Gender role orientation, thinking style preference and facets of adult paranormality: A mediation analysis

Paul Rogers PhD[1], Michael Hattersley MSc & Christopher C. French PhD

Anomalistic Psychology Research Unit
Department of Psychology
Goldsmiths College
University of London
New Cross
London SE14 6NW, UK.

[1] Correspondence should be addressed to the first author via email at progers1966@gmail.com.

Gender role orientation, thinking style preference and facets of adult paranormality: A mediation analysis

Highlights

1. stronger femininity directly predicts more intuitive thinking
2. stronger femininity directly predicts more anomalous experiences and belief
3. less rational thinking directly predicts more anomalous fear
4. more intuitive thinking mediates several gender role-paranormality relationships
5. findings are consistent with a gender role account of adult paranormality

Gender role orientation, thinking style preference and facets of adult paranormality: A mediation analysis

Abstract

This study examines the extent to which masculine and feminine gender role orientations predict self-reported anomalous experiences, belief, ability and fear once relevant correlates including biological sex are controlled for. The extent to which rational versus intuitive thinking style preference mediates these relationships is also examined. Path analysis (n=332) found heightened femininity directly predicts stronger intuitive preference plus more anomalous experiences, belief and fear with, additionally, intuitive preference mediating several gender role-paranormality relationships. By comparison, heightened masculinity directly predicts both thinking styles plus lower anomalous fear. The latter relationship is also shaped by the nature of mediators with (a) more anomalous experiences and belief leading to more anomalous fear and (b) either heightened rationality else more anomalous ability leading to, conversely, less anomalous fear. The extent to which findings support a gender (or social) role account of adult paranormality, together with methodological limitations and ideas for future research, is discussed.

Keywords: GENDER ROLE; PARANORMAL; ANOMALOUS; INTUITION; THINKING STYLE; DUAL PROCESS

Gender role orientation, thinking style preference and facets of adult paranormality: A mediation analysis

One of the most robust findings in anomalistic psychology is that women report more experiences of and/or belief in ostensibly paranormal phenomena than do men (French & Stone, 2014; Irwin, 2009)[2]. With evidence of genetic variation in paranormal endorsement at best limited (Rogers, Caswell & Brewer, 2017; Voracek, 2009), socio-cultural factors are the most likely cause of these robust sex-differences in adult paranormality (Blackmore, 1994). One possibility is they reflect adoption of stereotypical gender roles.

1.1. Gender Role

1.1.1 Masculine and Feminine Gender Role Orientation: According to *Gender Schema Theory* (Bem, 1981) individuals whose engendered identity corresponds to their biological sex are "sex-typed" and have a greater readiness to process information (e.g., about the self) in line with pre-existing gender schemata initially shaped by socio-cultural influences (e.g., parents, peers, the media) during childhood. As children absorb society's gender role stereotypes they come to learn which attributes are associated with their own engendered self-concept (for reviews see Donnelly & Twenge, 2017; Starr & Zurbriggen, 2017).

Similarly *Social Role Theory* (Eagly & Wood, 2012) asserts that gender-based stereotypes reflect (false) inferences about which traits are typically possessed by each sex. These (mis) perceptions are, in turn, based on observed sex differences in peoples' physicality and behavior. For instance, because of their physical child-bearing capabilities plus tendency to

[2] Anomalistic psychology attempts to explain paranormal belief along with *ostensible* paranormal and otherwise inexplicable (aka. anomalous) experiences in terms of known or knowable psychological and physical factors (French & Stone, 2014). Hereafter, the expression "paranormality" is employed as an umbrella term for self-reported experiences of, belief in, ability for and/or fears about apparently supernatural but non-theistic phenomena most notably extrasensory perception (ESP), psychokinesis (PK) and life after death (LAD). For definitions see Irwin and Watt (2007).

adopt the primary caretaking role with their offspring, women are often assumed to have a more nurturing disposition than men. Adherence to these gender stereotypes is shaped by a number of proximal determinants. At the biological level fluctuations in hormones - in particular the sex hormones testosterone and oxytocin - set boundary conditions that guide sex-typed behavior (e.g., acts of aggression versus acts of nurturance) (see Wood & Eagly, 2010). At the psychological level, people differ in their tendency to internalize gender norms as a "gold standard" for self-regulation and self-identity (e.g., acting in accordance with idealized notions of masculine assertiveness and leadership) (cf. Witt & Wood, 2010). Finally, at the social level, peer reactions to an individuals' (non) adherence to gender norms will have reinforcement effects, encouraging sex-typed using subtle interpersonal reward (e.g., heightened friendliness and cooperation towards stereotypically passive women) and/or sanctioning non-sex-typed behaviour via implicit forms of interpersonal punishment (e.g., greater dislike of and distancing from an atypically assertive women) (cf. Eagly, Karau & Makhijani, 1995). Together, these proximal factors regulate a person's gender role "performance" and thus sex-type congruence. Distal processes that encourage the two sexes to develop different social roles (e.g., "bread-winner" versus "home-maker") and skill sets (e.g., business versus home economics acumen) serve to reinforce gender role stereotypes and sex-typed behavior (Eagly & Wood, 2012).

In short, the common psychological divisions that differentiate masculine versus feminine genders are driven by socio-cultural assumptions that are somewhat divorced from biological variations across the sexes. These assumptions foster engendered self-identities and gender-typical norms that subsequently shape people's thinking and behavior (Wood & Eagly, 2015). Meta-analytic evidence suggesting within-sex correlations between second-to-fourth digit

ratio (2D:4D)[3] and self-reported gender role orientations support the assertion that gender is a social rather than biological construct (Voracek, Pietschnig, Nader & Stieger, 2011).

1.1.2. Gender Role Orientation and Adult Paranormality: Consistent with both Gender Schema and Social Role theories, it is possible women are more inclined to adopt a paranormal worldview because they follow socially constructed stereotypes about what it is to be feminine which includes being more intuitively and/or more paranormally (e.g., psychically or mediumistically) "sensitive" (Blackmore, 1994). This claim is not new. In the mid-1800s, Spiritualist Mediums were seen as lacking purportedly masculine characteristics like sound reasoning and strong will-power whilst excelling in supposedly feminine qualities like intuitiveness, empathy and impressionability, the latter implicating heightened receptiveness to "outside influences" including spirits of the deceased (Moore, 1975). The notion of the female sensitive was further enhanced by broader socio-cultural factors. At the time, many women were drawn to professional mediumship because few other career options were available to them (Leonard, 2005; Owen, 2004). By the late 1800's more women were employed as typists, telegram and later telephone operatives in the emerging transmissions industry. This role of the female "go-between" effectively rendered tele-communications - literally meaning "communication at a distance" - a feminized sector (Galvan, 2010). From this, the perception of Spiritualist mediums as a sensitive go-between in post-mortem communication was also feminized. This view still persists. Leonard (2005) interviewed 55 practicing Spiritualists finding the vast majority (82%) were female with many male mediums stating they were homosexual (percentage not given). From this Leonard postulated that mediumship might be connected to a type of non-sexual feminine "energy" if not heightened femininity *per se*.

[3] 2D:4D is a stable and retrospective biomarker for prenatal exposure to testosterone and oestrogen levels and is directly linked to adult physique, traits, cognitions and behaviour (Rogers et al., 2017).

If gender role expectations do underpin peoples' propensity to endorse a paranormal worldview, then regardless of biological sex, individuals who perceive themselves to be more psychologically feminine should report more paranormal experiences, maintain stronger paranormal belief, proclaim more paranormal ability and, due to their diminished machismo, also to having more paranormal-specific fears. To date only two studies have tested these claims. In the first, Spinelli, Reid, and Norvilitis (2002) found female biological sex predicted stronger paranormal belief, that feminine gender role predicted *lower* paranormal belief, and that neither biological sex nor psychological femininity predicted more subjective experiences of alleged paranormal phenomena. Instead, it was heightened masculinity that predicted both paranormal belief and experiences. Spinelli et al. explain these findings by claiming masculine individuals were more confident about expressing their pro-paranormal convictions. In more recent work, Simmonds-Moore and Moore (2009) tested paranormal belief, experiences and objective performance across Bem's (1981) original four-way gender role typology[4], finding feminine and androgynous women both maintained stronger paranormal belief than undifferentiated women, with androgynous women also reporting marginally more paranormal experiences than their undifferentiated counterparts. In contrast, gender role orientation had no impact on women's objective performance on a paranormal (clairvoyance) task. As the authors note, one criticism is that undifferentiated women reported very low paranormal belief implying it is the *rejection* of traditional gender roles that shapes paranormal *skepticism*. Another criticism is that with an all-women sample, this study lacked generalisability. A final limitation is that Bem's four-way typology employs the much maligned use of median split dichotomies (MacCallum, Zhang, Preacher & Rucker,

[4] Here, individuals are classified as being, in psychological terms, "feminine" (scoring high on femininity but low on masculinity dimensions), "masculine" (low on femininity but high on masculinity), "androgynous" (high on both) or "undifferentiated" (low on both). Note that the terms such as "psychological femininity" and "feminized" refer to same feminine gender role orientation and contrasted with female biological sex. Parallel terms indicative of a masculine gender role (e.g., "psychological masculinity", "masculinized") are contrasted with male biological sex (see Bem, 1974; 1981).

2002). Nevertheless, based on historical accounts (Moore, 1975) and following more recent empirical evidence (Leonard, 2006; Simmonds-Moore & Moore, 2009) more psychologically feminine individuals are expected to report more anomalous experiences and belief than those reporting less pronounced femininity.

