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## The role of attachment in sexualised polydrug use among LGBT+ male Chemsex users and the impact on Neuropsychology: Clinical implications for the use of Mentalisation Based Therapy (MBT)

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### KEYWORDS

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### Abstract

LGBT+ individuals still experience systemic, cultural, and personal discrimination in modern society, the impacts of which may impact not only on their mental wellbeing, but also their interpersonal functioning. Within LGBT+ men Chemsex is becoming of increasing interest in the literature. Current research into Chemsex explores the engagement through an epidemiological lens, exploring factors related to likelihood of engaging in Chemsex. Seldom however, outside of standard treatment protocols for addiction, has literature been submitted with recommendations on how best to support the needs of these individuals who are seeking support for their Chemsex use. Standard drug treatments may be lacking in understanding the unique phenomenology of LGBT+ men, resultant of the discrimination they may face within society, their homes, with their peers or other relationships.

The purpose of this paper is to examine how the experiences of LGBT+ men may impact on their psychological wellbeing through insecure attachments and subsequent mentalising capabilities. Based on the current evidence base with regards to attachment and mentalisation within LGBT+ men, it is being proposed that Mentalisation Based Therapy (MBT) may be an effective treatment model for LGBT+ men who view their Chemsex use as problematic.

### Introduction

LGBT+ individuals still experience systemic, cultural, and personal discrimination in modern society, the impacts of which may impact not only on their mental wellbeing, but also their interpersonal functioning. Within LGBT+ men Chemsex is becoming of increasing interest in the literature. Current research into Chemsex explores the engagement through an epidemiological lens,

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The paper will start by giving an outline of the definition of Chemsex, theories around Chemsex use, and the desired effects of the drugs used within this context. Explanations of attachment theory and how this relates to mentalisation, particularly with regards to the literature around LGBT+ men's attachment styles, and their resultant relational patterns, will be discussed. Finally, there will be an exploration of emotional dysregulation and the link between drug use and hypersexuality, before proceeding to argue for the case for MBT as a possible clinical intervention for Chemsex users. Conclusions and limitations regarding the evidence base and clinical implications will be drawn.

## Chemsex

Chemsex is defined by drug use that facilitates sexual encounters which can last for a few days among gay, bisexual and men who have sex with men (MSM) often using a combination of mephedrone,  $\gamma$ -hydroxybutyrate (GHB),  $\gamma$ -butyrolactone (GBL), and crystallised methamphetamine (crystal meth) (McCall et al., 2015). To explore the desired effect of each of these drugs, Bowden-Jones and Abdulrahim (2020) provide a clear overview. Mephedrone enhances mood, induces euphoria, increases energy, lessens the need to sleep, improves concentration, and enhances sexual experiences such as heightening sensuality, lowering inhibitions and enabling prolonged sexual performance. GHB/GBL causes euphoria, relaxation, sedation, and produces pro-sexual and smooth muscle relaxant effects. Crystal meth increases alertness, energy, and confidence, induces euphoria, and decreases appetite.

Most research on Chemsex exists within a post-positivist epistemology, often through an epidemiological lens. Quantitative and thematic

analyses ascertain which factors make individuals more likely to engage in Chemsex. Men who are HIV positive, those living in densely populated areas, men born outside of the UK, and those with a lower sexual self-efficacy are more likely to engage in Chemsex (Smit et al., 2012; Scrivner et al., 2013; Bourne et al., 2014; Hibbert et al., 2019). With interpersonal motivators being that those engaging in Chemsex do so from a desire to belong within the gay community (Smith & Tasker, 2017).

Gallios et al. (1992) suggest that sexual behaviour is influenced more by relationships with peers than relationships within families. Given Smith and Tasker's (2017) findings that gay men may engage in Chemsex to belong to the gay community, the social and relational aspect of Chemsex is apparent. Chemsex may provide men with an opportunity to belong within a community, based on normative behaviours as perpetuated and established amongst LGBT+ men.

Ahmed (2016) found that perceived drug use is common, highly visible, and a normalised behaviour among gay men in south London. Keogh et al. (2009) also found that gay men in England perceived drug use to be very common and an integral aspect of socialising. Arguably, the overt discourse around poly and sexualised drug use within the gay community make this a normative part of gay life, sex, and relationships. As such, as a means of 'fitting in' men may engage in Chemsex. From an attachment perspective one could argue that the desire to engage in Chemsex serves to aid in the development of attachment relationships with other men by engaging in behaviours that are seen as normal, even essential, serving as a function to form relationships within these social spheres.

## Attachment Theory

Attachment theory, first theorised by Bowlby (1969), postulates that early caregiving relationships form internal working relationships and working relationship with others. As children grow, they internalise their experiences with their caregivers, developing internal working models, creating frameworks for relationships in adult life (Bowlby, 1973). Ainsworth et al. (1978) developed this theory further, suggesting that

four general attachment patterns could be observed: secure, avoidant, anxious-ambivalent and disorganised. Secure attachments in a child's development have been linked with an ability to regulate emotions relatively autonomously (Fonagy, 2018) and the ability to form stable relationships in adult life (Coan, 2008). Further, in the presence of healthy attachments with caregivers, children develop the ability to mentalise, being able to understand their own, and others, emotional states, regulating these accordingly through self-reflection and the ability to understand oneself and others in terms of thoughts, feelings wishes and desires (Fonagy et al., 2000; Bateman et al., 2016).

Conversely, in the absence of secure attachments, people may struggle regulating their emotions, forming barriers to the development of healthy relationships in adult life (Schore, 2001; Belsky, 2002; Fonagy, 2010; Fuchshuber et al., 2019). Attachment relationships during childhood may act as a precursor for the attachment relationships in adult life (Hazan & Shaver, 1994; Simpson & Rhodes, 2010) with those who are securely attached being more able to negotiate and maintain close relationships than those with insecure attachments (Mikulincer & Shaver, 2007).

Attachment, however, is not a static concept. Attachment relationships can change over time. Research looking into the relationship formations in gay people shows that self-acceptance (a key concept in attachment theory through internalisation by our relationships with others) is highly impacted within LGBT+ people's relationships with their families and peers (Kaufman & Raphael, 1996; Malyon, 1981; Malyon 1982; Allen & Oleson, 1999). There may be high levels of judgement, impacting on levels of shame and internalised homophobia, causing significant ramifications on attachment styles and development. These judgements may become internalised, impacting on later relationships in adulthood and throughout different life stages.

### Attachment in LGBT+ populations

Peer rejection in gay men has been linked to attachment anxiety, independent of parental attachments (Landolt et al., 2004) highlighting the importance of attachment relationships

outside of parental structures and the resultant impact these can have on relationship development. Landolt et al. (2004) suggest that peer relationships may influence adult relationships and attachment due to an association with rejection, leading to anxious attachment relationships with others. Rejection in development may create templates which convey a message that relationships are dangerous or rejecting. LGBT+ men who have experienced bigotry and discrimination, may struggle to trust others, coping through either avoiding closeness, or trying to hold on to any relationships they have, activating various attachment coping strategies.

Shame has been linked to less integrated identity development in LGBT+ people (Wells & Hansen, 2003) with difficulty in accepting sexuality being related to avoidant and anxious attachments (Mohr & Fassinger, 2003). Formative relationships may lead to a disintegration of the ability to accept oneself if they are riddled with messages of shame and discrimination (Elizur & Mintzer, 2001). The failure to develop a strong sense of self may lead to unsatisfactory intimate relationships due to relationships being linked to shame, insecure attachment, and internalised homophobia (Erikson, 1993). In the absence of messages of acceptance and love in developmental relationships, these relational patterns may be mirrored in romantic relationships, leading to avoidant attachments to romantic partners through cutting off emotions to protect oneself. Or anxious attachments leading to anxiety-driven behaviours, such as subjugation of one's own needs for the benefit of romantic partners (Brown & Trevethan, 2010).

Links between adult attachment styles and how they influence romantic and sexual relationships can be seen amongst LGBT+ men. Developmental relationships may serve as a blueprint for how many LGBT+ men navigate their relationships. Sexual communication and confidence have been linked to adult attachment styles in gay men; those with anxious and avoidant attachments being less likely to feel able to communicate their sexual needs than those with secure attachments (Starks et al., 2013). Men with anxious and avoidant attachments are also more likely to engage in unprotected anal

intercourse (UAI) (Starks et al., 2013). With men who have avoidant attachments having on average 31.5 times as many casual sexual partners with whom they have UAI. Men with avoidant attachments are more likely to favour casual sexual partners devoid of commitment or emotional involvement, as a defensive mechanism to avoid closeness with others which may have been developmentally associated with pain and rejection through peer and or family relationships. Whereas men with anxious attachments are more likely to desire sex that communicates closeness, intimacy, and connection (Wang et al., 2010). LGBT+ men with anxious attachments are more likely to engage in UAI due to beliefs that condoms interfere with intimacy, suggesting that UAI serves as an unspoken communication of trust and intimacy to help form close relationships (Starks et al., 2017).

There is also a link between attachment style and sexualised drug use within LGBT+ men. Starks et al., (2015) suggest that gay men with avoidant attachment styles may engage in sexualised drug use to enable them to have sex, with drugs acting as an affect regulator. Given the desired effects of GHB/GBL and mephedrone as lowering inhibitions and regulating anxiety this makes sense. Further, evidence suggests that hypersexual behaviours, being sexual behaviours that are impulsive, frequent, and inappropriate (Kafka, 2010), may be maladaptive coping strategies to regulate emotions in the absence of effective affect regulation (Garofalo et al., 2016). Sexually related emotions may be particularly hard to manage (Diamond et al., 2011) so while not adaptive affect regulating behaviour, hypersexuality may serve as the only means some individuals have to regulate their emotions (Gratz & Roemer, 2004). If we consider Chemsex to fall under the umbrella of hypersexuality, by arguing that the use of drugs, engagement in sex with multiple partners, and being significantly more likely to engage in UAI, it could be argued that Chemsex facilitates a form of affect regulation in the absence of effective mentalisation. Engaging in poly-drug use and unsafe sexual practices (i.e., Chemsex) may also serve as a means of developing attachment bonds and belonging to a community.

