid a bad outcome. Concerning need for touch decreasing with participants' age and in line with previous reasoning, a lack of time to engage in activities with friends and decreased intimacy may be translated into fewer physical encounters, as friendships are maintained at a distance through social media, for example. This would explain the lack of opportunities to communicate through social touch, leading individuals to attribute more value to other forms of interaction, such as verbal communication or social media engagement (Décieux et al., 2018). On the mediation models we tested, age was positively associated with less intimate touch in the less intimate same-sex friendship; that is, the older the individuals were, the more frequently less intimate social touch they reported. This could translate to a greater presence of less intimate relationships in individuals' lives, such as friendships in the workplace.

There were significant differences between the heterosexual and sexually diverse participants, in need for touch, such that, more and less intimate social touch with more intimate same-sex female friends, and more intimate touch with same-sex female friends, such that the sexual diversity population reported a higher need for touch and more frequency of the social touch behavior. Sexually diverse participants showed a higher need for touch could suggest this population finds in social touch reassurance of a sense of belonging, a sense that has been shown to be protective, particularly to minority populations (Meeuwisse et al., 2010; Backhaus et al., 2019; Wilson & Liss, 2022). Regarding differences in social touch behavior, previous research with heterosexual individuals has shown a higher prevalence of social touch between different-

sex dyads (Major et al., 1990; Gallace and Spence, 2010). Our findings suggest the same may be observable in individuals who are to some extent attracted to the same-sex. On the mediation models tested, sexual orientation had a direct link with more intimate social touch with both more and less intimate same-sex female friends.

4.1. Theoretical and Practical Implications

This study offers relevant insight into social touch patterns in friendships, highlighting this behavior's importance for this type of relationship. By associating approach motives with the frequency of touch behavior in more intimate friendships, our results offer support to the longstanding theoretical hypothesis that touch has a connecting role in interpersonal relationships. Furthermore, emphasizing the higher prevalence of less intimate social touch (along with more intimate social touch) in more vs. less intimate same-sex female friendships, showing the relevance of less intimate social touch for more intimate social relationships, supports the perspective that intimacy is dynamic within the dyad's behavior (as proposed by The Interpersonal Process Model of Intimacy; Reis & Shaver, 1988). This dynamic perspective accounts for fluctuations on the dyadic behaviors and on the individuals' experience, as these fluctuations in behavior do not mean a change in the relationship (Vangelisti & Beck, 2007).

Applying the data collected about how the individual characteristic need for interpersonal touch is associated with social touch behavior, it is possible to suggest that individuals characterized with a higher need for interpersonal touch seek more social touch behavior and value more the information they collect from this behavior to manage themselves (e.g., their sense of closeness, their expectations) and their behavior on their interpersonal relationships. It is also possible to question how an interpersonal relationship involving an individual with a higher need for touch and another with a lower need for touch functions and whether their perceptions of the intimacy of the relationship are compatible. A further step, grounded on our finding that social touch behavior is employed as a connecting behavior, lies in exploring the extent to which social touch can achieve this. Concretely, in an increasingly multicultural context in Portugal (Dias, 2019), could we use touch as an intervention tool to help people with different backgrounds and customs connect, aiming to reduce prejudice.

4.2. Limitations and Future Research

The findings of this research must be taken with caution. It was not possible to establish causality, given that the data was correlational. Also, the sample size does not allow for

generalization to the target population. For future research, it would be valuable to expand sample characteristics, such as gender (to include gender diversity). Biological sex and gender are key factors of variability in experiences and behavior, not only relevant to social sciences, but across health-related research areas (Van Epps et al., 2022). Furthermore, we suggest expanding the dyad's composition, including different gender research dyads, to encompass gender differences that have been reported both in touch perception and touch behavior (Major et al., 1990; Gallace and Spence, 2010; Schirmer et al., 2022), previous research in which gender diversity is not included. As social relationships remain relevant to individuals' wellbeing throughout life and changes (Upenieks & Schafer, 2021) and age is considered a relevant factor for social touch behavior (Gallace & Spence, 2010), it would also be relevant to explore how social touch behavior varies in other life stages. A longitudinal study design would also be valuable to follow individuals' development in their adoption of social touch behavior. We suggest, particularly measuring their management of their social network (e.g., stability of romantic or sexual relationships, friendships; Camirand & Poulin, 2022) and social touch behavior.