To date, most studies of adult paranormality have focused on anomalous beliefs and to a lesser extent experiences (French & Stone, 2014). Some writers claim a primary predictor of the belief in the paranormal is direct experience of ostensibly paranormal events (e.g., Blackmore, 1994; Rogers & Lowrie, 2018). Others argue the opposite (Lange & Houran, 1999; Lawrence, Edwards, Barraclough & Church, 1995). A smaller number of studies have linked anomalous experiences and/or belief to more self-proclaimed anomalous ability (Gallagher, Kumar & Pekula, 1994; Rogers & Lowrie, 2016; 2018; Stone, 2016). For example, Stone (2016) found that paranormal practitioners (who had completed, on average 5 years of advanced psychic training and given over 100 psychic readings) maintained stronger paranormal endorsement than non-practitioner believers with, unsurprisingly, both practitioner and believer groups scoring higher than paranormal skeptics. However, no research has yet examined the influence gender role has on self-proclaimed anomalous ability. In line with broader gender roles (Eagly & Wood, 2012) and engendered views of the typical paranormal sensitive (Leonard, 2005), more feminine individuals should declare more paranormal ability (aka "paranormal giftedness").

Finally, a small number of studies have explored peoples' fear of ostensibly paranormal events with overall findings somewhat mixed. Gallagher et al. (1994) found lower belief was associated with more fear of anomalous concepts with, surprisingly, fear unrelated to self-reported experience and ability. Focusing on apparition-like and poltergeist-like phenomena, Lange and Houran (1998) found more reported experiences predicted less fear which, in turn, predicted stronger belief. In subsequent work exploring a broader range of paranormal

constructs, Lange and Houran (1999) found more subjective experiences predicted more fear, with women more afraid of (their) ostensibly paranormal experiences than men. More recently, Rogers and Lowrie (2018) found anomalous fear was indirectly predicted by more experiences through the double mediating impact of stronger belief then more self-proclaimed ability. With Gallagher et al. (1994), Lange and Houran (1998; 1999) and Rogers and Lowrie (2018) all utilizing the formers' *Anomalous Experiences Inventory* (AEI), measurement differences cannot explain these conflicting trends.

In sum, there is (surprisingly) mixed evidence for the relationships anomalous experiences, belief and ability have not only with anomalous fear (Gallagher et al., 1994; Lange & Houran, 1999; 1998; Rogers & Lowrie, 2018) but also with each other (Blackmore, 1994; Gallagher, et al., 1994; Lange & Houran, 1999; Lawrence, et al., 1995; Rogers & Lowrie, 2016; 2018; Stone, 2016). Consequently, further exploration of the inter-relationship between of Gallagher et al.'s four facets of adult paranormality seems justified; firstly to clarify the directionality of these (inter) relationships and subsequently to enhance conceptual understanding of how paranormal worldviews might form and be maintained (cf. Irwin, 2009). By extension, exploration of the potentially mediating impact each "intermediate" facet of adult paranormal - in the present model, anomalous experiences, belief and ability (see footnote 5 below) - has on gender role-anomalous fear relationships (cf. Rogers & Lowrie, 2018) is also warranted.

No research until now has examined the extent to which peoples' fear of ostensibly paranormal phenomena is shaped by engendered social role expectations. In general, dispositional fearfulness is congruent with traditional views of femininity which include heightened emotionality, more passivity, more submissiveness and a greater dependence on others. By contrast, the behavioral expression of fear is usually deemed incompatible with traditional notions of masculinity, with "real" men expected to independent, assertive and to

suppress - else learn (better) ways to manage - their anxieties (Bem, 1974; 1981). In line with these stereotypes, women tend to report more fear than men (Harris & Miller, 2000; Spiegler & Liebert, 1970), trends which Harris and Miller suggest are least influenced by socialization processes. Other work confirms that generally speaking feminized individuals report being more, and masculinized individuals less, fearful (e.g., Carey, Dusek & Spector, 1988; Dillon, Wolf & Katz, 1985; Tucker & Bond, 1997).

The association gender role might have with self-confessed anomalous fear is potentially more ambiguous than for other facets of adult paranormality. On one hand, more feminine individuals, if they do report more anomalous experiences, beliefs and ability, might be expected to have less fear of alleged paranormal phenomena through simple habituation (Avery & Blackford, 2016). On the other hand, they might also be socialized into expressing - or at least not suppressing - their fears including those for ostensibly paranormal encounters. Given general trends linking feminine gender role to heightened fear expression (e.g., Tucker & Bond, 1997) more pronounced femininity should be associated with more self-confessed anomalous fear. In more formal terms it is hypothesized that with respondents' biological sex and other demographic covariates controlled for[5]:

H01: The four facets of adult paranormality - namely anomalous experiences, belief, ability and fear - will be positively inter-related.

H02: Individuals with a more feminine gender role orientation will score higher on all facets of adult paranormality than individuals with a less feminine gender role orientation.

H03: Individuals with a more masculine gender role orientation will score lower on all facets of adult paranormality than individuals with a less masculine gender role orientation.

[5] Some critics might wonder why respondents' biological (male versus female) sex was not included as a primary predictor along with the two gender role measures. Whilst this would have been theoretically appropriate, retaining biological sex as a predictor - rather than covariate - would have over-complicated an already complex model (cf. Figure 1 below). Specifically, another six direct pathways (i.e. sex-to-intuitive thinking; sex-to-rational thinking; sex-to-anomalous experiences; sex-to-anomalous belief; sex-to-anomalous ability and sex-to-anomalous fear), not to mention a host of extra indirect (mediating) relationships, would have been generated. In short, biological sex was partialled out for reasons of parsimony. Consequently, the hypothesized model tests the extent to which gender role predicts adult paranormality *net* of biological sex.

1.2. Thinking Style

1.2.1. Intuitive verses Analytic Thinking Style Preference: A related possibility is that self-reported paranormality is higher amongst women because stems, at least in part, from socialized differences in preferred thinking style. According to *Dual Processing Theory* people encode, represent, organize and process information using two independent systems which, whilst operating by different rules, contribute jointly to judgment and decisions making. The first of these - labeled *experiential* or *System 1 thinking* - is preconscious, automatic, effortless, holistic, emotion-orientated, motivated by pain avoidance, resistant to change and, in short, akin to intuition. The second - termed *analytic or System 2 thinking* - is conscious, intentional, effortful, non-holistic, reason-orientated, motivated by error-avoidance, open to change and thus akin to rationality (e.g., Epstein, 2003; Kahneman, 2011; Wang, Highhouse, Lake, Petersen & Rada, 2017). Intuitive thinking preference is a dispositional measure of self-proclaimed intuitive ability and faith in one's intuitions (e.g., "When it comes to trusting people, I can usually rely on my gut feelings"; Pacini & Epstein, 1999).

Broadly speaking, psychological theories of intuition can be divided into classical versus inferential viewpoints (Hill, 1987). In the *classical view*, intuition is accepted as a valid psycho-epistemological tool capable of processing multiple pieces of information quickly and holistically without noticeable cognitive effort (e.g., Betsch & Glöckner, 2010). Colloquially defined as "knowing without knowing why" (Claxton, 1998) intuition is assumed to be inherently accurate and a useful quality to behold and develop (e.g., Brandon, 2013). Contrasting this is the *inferential view*. Here, intuition is deemed to be a cognitive heuristic ('rule of thumb') that can be used to make quick and easy but predictable flawed judgments under conditions of uncertainty offering at best, mere approximations of the truth (e.g., Gilovich, Griffin & Kahneman, 2002). Consistent with the inferential view, Epstein, Pacini,

Denes-Raj and Heier (1996) found stronger propensity for intuitive (System 1) thinking was linked to more stereotypical, simplistic and generalized thinking. More recent studies suggest System 1 thinking is unrelated else linked to *poorer* performance on objective decision-making tasks, with peoples' ability to judge the veracity of their own intuitions seemingly limited (Leach & Weick, 2018; Phillips, Fletcher, Marks & Hine, 2016). Despite these findings, many laypeople uphold the classical viewpoint, believing (their) intuition to be a highly accurate, reliable and credible source of information (e.g., Gigerenzer, Galesic & Garcia-Retamero, 2014). For some, intuition is a form of "sixth sense" akin to psychic ability/ESP (Rogers & Wiseman, 2010).

1.2.2. Gender Role Orientation and Thinking Style Preference: Another long-standing folk belief is that women are *especially* intuitive (e.g., Davis, 1990). Consistent with this assumption, women tend to report stronger preference for using and more faith in (the accuracy of) their intuitions than do men (e.g., Gigerenzer et al. 2014; Norris & Epstein, 2012; Sladek, Bond, & Phillips, 2010). Gigerenzer and colleagues (2014) also found women viewed female intuition to be more accurate than men's. However, men believed *male* intuition to be superior, suggesting both sexes maintain a self-serving bias for their own intuitive capabilities. Despite a few studies reporting no sex differences or women claiming to be less intuitive than men (e.g., Hayes, Allinson & Armstrong, 2004; Sadler-Smith, 2011) the general stereotype is that females are more intuitively proficient and their male counterparts.