## The neurological components of attachment and poly-drug use

The neurology of poly-drug users, and the role of attachment on the brain, suggests that the main regions of interest (ROI) appear to be in white matter (WM) integrity of the superior longitudinal fasciculus (SLF) and the superior corona radiata (SCR). Diffusion tensor imaging (DTI) through fractional anisotropy (FA) often ascertains this information. DTI is an imaging technique which evaluates microstructural differences in white matter, with FA being a common measure in DTI research. FA explores movement of isotropic water molecules, such as cerebrospinal fluid, and anisotropic water molecules, such as fibre bundles (Morgan et al., 2012). FA can be used to infer alterations in axonal diameter, fibre density and myelin structure, providing an understanding of the effectiveness of axons in the brain in communicating messages between different brain regions (González-Reimers et al., 2019). Smaller axonal diameter, less fibre density and impaired myelin structure are theoretically linked to poorer effectiveness of neural communication through reduced size to send information, or insufficient insulation of axons potentially leading to circuitry discharge. A weakness of approaches from this perspective are that they lack the ability to establish cause and effect, instead only identifying correlation. Nevertheless, such approaches can be helpful in ascertaining physical changes and considering how these factors may be incorporated into practice by reifying theories of attachment in a neurological basis.

Research conducted on neurological differences in drug users have shown differences in WM integrity in poly-drug users compared to non-drug using controls. Poly-drug use has been shown to be particularly harmful to WM in the SLF and SCR (Hiebler-Ragger et al., 2016), with FA in the left and right SLF and SCR being greater in non-drug users compared to poly-drug users (Unterrainer et al., 2017). Diminished WM integrity of these regions has been linked to impaired decision making (Bechara, 2005) insecure attachment, personality dysfunction (Hiebler-Ragger et al., 2016) and substance use



disorder (SUD) (Beardslee et al., 2011; Baker et al., 2013; Unterrainer et al., 2016).

Six key emotions have been identified within the brain's affective systems, proposed as influencing both personality structure and attachment organisation. These being SEEKING, SADNESS, FEAR, ANGER, CARE, and PLAY (Panksepp et al., 2002; Davies & Panksepp, 2011; Zellner et al., 2011). WM impairment have been found in the SUF and the SCR in those with insecure attachment, which has been linked to negative affect (Unterrainer et al., 2017). It has been suggested that diminished WM integrity in these areas may be linked to affective states of FEAR and SADNESS in poly-drug users, which have been linked to attachment pathology (Unterrainer et al., 2016; Hiebler-Ragger et al., 2016) with poly-drug users exhibiting higher amounts of anxious attachments, ANGER, FEAR, and SADNESS than non-drug users (Unterrainer et al., 2017). It has been argued that substance use can be seen as a chemical affect regulator, creating an artificial secure attachment base in those using them (Flores, 2004; Fuchshuber et al., 2020). However, in the long run substance abuse weakens attachment relationships potentially leading to a complete lack of control (Flores, 2004).

Given the link then between drug use, insecure attachment, sexual behaviours, and the role of attachment formation in LGBT+ men's lives, it would make sense that men may turn to Chemsex to form bonds with other men and regulate negative affect. However, this does not provide a long-term solution to managing attachment difficulties or emotions. Clinical interventions with this group of individuals could benefit therefore from focussing on developing attachment relationships and enabling adaptive emotional regulation. As such, mentalisation based therapy (MBT) could be an effective way to facilitate this.

### **Mentalisation and MBT**

Mentalisation is the ability to understand one's own actions and the actions of others through understanding thoughts feelings, wishes and desires (Fonagy et al., 2016). In the absence of effective mentalising, it is theorised that no constructive social interactions can exist, nor

mutuality in relationships or sense of personal security (Fonagy et al., 2018). Mentalising is largely preconscious and imaginative, requiring one to imagine the inner states of oneself and others (Fonagy et al., 2016). The ability to mentalise emerges in the context of secure attachments in development and is a key determinant of self-organisation and affect regulation (Fonagy et al., 2016). Psychopathology is proposed to be resultant of ineffective mentalising, with individuals failing to appropriately process their own experiences and those of others, when a mental picture of the other is inferred from one's own experience of the self, through projection (Bateman & Fonagy, 2016).

Mentalising capabilities have been categorised into four different dimensions (Lieberman, 2007), these being: automatic versus controlled, mentalising the self-versus others, mentalising with regards to internal versus external features, and cognitive versus affective mentalising. Controlled mentalising is a slow process, requiring reflection, attention, awareness, intention, and effort. Whereas automatic mentalising is faster, reflexive and requires minimal attention, awareness, intention, or effort. Well-functioning mentalising requires the ability to switch flexibly between these modes. A mentalising intervention may encourage movement from automatic mentalising to controlled mentalising through reflection and partnership with the therapist (Fonagy et al., 2016). Automatic mentalising develops in infancy, tracking and expressing mental states quickly and efficiently to satiate survival needs. Controlled mentalising develops later, with executive function in the brain not developing until later in life (Apperly, 2010). Insecure attachments in development may impair communication between the automatic and executive regions of the brain through inhibiting neural systems associated with controlled mentalising (Nolte et al., 2013).

Mentalising of the self-versus others involves the ability to mentalise one's own internal states and motivation and the internal states and motivations of others (Fonagy et al., 2016). The ability to mentalise the internal states of others is linked with the ability to mentalise one's own internal states; relying on a shared representation

system enabling empathic processing, which operate through mirror-neuron stimulation (Lieberman, 2007; Lombardo et al., 2010). In the absence of appropriate activation of these neural systems in development, an individual may struggle to mentalise through miscommunication of these systems due to them never fully developing. Particularly in interpersonal situations, an individual may misinterpret another's motivation or internal states and misconstrue their actions to be attacking, punitive, or dismissive which could lead to a rupture in the relationship. This can be seen in clients with borderline personality disorder (BPD), who may Hypermentalise emotions in others through excessive attention given to external cues without reflection, engaging in automatic, but not controlled, mentalising (Fonagy et al., 2016).

Where cognitive mentalising allows individuals to name, recognise and reason about mental states, affective mentalising involves the ability to understand the feelings of these states, which is essential for genuine empathy and sense of self (Fonagy et al., 2016). MRI research has shown that emotionally triggering situations suppress the neural communication between the cognitive and affect mentalising networks (Beyer et al., 2014). Individuals with BPD have been shown to experience heightened sensitivity towards emotional cues, linked to overactivation of the amygdala, and regulatory deficits in the orbitofrontal cortex and prefrontal cortex (Lynch et al., 2006; Domes et al., 2009; Harari et al., 2010; Ritter et al., 2011). Given that insecure attachments impede on healthy neurodevelopment and impair neural communication between brain regions responsible for effective mentalising (Nolte et al., 2013) it is unsurprising that individuals with BPD struggle with this and may hypermentalise the states of others. Due to an overactivation of brain's threat systems resultant of historical attachment relationships causing repeated activation of these through neglect, abuse, or rejection; individuals may learn the message that others, and attachments to others, are dangerous, and to maintain their safety they must separate themselves from others to survive. Much like how many LGBT+ men may have learned to

relate to one other through repeated discrimination as described above.

Given the link between insecure attachment and substance misuse, and the role of attachment in relationship formation and sexualised behaviours in LGBT+ men, it is possible that through ineffective mentalising, LGBT+ men may engage in Chemsex as a form of affect regulation in the absence of effective mentalising capabilities. As such, MBT may be effective in the treatment of this client group, developing a therapeutic process in which the mind of the client becomes the focus of the treatment, supporting them in understanding how they think and feel about themselves and others (Fonagy et al., 2016). MBT focuses on supporting individuals to see how their 'errors' in understanding themselves and others may perpetuate their concerns, maintaining difficulties in relating to others (Fonagy et al., 2016). Particularly for this client group, MBT may support in understanding how their historical relational patterns may colour their current interpretations and relationships with others, associating intimacy and closeness with attack or rejection, leading to an inability to effectively mentalise.

### Limitations and recommendations

MBT is fundamentally a micro, individualistic approach which comes from a one-person psychology, which is evident given its psychoanalytic roots. Mentalisation and the role of attachment may be important factors for many LGBT+ men and their engagement in Chemsex, however this is only one aspect of the many reasons as to why LGBT+ may engage. Attachment theory and mentalisation do well in the explanation and justification of understanding the individual in the room, however they do little to understand the wider contextual and systemic discrimination that LGBT+ men experience. Further, this paper does not account for the instances for when LGBT+ men may engage in Chemsex despite having had secure attachment relationships. Nor does it consider those with insecure attachments who do not engage in Chemsex.

However, this paper does not seek to propose that MBT is the only approach for working with these

individuals. Instead, it aims to suggest a framework grounded in the evidence base, using a particular model to work with these individuals. Further, as is the case with the majority of psychotherapy research and application, the focus is between the client, the therapist, and the material being brought (regardless of the particular theory of mind being drawn upon within the psychotherapeutic model).

However, it could be argued that the role of therapy is not to challenge or make changes to the systemic oppression that exists within marginalised communities, but to provide a space in which this oppression can be made sense of in an environment that enables the ability to understand and reflect. Though this is not to say that practitioners do not have a moral or ethical duty to fight oppression outside of the therapy room.

Further, given the unique phenomenology of LGBT+ men, the attachment of these individuals and the discrimination experienced throughout their development could be brought into the MBT framework to enable clients not to only understand their distress, but also offer a framework within which this distress can be made sense of as a result of the systemic and lifelong discrimination they may have experienced. This would need to be carefully assessed for and understood in the context of mentalising capability and attachment relationships within a clinical setting, to ensure that MBT would in fact be the most appropriate model for the client.

## Conclusion

Chemsex could be viewed as a maladaptive form of coping with repeated rejection in attachment relationships. With men desiring to fit into a community and connect with others, while experiencing anxiety in trying to get close to others through repeated messages that relationships result in rejection. Given the overlap between activation of brain regions associated with attachment and drug use it could be argued that through repeated rejection, some men may turn to drugs to relate to others, while inhibiting anxiety

through both hypersexual behaviours and drug use.

