# Beyond biological sex: Dream intensity and attitudes of transgender and gender nonconforming individuals

Marco Kwan-kit Sung, and Calvin Kai-Ching Yu

Department of Counselling and Psychology, Hong Kong Shue Yan University, Hong Kong, China

*Summary*. Considerable evidence demonstrates that dream recall differs between females and males and is associated with femininity. However, sex and sex role orientation are intertwined such that males tend to be more masculine, females being more feminine. Accordingly, it is unclear that women experience more intense dream experiences possibly due to their biological sex characteristics rather than their psychological sex characteristics. Transgender and gender nonconforming (TGNC) individuals, who do not conform to their birth-assigned sex, present a unique opportunity for investigating the influence of self-identified gender and sex role orientation. Therefore, this study examined 85 TGNC participants' sex role orientation, dream intensity, and attitudes toward dreams. It was found that attitudes toward dreams significantly mediated the relationship between femininity and dream intensity, despite the negative association between self-identified gender and birth-assigned sex.

*Keywords:* Dream attitude, dream intensity, gender nonconforming, sex role orientation, transgender

## 1. Introduction

Research focuses on the dreams of transgender and gender nonconforming (TGNC) individuals is relatively scarce. Aside from the study by Andrew et al. (2020), which linked nightmare frequency to suicidal risk, the literature mainly consists of clinical case studies, including PTSD intervention (Abramovich et al., 2020; Kovacevic & Davis, 2020), dream series over a transwoman's transition (Martin & Davenport, 2014), homosexual desire during mid-life (McKenzie, 2010), and psychoanalytic work (Knafo, 2012). To the best of our knowledge, no study has specifically investigated TGNC individuals' dream experiences and sex role orientation.

Many studies (Domhoff, 2005; Nielsen et al., 2003; Schredl, 2010; Schredl et al., 2004; Schredl & Lahl, 2010; Schredl et al., 2010; Schredl et al., 2019; Zhang et al., 2020) reported sex differences in dream experiences, but these studies might consist of a combination of cisgender people and transgender people. In these studies, the gender of the participants was expected to be reported primarily based on their biological sex, with a subset identified according to their gender identity, which can be loosely understood as "psychological sex." The question arises as to whether the disparities observed are largely attributable to biological sex or whether they are also influenced by psychological constructs, such as gender identity and sex role orientation within an individual. TGNC individuals offer a distinctive opportunity to explore this issue because they have a gender identity that does not align with the sex they were assigned at birth (American Psychological Association, 2015). Therefore, the present study attempted to tackle this issue by investigating the dream experiences of TGNC participants from the lens of gender identity and sex role orientation.

Prior research has found significant differences in dream experiences between males and females. For example, it has been consistently demonstrated that females experience a higher dream recall frequency than do males (Giambra et al., 1996; Pagel et al., 1995; Schredl, 2002; Schredl & Piel, 2003; Schredl & Reinhard, 2008). Schredl and Reinhard's (2008) meta-analysis found that this sex difference in dream recall was independent of methodological factors and publication years. Yu (2010, 2012) introduced the term *dream intensity* to encapsulate the overall magnitude of various dream-related variables, such as dream recall frequency, nightmare frequency, and instances of lucid dreaming. Consistent with previous studies, he found that females experience stronger dream intensity than males, especially in the aspects of dream quantity and vividness.

Schredl and Reinhard (2008) found a mild sex difference in dream recall frequency for children under 10 years of age. This suggests that socialization of sex roles contributes to the sex difference for dream recall frequency in adulthood (Schredl, 2002; Schredl & Lahl, 2010). Indeed, according to Schredl et al. (2013), sex role orientation – namely, femininity and masculinity – affects not only dream recall frequency, but also nightmare frequency, dream tone, emotional intensity, and attitudes toward dreams.

Numerous studies (Belicki, 1987; Cernovsky, 1984; Herman & Shows, 1984; Hill et al., 1997; Robbins & Tanck, 1978; Rochlen et al., 1999; Schredl, 2009; Schredl, Ciric, et al., 2003; Schredl et al., 1996) have demonstrated a positive correlation between attitudes toward dreams and dream recall frequency. These studies have also highlighted various

Corresponding address:
Marco Kwan-kit Sung, Hong Kong Shue Yan University,
10 Wai Tsui Crescent, Braemar Hill, North Point, Hong Kong
China.
Email: kksung@hksyu.edu

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factors that influence dream recall, including gender, which may encompass both biological sex and self-identified gender, and attitudes toward dreams. It has been observed that females generally exhibit more positive attitudes toward dreams than males. In Schredl's (2009) study, dream attitudes were correlated with most dream variables examined, including dream recall frequency and recalled dream details. In addition, dream attitudes were more strongly correlated with recalled dream details than dream recall frequency, indicating that individuals possessing more positive or favorable dream attitudes were more likely to be able to recall their dreams in greater detail. Accordingly, dream attitudes may moderate the effect of sex role orientation and gender on dream recall frequency (Schredl et al., 2013). Alternatively, perhaps, sex role orientation may influence dream experiences through attitudes toward dreams.