Whilst cognitive style has been linked to genetic variation (Bosch-Domènech, Brañas-Garza, & Espín, 2014), most writers believe preference for intuitive thinking stems from cultural socialization (e.g., Epstein, 2003). With this in mind, it is surprising that the relationship between gender role and thinking style preference has rarely been investigated. In the only study to date, Moreland, Harren, Kass and Tinsley (1978) found undergraduates'

tendency to make intuitive decisions about their college and future career choices was predicted by higher psychological femininity (all students) and lower masculinity scores (male students only). Conversely, students' propensity to base their occupational choices on reasoned decision-making was predicted by the lower femininity and higher masculinity (both sexes). The implication here is that women's preference for intuitive thinking reflects a more pronounced rejection of stereotypically masculine characteristics rather than active acceptance of stereotypically feminine traits.

The present study re-examines these relationships in a non-occupational context. In line with folk beliefs (Davis, 1990), scholarly evidence for women's self-proclaimed high intuitiveness (Gigerenzer et al. 2014) and early work outlining the relationship gender roles have with intuition-based decision making (Moreland et al., 1978), stronger psychological femininity should be associated with a stronger preference for intuitive and less preference for rational thinking with again, trends for psychological masculinity in the opposite direction. Formerly, with biological sex and other demographic covariates controlled for:

H04: Individuals with a more feminine gender role orientation will present stronger preference for intuitive thinking [H04a] and less preference for rational thinking [H04b] than individuals with a less feminine gender role orientation.

H05: Individuals with a more masculine gender role orientation will present lower preference for intuitive thinking [H05a] and stronger preference for rational thinking [H05b] than individuals with a less masculine gender role orientation.

1.2.3. Thinking Style Preference and Adult Paranormality: Unlike the paucity of research on gender role-thinking style associations, a host of studies have linked a preference for intuitive (over analytic) thinking to subjective paranormal experiences and/or more pronounced paranormal belief (e.g., Bouvet & Bonnefon, 2015; Irwin, 2015; Rogers, Fisk & Lowrie, 2018; see also French & Stone, 2014; Irwin, 2009). As noted earlier, some people believe intuition is a form of ESP. Interestingly these tend to report more frequent and more intense intuitions - which they are then more likely to act on - than individuals endorsing the

non-paranormal (i.e. non-conscious information processing) view of intuition (Rogers & Wiseman, 2010).

By contrast, adoption of an analytic cognitive style predicts lower paranormal belief even with cognitive ability, education level, biological sex and other factors such as age, religious engagement and political ideology all partialled out (Pennycook, Cheyne, Seli, Koehler & Fugelsang, 2012). However, trends have not always been consistent; some research has found stronger preference for *both* thinking styles is predictive of greater paranormal endorsement (Majimi, 2015) whereas other work has linked heightened intuitiveness to more paranormal experiences but *not* belief (Rattet & Bursik, 2001). Nevertheless, given general trends it is not surprising that more intuitive thinking is also linked with more self-proclaimed paranormal ability or giftedness. Stone (2016) found paranormal practitioners reported higher preference for intuitive thinking than non-practitioner believers and paranormal skeptics. One possibility is that individuals claiming to be paranormally gifted view intuition and psychic ability to be essentially the same process (Rogers & Wiseman, 2010) and consequently, base their self-proclaimed paranormal ability on stereotypically "feminine" qualities like heightened intuitive sensitivity (Blackmore, 1994; Leonard, 2006; Moore, 1975). Given expected associations between gender role orientation and the four facets of adult paranormality outlined above, stronger intuitive thinking should predict with more anomalous experiences, belief, ability and fear, with the opposite true for stronger rational thinking. More formally, with biological sex and other demographic covariates controlled for:

H06: Individuals with a stronger preference for intuitive thinking will score higher on all facets of adult paranormality than individuals with less preference for intuitive thinking.

H07: Individuals with a stronger preference for rational thinking will score lower on all facets of adult paranormality than individuals with less preference for rational thinking.

1.2.4. Thinking Style as a Mediator of Gender Role-Paranormality Relationships: The mediating impact thinking style preference has on gender role-paranormality relationships has so far been ignored by academics. Drawing on Gender Schema (Bem, 1981), Social Role (Eagly & Wood, 2012) and Dual Processing (e.g., Kahneman, 2011) it seems reasonable to expect hypothesized relationships between gender role orientation and the four facets of adult paranormality will be influenced (mediated) by individual differences in preferred thinking style (cf. Epstein et al., 1996). Specifically, if stronger femininity heightens self-perceived intuitiveness and endorsement of a paranormal worldview, then a stronger proclivity for intuitive (relative to rational) thinking should strengthen positive femininity-paranormality relationships. Conversely, if stronger masculinity encourages adoption of critical reasoning as well as a general skepticism of paranormal claims, then a stronger inclination for rational thinking should enhance negative masculinity-paranormality relationships. The current study is the first to formally test these assertions. Here, indirect routes are those stemming from either gender role to the "final" criteria measure anomalous fear, via (i.e. mediated by) either thinking style preference (intuitive or rational) and/or any of the three paranormality mediators (anomalous experience, belief or fear). As a consequence numerous "single", "double", "triple" and "four-way" serial mediation effects (cf. Hayes, 2013) are possible[6]. In general, stronger preference for intuitive thinking is expected to enhance femininity-

[6] Anomalous fear is described as the "final" criteria because the *PROCESS* macro (Hayes, 2012-2016) only allows for one outcome variable to be entered per analysis. At various stages of serial mediation, each mediator effectively serves as a criteria measure in its own right. In other words, running a multiple mediator path analysis enables "shorter" mediating pathways to be tested simultaneously. In the present context, a single mediation effect would exist if, say, higher femininity predicts more anomalous fears via more intuitive thinking (as denoted by the path a_1b_1 in Figure 1). By comparison, a double mediation effect would exist if higher femininity predicts more anomalous fears first via more intuitive thinking and second via more anomalous experiences (as shown by the path $a_1d_{23}b_3$ in Figure 1). Similarly, a triple mediation effect would exist if higher femininity predicts more anomalous fears via more intuitive thinking *then* more anomalous experiences and *then* more anomalous belief (as indicated by the path $a_1d_{23}d_{33}b_4$ in Figure 1). Finally, a four-way mediation effect would exist if higher femininity predicts more anomalous fears first via more intuitive thinking *then* more anomalous experiences *then* via more anomalous belief and lastly via more anomalous ability (not depicted in Figure 1 because, following partial correlation analyses, the conceptual path between anomalous ability and fear is omitted. Non-hypothesized pathways are generated by *PROCESS* for computational purposes only). Figure 1 is presented in the Results section because the hypothesized mediation model was finalized only *after* results from partial correlation analysis were obtained.

paranormality associations whilst stronger preference for rating thinking is expected to diminish them. As before, opposite trends should emerge for corresponding (mediated) masculinity-paranormality relationships. Thus, with respondents' biological sex and other demographic covariates controlled for:

H08: The positive relationship femininity has with each facet of adult paranormality will be positively mediated (strengthened) by stronger intuitive thinking [H08a] and negatively mediated (weakened) by stronger rational thinking [H08b].

H09: The negative relationship masculinity has with each facet of adult paranormality will be positively mediated (weakened) by stronger intuitive thinking [H09a] and negatively mediated (strengthened) by stronger rational thinking [H09b].

H10: Following Rogers and Lowrie (2018), various gender role-paranormality relationships will (also) be mediated by levels of anomalous experience [H10a], anomalous belief [H10b] and/or anomalous ability [H10c] to generate single, double, triple and four-way mediation effects. In general, the strength of positive pathways involving femininity and/or intuitive thinking will be enhanced, with the strength of negative pathways involving masculinity and/or rational thinking diminished by these three "intermediate" facets of adult paranormality[7].

1.4. Study Aims and Hypotheses

To recap: using multiple mediator path analysis the current study addresses this issue in several ways. First, it tests the extent to which two gender role orientations (masculinity and femininity) predict four separate facets of adult paranormality - anomalous experiences, belief, ability and fear) - once respondents' biological sex and other relevant demographic covariates are controlled for. Second, it builds upon previous work by testing the extent to which these gender role-paranormality relationships are mediated by two thinking style preferences (intuitive and rational). As outlined above, 10 primary hypotheses comprising a total of 16 sub-hypotheses are forwarded which, for ease of comparison, are presented together (with outcomes) in the supplementary data file (see Supplementary Table 6). Finally,

[7] To be contrasted with the "final" paranormality facet anomalous fear (see footnote 6). Separate hypotheses for the multitude of indirect pathways to *each* "intermediate" facet of paranormality are not offered for reasons of parsimony and to prevent hypothesis numbers becoming excessive.

with four facets of adult paranormality in the hypothesized model, a series of single, double, triple and four-level serial mediation effects - illustrated in Figure 1 below - are tested.

Method

2.1. Participants

A total of 439 individuals were recruited from opportunistic, face-to-face recruitment followed by (for pragmatic reasons) online sampling of predominantly UK adults. Of these, 343 usable questionnaires that contained at least some non-demographic data (face-to-face *n*=114; online *n*=229) were returned, an overall response rate of 78.1%. Respondents were aged 18 to 80 years (*M*=40.5 years; *SD*=12.6 years) with most being female (61.5%), of Caucasian ethnicity (93.3%), either employed (73.6%) or in full time education (10.6%), and qualified to at least undergraduate degree level (62.6%). Online respondents also stated their nationality. Most were British (76.9%) with a small number of other European, American, Australian, Canadian and South African nationals (< 5.0% each) also participating.