Using MBT, Chemsex users may be able to build on their mentalising capabilities and learn to communicate more effectively between mentalising modes, enabling better affect regulation, leading to a reduction in the need to rely on Chemsex to engage in relationships with other men, forming attachments which are secure in their adult relationships.

This paper provides a framework for understanding Chemsex as an attachment disorder, linked with ineffective mentalising capabilities. However, further research is needed on the topic to see if the clinical application of this a viable treatment option for these individuals.

## Conflict of interest

The author of this paper declares no conflict of interests, including any financial, personal, or other relationships with other people or organisations.

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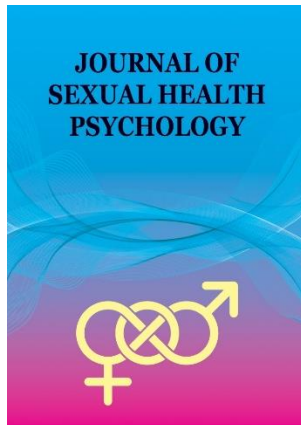


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## Intention to Use Novel Methods of Male Directed Contraception Among College Students

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### Abstract

**Purpose:** Currently, men have two choices for contraception: the male condom and vasectomy. Male condoms have limited user efficacy, and vasectomies are not easily reversible. To supplement vasectomy and condom use, the World Health Organization has backed the urgent development of male-directed contraception (MDC). Using the Theory of Planned Behavior (TPB), this study was guided by the following aims: (1) describe college men's attitudes, subjective norms, and perceived behavioral control towards male birth control methods and (2) determine if the following factors are associated with intention to use MDC methods: masculinity, attitudes, subjective norms, and perceived behavior control.

**Methods:** This study used a cross-sectional design. Data were collected online, via email, from male college students at one Midwestern University.

**Results:** Attitudes, subjective norms, and perceived behavioral control were statistically significant predictors of intention to use a male hormonal pill, transdermal gel, and hormonal injection. Attitudes and subjective norms were also found to be associated with intention to use a male birth control implant.

**Conclusion:** These results suggest the TPB may be a suitable theory for further investigation into the intended use of MDC. Attitudes and subjective norms accounted for the most variability in intention to use MDC. Future research should therefore investigate specific attitudes and subjective norms that influence the intention to use developmental methods of MDC. Future research should also consider additional theoretical models, such as the Health Belief Model, to continue investigating intention to use developmental methods of MDC.

### Introduction

As one of the ten great public health achievements of the 20th century (Centers for Disease Control and Prevention [CDC], 1999), family planning allows

individuals to achieve a desired family size and spacing between births while also contributing to improved health outcomes for infants, children, women, and families (CDC, 1999; Gipson, Koenig, & Hindin, 2008; Sonfield, Hasstedt, & Gold, 2014). Family planning includes a

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multitude of services such as sexually transmitted infection (STI) and human immunodeficiency virus (HIV) prevention education, reproductive health services, pregnancy testing, and contraceptive services (Gavin et al., 2014; Gavin & Pazol, 2016; Guttmacher Institute, 2014). In 2015, 1.9 million unintended pregnancies were prevented by publicly funded family planning services. Moreover, federal and state governments saved on average \$7.09 for every public dollar spent on family planning (Frost et al., 2017; Sonfield et al., 2014).

Despite the marked effects of family planning services, unintended pregnancies, or pregnancies that are unwanted or mistimed, account for 45 percent of all pregnancies in the United States with the highest rates of unintended pregnancy occurring among women aged 18-24 (Finer & Zolna, 2016). For individuals who are sexually active, correct and consistent contraceptive use can be highly effective at preventing unintended pregnancy; however, only 52 percent of sexually active college students used a method of contraception during their last vaginal intercourse (American College Health Association [ACHA], 2017). These data suggest use of pregnancy prevention methods, specifically in college students, are inadequate.

Currently, men have two choices for contraception: the male condom and vasectomy. Male condoms, however, have limited user efficacy, and vasectomies are not easily reversible (Contraceptive Use in the United States, 2015). To supplement vasectomy and condom use, the World Health Organization (WHO) has backed the urgent development of male-directed contraception (MDC; WHO, 2010). Multiple methods of MDC are under development including oral pills, gels, injections, and implants (Nieschlag, 2010). Multiple publications have found the majority of men would be willing to use or try a method of MDC (Amory, Page, Anawalt, Matsumoto, & Bremner, 2007; Dismore, Van Wersch, & Swainston, 2016; Heinemann, Saad, Wiesemes, White, & Heinemann, 2005; Meriggiola et al., 2006; Walker, 2011; Weston, Schlipalius, Bhuienneain, & Vollenhoven, 2002). Despite high acceptability of MDC generally, research shows acceptability among college students is low. In a study of college men, over 60 percent of

respondents reported low to no willingness to use MDC (Peterson, Campbell, & Lacky, 2019). Given the highest rates of unintended pregnancy occur among adults aged 18-24 (Finer and Henshaw, 2006), investigating acceptability of MDC in this age group is critical to meeting the Healthy People 2030 objectives.

### **Masculinity**

Gender norms, a cultural-environmental level factor, are a result of socialization (West & Zimmerman, 1987) enacted by repeated behaviors, actions, and interactions (Connell, 1995; West & Zimmerman, 1987). Gender encompasses the select characteristics of femaleness and maleness (Boles & Hoeveler, 2004). Masculinity for example, is a result of the socially identified behaviors, beliefs, feelings, values, and cognitions of male identity (Knight et al., 2012; Rothgerber, 2013; Wester & Vogel, 2012). Gender norms have been identified as a modifying factor of attitudes towards MDC, although results in the literature are conflicting. Some scholars have identified gender norms, links to femininity or associations of masculinity, as barriers of willingness to use MDC (Peterson et al., 2019; Walker, 2011; Zhang et al., 2006). Qualitative researchers, however, found men would be willing to use male birth control pills as they represent contraceptive responsibility (Dismore et al., 2016). Contraceptive responsibility is portrayed as a significant act of masculine valor (Terry & Braun, 2012), and thus, an engagement of masculinity. Given the inconsistency of the literature, it is necessary to investigate the relationship between masculinity and factors associated with willingness to use MDC.

### **Theoretical Framework**

One of the most extensively used theories exploring social and health behaviors, the Theory of Planned Behavior (TPB) posits the likelihood of performing a specific behavior is determined by individual motivational factors including: attitudes towards performing the behavior, subjective norms associated with the behavior, and perceived control over the behavior (Glanz,

Rimer, & Viswanath, 2008). Attitudes are an individual's beliefs about what will happen if the behavior is performed and their judgment of the expected outcome. Subjective norms are an individual's beliefs about what other people think about the behavior and their motivation to conform to the perceived norms. Perceived control is an individual's beliefs about the factors associated with performing the behavior and the amount of perceived control they have over performing the behavior (Edberg, 2019).

As the only available male contraceptive method, understanding condom use intentions may provide the best tentative understanding of MDC intention. Previous meta-analyses have found all TPB constructs to have moderate to strong associations with behavior (Cooke, Dahdah, Norman, & French, 2016; McDermott et al., 2015; McEachan et al., 2011; Riebel et al. 2015; Starfelt & White, 2016). When comparing the predictive validity of three socio-cognitive models, the TPB was found to best predict the frequency of condom use compared to the socio-cognitive model and the information-motivation-behavioral skills model (Espada, Morales, Guillén-Riquelme, Ballester, & Orgilés, 2015). A meta-analysis using the TPB and Theory of Reasoned Action as models for condom use concluded attitudes are the best predictor of condom use intention (Albarracin, Johnson, Fishbein, & Muellerleile, 2001). Reid and Aiken found similar results with attitudes providing associations with intended condom use (2011). Among college students specifically, attitudes, subjective norms, and perceived behavioral control accounted for 64 percent of the variance in condom use intention with perceived behavioral control accounting for 35 percent of the variance in condom use behavior (Asare, 2015). Furthermore, there are potential differences in condom use intentions based on gender and sexual experience. In a separate study on the role of gender and sexual experience in predicting condom use intentions, results demonstrated that among the TPB constructs, attitudes towards condom use were the most significant predictor of condom use intentions among sexually inexperienced participants. Attitudes and subjective norms towards condom use were the most significant predictors of condom use intentions among sexually

experienced participants (Rich, Mullan, Sainsbury, & Kuczmierczyk, 2014). The TPB, with an added masculinity construct, was used to guide this study.

## Purpose

Currently, MDC use is a hypothetical behavior; however, the use of MDC can be assessed indirectly by understanding intended use. Intended use is regarded as an indirect measure of MDC's acceptability which is influenced by numerous factors including cost, availability, accessibility, and attitudes (Glasier, 2010). Considering the inconsistent use of contraceptive methods among college students and the lack of feasibility of vasectomies for young adult men, there is a need to understand factors related to the potential use of innovative MDC methods to prevent unintended pregnancies. Therefore, the purpose of this study was to determine factors related to intention to use MDC methods among college students. Using the TPB, this study was guided by the following aims:

1. Describe college men's attitudes, subjective norm, and perceived behavioral control towards male birth control methods.
2. Determine if the following factors are associated with intention to use MDC methods: masculinity, attitudes, subjective norms, and perceived behavior control.

## Methods

### Participants

This study's priority population was college students enrolled in a Midwestern university. Inclusion criteria for this study required participants to be: 1) aged 18 years or older; 2), fluent in English, and 3) available for contact via a valid university email address. One hundred and five ( $n = 105$ ) college men completed the survey. A sample size of at least 43 was needed to determine small effect sizes (Soper, 2017).

**Table 1.** Participant Characteristics ( $N = 105$ )

Variable	<i>n</i>	%
<b>Age</b>		
18-24	80	76.2
25-31	10	9.5
32-38	4	3.8
39-45	6	5.7
46+	5	4.8
<b>Race</b>		
White	98	83.1
African American	8	6.8
Asian	6	5.1
Multi-Racial	5	4.2
Other	1	0.8
<b>Relationship Status</b>		
Single and not in a monogamous relationship	59	53.2
Single, but in a monogamous relationship	34	30.6
Married	18	16.2
<b>Religion</b>		
Non-Denominational Christian	35	29.7
Agnostic	24	20.3
Catholic	19	16.1
Other	11	9.3
Protestant	10	8.5
Atheist	10	8.5
Islamic	4	3.4
Jewish	2	1.7
Buddhist	2	1.7
Hindu	1	0.8
<b>Sexual Orientation</b>		
Straight/Heterosexual	97	82.9
Asexual	9	7.7
Bisexual	4	3.4
Gay	3	2.6
Pansexual	2	1.7
Questioning	1	.9
<b>Insurance</b>		
Parent's Policy	77	65.3
Individually Purchased Policy	14	11.9
School Policy	13	11.0
Government Policy	7	5.9
None	4	3.4
Military Policy	3	2.5

NOTE: Differences in counts the result of missing values.