Many studies have shown significant sex differences on dream experiences (Björkqvist, 2018; Blume-Marcovici, 2010; Domhoff, 2005; Hyde & Linn, 1988; Lippa & Connelly, 1990; Schredl, 2000, 2002, 2010; Schredl et al., 2015; Schredl et al., 2004; Schredl & Lahl, 2010; Schredl & Piel, 2003; Schredl & Reinhard, 2008; Schredl et al., 2019; Zhang & Wing, 2006), including dream intensity (Yu, 2009, 2012), dream attitudes, and dream recall frequency (Beaulieu-Prévost & Zadra, 2005; Schredl, 2009; Schredl et al., 2013; Schredl et al., 1996; Schredl, Wittmann, et al., 2003). Nonetheless, their samples were anticipated to consist mainly of cisgender individuals due to several interconnected factors: (1) the deeply ingrained habit of responding to "Sex" (M/F) on official forms based on biological markers at birth; (2) with the cisgender majority, selecting based on biological sex is straightforward and requires no complex reflection; and (3) there may not be the awareness in the participants regarding the distinction between sex and gender identity, especially for studies which were relatively dated.

To fill the gap, the current study investigated the interplay between sex role orientation, self-identified gender, dream intensity, and attitudes toward dreams among TGNC participants, ensuring the homogeneity of gender identification based on gender identity but not biological sex. Focusing on TGNC participants provides additional evidence regarding whether the sex differences observed in previous dream studies may be attributable to psychological sex.

There were three primary hypotheses. First, TGNC individuals exhibit femininity or masculinity that aligns with their self-identified gender in spite of their opposite primary sex characteristics. Second, femininity positively predicts positive dream attitudes although trans women/biological men are more feminine than trans men/biological women in this TGNC sample. Third, the relationship between femininity/masculinity and dream intensity is mediated by attitudes toward dreams.

## 2. Method

### 2.1. Participants

We purposively recruited participants through local TGNC support groups, leveraging community connections. The study was promoted through word of mouth at TGNC-related events and gatherings. The inclusion criterion was that the individuals clearly self-identified as a gender or genders that differed from their assigned sex at birth. We chose to exclude those who were questioning or uncertain whether their gender identity was aligned with their assigned sex at birth.

Participants were asked to indicate their self-identified gender by selecting from "male," "female," or "others (please specify)." Those whose responses did not fall within the male/female binary were categorized as nonbinary for the purposes of this study. Just before this question, participants were also asked to report their assigned sex at birth. This sequencing was intentional, making it clearly focusing on gender identity rather than biological sex. The study adopted the definition of self-identified gender provided by the World Health Organization, which describes it as "a person's deeply felt, internal and individual experience of gender, which may or may not correspond to the person's physiology or designated sex at birth" (World Health Organization, n.d.).

The sample of 85 TGNC participants from Hong Kong (age: 16-59 years; $M$ = 29.31, $SD$ = 9.28) included 26 (31%) trans females, 44 (52%) trans males, and 15 (17%) nonbinary persons. A 2x3 chi-square test showed that biological sex and self-identified gender were not independent of each other, $\chi^2 = 69.664$, $p < .001$, Cramer's $V = .905$. Post-hoc pairwise chi-square tests with Bonferroni correction (adjusted $\alpha = .0167$) revealed that biological males were more likely to be trans females, and biological females were more likely to be trans males, $\chi^2 = 62.094$, $p < .001$, and no significant difference was found for biological sex and nonbinary self-identified gender $\chi^2 = 0.044$, $p > .05$. Self-identified gender was significantly related to attracted gender, with 80% trans males being attracted to females, $\chi^2 = 14.223$, $p = .003$, Cramer's $V = .451$.

### 2.2. Instruments

Dream Intensity Scale (DIS; Yu, 2010, 2012), Attitudes Toward Dreams – Revised (ATD-R; Hill et al., 2001), Bem Sex Role Inventory (BSRI; Bem, 1974), and Traditional Masculinity-Femininity Scale (TMF; Kachel et al., 2016) were employed to assess the magnitude of dream experiences, attitudes about dreaming, socially-ascribed masculinity-femininity, and self-perceived masculinity-femininity, respectively.