2.2. Materials

A standard pack containing three psychometrically sound questionnaires plus five demographic items was created, with a reversed version of the pack (except for demographics) generated to counter potential order effects. Online items included a "prefer not to say" option to mirror face-to-face items being left blank. The three questionnaires were as follows:

2.2.1. Adult Paranormality: Self-reported experiences of, belief in, claimed ability for and fear about ostensibly paranormal phenomena - primarily extrasensory perception, psychokinesis and life after death (e.g., "Using an Ouija board frightens me") - were assessed via the 63-item *Anomalous Experiences Inventory* (AEI: Gallagher, et al., 1994). Items were rated on a seven-point Likert scale from 1 'strongly disagree' to 7 'strongly

agree', with higher scores indicating more of each facet. Satisfactory internal reliability (Cronbach's α values of at least .96, .88, .90 and .76 respectively) has been reported for each subscale elsewhere (Rogers & Lowrie, 2016; 2018). A fifth AEI subscale ('drug and alcohol use'), deemed irrelevant to current study aims, was not utilized.

2.2.2. Gender Role Orientation: Gender identity was explored using the 60-item *Bem Sex Role Inventory* (BSRI; Bem, 1974) with respondents rating themselves on 20 stereotypically masculine (e.g., aggressive), 20 stereotypically feminine (e.g., affectionate) and 20 gender neutral (e.g., conscientious) traits. Items were scored on a seven-point scale from 1 'never or almost never true' of me to 7 'always or almost always true' of me, with higher scores indicative of stronger trait characteristics. Data from one masculine trait ('analytical') implicated a particular style of thinking and so was omitted. Continuous masculinity and femininity dimensions were calculated with data from all gender-neutral traits also dropped. Meta-analysis suggests both BSRI subscales are internally reliable (Cronbach's α values of at least .84 and .79 respectively; Voracek et al., 2011).

2.2.3. Thinking Style: Preferred thinking style was assessed via the 40-item *Rational-Experiential Inventory* (REI; Pacini & Epstein, 1999) comprising subscales for intuitive and rational thinking preferences (aka. faith in intuition and need for cognition respectively). Items were rated on a 5-point scale from 1 'extremely uncharacteristic of me' to 5 'extremely characteristic of me' with higher scores indicating a stronger preference for the thinking style in question. Both intuition and rationality dimensions have demonstrated good internal reliability elsewhere (Cronbach α's of .87 and .90 respectively; Pacini & Epstein, 1999).

2.2.4. Demographics: Finally, respondents indicated their biological sex (male versus female), age (in years), ethnicity (16 categories), occupational status (13 categories), and general level of qualification (from 1 'none' to 5 'postgraduate degree/professional'). The online questionnaire also asked respondents to state their nationality (in words).

2.3. Procedure

For the face-to-face sample, members of the UK public were approached within various locations (e.g., corporate coffee shops, a University refectory) in the North-West or South coast regions of England and asked to take part in a study of peoples' "beliefs and personality". Volunteers were handed a randomly selected questionnaire pack containing written instructions, the aforementioned questionnaires and a detachable debrief sheet with the latter containing a study overview plus contact details for the first author as well as relevant welfare agencies (e.g., *The Gender Trust*, *The Society for Psychical Research*). No time limit or payment was offered with completed questionnaires returned in person else via the (internal) post. For the online sample, the standard-order questionnaire pack was developed into a web-based survey using *Qualtrics®* software by the second author. All authors made calls for participation through various social media outlets (e.g. *Facebook*) with the questionnaire "active" until no further questionnaires were being returned (approximately 3 months). Again, no time limit or payment was offered. All aspects of the study conformed to departmental and British Psychological Society ethical guidelines. A recent review suggests face-to-face and online sampling tend to generate equivalent data (Campbell, Ali, Finlay & Salek, 2015) with both procedures deemed appropriate for current purposes.

Results

3.1. Preliminary Analyses

3.1.1. Missing Values Analysis: Respondents who failed to provide *any* BSRI, REI or AEI data were dropped. Of the remaining sample (n=343) a third of cases (31.2%) had at least one missing data point. However, no BSRI, REI and AEI item was missing data from more than 3.8% of the sample (13 cases). Visual inspection confirmed missing values were randomly

distributed hence monotonic which, for continuous measures, were replaced via regression-based multiple imputations and appropriate value constraints imposed (IBM, 2012). Pooled values across ten imputations were computed using Microsoft EXCEL©.

3.1.2. Subscale Characteristics: Table 1 presents internal reliability, descriptive and skew data for the various BSRI, REI and AEI subscales. All measures presented good internal reliability (Cronbach α's $\geq$.84) with mean gender role, thinking style and adult paranormality ratings comparable to those reported elsewhere (Bem, 1981; Pacini & Epstein, 1999; Rogers & Lowrie, 2016; 2018). Anomalous experience, belief, ability and fear ratings were all positively skewed beyond the p=.01 significance cut-off recommended by Clark-Carter (2004). Whilst 34 outliers (mostly for anomalous ability ratings) were observed, these had minimal impact on normality so were retained. Following recommendations to use robust analytic procedures in preference to transforming data (Field, 2013; p. 202) 10,000 bias-corrected bootstrapped sampling was employed.

*** Table 1 here ***

3.1.3. Sample Type: Mean scale ratings and demographics were compared across face-to-face verses online sampling procedures (for details see Supplementary Tables 1a and 1b). Overall, scale reliabilities varied little across sample type with it deemed appropriate to combine the two data sets. Further analysis revealed significant sample type differences in psychological femininity, both thinking styles, all four facets of adult paranormality and three of the five demographic measures namely age, ethnicity and general qualification level (all p's <.05). Consequently, future analyses will control for sample type.

3.2. Partial Correlations

3.2.1. Partial Correlations with Facets of Adult Paranormality: Table 2 presents partial correlations between AEI, BSRI, REI subscales and respondent demographics once sample

type is controlled for. As shown, anomalous experiences, belief, ability and fear ratings were highly and positively inter-correlated with one exception; anomalous ability was unrelated to anomalous fear. All four paranormality facets correlated positively with femininity with just one - anomalous fear - correlating significantly (and negatively) with masculinity. The four paranormality facets also correlated positively with intuitive thinking and for the most part negatively with rational thinking; only anomalous belief was unrelated to rationality scores. In terms of demographics, women reported more anomalous experiences, belief and fear; respondent age correlated negatively with anomalous fear; Caucasian (versus non-Caucasian) ethnicity was negatively associated with anomalous ability whilst general qualification level correlated negatively with anomalous experiences, belief and ability. Occupational status was not significantly related to any aspect of adult paranormality.

*** Table 2 here ***

3.2.2. Partial Correlations between Predictors: With sample type partialled out, feminine and masculine gender roles were not significantly associated. By comparison, femininity correlated positively with intuitive thinking with masculinity correlating positively with both thinking style preferences. Intuitive and rational thinking were unrelated. Regarding demographics, women reported more femininity and more intuitive thinking preference, respondent age correlated positively with rational thinking, Caucasian (versus non-Caucasian) ethnicity was associated with less femininity and more rationality as was general qualification levels. Finally, women tended to be younger than men with, unsurprisingly, students younger than non-students. Besides age, respondents' student (versus non-student) occupational status was not related to any measure. No evidence of predictor

multicollinearity was found (all $r_{xy.z}$'s < ± .57). Future analyses will control demographic correlates also[8].

3.3. Path Analysis

3.3.1. Introduction: Path analysis was conducted using the *PROCESS for SPSS 2.15* macro (Hayes, 2012-2016) with 10,000 bias-corrected bootstrapping adopted to ensure statistical robustness. The hypothesized path diagram - illustrated in Figure 1 - includes coefficient labeling (e.g., a_1, b_2, c'_2 and d_{21}) based on notation employed by Hayes (2013). Note that use of a single, multiple mediator path analysis means a large number of hypotheses can be tested without inflating familywise error rates.

*** Figure 1 here ***

The hypothesized model included two predictor variables (feminine and masculine gender role orientation) plus four sequential mediators - thinking style preference (M_1), then anomalous experiences (M_2), then anomalous belief (M_3) and finally anomalous ability (M_4) - with M_1 comprising two parallel mediators (either intuitive or rational thinking style preference). From these direct links a series of "single", "double", triple" and "four-way" mediation effects (pathways) to the "final" outcome measure (anomalous fear) were anticipated (see footnote 6 above for examples).

Due to previous associations between gender role, thinking style and adult paranormality (cf. Table 2 above; also French & Stone, 2014) five demographic correlates (biological sex, age, ethnicity, and general qualification level) and sample type (face-to-face versus online)

[8] Following reviewer feedback, relationships were re-tested when (a) sample type was *not* controlled for. Whilst a few newly significant relationships emerge trends were, for the most part, consistent with those reported in Table 2 in the main text (for details see Supplementary Table 2a and associated text). This suggests partial correlations in the main study were robust. Follow-up analyses were also undertaken to test whether biological sex and thinking styles were associated when, *in addition to sample type*, either (b) no gender role, (c) just femininity, (d) just masculinity or (e) both gender role orientations were (also) controlled for. Overall, little variation across trends was found (for details see Supplementary Tables 2b, 2c, 2d and 2e respectively plus accompanying text).

were controlled for. To maintain visual clarity, these covariates are not illustrated in Figure 1. Finally, the lack of significant partial correlations between (a) femininity and rationality, (b) masculinity and anomalous experiences, belief and ability, and (c) anomalous ability and anomalous fear ratings (cf. Table 2) meant these paths were omitted from the hypothesized model depicted by Figure 1.