## Procedures

Prior to beginning data collection, this study was reviewed and approved by the University of Cincinnati Institutional Review Board (IRB) (IRB 2019-0916). All data collection occurred through Qualtrics in the Fall of 2019. Participant emails were provided by university administrators. Prospective participants received the study's recruitment emails and consent form

online. Those agreeing to participate clicked a button to advance and complete the study survey.

## Instrumentation

**Measures.** The instrument included 6 demographic and descriptive items to characterize the sample. Participants were asked to report: age, race/ethnicity, relationship status, religion, sexual orientation, and primary source of health insurance.

**Masculinity.** Masculinity was measured by six items modified from the Traditional Masculinity-Femininity Scale (TMF) developed by Kachel and colleagues (Kachel, Steffens, & Niedlich, 2016). TMF utilizes six independent items on a 7-point scale with masculinity and femininity as two unipolar dimensions (Kachel, et al., 2016). For the purposes of this study, the 7-point scale was modified with "not at all masculine" and "totally masculine" as endpoints for male respondents. The possible construct score ranged from 6-42 with higher scores indicating participants viewing themselves as being more masculine.

**Attitude.** Attitude was operationally defined as an individual's general feeling of like or dislike toward each MDC method. Attitude towards each MDC method was measured using seven 7-point semantic differential scale items based on bipolar adjectives (Francis et al., 2004). The stem statement for these items was, "To prevent pregnancy, I think a (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD) for men would be." End points included, irresponsible-responsible, unacceptable-acceptable, unhealthy-healthy, disadvantages-advantageous, undesirable-desirable, ineffective-effective, and unsafe-safe with a possible construct score range of 7-49. Higher scores indicated more positive attitudes towards each contraceptive method. In our sample, the attitude construct exhibited a Cronbach's alpha of 0.94, 0.95, 0.93, and 0.94 for a contraceptive pill, transdermal gel, injection, and implant respectively (Table 2).

**Subjective norm.** Subjective norm was defined as an individual's general belief about what significant people in their lives think about MDC. Subjective norms towards each MDC method were measured using seven items.

**Table 2.** *Theory of Planned Behavior Construct Descriptive Statistics*

Construct	Possible Range	Observed Range	M	SD	Cronbach's $\alpha$
<b>Pill</b>					
Behavioral Intention	3-21	3-21	13.24	5.85	.97
Attitude Toward the behavior	7-49	7-49	37.53	11.05	.94
Subjective Norm	7-49	7-49	27.65	10.23	.93
Perceived Behavioral Control	2-14	2-14	11.19	2.42	.36
<b>Gel</b>					
Behavioral Intention	3-21	3-21	11.78	5.95	.97
Attitude Toward the behavior	7-49	7-49	37.88	11.69	.95
Subjective Norm	7-49	7-49	26.22	10.37	.96
Perceived Behavioral Control	2-14	2-14	10.76	3.09	.57
<b>Injection</b>					
Behavioral Intention	3-21	3-21	9.90	6.08	.98
Attitude Toward the behavior	7-49	7-49	32.55	11.67	.93
Subjective Norm	7-49	7-49	24.32	10.554	.95
Perceived Behavioral Control	2-14	2-14	9.85	3.00	.46
<b>Intra Vas Device</b>					
Behavioral Intention	3-21	3-21	9.13	5.88	.98
Attitude Toward the behavior	7-49	7-49	38.48	11.43	.94
Subjective Norm	7-49	7-49	23.26	10.79	.97
Perceived Behavioral Control	2-14	2-14	9.56	3.21	.49

Participants were asked, “If it were available to prevent pregnancy, people who are important to me think that I should use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, “If it were available to prevent pregnancy, my parent(s) or legal guardian(s) would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, “If it were available to prevent pregnancy, family members other than my parent(s) or legal guardians(s) (for example, sibling, aunt, uncle, grandparent, etc.) would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, “If it were available to prevent pregnancy, my friends would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, “If it were available to prevent pregnancy, my sexual partner(s) would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, “If it were available to prevent pregnancy, my religious leader(s) would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or implant) for men”, and “If it were available to prevent pregnancy, my healthcare provider(s) (e.g., doctor, nurse) would like me to use a (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD) for men”. Each item was measured using a 7-point Likert-

type scale with strongly disagree and strongly agree endpoints with a possible construct score range of 7-49. Higher scores indicated more positive subjective norms towards each contraceptive method. In our sample, the subjective norm construct exhibited a Cronbach's alpha of 0.93, 0.96, 0.95, and 0.97 for a contraceptive pill, transdermal gel, injection, and implant respectively (Table 2).

**Perceived behavioral control.** Perceived behavioral control (PBC) was operationally defined as the extent to which people believe they are in control of using the MDC method. PBC towards each method of MDC was measured by two items. Participants were asked, “I am confident I can use a male (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD)” and “If it were commercially available, I intend to use a male (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD)”. Each item was measured using a 7-point Likert-type scale with strongly disagree and strongly agree endpoints with a possible construct score range of 2-14. Perceived behavioral control was the only construct to fall below a priori Cronbach alpha level of .92 for the male pill ( $\alpha = .36$ ), contraceptive gel ( $\alpha = .57$ ), contraceptive injection ( $\alpha = .46$ ), and implant ( $\alpha = .49$ ) (Table 2).



Behavioral intention. Behavioral intention was operationally defined as college men's intention to use MDC. Behavioral intention towards each MDC method was measured by three items. Participants were asked, "If it were commercially available, I intend to use a male (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD)", "If it were commercially available, I want to use a male (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD)", and "If it were commercially available, I would try to use a male (contraceptive pill, contraceptive gel, injectable contraceptive, or IVD)". Each item was measured using a 7-point Likert-type scale with strongly disagree and strongly agree endpoints with a possible construct score range of 3-21. Higher scores indicated more positive intentions towards using each contraceptive method. In our sample, the intention construct exhibited a Cronbach's alpha of 0.97, 0.97, 0.98, and 0.98 for a contraceptive pill, transdermal gel, injection, and implant respectively (Table 2).

### Data Analysis

Data were analyzed using International Business Machines (IBM®) Statistical Package for Social Sciences (SPSS) version 24 (IBM, Armonk, NY). Descriptive statistics were used to describe participant characteristics. Cronbach's alpha was used to assess internal consistency of TPB construct items. Four separate liner regressions analysis models, one for each dependent variable, were conducted to determine the factors associated with intention to use male birth control. An alpha of  $<.05$  was set as the criteria to determine statistical significance. Beta weights and structure coefficients were analyzed to determine which variables contributed the most to each model's effect.

## Results

### Participant Characteristics

The sample was predominantly between the ages of 18 and 24 ( $n = 80$ , 76.2%), white ( $n = 98$ , 83.1%), and identified as straight or heterosexual ( $n = 97$ , 82.9%). Most participants ( $n = 77$ ,

65.3%) were on their parent's insurance policy and identified as non-denominational Christian ( $n = 35$ , 29.7%), agnostic ( $n = 24$ , 20.3%), or Catholic ( $n = 19$ , 16.1%). Over half of the sample ( $n = 59$ , 53.3%) reported being single and not in a monogamous relationship. Additional characteristics of the sample can be found in Table 1.

### Behavioral Intention to use Male Directed Contraception

Behavioral intention scores to use all four methods of MDC were low. Behavioral intention to use a male birth control pill ( $M = 13.24$ ;  $SD = 5.85$ ) and a transdermal birth control gel ( $M = 11.78$ ;  $SD = 5.95$ ) had the highest mean scores. Behavioral intention to use a male birth control injection ( $M = 9.90$ ;  $SD = 6.08$ ) and a male birth control implant ( $M = 9.13$ ;  $SD = 5.88$ ) had the lowest mean intention scores of all four methods.

### Behavioral Intention to use a Male Contraceptive Pill

Multiple linear regression was used to run five models for predicting male college students' intention to use male hormonal birth control pills. For the first model, only demographic variables were entered. The first model was not statistically significant. The second model included all demographic variables and the TPB construct attitude towards a male hormonal birth control pill. The second model was statistically significant and accounted for 39 percent of the variance ( $F [17, 75] = 2.86$ ,  $p = 0.001$ ,  $R^2 = 0.39$ ). The third model included all demographic variables and the TPB constructs attitude towards a male hormonal birth control pill and subjective norms. The third model was statistically significant and accounted for 54 percent of the variance ( $F [18, 74] = 4.73$ ,  $p = .001$ ,  $R^2 = 0.54$ ). The fourth model included all demographic variables and the TPB constructs attitude towards a male hormonal birth control pill, subjective norms, and perceived behavioral control. The fourth model was statistically significant and accounted for 58.8% of the variance ( $F [19, 73] = 5.48$ ,  $p = .001$ ,  $R^2 = 0.59$ ). The final model included all demographic variables, all TPB



constructs, and an added masculinity variable. The final model was statistically significant and accounted for 59 percent of the variance ( $F [20, 72] = 5.14, p = 0.001, R^2 = 0.59$ ). In the final model, intention to use a male hormonal birth control pill was predicted by male college students': attitudes ( $\beta = .24, p = 0.027$ ), subjective norms ( $\beta = .43, p = 0.001$ ), and perceived behavioral control ( $\beta = .27, p = 0.003$ ). In assessing the squared structure coefficients, attitudes, subjective-norms, and PCB accounted for 62 percent, 85 percent, and 44 percent, respectively, of the effect in the final model. Regression weights, structure coefficients, and confidence intervals are shown in [Table 3](#).