The DIS, Cronbach's $\alpha = .79$, consists of 23 items, which can yield four factor and eight subscale scores: (a) Dream Quantity, composed of Regular Dreams and Bad Dreams subscales, (b) Dream Vividness, composed of Major Modalities and Minor Modalities subscales, (c) Diffusion, composed of Dream Work and Paramnesia subscales, and (d) Altered Dream Episodes, made up of Lucid Dreaming and Autosuggestion subscales.

The ATD-R, Cronbach's $\alpha = .90$, is a 9-item self-report designed to assess respondents' personal beliefs about the values of understanding their dreams.

The BSRI is a 60-item inventory used for assessing respondents' levels of socially-ascribed masculinity and femininity. The BSRI treats femininity, Cronbach's $\alpha = .83$, and masculinity, Cronbach's $\alpha = .90$, as two independent subscales. Respondents are required to evaluate the extent to which feminine (e.g., affectionate, soft-spoken, tender) and masculine descriptives (e.g., ambitious, willing to take a stand, willing to take risks) can be applied to them. In the current study, three scores were derived from the BSRI scale: BSRI Femininity, BSRI Masculinity, and BSRI Sex Role Difference or Androgyny (i.e., BSRI Femininity minus

BSRI Masculinity; positive value = more feminine, negative value = more masculine).

The TMF, Cronbach's $\alpha$ = .92, consists of six items covering three aspects of self-ascribed gender role: gender-role adoption, gender-role preference, and gender-role identity. It assesses self-perceived levels of femininity and masculinity on a 7-point Likert scale (1 = totally masculine, 7 = totally feminine). Unlike BSRI, TMF conceives femininity and masculinity as two opposing poles on the same plane. Thus, a smaller TMF score indicates a higher level of self-ascribed masculinity, whereas a larger score indicates a higher level of self-ascribed femininity.

## 3. Results

### 3.1. Self-Identified Gender and Femininity/Masculinity

The TMF score was correlated positively with the BSRI Femininity score, $r$ = .36, $p$ = .001, and negatively with the BSRI Masculinity score, $r$ = -.34, $p$ = .002. One-way ANOVA indicated that there were significant differences between three self-identified genders in the BSRI Femininity, $F(2,82)$ = 3.13, $p$ = .049, $\eta^2$ = .07, BSRI Sex Role Difference, $F(2,82)$ = 5.58, $p$ = .005, $\eta^2$ = .12, and TMF, $F(2,82) = 63.62, p < .001, \eta^2 = .61$ but not in the BSRI Masculinity, $F(2,82)$ = 2.59, $p$ = .081, $\eta^2$ = .06. Post-hoc tests showed that trans females, $M$ = 95.04, $SD$ = 13.32, scored significantly higher in the BSRI Femininity than trans males, $M$ = 87.02, $SD$ = 11.96, $p$ = .039. In BSRI Sex Role Difference, trans females, $M$ = 10.62, $SD$ = 17.52, also scored significantly higher than trans males, $M$ = -6.61, $SD$ = 22.30, $p$ = .002. Trans females, $M$ = 30.65, $SD$ = 4.61, scored significantly higher TMF score than trans males, $M$ = 14.82, $SD$ = 5.10, $p$ < .001 and nonbinary participants, $M$ = 23.20, $SD$ = 8.61, $p$ = .016, who in turn had a significantly larger TMF score than trans males, $p$ = .006. Pearson's correlation tests showed that the duration of having received hormone replacement therapy or recognizing one's own transgender identity was not significantly correlated with any dream and sex role orientation variables (all $p$-values > .05).

### 3.2. Mediating Role of Attitudes Toward Dreams in the Relationship between Femininity and Dream Intensity

A multiple regression analysis was run to test whether the BSRI Femininity, BSRI Masculinity, and TMF could significantly predict dream attitude. The regression model was significant, $F$ = 4.619, $p$ = .005, $R^2$ = .146, with only the BSRI Femininity being a significant predictor, $\beta$ = .388, $t$ = 3.424, $p$ <.001.

PROCESS macro model 4 analysis was conducted to test the mediation effect of the ATD-R on the relationship between the BSRI (/TMF) and DIS scores. A conceptual path diagram is presented in Figure 1.