3.4. Path Analysis: Direct and Indirect Predictors of Adult Paranormality

3.4.1: The Global Model: Overall, the observed model is highly significant in predicting anomalous fear, $F(12,322)=8.38$; $p<.001$; $R^2=.49$; *adj* $R^2=.24$, accounting for just under half (49%; adjusted 24%) of the variance in this final outcome measure. This represents a large effect size[9].

Statistics for all direct paths are given in Tables 3 where the column titled "Direct Effects 1" presents coefficients for the various paths were for computational purposes (Hayes, 2012-2016) either intuitive *or* rational thinking style effectively serves as the outcome variable. By extension, the four columns titled Direct Effects 2, 3, 4 and 5 in Table 3 present data for pathways were either anomalous experience, belief, ability or fear is effectively the criterion measure. Associated Total Effects, Total Indirect Effects and (Total) Net Direct Effects data are given in Table 4 (the former is repeated in Table 3) with data for all indirect (mediating) pathways shown in Table 5. The observed model is depicted in Figure 2. For linguistic convenience, the following discussion is of results once respondents' biological sex and other demographic covariates (cf. Table 2) have already been partialled out.

*** Tables 3 and 4 plus Figure 2 here ***

3.4.2. Total Effects: Predictor-to-Criteria Relationships (c paths): As Table 3 shows, the total effect of feminine gender role in predicting anomalous fear is highly significant.

[9] For regression-based models small, medium and large effect sizes are indicated by *ES* values of .02, .15 and .35 respectively (Ellis, 2010).

Specifically, a one unit increase in femininity is associated with a .35 unit increase in anomalous fear when mediated through all intuitive routes and a .31 unit increase in anomalous fear when mediated through all rational pathways. Both represent medium effects sizes (*ES*'s of .12 and .10 respectively). Total effects of masculine gender role also reached statistical significance; a one unit rise in masculinity being associated with a .19 unit decrease in anomalous fear via all intuitive routes and a .25 unit fall in this fear via all rational paths. This time corresponding effect sizes (*ES*'s of .04 and .06 respectively) were small.

3.4.3. Direct Effects: Predictor-to-Mediator Relationships (a paths): Stronger femininity was expected to predict more preference for intuitive thinking but less preference for rational thinking [H04a and H04b respectively], with opposite trends anticipated for stronger masculinity [H05a and H05b respectively]. In Table 3, the column headed "Direct Effects 1" shows femininity is direct and positive predictor of intuitive thinking; a one unit rise in the former being associated with a .28 unit rise in the latter with this representing a small-to-medium effect size (*ES* of .08)[10]. Consequently, H04a is supported. The lack of a significant association between femininity and rational thinking (also implied by the lack of a significant partial correlation in Table 2) means H04b is rejected. By comparison, masculinity is a significant and positive predictor of both thinking styles; a one unit rise in masculinity being associated with a .14 unit in intuitive thinking and a .19 unit rise in rational thinking, with both pathways having a small effect size (*ES*'s of .02 and .04 respectively). However, being positive, the masculinity-intuitive relationship is contrary to the hypothesized direction meaning H05a is rejected with only H05b confirmed.

[10] The effect size (*ES*) for each direct path is given by the squared semi-partial correlation ($r^2_{XY.W}$) coefficient and represents the percentage of variance in the target variable explained by its predictors once relevant covariates have been partialled out (Preacher, 2006). By comparison, the *ES* for each indirect path is given by *upsilon* (υ) where $\upsilon=[\beta^2_{IVM1}.\beta^2_{M1M2}.\beta^2_{M2M3}.\beta^2_{M3M4}.\beta^2_{M4DV}]$ and represents the proportion of outcome variance accounted for jointly by all mediators and predictors having adjusted for variable order plus relevant covariates (Lachowicz, 2017; Lachowicz, Preacher & Kelly, 2017). The present study's statistical sensitivity was tested via a retrospective power analysis using *G*Power* software (Faul, 2008). For an omnibus multiple regression with 7 predictors/mediators, alpha set to the standard .05 level (two-tailed) and statistical power (1−β) set to .95, an *N* of 335 is sufficient to detect small-to-medium effect sizes (f^2=.07).

Stronger femininity was also expected to predict stronger endorsement of all facets of adult paranormality [H02] with again, stronger masculinity expected to have the opposite relationship [H03]. In Table 3, data in Direct Effect columns 2, 3 and 4 indicate some support for the first of these two hypotheses. In particular, a unit increase in femininity is directly associated with a .30 unit increase in anomalous experiences and .19 unit increase in anomalous belief. In contrast, femininity does not directly predict anomalous ability. In short, H02 is partially supported with effect sizes for the first two pathways being small-to-medium and smallish (*ES*'s of .09 and .04) respectively. As implied by the lack of partial correlations in Table 2, masculinity failed to directly predict anomalous experiences, belief or ability meaning that, for now, H03 remains unsupported[11].

3.4.4. Direct Effects: Mediator-to-Mediator Relationships (d paths*)*: Several direct mediator-to-mediator pathways were also hypothesized. In particular, stronger preference for intuitive thinking was expected to predict more adult paranormality [H06] with opposite trends anticipated for stronger rational thinking preference [H07]. Inspection of Direct Effect 2, 3 and 4 columns in Table 3 indicate some support for the former hypothesis. Specifically, a one unit rise in intuitive thinking directly predicts a .72 unit rise in anomalous experiences and a .34 unit rise in anomalous belief but, surprisingly, has no predictive relationship with anomalous ability. These first two pathways present large and medium effects sizes (*ES*'s of .52 and .12) respectively with H06 partially supported. By contrast, stronger rational thinking failed to directly predict anomalous experiences, belief or ability meaning that, for the moment, H07 also remains unsupported.

Data for the hypothesized positive inter-relationships between the four paranormality facets [H01] is also presented in the Direct Effects 5 column of Table 3. As expected, anomalous experiences are highly and positively predictive of both anomalous belief and

[11] Direct effects pertaining to anomalous fear (the "final" outcome measure) are given in sub-sections 3.4.5 and 3.4.6 below.

anomalous ability; a one unit rise in the former leading to a .91 unit and a .82 unit rise in belief and ability ratings respectively with both representing very large effect sizes (*ES*'s of .83 and .67 respectively). Contrary to expectations, anomalous belief does not directly predict anomalous ability implicating only partial support for H01. The three hypotheses relating to the final criteria measure namely anomalous fear are discussed below.

3.4.5. Direct Effects: Mediator-to-Criteria Relationships (b paths*)*: The direct effect each mediator has on anomalous fear is presented in the Direct Effects 5 column of Table 3. Intuitive and rational thinking preferences were expected to be direct positive and direct negative predictors of anomalous fear (H06 and H07) respectively. Contrary to the former hypothesis, intuitive thinking does not directly predict anomalous fear. In contrast, rational thinking does; a one unit increase in this being associated with a .31 unit *increase* in anomalous fear with this representing a small-to-medium effect size (*ES* of .10). However, with the observed relationship directionally opposite to the one hypothesized, H07 is rejected.

As Table 3 also shows (and partial correlations in Table 2 imply), anomalous experiences are unrelated to anomalous fear, contrary to H01. As expected, both anomalous belief and anomalous ability directly predict anomalous fear. More precisely, a single unit increase in each of the former two measures is respectively associated with .55 unit increase but a .35 unit *decrease* in anomalous fear. Whilst these pathways constitute medium-to-large and medium effect sizes (*ES*'s of .30 and .12) respectively, only the former is in the expected direction. Consequently, H01 is, so far, only partially supported.

It is noticeable that despite a lack of significant partial correlation between anomalous ability and fear scores ($r_{xy.z}$=.09; p=.092; *ns*; *two-tailed*; n=332; see Table 2) mediation analysis reveals a significant pathway between these measures, implicating the presence of at least one suppressor variable (Maassen & Bakker, 2001) in the observed model.

3.4.6. Direct Effects: Predictor-to-Criteria Relationships (a paths*)*: The direct effect each of the two primary predictors (feminine and masculine gender role) has on the final outcome measure (anomalous fear) is also presented in the Direct Effects 5 column of Table 3. Surprisingly, stronger femininity has no direct association with anomalous fear contradicting H02. As hypothesized, a one unit increase in masculinity is directly linked to a .20 unit drop in anomalous fear albeit with an effect that is small(ish) in size (*ES* of .04). This latter relationship offers some, perhaps limited, support for H03.

3.4.7. Total Indirect Effects: Mediating Pathways (Σ[ab and adb] paths): Finally, various indirect routes were also hypothesized. Total effects data for these indirect pathways is also presented in Table 5. As shown, femininity has a statistically significant total indirect effect on anomalous fear via the various mediating pathways illustrated in Figure 2, the effect size of which was very small (*ES* ≤ .01). This was not true of masculinity; the total indirect effect for this gender role being non-significant.

Whilst stronger intuitive thinking was expected to have a positive mediating (strengthening) effect on the positive relationships femininity had with each of four facets of adult paranormality (H08a), stronger rational thinking hypothesized to have a negative mediating (weakening) impact on the same four relationships (H08b). Conversely intuitive thinking was hypothesized to have a positive mediating (weakening) effect on the negative relationships masculinity had each paranormality facet (H09a) with again, rational thinking having the opposite negative mediating (this time strengthening) impact (H09b). Table 5 presents completely standardized beta weights, bootstrapped beta weight estimates, (bootstrap minus observed) bias estimates and 95% confidence intervals (CI_{95}) for each indirect pathway in the observed model (cf. Figure 2). To enhance clarity, data are split across the four gender role × thinking style combinations. With bootstrapping, statistical significance is indicated by lower and upper CI_{95} bounds not crossing zero (Hayes, 2013).