The current research collected data solely based on self-report measures, which can be susceptible to bias. Therefore, it would be interesting to adopt a mixed-method approach. Specifically, we propose to draw from Guerrero & Andersen's (1991) method using both the observational method and self-report measures. In their study, coders went to public places to observe social touch behavior among couples, then notified the people observed, requested their consent to participate in the study, and to answer self-report measures. This method would provide more accurate data about individuals' perceptions and their connection to actual social touch behavior (Manfredo & Shelby, 1988).

The need for interpersonal touch, particularly the questionnaire used (Need for Interpersonal Touch; Nuszbaum et al., 2013), may not be the most adequate. This measure was initially developed in a marketing context (Peck & Childers, 2003) to differentiate people based on how touching a product is related to their confidence in the decision-making process for the purchase. Later, it was adapted to differentiate individuals on their level of susceptibility to touch from the seller during the decision-making process of whether to make the purchase or not (Nuszbaum et al., 2013). Although there are some validated scales to assess comfort with touch (i.e., the degree to which someone feels comfortable with intentional interpersonal touch; Webb & Peck, 2014), longing for interpersonal touch (i.e., when individuals perceive they don't have the desired frequency of touch; Beßler et al., 2019) and attitudes toward touch (Social Touch Questionnaire; Vieira et al., 2016), these do not fit the research question, since the

theoretical concept we had in mind most closely fits Need for Interpersonal Touch Questionnaire's (Nuszbaum et al., 2013) reasoning and face value – individuals' differences in their reliance of the information they collect through touch. It would be interesting to understand whether this perspective on the use of interpersonal touch (i.e., at which dimension touch is valued as a source of information to make decisions) stands as a theoretical concept relevant to understanding how individuals navigate social touch in their daily lives.

A similar issue resides in the lack of validated measures to assess the frequency of touch behavior. Sorokowska et al. (2021) validated for their study a scale that assessed the prevalence of four touch behaviors (i.e., embrace, caress, kiss, hug). We wanted to investigate further and look at data about frequency, since it would allow for more insight into the individuals' patterns of behavior. Applying Suvilehto et al.'s (2015) research and consistent with recognizing intimacy's association with social touch behavior, we included more behaviors in the measure, which allowed for a more detailed analysis through an exploratory division of the outcome variable into more and less intimate social touch behavior. It would be significant to further develop and validate this measure, allowing for a more detailed data collection on social touch behavior.

Regarding the mediation models tested, although avoidance motives are positively associated with need for touch, they are not associated with social touch behavior and do not mediate the relationship between these two variables. The employment of social avoidance motives and its consequences on outcomes has been verified by empirical research (Gable, 2005) and specifically on friendships (Elliot et al., 2006), however it would be relevant to test whether in the context of social touch in friendships individuals who employ the avoidance motivation mechanism tend to not act on the behavior -further emphasizing social touch as adopted primarily as connecting behavior in friendships- or if there was a design flaw that lead to the insignificance of the mediation through avoidance motives.

Conclusion

Communication through social touch behavior is quiet but impactful on individuals, their relationships, and their well-being. With a prominent role in individuals' daily lives, uncovering the mechanisms through which one touches another helps researchers further understand human behavior and its variability. The step taken here highlights individuals' orientation towards connection through social touch behavior in their more intimate friendships, suggesting this behavior as an asset to maintaining the closest links of social networks and support systems. Additionally, we bring forth friendships, essential relationships that constitute a significant part of individuals' social networks. Lastly, we have taken a first step in the development of a measure for social touch behavior in interpersonal relationships.

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