### ***Behavioral Intention to use a Male Contraceptive Transdermal Gel***

Multiple linear regression was used to run five models for predicting male college students' intention to use male hormonal birth control gel. For the first model, only demographic variables were entered. The first model was not statistically significant. The second model included all demographic variables and the TPB construct attitude towards a male hormonal birth control gel. The second model was statistically significant and accounted for 45 percent of the variance ( $F [17, 79] = 3.85, p = .001, R^2 = 0.45$ ). The third model included all demographic variables and the TPB constructs attitude towards a male hormonal birth control gel and subjective norms. The third model was statistically significant and accounted for 60 percent of the variance ( $F [18, 78] = 6.40, p = 0.001, R^2 = 0.60$ ). The fourth model included all demographic variables and the TPB constructs attitude towards a male hormonal birth control gel, subjective norms, and perceived behavioral control. The fourth model was statistically significant and accounted for 64 percent of the variance ( $F [19, 77] = 7.13, p = 0.001, R^2 = 0.64$ ). The final model included all demographic variables, all TPB constructs, and an added masculinity variable. The final model was statistically significant and accounted for 64 percent of the variance ( $F [20, 76] = 6.72, p = 0.001, R^2 = 0.64$ ). In the final model, intention to use a male hormonal birth control gel was predicted by male college

students': attitudes ( $\beta = .30, p = 0.003$ ), subjective norms ( $\beta = .41, p = 0.001$ ), and perceived behavioral control ( $\beta = .26, p = 0.004$ ). In assessing the squared structure coefficients, attitudes, subjective-norms, and PCB accounted for 66 percent, 79 percent, and 53 percent, respectively, of the effect in the final model. Regression weights, structure coefficients, and confidence intervals are shown in [Table 4](#).

### ***Behavioral Intention to use a Male Contraceptive Injection***

Multiple linear regression was used to run five models for predicting male college students' intention to use male hormonal birth control injection. For the first model, only demographic variables were entered. The first model was not statistically significant. The second model included all demographic variables and the TPB construct attitude towards a male hormonal birth control injection. The second model was statistically significant and accounted for 49 percent of the variance ( $F [17, 77] = 4.48, p = 0.001, R^2 = 0.49$ ). The third model included all demographic variables and the TPB constructs attitude towards a male hormonal birth control injection and subjective norms. The third model was statistically significant and accounted for 70 percent of the variance ( $F [18, 76] = 10.05, p = 0.001, R^2 = 0.70$ ). The fourth model was statistically significant and accounted for 71 percent of the variance ( $F [19, 75] = 10.09, p = 0.001, R^2 = 0.71$ ). In the fourth model, intention to use a male hormonal birth control injection was positively predicted by male college students': attitudes ( $\beta = .24, p = 0.006$ ), and subjective norms ( $\beta = .49, p = 0.001$ ). The final model included all demographic variables, all TPB constructs, and an added masculinity variable. The final model was statistically significant and accounted for 72 percent of the variance ( $F [20, 74] = 9.50, p = 0.001, R^2 = 0.72$ ). In the final model, intention to use a male hormonal birth control injection was positively predicted by male college students': attitudes ( $\beta = .24, p = 0.006$ ), subjective norms ( $\beta = .50, p = 0.001$ ), and perceived behavioral control ( $\beta = .17, p = 0.049$ ). Intention to use a male hormonal birth control injection was negatively predicted by male

**Table 3. Behavioral Intention to use a Male Hormonal Birth Control Pill**

Predictor	Model 1 $R^2 = .19$ $F = 1.14$				Model 2 $R^2 = .39$ $F = 2.86$				Model 3 $R^2 = .54$ $F = 4.73$				Model 4 $R^2 = .59$ $F = 5.48$				Model 5 $R^2 = .59$ $F = 5.14$			
	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI
Age	.08	0.11	.11	[-.21, .37]	.06	0.05	.08	[-.19, .31]	.10	0.04	.14	[-.13, .32]	.03	0.04	.04	[-.18, .25]	.03	0.04	.04	[-.19, .25]
Race/Ethnicity <sup>a</sup>																				
White	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-White	-	0.03	-	[-6.28, 2.05]	-	0.01	-	[-6.01, 1.26]	-.50	0.01	-	[-3.80, 2.80]	-.37	0.01	-	[-3.50, 2.76]	-.39	0.01	-	[-3.55, 2.76]
	2.12		.13		2.38		.14				.03				.02			.02		
Relationship Status <sup>b</sup>																				
Single, not in a monogamous relationship	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Single, in a monogamous relationship	1.60	0.07	.12	[-1.43, 4.63]	.69	0.04	.05	[-1.98, 3.36]	.34	0.03	.03	[-2.02, 2.70]	.49	0.03	.04	[-1.75, 2.73]	.49	0.03	.04	[-1.76, 2.75]
Married	1.19	0.02	.07	[-6.48, 8.87]	-.72	0.01	-	[-7.46, 6.03]	.49	0.01	.03	[-5.48, 6.46]	.94	0.01	.06	[-4.73, 6.61]	.97	0.01	.06	[-4.74, 6.68]
Religion <sup>c</sup>																				
Non-denominational Christian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Catholic	-	0.02	-	[-5.71, 1.75]	-.63	0.01	-	[-3.93, 2.68]	.76	0.01	.05	[-2.21, 3.73]	.85	0.01	.05	[-1.96, 3.67]	.87	0.01	.06	[-1.97, 3.70]
	1.98		.13				.04													
Protestant	-	0.15	-	[-7.31, 2.02]	-.36	0.07	-	[-4.53, 3.82]	-.75	0.06	-	[-4.44, 2.94]	-	0.05	-	[-4.61, 2.40]	-	0.05	-	[-4.63, 2.43]
	2.64		.12				.02				.04		1.11		.05		1.10		.05	
Hindu	9.90	0.06	.17	[-2.66, 22.45]	6.36	0.03	.11	[-4.70, 17.412]	5.22	0.02	.09	[-4.54, 14.99]	6.00	0.02	.10	[-3.27, 15.27]	6.12	0.02	.11	[-3.24, 15.49]
Buddhist	4.72	0.01	.08	[-8.72, 18.16]	6.33	0.00	.11	[-5.43, 18.09]	1.63	0.00	.03	[-8.93, 12.18]	-.03	0.00	.00	[-10.09, 10.04]	.03	0.00	.00	[-10.11, 10.16]
Islamic	-.66	0.05	-	[-9.38, 8.06]	4.57	0.03	.14	[-3.34, 12.47]	1.78	0.02	.05	[-5.29, 8.85]	1.96	0.02	.06	[-4.74, 8.66]	2.00	0.02	.06	[-4.75, 8.75]
Atheist	1.04	0.01	.05	[-3.56, 5.64]	-	0.00	-	[-5.74, 2.56]	-.19	0.00	-	[-3.90, 3.52]	-.09	0.00	-	[-3.61, 3.42]	.02	0.00	.00	[-3.60, 3.65]
					1.59		.08				.01				.01					
Agnostic	2.59	0.15	.17	[-1.07, 6.26]	.45	0.07	.03	[-2.86, 3.77]	1.07	0.05	.07	[-1.87, 4.00]	.90	0.05	.06	[-1.88, 3.69]	1.06	0.05	.07	[-1.93, 4.05]
Insurance <sup>d</sup>																				
No Insurance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Parent's Policy	-	0.10	-	[-18.92, 9.39]	-	0.05	-	[-18.08, 6.66]	-	0.04	-	[-13.31, 8.69]	-.94	0.03	-	[-11.40, 9.53]	-	0.03	-	[-11.87, 9.47]
	4.77		.38		5.71		.45		2.31		.18				.07		1.20		.10	
School Policy	-	0.19	-	[-24.11, 5.09]	-	0.10	-	[-22.24, 3.27]	-	0.07	-	[-16.50, 6.29]	-	0.06	-	[-13.61, 8.23]	-	0.06	-	[-14.14, 8.17]
	9.52		.49		9.48		.49		5.11		.26		2.69		.14		2.99		.16	
Individually Purchased Policy	-	0.03	-	[-21.89, 5.01]	-	0.01	-	[-19.30, 4.25]	-	0.01	-	[-14.71, 2.27]	-	0.01	-	[-12.26, 2.50]	-	0.01	-	[-12.69, 2.50]
	8.44		.47		7.55		.42		4.25		.24				.13				.14	

								4.21]						6.21]						7.73]						7.67]
Military Policy	-	0.00	-	[-	-	0.00	-	[-	-	0.00	-	[-	-49	0.00	-	[-	-79	0.00	-	[-						
	3.49		.10	18.778,	6.01		.18	19.39,	1.89		.06	13.82,			.01	11.84,		.02	12.37,							
				11.79]				7.38]				10.04]				10.86]			10.80]							
Government Policy	-	0.00	-	[-23.38,	-	0.00	-	[-	-	0.00	-	[-	-	0.00	-	[-	-	0.00	-	[-						
	8.34		.32	6.69]	7.07		.27	20.22,	3.43		.13	15.12,	2.55		.10	13.65,	2.89	.11	14.27,							
								6.07]				8.26]				8.54]			8.49]							
Attitudes					.31	0.94	.55	[.18,	.18	0.69	.31	[.05,	.14	0.62	.24	[.02,	.14	0.62	.24	[.02,						
								.43]				.30]				.25]			.26]							
Subjective Norms									.28	0.92	.48	[.16,	.25	0.85	.43	[.14,	.25	0.85	.43	[.14,						
												.40]				.37]			.37]							
PBC													.50	0.44	.26	[.18,	.51	0.44	.27	[.18,						
																.83]			.84]							
Masculinity																	.03	0.03	.03	[-.14,						
																				.20]						

Note.  $r_s^2$  = structure coefficient. CI = 95% confidence interval. Statistically significant ( $p < 0.05$ ) associations are bolded

<sup>a</sup> Race/Ethnicity was represented by one dummy variable with White serving as the reference group.

<sup>b</sup> Relationship status was represented by four dummy variables with Single, not in a monogamous relationship serving as the reference group.

<sup>c</sup> Religion was represented by ten dummy variables with Non-denominational Christian serving as the reference group.

<sup>d</sup> Insurance was represented by six dummy variables with no insurance serving as the reference group.