Given this criterion, ten different mediating pathways - two single, four double and four triple mediation effects - are significant[12].

*** Table 5 here ***

3.4.8. Individual Indirect Effects: Mediating Pathways (ab and *adb* paths*)*: As Table 5 shows, three statistically significant indirect pathways from femininity to anomalous fear via (the mediating impact of) more intuitive thinking exist, albeit with mixed trends. First, higher femininity is associated with more anomalous fear via (a) the single mediating effect of more anomalous belief. This is enhanced by higher femininity being indirectly linked to heightened fear via (b) the double mediating effect of more intuitive thinking then more anomalous belief as well as (c) the triple mediation of more intuitive thinking then more anomalous experiences then more belief. All three of these indirect routes present very small effect sizes (all *ES*'s ≤ .01), with the latter two (b and c) providing partial support for H08a. Surprisingly, stronger femininity is also indirectly linked to *less* anomalous fear initially via the double mediation effect of more anomalous experiences then more anomalous ability, and subsequently via the triple mediation of more intuitive thinking then more anomalous experiences then more ability. These two routes present small and very small effect sizes (*ES* of .01 and *ES* <.01) respectively. However, due to the negative relationship between anomalous ability and fear, both pathways were not in the direction hypothesized and thus contrary to H08a. In sum, the various indirect pathways from feminine gender role through intuitive thinking observed in the present model provide only partial support for H08a. Inspection of Figure 2 suggests mixed trends for the femininity-anomalous fear relationship are due to the strong negative association between the latter and anomalous ability. By

[12] Whilst 13 significant pathways are presented three are repeated in both intuitive and rational thinking sections meaning only ten *unique* pathways exist. Minor differences in observed *beta* weights ("*Data"*) for these conceptually identical pathways are reported by *PROCESS* and reflect the fact that mediators vary for different steps in the analysis in that different factors are controlled for when estimating causal pathways that appear "later" in the model (Hayes, personal communication). In the present study, minor differences (e.g., in the femininity-to-belief-to-fear pathway given an intuitive versus rational thinking) have no bearing on final results so are not discussed further.

comparison, all indirect pathways from femininity through rational thinking were non-significant meaning H08b is fully rejected.

Further examination of Table 5 reveals three significant indirect pathways from masculinity to anomalous fear via intuitive thinking although again, with overall trends somewhat mixed. First, stronger masculinity predicted *more* anomalous fear via (a) the double mediation effect of more intuitive thinking then stronger anomalous belief. This is compounded by stronger masculinity also predicting *more* anomalous fear this time via (b) the triple mediation of more intuitive thinking then more anomalous experiences then more belief. In both these cases, observed pathways are contrary to expected directions. As hypothesized, stronger masculinity also predicted *less* anomalous fear by virtue of a different triple mediation effect; this time through (c) more intuitive thinking then more anomalous experiences and finally more anomalous ability. Here, only the first two elements were contrary to expected directions with the final - hence overall - path presenting a negative relationship. Associated effects sizes for these three routes are also very small (*ES*'s <.01). In short some but again perhaps limited support for H09a is found.

Finally, and as expected, higher masculinity indirectly predicted *less* anomalous fear this time via the single mediation of more rational thinking. The effect size for this route is again very small (*ES* <.01). All other indirect pathways from masculinity via rational thinking are non-significant meaning that overall, partial support for H09b is also observed. This too reflects the strong negative association between anomalous ability and anomalous fear depicted in Figure 2.

3.4.9. Net Direct Effects (c' paths): Returning to Table 4, observed data suggests that with all indirect (mediation) effects accounted for, femininity has a near-significant net direct effect on anomalous fear. In other words, with all indirect pathways factored out a one unit increase in femininity is uniquely associated with a .20 unit rise in fear of anomalous

phenomena, albeit only marginally so. By comparison, masculinity has a significant net direct effect on this "final" outcome measure; a comparable unit increase in masculinity being (significantly and) uniquely associated with a .20 unit *drop* in anomalous fear. In both these cases, effects sizes are on the small side (*ES*'s of .04).

3.4.10. Variance Explained: As noted earlier, the observed model explained 49% (adjusted 24%) of the variance in anomalous fear ratings, $F(12,322)=8.38$; $p<.001$; $R^2=.49$; *adj* $R^2=.24$, with this representing a large effect size (Ellis, 2010). Similar was true for the three "intermediate "facets of adult paranormality, with the observed model explaining 60% (adjusted 36%) of the variance in anomalous experience, $F(9,325)=20.41$; $p<.001$; $R^2=.60$; *adj* $R^2=.36$, as much as 90% (adjusted 80%) of the variance in anomalous belief, $F(10,324)=132.02$; $p<.001$; $R^2=.90$; *adj* $R^2=.80$, and an even higher 92% (adjusted 85%) of the variance in anomalous ability, $F(11,323)=172.67$; $p<.001$; $R^2=.92$; *adj* $R^2=.85$, ratings. Unsurprisingly, all three represented large effect sizes. Finally, 40% (adjusted 16%) of the variance in intuitive thinking preference, $F(8,326)=7.82$; $p<.001$; $R^2=.40$; *adj* $R^2=.16$, together with 45% (adjusted 20%) of the variance in rational thinking preference $F(8,326)=10.36$; $p<.001$; $R^2=.45$; *adj* $R^2=.20$, was explained, these figures representing a large and medium effect size respectively.

3.4.11. Feminine versus Masculine Gender Roles: In general, (non-zero) direct pathways stemming from femininity (*ES* from .04 to .09) are larger than those emanating from masculinity (*ES*'s from .02 to .04).

3.4.12. Intuitive versus Rational Thinking Style: Likewise, (non-zero) direct pathways from intuitive thinking (*ES*'s from .03 to .52) are generally than those from rational thinking (*ES*'s from .01 to .10).

3.4.13. *Summary:* Full support was found for two of the 16 (sub) hypotheses in that more feminized and masculinized individuals presenting stronger intuitive and stronger rational thinking preferences [H04a and H05b] respectively. Additionally, partial support was for nine hypotheses. For the most part, the four facets of adult paranormality were positively inter-related [H01] with only anomalous ability and fear ratings uncorrelated. More feminine individuals scored (marginally) higher on all paranormality except anomalous ability [H02] whilst more masculine individuals scored lower on one; anomalous fear [H03]. Similarly, individuals with a stronger preference for intuitive thinking reported more anomalous experiences and stronger anomalous belief [H06]. By extension, intuitive thinking positively mediated three femininity-paranormality relationships via anomalous experiences, belief and/or ability [H08a] as well as two masculinity-paranormality relationships via the first two of these three intermediary facets [H09a]. Finally, several single, double, triple and four-way mediation effects through more anomalous experiences [H10a] and/or stronger anomalous belief [H10b] were observed. The remaining five hypotheses [H04b, H05a, H08, H08b and H10c] are all rejected. For convenience findings are re-presented in Supplementary Table 8).

3.5. Follow-Up Path Analysis: Comparing Models with Gender Role versus Biological Sex as the Primary Predictor

To assess the relative robustness of the current model, a follow-up path analysis was undertaken this time assessing the extent to which respondents' biological sex (male versus female) predicts facets of adult paranormality *once gender role orientation* (plus the same demographic covariates) are controlled for; in other words, when biological sex replaces gender role orientation as the primary predictor (for details see Supplementary Figures 1 and 2, Supplementary Tables 3, 4 and 5 plus accompanying supplementary text). Overall trends indicate sex has little association with any thinking style or paranormality measure except

intuitive thinking which, regardless of their gender role orientation, women seem to prefer more than men.

Discussion

4.1. Preliminary Findings

4.1.1. Differences across Biological Sex: Whilst women claim to be more feminine they also see themselves as being just as masculine as men. The latter finding suggest both sexes are equally comfortable expressing stereotypically "male" characteristics like leadership, dominance and aggression although with mean BSRI ratings generally low, it would be more accurate to suggest the two sexes are equally rejecting of this traditional male stereotype (cf. Bem, 1974). The lack of a significant relationship between biological sex and psychological masculinity supports the above claim and is consistent with Spinelli et al., (2002). Theoretically, neither men nor women were completely sex-typed (Bem, 1981) which, given the evolution of modern gender stereotypes (e.g., Donnelly & Twenge, 2017), is not too surprising. It remains to be seen whether current trends for the BSRI replicate to a more contemporary measure of gender "typicality" (Egan & Perry, 2001).

Women also displayed a stronger preference for (aka. faith in their) intuitive thinking than did men, a finding which is consistent with the folk belief that women are intuitively superior (e.g., Davis, 1990; Gigerenzer et al., 2014). Consistent with recent meta-analytic findings (Wang et al., 2017), intuitive and rational thinking style preferences were not significantly related.

Finally, women also reported frequent experiences of, stronger belief in and more fear of ostensibly paranormal phenomena supporting previous claims that they tend to maintain a more robust paranormal worldview (French & Stone, 2014; Irwin, 2009) yet are more fearful such concepts (Lange & Houran, 1999). Surprisingly, parallel sex differences did not extend

to self-proclaimed anomalous ability, with women perceiving themselves to be just as paranormally gifted as men.