A full mediation model was observed with the BSRI Femininity as the predictor and the DIS total score as the outcome variable (see Table 1). Follow-up analyses resulted in similar models for the DIS Dream Quantity factor and the Regular Dreams subscale score. Specifically, no significant direct effect was found between the BSRI Femininity and the DIS variables. However, significant indirect effects of the BSRI Femininity on the DIS variables through the ATD-R were observed. All three models had 95% CI for the indirect effect through the ATD-R not crossing zero, which suggested the presence of a significant mediation effect.

## 4. Discussion

This study aimed to investigate the influence of self-identified gender and sex role orientation on the dream experiences of TGNC individuals. Examining TGNC participants, whose self-identified gender does not align with their birth-assigned sex, sheds light on the influence of psychological gender, irrespective of participants' biological sex at birth. Our findings indicate that femininity, especially socially ascribed femininity, can predict positive attitudes toward dreams, which in turn can account for subjective intensity of dream experiences. These findings appear to echo earlier research suggesting that femininity is related to sex differences in various aspects of dream experience, such as dream recall frequency, nightmare frequency, dream tone, emotional intensity, and attitudes toward dreams (Schredl et al., 2013). Previous studies have shown that biological wom-

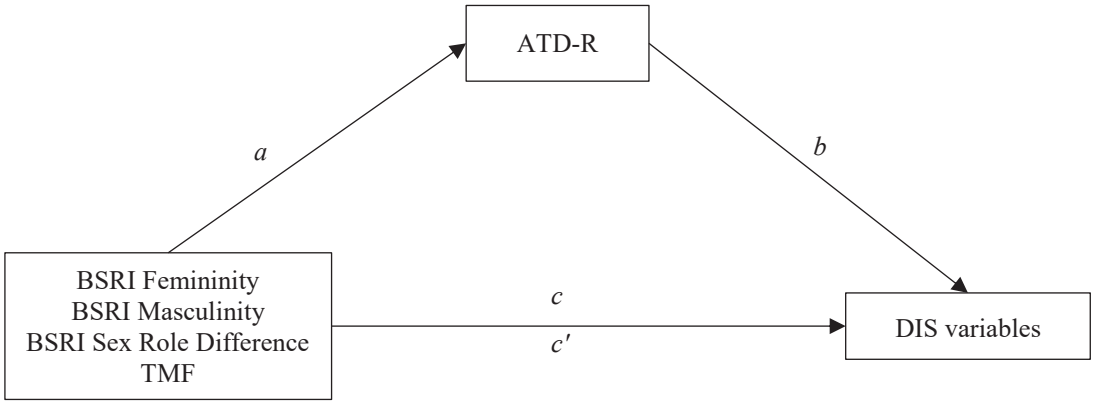


*Figure 1*. Path Diagram of Mediation Role of Attitudes toward dreams between Femininity/Masculinity and Dream Intensity. Note. *c'* = direct effect of predictor on outcome, *c* = total effect of predictor on outcome through mediator. DIS variables: DIS Total, Dream Quantity, Regular Dreams, Bad Dreams, Dream Vividness, Major Modalities, Minor Modalities, Diffusion, Dream Work, Paramnesia, Altered Dream Episodes, Lucid Dreaming, and Autosuggestion.

*Table 1*. Mediation of Attitudes toward dreams between Femininity/Masculinity and Dream Intensity.

| | Path *a* | | | | Path *b* | | | | Path *c'* | | | | Path *c* | | | | Indirect effect (a*b) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | B | SE | t | p | B | SE | t | p | B | SE | t | p | B | SE | t | p | B | SE | 95% CI |
| BSRI Femininity (predictor) → DIS Total (outcome) | 0.18 | 0.05 | 3.34** | .001 | 0.68 | 0.27 | 2.50* | .014 | -0.01 | 0.14 | -0.04 | .966 | 0.11 | 0.13 | 0.85 | .400 | 0.12 | 0.06 | 0.02, 0.24 |
| BSRI Femininity (predictor) → DIS Dream Quantity (outcome) | 0.18 | 0.05 | 3.34** | .001 | 0.34 | 0.13 | 2.70** | .008 | 0.03 | 0.06 | 0.47 | .640 | 0.09 | 0.06 | 1.44 | .154 | 0.06 | 0.02 | 0.02, 0.11 |
| BSRI Femininity (predictor) → DIS Regular Dreams (outcome) | 0.18 | 0.05 | 3.34** | .001 | 0.27 | 0.08 | 3.32** | .001 | 0.03 | 0.04 | 0.66 | .513 | 0.07 | 0.04 | 1.81 | .074 | 0.05 | 0.02 | 0.02, 0.09 |