**Table 4. Behavioral Intention to use a Male Hormonal Birth Control Gel**

Predictor	Model 1 $R^2 = .10$ $F = .57$				Model 2 $R^2 = .45$ $F = 3.85$				Model 3 $R^2 = .60$ $F = 6.40$				Model 4 $R^2 = .64$ $F = 7.13$				Model 5 $R^2 = .64$ $F = 6.72$			
	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI
Age	0.03	0.08	0.04	[-0.25, 0.32]	-	0.02	-	[-0.29, 0.15]	0.03	0.01	0.04	[-0.16, 0.23]	0.01	0.01	0.02	[-0.17, 0.21]	0.01	0.01	0.01	[-0.18, 0.20]
Race/Ethnicity <sup>a</sup>																				
White	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-White	-	0.00	-	[-4.33, 3.89]	-	0.00	-	[-3.59, 2.87]	0.19	0.00	0.01	[-2.64, 3.00]	0.11	0.00	0.00	[-2.56, 2.78]	0.04	0.00	0.00	[-2.66, 2.74]
	0.22		0.01		0.36		0.02													
Relationship Status <sup>b</sup>																				
Single, not in a monogamous relationship	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Single, in a monogamous relationship	-	0.00	-	[-3.28, 2.96]	0.34	0.00	0.02	[-2.11, 2.80]	0.02	0.00	0.00	[-2.10, 2.15]	0.41	0.00	0.03	[-1.63, 2.46]	0.45	0.00	0.03	[-1.61, 2.51]
	0.16		0.01																	
Married	-	0.08	-	[-8.92, 4.25]	-	0.02	-	[-6.45, 3.91]	-	0.01	-	[-5.44, 3.52]	-	0.01	-	[-5.62, 2.95]	-	0.01	-	[-5.56, 3.08]
	2.34		0.14		1.26		0.07		0.95		0.06		1.33		0.08		1.24		0.07	
Religion <sup>c</sup>																				
Non-denominational Christian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Catholic	-	0.14	-	[-6.50, 1.36]	-	0.03	-	[-5.70, 0.47]	-	0.02	-	[-3.94, 1.50]	-	0.02	-	[-4.02, 1.18]	-	0.02	-	[-4.03, 1.19]
	2.57		0.15		2.61		<b>0.15</b>		1.21		0.07		1.41		0.08		1.42		0.08	

Protestant	-	0.34	-	[-8.35, 0.85]	-	0.07	-	[-5.80, 1.48]	-	0.06	-	[-5.40, 0.89]	-	0.05	-	[-5.53, 0.49]	-	0.05	-	[-5.54, 0.50]
Hindu	3.75	0.04	0.18	[-9.65, 16.25]	-	0.01	-	[-11.56, 8.95]	-	0.01	-	[-9.03, 8.72]	-	0.01	-	[-8.94, 8.00]	-	0.01	-	[-8.82, 8.30]
Buddhist	-	0.05	-	[-17.01, 10.74]	-	0.01	-	[-12.63, 9.19]	-	0.01	-	[-14.23, 4.77]	-	0.01	-	[-11.88, 6.44]	-	0.01	-	[-11.77, 6.71]
Islamic	-	0.01	-	[-9.18, 8.63]	3.29	0.00	0.09	[-3.77, 10.36]	0.20	0.00	0.00	[-6.02, 6.42]	1.55	0.00	0.04	[-4.45, 7.55]	1.61	0.00	0.04	[-4.43, 7.65]
Atheist	1.07	0.06	0.05	[-3.57, 5.72]	-	0.01	-	[-5.36, 2.09]	-	0.01	-	[-3.93, 2.55]	-	0.01	-	[-4.31, 1.91]	-	0.01	-	[-4.23, 2.22]
Agnostic	-	0.06	-	[-4.00, 3.58]	-	0.01	-	[-5.217, 0.84]	-	0.01	-	[-4.08, 1.18]	-	0.01	-	[-4.07, 0.95]	-	0.01	-	[-4.03, 1.41]
Insurance <sup>d</sup>																				
No Insurance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Parent's Policy	-	0.17	-	[-10.71, 8.48]	0.52	0.04	0.04	[-7.03, 8.08]	0.26	0.03	0.02	[-6.26, 6.80]	-	0.03	-	[-6.84, 5.67]	-	0.03	-	[-7.01, 5.60]
School Policy	-	0.18	-	[-14.17, 6.87]	0.06	0.04	0.00	[-8.27, 8.39]	0.81	0.03	0.04	[-6.39, 8.02]	0.10	0.03	0.00	[-6.79, 6.99]	-	0.03	-	[-7.03, 6.89]
Individually Purchased Policy	-	0.06	-	[-10.77, 10.00]	2.33	0.01	0.12	[-5.86, 10.53]	1.16	0.01	0.06	[-5.94, 8.26]	1.08	0.01	0.06	[-5.69, 7.85]	0.97	0.01	0.05	[-5.85, 7.79]
Military Policy	3.34	0.07	0.09	[-8.54, 15.22]	3.53	0.01	0.10	[-5.80, 12.87]	4.11	0.01	0.12	[-3.96, 12.19]	3.00	0.01	0.08	[-4.73, 10.74]	2.84	0.01	0.08	[-4.96, 10.65]
Government Policy	-	0.02	-	[-14.60, 7.19]	1.34	0.00	0.05	[-7.32, 10.02]	1.94	0.00	0.07	[-5.56, 9.44]	-	0.00	-	[-7.35, 7.21]	-	0.00	-	[-7.67, 7.09]
Attitudes					0.35	0.92	<b>0.67</b>	[0.25, 0.45]	0.20	0.69	<b>0.38</b>	[0.09, 0.30]	0.15	0.66	<b>0.29</b>	[0.05, 0.26]	0.16	0.66	<b>0.3</b>	[0.05, 0.26]
Subjective Norms									0.29	0.85	<b>0.49</b>	[0.18, 0.41]	0.25	0.79	<b>0.41</b>	[0.14, 0.36]	0.25	0.79	<b>0.41</b>	[0.14, 0.36]
PBC													0.50	0.53	<b>0.25</b>	[0.16, 0.83]	0.51	0.53	<b>0.26</b>	[0.17, 0.85]
Masculinity																	<b>0.03</b>	<b>0.04</b>	<b>0.04</b>	<b>[-0.11, 0.19]</b>

Note.  $r_s^2$  = structure coefficient. CI = 95% confidence interval. Statistically significant ( $p < 0.05$ ) associations are bolded

<sup>a</sup> Race/Ethnicity was represented by one dummy variable with White serving as the reference group.

<sup>b</sup> Relationship status was represented by four dummy variables with Single, not in a monogamous relationship serving as the reference group.

<sup>c</sup> Religion was represented by ten dummy variables with Non-denominational Christian serving as the reference group.

<sup>d</sup> Insurance was represented by six dummy variables with no insurance serving as the reference group.

**Table 5.** Behavioral Intention to use a Male Hormonal Birth Control Injection

Predictor	Model 1 $R^2 = .25$ $F = 1.65$				Model 2 $R^2 = .49$ $F = 4.48$				Model 3 $R^2 = .70$ $F = 10.05$				Model 4 $R^2 = .71$ $F = 10.09$				Model 5 $R^2 = .72$ $F = 9.50$			
	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI
Age	.28	0.06	.36	[-.00, .57]	.17	0.03	.21	[-.07, .41]	.21	0.02	<b>.28</b>	[.02, .40]	.18	0.02	.23	[-.00, .37]	.17	0.02	.22	[-.01, .36]
Race/Ethnicity <sup>a</sup>																				
White	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-White	-2.51	0.01	-	[-6.55, 1.52]	-	0.00	-	[-5.36, 1.31]	-.11	0.00	-	[-2.74, 2.51]	-.19	0.00	-	[-2.77, 2.39]	-.25	0.00	-	[-2.87, 2.35]
Relationship Status <sup>b</sup>																				
Single, not in a monogamous relationship	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Single, in a monogamous relationship	.47	0.03	.03	[-2.62, 3.57]	-.95	0.01	-	[-3.56, 1.64]	-.43	0.01	-	[-2.44, 1.58]	-.33	0.01	-	[-2.32, 1.64]	-.30	0.01	-	[-2.30, 1.69]
Married	.11	0.02	.00	[-7.29, 7.51]	-	0.01	-	[-8.36, 3.95]	-	0.01	-	[-5.81, 3.72]	-.82	0.01	-	[-5.51, 3.86]	-.71	0.01	-	[-5.44, 4.01]
Religion <sup>c</sup>																				
Non-denominational Christian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Catholic	-5.60	0.14	-	[-9.42, -1.77]	-	0.07	-	[-6.94, -.51]	-	0.05	-	[-4.63, .41]	-	0.05	-	[-4.72, .23]	-	0.05	-	[-4.71, .27]
Protestant	-3.31	0.07	-	[-7.86, 1.24]	-	0.04	-	[-5.17, 2.45]	-	0.03	-	[-5.48, .44]	-	0.03	-	[-5.52, .30]	-	0.03	-	[-5.55, .30]
Hindu	-5.39	0.04	-	[-18.15, 7.35]	-	0.02	-	[-16.87, 4.20]	-	0.01	-	[-14.89, 1.39]	-	0.01	-	[-14.52, 1.46]	-	0.01	-	[-14.38, 1.79]
Buddhist	9.66	0.00	.15	[-3.99, 23.33]	7.84	0.00	.12	[-3.45, 19.14]	.80	0.00	.01	[-8.13, 9.74]	.68	0.00	.01	[-8.09, 9.45]	.78	0.00	.01	[-8.04, 9.62]
Islamic	-1.46	0.00	-	[-10.33, 7.41]	2.52	0.00	.06	[-4.91, 9.97]	-.99	0.00	-	[-6.81, 4.83]	-.49	0.00	-	[-6.23, 5.25]	-.47	0.00	-	[-6.24, 5.30]
Atheist	-1.55	0.00	-	[-6.14, 3.03]	-	0.00	-	[-6.72, .91]	-.60	0.00	-	[-3.61, 2.41]	-.85	0.00	-	[-3.82, 2.11]	-.65	0.00	-	[-3.74, 2.44]
Agnostic	.96	0.10	.06	[-2.85, 4.79]	-	0.05	-	[-5.04, 1.52]	-	0.04	-	[-4.09, .97]	-	0.04	-	[-4.01, .96]	-	0.04	-	[-3.96, 1.36]
Insurance <sup>d</sup>																				
No Insurance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Parent's Policy	-7.35	0.00	-	[-16.94, 2.23]	-	0.00	-	[-15.06, .79]	-	0.00	-	[-11.38, .89]	-	0.00	-	[-11.18, .87]	-	0.00	-	[-11.30, .83]
School Policy	-	0.06	-	[-23.61, -2.66]	-	0.03	-	[-18.61, -1.18]	-	0.02	-	[-13.11, .49]	-	0.02	-	[-12.64, .72]	-	0.02	-	[-12.83, .65]