As noted earlier, most studies highlighting sex differences in adult paranormality have failed to consider gender *role* which may be a confounding factor. With this in mind, subsequent discussion concerns the impact socially constructed gender role orientation has on thinking style preference and subsequently adult paranormality once respondents' biological sex plus other demographic covariates are controlled for.

4.2. Main Findings

4.2.1. Overview: The current study modeled the extent to which gender role predicts intuitive and rational thinking and, in turn, the extent to which gender role-paranormality relationships are mediated by thinking style preferences. Overall, the observed model was effective in predicting not only the "final" outcome measure anomalous fear but also the three "intermediate" facets of adult paranormality as well as both thinking style preferences(all p's<.001). The model explained just under half (49%) of the total variance in anomalous fear ratings, just under two-thirds (60%) of the variance in anomalous experiences, nine-tenths (90%) of the variance in anomalous belief, a similarly high percentage (92%) of variance in anomalous ability, and around two-fifths of the variance in both intuitive (40%) and rational (45%) thinking style preferences. Adjusting for sample size and model complexity approximately a quarter (24%) of anomalous fear variance, a third (36%) of anomalous experiences variance, three-quarters of anomalous belief (80%) and anomalous ability (85%) variance a fifth of intuitive (40%) and rational (45%) thinking style variance were accounted for. As already noted, two of the 16 (sub) hypotheses were fully supported with another nine attaining partial support.

4.2.2. Gender Role Orientation and Adult Paranormality: Individuals who were more psychologically feminine reported more subjective experiences and stronger belief (in the veracity) of ostensibly paranormal phenomena than those who were less feminine. This was expected (Simmons-Moore & Moore, 2009) and suggests these two facets of adult paranormality are both shaped by a person's gender role orientation (Bem, 1981; Starr & Zurbriggen, 2017) and engendered expectations (Eagly & Wood, 2012) rather than by biological sex. As previously noted, Simmonds-Moore and Moore (2009) found their all-women sample had comparatively low levels of anomalous belief claiming it was women's *rejection* of traditional gender roles that shaped their paranormal *skepticism*. In the present study both sexes presented moderate levels of paranormal endorsement, males having marginally less belief than females[13]. In sum, Simmonds-Moore and Moore's (2009) skepticism-focused interpretation, whilst still possible, seems less applicable here.

Contrary to expectations, gender role had little direct influence on self-proclaimed paranormal ability net of the aforementioned experience and belief relationships. In other words, more feminized individuals claimed to be just as paranormally adept as their less feminized counterparts regardless of their (prior) experiences of and beliefs in such phenomena. The same was true of psychologically masculine individuals. Whilst it is possible feminized individuals were less confident and so less willing to promote their self-alleged capabilities (cf. Spinelli et al., 2002), current trends suggest self-proclaimed paranormal giftedness primarily stems from having a higher number of seemingly paranormal encounters (cf. Rogers et al., 2018; Stone, 2016).

[13] In the present study, *mean* AEI belief scores based on a five-point Likert scale (potential range =1 to 5) were low-to-moderate for men (M=2.98 SD=1.47) and moderate for women (M=3.50; SD=1.43), $F(1,331)=3.35$; p=.068; two-tailed; *partial eta*^{2}=.01. By comparison, Simmonds-Moore and Moore (2009) report *total* AIE scores of 7.13 (SD=4.30; potential range =0 to 29) based on a simple "yes" versus "no" dichotomous rating scale (scoring 1 and 0 respectively). As such direct numerical comparison across the two studies would not be meaningful.

As predicted, more masculine individuals reported less paranormal-specific fear net of their experience, belief and ability levels than did less masculine individuals, contradicting Spinelli et al. (2002). The same was true of less feminine individuals who reported marginally less fear (p=.063; CI_{95} bounds from -.01 to .40). These findings are consistent with the "fearful feminine" stereotype implicated in non-paranormal contexts (e.g. Tucker & Bond, 1997). Adoption of more masculine attitudes towards allegedly paranormal encounters and/or pro-paranormal claims may be driven by a need to display male pride or machismo (cf. Sorek, 2009).

4.2.3. Gender Role Orientation and Thinking Style Preference: Psychologically more feminine individuals also presented a stronger preference for intuitive (System 1) but not rational (System 2) thinking compared to their less feminine equivalents. By comparison, more masculine individuals presented a stronger preference for both thinking styles; not only a greater need for (reasoned) cognition but also greater faith (in the accuracy) of their intuitive judgments (Pacini & Epstein, 1999), with these trends persisting even after respondents' biological sex (and other demographic correlates) had been partially out. The implication here is that thinking style preference is shaped more by cultural socialization and gender role expectations than by genetic variation (Epstein, 2003). Contrary to the popular view women are intuitively superior (Davis, 1990), current data imply it is psychologically *feminine* individuals of either biological sex who rely on their intuitions. But with the same is also true of psychologically masculine individuals of either sex, overall trends support the notion of a gender-specific bias in self-reported intuitiveness (Gigerenzer et al., 2014) albeit now with these biases applied to individual differences in gender role constructions rather than biological sex. By extension, it seems plausible psychologically androgynous individuals - who score high on both feminine *and* masculine dimensions of the BSRI (Bem, 1974) - might be even more likely to adopting a predominantly intuition-based style of information

processing. Either way, with intuitive (System 1) thinking either unrelated to else associated with poorer performance on objective tests of decision-making (Leach & Weick, 2018; Phillips et al., 2016), the stereotype of feminine intuition being especially accurate (e.g., Brandon, 2013) seems to have little basis in reality.

4.2.4. Thinking Style Preference and Adult Paranormality: Regardless of individuals' biological sex and/or gender role, those with a stronger preference for intuitive thinking reported more experiences of and belief in paranormal phenomena than those with less preference for this thinking style, supporting previous claims (e.g., Bouvet & Bonnefon, 2015; Irwin, 2015; Rogers et al., 2018). No such associations were found with rational thinking preference and furthermore, do not extend to anomalous ability; perceiving oneself to be paranormally gifted is *not* uniquely linked to intuition-based (System 1) information processing. Instead, this self-perception appears to be influenced only by the *frequency* of subjective anomalous experiences (Rogers et al., 2016; 2018).

Additionally, it seems paranormal-specific fear is not uniquely affected by a heightened preference for intuitive thinking either. Instead, the former reflects a lower preference for rational thinking and, by implication, a less reasoned (critical) appraisal of seemingly inexplicable concepts. This interpretation is consistent with Risen's (2016) claim that paranormal intuitions once "activated" are either accepted through avoidance of critical evaluation else rejected because of it (see also Gray & Gallo, 2016; Irwin, Dagnall & Drinkwater, 2013).

4.2.5. The Relationship between Different Facets of Adult Paranormality: Having more anomalous (aka. inexplicable) experiences predicted stronger belief (in the veracity of) paranormal concepts like ESP PK and life-after death, a finding which is consistent with some (Blackmore, 1994; Rogers & Lowrie, 2018) but not all (Lawrence et al., 1995) previous claims. More experiences also directly predicted more self-proclaimed anomalous ability net

of belief levels. This suggests it is the number of subjective experiences - not merely peoples' strength of belief - that shapes self-proclaimed paranormal giftedness (Gallagher et al., 1994; Rogers & Lowrie, 2016; 2018) although at present, the direction of this relationship (i.e. whether more paranormal experiences lead to or are the result of more paranormal ability) cannot be confirmed. Finally, anomalous fear was unrelated to the frequency of anomalous experiences supporting Gallagher et al. (1994) but contradicting previous claims that these constructs are either positively (Lange & Houran, 1999; Rogers & Lowrie, 2018) else negatively (Lange & Houran, 1998) associated. However, more fear was linked to stronger anomalous belief and less self-proclaimed anomalous ability. In short, individuals who more strongly endorsed the veracity of allegedly paranormal events were more fearful of these phenomena whilst individuals who claimed to be paranormally gifted were less fearful of them. This seems reasonable, especially if the latter believe they have some control over and/or understanding of their alleged gift (cf. Roxburgh & Roe, 2014). Taken together, current findings imply paranormal-specific fear is driven by a somewhat "remote" endorsement of – rather than direct encounter with - ostensibly paranormal activity, with this the case irrespective of whether such events are encountered as a passive witness or active participant. As yet, the extent to which individuals claiming paranormal giftedness initially had but then overcame their fear of the paranormal remains largely unexplored (although see Roxburgh & Roe, 2014).

4.2.6. The Mediating Impact of Thinking Style Preference on Gender Role-Paranormality Relationships: The extent to which socialized gender role predicts certain facets of adult paranormality was, as expected, mediated by individual differences in thinking style preference. However, the net effect of these factors on the final outcome measure - anomalous fear - depended on number and nature of mediators; that is, the specific path "taken" in the depicted model (Figure 2). For example, feminine individuals whose

preference for intuitive thinking was linked to them reporting more paranormal experiences and/or belief subsequently felt more afraid of allegedly paranormal phenomena (cf. Gallager et al., 1994; Lange & Houran, 1999). However, for feminine individuals intuitive preference was linked to them reporting more frequent anomalous experiences and more pronounced paranormal ability (versus "mere" belief), such fears were diminished. It seems to be alleged paranormal giftedness that is the key factor shaping paranormal-specific fearfulness (Rogers et al., 2018).