Note. Path a = BSRI Femininity to attitudes toward dreams; Path b = attitudes toward dreams to dream variable; Path c' = BSRI Femininity to dream variable (direct effect); Path c = total effect of BSRI Femininity on dream variable via the mediator. **p <.01 level (2-tailed), *p <.05 level (2-tailed)

en generally have more positive attitudes toward dreaming (Bulkeley & Schredl, 2019; Olsen et al., 2016; Schredl et al., 1996, 2019; Schredl & Reinhard, 2008, 2011). Our findings can also be compared favorably with the previous evidence that biological women are characterized by their more positive toward dreams and more intense dream experiences than biological men. This idea appears to offer an elaborative supplement to the classical continuity hypothesis, which suggests dreams reflect waking-life experiences and concerns. Perhaps the true essence of this continuity resides more in the mind of the dream interpreter, hinting at a greater role for emotional processing. It may be through this emotional lens that individuals perceive their world, rather than solely through the specific, concrete events they have encountered. In addition, our findings suggest no significant correlation between the duration of hormone replacement therapy use or recognizing one's own transgender identity and dream-related variables.

All trans male participants were biological females at birth, and all trans female participants were biological males at birth. The results of the study indicated significant differences in sex role orientation between trans female and trans male participants. Trans female participants, who were all assigned male at birth, scored higher on the BSRI and TMF femininity, suggesting a stronger alignment with feminine traits and behaviors. Conversely, trans male participants, who were all assigned female at birth, were more masculine as indicated by the TMF. These findings support the notion that transgender individuals tend to possess sex roles and demonstrate sex-role-related traits and behaviors that align with their self-identified gender identity rather than their assigned sex at birth. These findings appear to offer compelling evidence for the widely accepted contemporary view on gender identity that gender identity is "a person's deeply felt, internal and individual experience of gender, which may or may not correspond to the person's physiology or designated sex at birth" (World Health Organization, n.d.). Our findings support that gender is not merely about one's sex assigned at birth. Rather, it involves an intricate mix of internal identity, including how one takes on social roles, and how one expresses oneself. Specifically, what we observed in our findings is that among TGNC individuals, their sex role orientation often aligned closely with their self-identified gender. This alignment seems to highlight just how deeply psychological gender identity can shape an individual's sense of self and their outward behavior. It lends further support to the idea that gender is perhaps best understood as an internal, felt sense, rather than something determined solely by biology.

The present study offers initial evidence that sex role orientation, particularly femininity, affects an individual's dream attitudes and, consequently, the subjective intensity of dream experiences. This influence persists even when a person's self-identified gender differs from their birth-assigned sex. In most dream research studies, there has been a tendency to focus on binary biological sex differences, leading to no clear differentiation among the influences of biological sex, gender identity, and sex role orientation. Our current study, however, appears to offer an important theoretical refinement. We found that sex role orientation, particularly femininity, can exert a significant and independent influence on dream experiences. This holds true even when we consider it separate from the sex assigned at birth. This line of reasoning suggests that what we once consid-

ered "sex differences" in dreaming might, in many cases, be more accurately understood as "gender differences," likely mediated by an individual's psychological traits and the social roles they inhabit.

Dream researchers may modify their methodology in future studies to account for the influence of self-identified gender and sex role orientation, beyond just biological sex differences. Clinical practitioners utilizing dream work may also take clients' self-identified gender and sex role orientation into consideration in their practice. The current study highlights the importance of considering self-identified gender and sex role orientation when analyzing dream experiences. Unlike previous research, which often left it unclear whether gender differences stemmed from biological sex or sex role orientation due to the lack of homogeneity in gender identification based on gender identity. This shift in focus recognizes the complex ways in which identity can shape our inner experiences. Echoing with Domhoff's (2001) neurocognitive theory of dreaming, which suggests the neural networks involved in dreaming appear to be guided by the continuity principle reflecting our current personal concerns, and the repetition principle rooting in our past emotional preoccupations. This framework suggests that dreaming is an inherently internal and subjective experience, and deeply psychological. As such, dreaming is likely to be susceptible to the subtle influences of one's internal sense of self, which includes gender identity, and its associated psychological traits, such as sex roles. In light of this, dreaming serves as a compelling example where the influence of self-identified gender is so pronounced that it may even overshadow the effects of birth-assigned sex.

## Author Note

Marco Kwan-kit Sung
https://orcid.org/0000-0002-7498-9582
Calvin Kai-Ching Yu
https://orcid.org/0000-0002-4372-7934

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