Individually Purchased Policy	-12.13	0.00	<b>.63</b>	[-22.35, -1.92]	-9.04	0.00	<b>.47</b>	[-17.54, -.54]	-7.87	0.00	<b>.41</b>	[-14.44, -1.30]	-7.34	0.00	<b>.38</b>	[-13.81, -.86]	-7.44	0.00	<b>.38</b>	[-13.96, -.92]
Military Policy	-5.57	0.00	<b>.15</b>	[-17.27, 6.13]	-6.65	0.00	<b>.18</b>	[-16.32, 3.02]	-4.47	0.00	<b>.12</b>	[-11.97, 3.01]	-4.27	0.00	<b>.11</b>	[-11.63, 3.08]	-4.41	0.00	<b>.12</b>	[-11.82, 3.00]
Government Policy	-7.72	0.02	<b>.29</b>	[-18.53, 3.09]	-5.49	0.01	<b>.20</b>	[-14.45, 3.46]	-4.19	0.01	<b>.16</b>	[-11.12, 2.73]	-4.48	0.01	<b>.17</b>	[-11.29, 2.32]	-4.67	0.01	<b>.17</b>	[-11.56, 2.21]
Attitudes					.31	0.62	<b>.59</b>	[-.21, .42]	.16	0.44	<b>.30</b>	[-.07, .25]	.13	0.42	<b>.24</b>	[-.03, .22]	.13	0.42	<b>.24</b>	[-.03, .22]
Subjective Norms									.35	0.72	<b>.57</b>	[-.25, .44]	.30	0.71	<b>.49</b>	[-.20, .41]	.30	0.71	<b>.50</b>	[-.20, .41]
PBC													.35	0.49	<b>.16</b>	[-.00, .70]	.35	0.49	<b>.17</b>	[-.00, .71]
<b>Masculinity</b>																	<b>.03</b>	<b>.02</b>	<b>.03</b>	<b>[-.11, .18]</b>

Note.  $r_s^2$  = structure coefficient. CI = 95% confidence interval. Statistically significant ( $p < 0.05$ ) associations are bolded

<sup>a</sup> Race/Ethnicity was represented by one dummy variable with White serving as the reference group.

<sup>b</sup> Relationship status was represented by four dummy variables with Single, not in a monogamous relationship serving as the reference group.

<sup>c</sup> Religion was represented by ten dummy variables with Non-denominational Christian serving as the reference group.

<sup>d</sup> Insurance was represented by six dummy variables with no insurance serving as the reference group.

**Table 6. Behavioral Intention to use an Implant**

Predictor	Model 1 $R^2 = .21$ $F = 1.31$				Model 2 $R^2 = .54$ $F = 5.45$				Model 3 $R^2 = .63$ $F = 7.41$				Model 4 $R^2 = .65$ $F = 7.42$				Model 5 $R^2 = .66$ $F = 7.20$			
	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI	B	$r_s^2$	$\beta$	95% CI
Age	.21	0.00	.29	[-.05, .48]	.10	0.00	.14	[-.10, .31]	.16	0.00	.22	[-.02, .35]	.14	0.00	.19	[-.05, .33]	.12	0.00	.16	[-.07, .31]
Race/Ethnicity <sup>a</sup>																				
White	--		--	--	--		--	--	--		--	--	--		--	--	--		--	--
Non-White	-4.52	0.05	<b>.27</b>	[-8.48, -.56]	-2.75	0.02	<b>.17</b>	[-5.81, .31]	-1.95	0.02	<b>.12</b>	[-4.73, .83]	-1.98	0.02	<b>.12</b>	[-4.72, .75]	-2.16	0.02	<b>.13</b>	[-4.90, .57]
Relationship Status <sup>b</sup>																				
Single, not in a monogamous relationship	--		--	--	--		--	--	--		--	--	--		--	--	--		--	--
Single, in a monogamous relationship	.94	0.07	.06	[-2.11, 3.99]	.05	0.03	.00	[-2.28, 2.39]	-.02	0.02	<b>.00</b>	[-2.14, 2.08]	-1.98	0.02	<b>.00</b>	[-4.72, .75]	.01	0.02	<b>.00</b>	[-2.05, 2.08]
Married	-3.37	0.01	<b>.20</b>	[-9.69, 2.93]	-3.45	0.00	<b>.21</b>	[-8.27, 1.37]	-3.32	0.00	<b>.20</b>	[-7.67, 1.01]	-1.98	0.00	<b>.18</b>	[-4.72, .75]	-2.77	0.00	<b>.17</b>	[-7.06, 1.51]
Religion <sup>c</sup>																				
Non-denominational Christian	--		--	--	--		--	--	--		--	--	--		--	--	--		--	--

Catholic	-3.54	0.08	-	[-7.33, .21 .24]	-2.70	0.03	-	[-5.60, .19]	-	0.03	-	[-4.72, .53]	-	0.03	-	[-4.72, .75]	-	0.03	-	[-4.86, .31]
Protestant	.90	0.00	.04	[-3.52, 5.32]	-.36	0.00	-	[-3.76, 3.03]	-.66	0.00	-	[-3.72, 2.40]	-	0.00	-	[-4.72, .75]	-.73	0.00	-	[-3.74, 2.26]
Hindu	6.42	0.01	.10	[-6.00, 18.85]	-.05	0.00	-	[-9.70, 9.59]	-.45	0.00	-	[-9.14, 8.23]	-	0.00	-	[-4.72, .75]	-.04	0.00	-	[-8.61, 8.51]
Buddhist	5.94	0.02	.10	[-7.36, 19.25]	3.52	0.01	.05	[-6.66, 13.70]	2.67	0.01	.04	[-6.50, 11.86]	-	0.01	.01	[-4.72, .75]	1.19	0.01	.02	[-8.01, 10.40]
Islamic	5.36	0.00	.15	[-3.20, 13.93]	6.30	0.00	.18	[-2.24, 12.85]	3.93	0.00	.11	[-2.06, 9.93]	-	0.00	.11	[-4.72, .75]	4.09	0.00	.11	[-1.78, 9.97]
Atheist	-.41	0.01	-	[-4.87, 4.05]	-3.09	0.00	-	[-6.58, .38]	-	0.00	-	[-4.50, 1.98]	-	0.00	-	[-4.72, .75]	-.94	0.00	-	[-4.24, 2.36]
Agnostic	-.08	0.01	-	[-3.73, 3.57]	-2.25	0.00	-	[-5.10, .59]	-	0.00	-	[-4.79, .34]	-	0.00	-	[-4.72, .75]	-	0.00	-	[-3.97, 1.51]
Insurance <sup>d</sup>																				
No Insurance	--		--	--	--		--	--	--		--	--	--		--	--	--	--	--	--
Parent's Policy	-9.77	0.03	-	[-	-7.02	0.01	-	[-	-	0.01	-	[-	-	0.01	-	[-4.72, .75]	-	0.01	-	[-
			<b>.76</b>	18.98, -55]			.54	14.09, .05]	5.39		.42	11.80, 1.02]	1.98		.42		5.67	.44	11.97, .62]	
School Policy	-	0.14	-	[-	-	0.05	-	[-	-	0.04	-	[-	-	0.04	-	[-4.72, .75]	-	0.04	-	[-
	16.07		.81	26.16, -5.98]	10.02		<b>.50</b>	17.89, -2.15]	7.89		<b>.40</b>	15.04, -7.73]	1.98		<b>.37</b>		7.74	<b>.39</b>	14.80, -68]	
Individually Purchased Policy	-	0.02	-	[-	-7.64	0.01	-	[-	-	0.01	-	[-	-	0.01	-	[-4.72, .75]	-	0.01	-	[-
	12.28		<b>.67</b>	22.24, -2.31]			.41	15.34, .06]	6.77		.37	13.72, .18]	1.98		.36		7.00	<b>.38</b>	13.83, -17]	
Military Policy	-7.49	0.00	-	[-	-6.20	0.00	-	[-	-	0.00	-	[-	-	0.00	-	[-4.72, .75]	-	0.00	-	[-
			.21	18.89, 3.90]			.17	14.91, 2.51]	4.23		.12	12.13, 3.66]	1.98		.14		5.26	.15	13.05, 2.53]	
Government Policy	-	0.01	-	[-	-8.23	0.00	-	[-	-	0.00	-	[-	-	0.00	-	[-4.72, .75]	-	0.00	-	[-
	12.35		<b>.45</b>	23.00, -1.71]			<b>.30</b>	16.43, -0.3]	6.38		.23	13.82, 1.05]	1.98		.25		7.54	.27	14.91, -17]	
Attitudes					.32	0.69	<b>.65</b>	[.23, .41]	.20	0.59	<b>.41</b>	[.11, .29]	-	0.59	<b>.34</b>	[-4.72, .75]	.16	0.56	<b>.34</b>	[.06, .26]
Subjective Norms									.23	0.76	<b>.40</b>	[.12, .33]	-	0.76	<b>.31</b>	[-4.72, .75]	.18	0.72	<b>.31</b>	[.06, .29]
PBC													-	0.53	.19	[-4.72, .75]	.39	0.52	.20	[-.00, .78]
Masculinity													1.98				.09	0.01	.10	[-.05, .25]

Note.  $r_s^2$  = structure coefficient. CI = 95% confidence interval. Statistically significant ( $p < 0.05$ ) associations are bolded

<sup>a</sup> Race/Ethnicity was represented by one dummy variable with White serving as the reference group.

<sup>b</sup> Relationship status was represented by four dummy variables with Single, not in a monogamous relationship serving as the reference group.

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<sup>d</sup> Insurance was represented by six dummy variables with no insurance serving as the reference group.

college students' having an individually purchased healthcare policy ( $\beta = -.38$ ,  $p = 0.026$ ). In assessing the squared structure coefficients, attitudes, subjective norms, and perceived behavioral control positively accounted for 42 percent, 71 percent, and 49 percent, respectively, of the effect in the final model. Regression weights, structure coefficients, and confidence intervals are shown in [Table 5](#).

### ***Behavioral Intention to use a Male Contraceptive Implant***

Multiple linear regression was used to run five models for predicting male college students' intention to use an implant. For the first model, only demographic variables were entered. The first model was not statistically significant. The second model included all demographic variables and the TPB construct attitude towards an implant. The second model was statistically significant and accounted for 54 percent of the variance ( $F [17, 77] = 5.45$ ,  $p = 0.001$ ,  $R^2 = 0.54$ ). The third model included all demographic variables and the TPB constructs attitude towards an implant injection and subjective norms. The third model was statistically significant and accounted for 63 percent of the variance ( $F [18, 76] = 7.41$ ,  $p = 0.001$ ,  $R^2 = 0.63$ ). The fourth model included all demographic variables and the TPB constructs attitude towards an implant, subjective norms, and perceived behavioral control. The fourth model was statistically significant and accounted for 65 percent of the variance ( $F [19, 75] = 7.42$ ,  $p = 0.001$ ,  $R^2 = 0.65$ ). The final model included all demographic variables, all TPB constructs, and an added masculinity variable. The final model was statistically significant and accounted for 66 percent of the variance ( $F [20, 74] = 7.20$ ,  $p = 0.001$ ,  $R^2 = 0.66$ ). In the final model, intention to use an implant was positively predicted by male college students': attitudes ( $\beta = .34$ ,  $p = 0.001$ ) and subjective norms ( $\beta = .31$ ,  $p = 0.003$ ). Intention to use an implant was negatively predicted by male college students': having a school purchased healthcare policy ( $\beta = -.39$ ,  $p = 0.032$ ) and having an individually purchased healthcare policy ( $\beta = -.38$ ,  $p = 0.045$ ). In assessing the squared structure coefficients, attitudes and subjective norms positively

accounted for 56 percent and 72 percent, respectively, of the effect in the final model. Regression weights, structure coefficients, and confidence intervals are shown in [Table 6](#).

### **Discussion**

In this study, we used the TPB constructs to assess college men's intention to use innovative methods of MDC. Behavioral intention to use each method of MDC was low, with the male contraceptive pill and transdermal gel having the highest mean intention scores. Although behavioral intention was low for each method, the regression models were statistically significant for each contraceptive method and demonstrated TPB constructs association with intended use for each method. Attitudes, subjective norms, and PBC were all found to be associated with intention to use a male hormonal pill, transdermal gel, and injection. Attitudes and subjective norms were also found to be associated with intention to use a male birth control implant. These results suggest the TPB may be a suitable theory for further investigation into the intended use of MDC. Masculinity was not found to be associated with intended MDC use.

Overall intention to use each method of MDC was low. While dominate gender norms surrounding reproductive responsibility lead many to conclude no market exists for male contraceptives, this is inconsistent with prior research. Not only do men believe they should take more responsibility for family planning (Glasier et al., 2010) but evidence suggests men are willing to use such methods. Multiple studies have found acceptability of MDC or willingness to use MDC to be high (Heinemann, Saad, Wiesemes, White, & Heinemann, 2005; Marcell, Plowden, & Bowman, 2005; Martin et al., 2000; Weston, Schlipalius, & Vollenhoven, 2002; Weston, Schlipalius, Bhuinneain, & Vollenhoven, 2002). In studying specific MDC methods, studies have found high acceptability of a male contraceptive pill (Dismore, Van Wersch, & Swainston, 2016; Walker, 2011), transdermal gel (Amory, Page, Anawalt, Matsumoto, & Bremner, 2007; Roth et al., 2014), and injectable contraceptives (Meriggiola et al., 2006) to be high. The low intention scores in the current study, however, do not wholly reflect the level of

attitudes, subjective norms, and PBC which were moderate to high for each method in every model. The low intention scores, but high levels of attitudes, subjective norms, and PBC may be indicative of other factors not captured by the TPB. For example, some men have expressed their willingness to use a contraceptive method is dependent upon cost and potential side effects (Vera Cruz, Humeau, Moore, & Mullet, 2019). Impending research should continue using theory-based approaches to investigate factors associated with potential use of MDC. The Health Belief Model (HBM) for example may provide a good theoretical understanding to factors associated with intention or potential use of MDC. The HBM would allow researchers to investigate men's perceived susceptibility and severity of unintended pregnancies while also investigating their perceived benefits and potential barriers to MDC use.

In the current study, college men had the greatest intention to use a male contraceptive pill or a transdermal gel. This is consistent with prior research identifying an oral pill as the preferred method of contraception (Dismore et al., 2016; Heinemann et al., 2005; Westen et al., 2002; Western et al., 2002); however, whether an oral pill is the first or second choice of contraception is still up for debate. Method preference is a practical concern because the most successful male hormonal methods trailed to date have used injectable hormones as opposed to an oral pill. While an injectable contraceptive is routinely found to be one of the most preferred methods of MDC (Dismore et al., 2016; Heinemann et al., 2005; Westen et al., 2002; Western et al., 2002), future research should continue to investigate method preference. Moreover, research is needed on the exact administrative method of MDC methods. Compared to gynecology, the field of andrology remains small. The field of andrology is also fragmented with practitioners with specific knowledge of the male reproductive system being distributed over several medical specialties as opposed to being concentrated in one specialty as is the case for the female reproductive system (Oudshoorn, 2003, p. 26). The field of andrology's small size and fragmentation will pose logistical challenges in the uptake of MDC if and when it becomes commercially available. Research is needed to mitigate these challenges.

Attitudes towards each contraceptive method were associated with behavioral intention in each of the four models and accounted for a significant portion of the variance. Attitudes are strongly associated with acceptability, which is an indirect measure of intended use (Glasier, 2010). In other contraceptive research, attitudes are one of the most important factors associated with behavior when background characteristics and contraceptive knowledge are controlled (Frost, Lindberg, & Finer, 2012). Additionally, a study of five health behavior models found attitudes to have the strongest correlation with behavior and was a direct predictor of contraceptive use (Reid & Aiken, 2011). Thus, understanding male attitudes towards MDC maybe the most significant factor associated with understanding future use. Given the high portion of variance explained by attitudes in the current study, future research should investigate the specific attitudes that contribute the most to intended use of MDC. Attitudes for consideration include: side effects, responsibility, advantages and disadvantages of each method. Similar to attitudes, the construct subjective norms were associated with intention to use all four methods of MDC. Additionally, subjective norms accounted for the most variance in the final model for each method of MDC. This is consistent with prior contraceptive research identifying the association between subjective norms and behavioral intention (Asare, 2015; Rich et al., 2014). Given subjective norms accounted for the most variance for all methods of MDC, future research should investigate the specific normative beliefs contributing to intended MDC use.

Perceived behavioral control (PBC) or the extent to which people believe they are in control of using the MDC method was only associated with intention to use a male contraceptive pill, transdermal gel, and contraceptive injection. MDC use is still a hypothetical behavior, making the investigation of PBC difficult. For example, the exact delivery system and dosage of each MDC method remains unknown, making our understanding of PBC tentative at best. Despite these challenges, research should continue to investigate men's perceived control over using such methods. Control and potential use of different methods, delivery systems, and dosages should continue to be investigated. Currently,

investment in MDC is low because pharmaceutical companies do not believe MDC to be a lucrative investment (Oudshoorn, 2003). If social science researchers can show men are willing to use different methods of MDC, and identify the methods and dosages preferred, then pharmaceutical companies maybe more inclined to invest in the development of MDC methods.

Despite the literature suggesting gender norms, specifically masculinity, being a modifying factor of attitudes towards MDC (Dismore et al., 2016; Peterson et al., 2019; Walker, 2011; Zhang et al., 2006), the current study found no association between masculinity and intention to use any of the four methods of MDC. This suggests any impact of masculinity on intended use of MDC methods is likely to be indirect. Masculinity is a result of socially identifiable behaviors, beliefs, feelings, values, and cognitions of male identity (Knight et al., 2012; Rothgerber, 2013; Wester & Vogel, 2012) making it possible enactments of specific gender norms were better measured by TPB constructs. Evidence also suggest gender norms surrounding contraceptive responsibility are changing (Darroch, 2008). Therefore, the idea of masculinity as a modifying factor of intention to use MDC may not be best measured in a younger population. Regardless, gender norms and contraceptive responsibility are a persistent theme in contraceptive research and should be continuously investigated.

### Limitations

There are several limitations which should be noted. First, all data were self-reported and may not accurately reflect participants true attitudes towards MDC. Additionally, this was a cross sectional study with a sample collected from one Midwestern University. The majority of participants identified as white and between the

ages of 18-24 making generalizability to the larger population limited. The current study also examined a hypothetical behavior, thereby allowing only for a tentative understanding of theory constructs. Additionally, the TPB accounts for primarily individual level influences on behavior and does not account for structural or community-level factors which may also influence men's intention to use MDC. Lastly, the Cronbach alpha for the perceived behavioral control construct was low, limiting the predictive validity of the construct.

### Conclusion

This research demonstrates the usefulness of applying the TPB in continued efforts to understand the intended use of MDC among college men. Despite the findings of this study, the development and availability of MDC however will not be enough to change the current contraceptive arrangement between men and women. It is thus important for health care professionals to involve men more fully in reproductive health care, specifically contraception, in order for the adoption of MDC to be successful. Subjective norms and attitudes towards MDC accounted for the most variability in behavioral intention. Therefore, future research should investigate specific attitudes and normative beliefs among men that influence their intention to use developmental methods of MDC.

### Conflict of interest

The authors have no conflicts of interests to disclose.

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