Evidence of a triple mediated relationship between a psychological masculinity and lower paranormal fear via more intuitive thinking, then more anomalous experiences then more self-decreed anomalous ability, suggests gender role may be a less important factor in shaping adult paranormality than thinking style. Corresponding evidence that the same masculinity-fear relationship is also mediated by heightened preference for rational thinking suggests at least part of the reason why masculinized individuals report being unafraid of allegedly paranormal concepts is that, based on their engendered self-concept, they are more likely to engage in reasoned (critical) evaluation of otherwise inexplicable events (Gray & Gallo, 2016; Irwin, et al., 2013; Risen, 2016). Evidence that both feminine and masculine identities were (near) significant predictors of anomalous fear *net* of thinking style and all other (mediating) facets of adult paranormal (depicted by *c'* paths in Table 4) offers further support for this interpretation.

4.2.7. Gender Role Orientation versus Biological Sex: Cross-model comparisons (Figure 2 verses Supplementary Figure 2) suggest psychological femininity is a better predictor of intuitive thinking preference and a (marginally) better predictor of three paranormality facets - anomalous experiences, belief and fear - than is female biological sex. Likewise masculinity is a better predictor of rational thinking and anomalous fear than male biological sex. These

trends are consistent with a gender role account of both thinking style preference (Epstein, 2003; Moreland et al., 1978) and adult paranormality (Irwin, 2015; Rogers & Lowrie, 2018).

4.2.8. Practical Implications: Whilst current findings have predominantly theoretical implications a better understanding of how gender roles and/or thinking style preferences shape adult paranormality will, at a pragmatic level, enable observers to make more informed choices about whether or not to visit paranormal practitioners (cf. Stone, 2016).

4.3. Other Findings

4.3.1. Sample Type Differences: Evidence that face-to-face versus online respondents differed on all self-report measures *except* masculinity was surprising given previous claims of data equivalence across these two sampling techniques (Campbell et al., 2015). However, it is noticeable that face-to-face paranormality ratings reported elsewhere (Rogers et al., 2018) were more akin to those of the present online group, the implication being that online data collection (via social media) does not lead to undue sampling biases. Still, researchers should remain mindful that different data collection procedures have the potential to confound results and control for sample type variations as appropriate.

4.3.2. Demographic Correlates of Adult Paranormality: Consistent with general trends (French & Stone, 2014; Irwin, 2009) more qualified individuals endorsed a more extreme paranormal worldview (except for fears) than those with lower educational attainment. In terms of paranormal belief, the same can be said those with non-Caucasian (versus Caucasian) ethnicity. By comparison, evidence linking younger individuals to less paranormal fear adds to mixed paranormality trends for this particular demographic.

4.4. Methodological Issues and Ideas for Future Research

Despite several methodological strengths (e.g., a sufficiently large sample size, both sexes recruited from various geographical locations, use of continuous BRSI measures, 10,000 bias-corrected bootstrapping and controlling for demographic correlates), a number of limitations are worthy of comment.

First, effects sizes for most direct and all indirect paths to anomalous fear were either small (*ES*'s ≤ .2) or very small (*ES*'s <.01) with the current study unlikely to have suffered Type II errors (Field, 2013). That said, the smallish size of current effects is less than surprising given the current model's complexity coupled with the myriad of factors known to influence adult paranormality (French & Stone, 2014; Irwin, 2009). For example, there is robust evidence to suggest women are more inclined to endorse scientifically *implausible* beliefs like the veracity of life after death with men, in contrast, drawn more to scientifically *possible* - but as yet unproven - notions such as the reality of extraterrestrial visitation. The implication here is that sex differences in adult paranormality might be the consequence of females having lower interest, fewer opportunities and/or less encouragement to acquire working knowledge of the principles of scientific inquiry (French & Stone, 2014). Recent findings that male-supportive biases remain prevalent in the teaching of core science-based subjects (Hand, Rice & Greenlee, 2017) support this assertion. The role scientific understanding plays as a potentially mediating factor in shaping a gender role account of adult paranormality has yet to be explored.

A second criticism is that certain traits in the BSRI (e.g. yielding) may no longer be applicable to modern gender stereotypes (cf. Donnelly & Twenge, 2017). Because the current study served as a direct comparison and extension of earlier work (Simmonds-Moore & Moore, 2009; Spinelli et al., 2002), coupled with the BSRI's continued employment in other fields of psychological research (e.g., Jonason & Davis, 2018), present use of the BSRI is justified. That said, replication using a more recent measures of gender role expectations

(e.g., Egan & Perry, 2001) would enhance the current model's robustness. As one anonymous reviewer suggested, future work could employ experimental methods to overcome general shortcomings of correlation-based research including issues of directionality (i.e. the extent to which intuitive thinking and/or adult paranormality predicts gender role identity). Artificially priming gender roles (e.g., through presentation of [false] gender-specific norms; Robinson, Gagnon, Riley III & Price, 2003) would provide a more robust test of how gender role expectations shape thinking style preference and/or adult paranormality. That said, the likelihood that masculinity and femininity are non-stable dimensions prone to adaptation across different life-stages and/or contexts (Keener, Mehta & Smirles, 2017) should also be considered. By extension, (longitudinal) study of the extent to which gender identity in childhood (Perry, Pauletti & Cooper, 2019) is a precursor of adult paranormality - either uniquely or in combination with other developmental factors like childhood trauma or exposure to inappropriate parenting (Rogers & Lowrie, 2016; 2018) - could also be explored.

Future research could also distinguish between self-perceived intuitive *ability* verses self-rated intuitive *engagement* (Pacini & Epstein, 1999) which, due to model complexity, were not differentiated in the present study. Some writers argue that due to limitations in people's metacognitive awareness self-report measures do not reflect behavioral reality and that instead, *actual* intuitive processing ability (aka. accuracy) ought to be tested using objective performance measures (Pennycook, Ross, Koehler & Fugelsang, 2017; see also Leach & Weick, 2018; Phillips et al., 2016). The influence actual intuitive performance has on adult paranormality remains untested. In addition, rationality is a fluid and context-specific construct (what seems rational in one context may appear irrational in another) with no one model fitting all situations[14]. By implication, peoples' general preference for analytic thinking might be "artificially" diminished when faced when an ostensibly paranormal

[14] Besides *Dual Processing Theory* there are other often overlapping models of rationality which broadly speaking can be divided into *normative* accounts (how people *ought* to make decisions) versus *descriptive* accounts (how people actually *do* make decisions). For discussion see Djulbegovic and Elqayam (2017).

experience (cf. Ståhl & van Prooijen, 2018). In the present study, self-reported thinking preferences were unrelated adding further, if indirect, support for the independence of System 1 versus System 2 processing (Wang et al., 2017). Whilst Pacini and Epstein's (1999) REI remains a useful tool for assessing subjective thinking style *preference*, researchers should be mindful of the above criticisms.

In addition, future work could also move beyond intuitive versus rational distinctions to explore the mediating role played by other thinking dispositions such as absolutism and categorical thinking (Stanovich & West, 1997) in the same engendered context. As noted earlier, other gender-relevant factors such as level of *scientific* education /understanding (French & Stone, 2014) should also be considered.

Fifth, replication of current work across paranormal practitioners (e.g., psychic readers, Spiritual mediums) versus non-practitioners (Stone, 2016) and/or specific *types* of paranormal concept (e.g., ESP versus PK versus life after death; cf. Rogers, et al., 2017) seems worthwhile. Research could also move beyond these three "core" parapsychological concepts (Irwin & Watt, 2007) and extend to a broader range of anomalous topics including a belief in or alleged experience of extraterrestrial visitation which men are more inclined to report (French & Stone, 2014; Irwin, 2009).

Finally, the current study included relatively few non-Caucasian respondents. Whilst the extent to which *intra*-cultural ethnic variance impacts on adult paranormality is still debated (French & Stone, 2014; Irwin, 2009), future studies should try to ensure in more representative sampling and perhaps engage in cross-cultural research of the current topic.

4.5. Conclusion

It seems both feminine and masculine gender role orientations have some influence in shaping most facets of adult paranormality - all *except* self-proclaimed paranormal giftedness

- adding to the currently sparse and mixed literature on this topic. In doing so, the present study represents a valuable addition to anomalistic psychology and suggests future work should highlight gender role rather than simply "gender" (i.e. biological sex) differences in adult paranormality. A second and seemingly more important factor appears to be preferred thinking style. Individuals with greater faith in (their) intuitions are more inclined to report having a paranormal experience and/or to believing in the veracity of paranormal concepts than those with less faith. Conversely, a greater need for (reasoned) cognition is important as it helps alleviate peoples' fear of seemingly inexplicable phenomena. As yet, the extent to which thinking style preferences are influenced by different gender role identities is less than clear although given the dearth of relevant research this is hardly surprising. More work is needed to replicate current trends and further explore the extent to and ways in which gender role expectations and/or thinking style preferences shape different facets of adult paranormality.

Acknowledgements

The authors would like to thank Prof. Andrew Hayes for his advice regarding mediation analysis and the *PROCESS* macro plus three anonymous reviewers for their comments on an earlier manuscript draft.

References

Avery, S. N., & Blackford, J. U. (2016). Slow to warm up: The role of habituation in social fear. *Social Cognitive & Affective Neuroscience, 11*(11), 1832-1840. https://doi.org/10.1093/scan/nsw095

Bem, S.L. (1974). The measurement of psychological androgyny. *Journal of Consulting & Clinical Psychology*, *42*(2), 155- 162. doi:10.1037/H0036215.

Bem, S.L. (1981). Gender schema theory: A cognitive account of sex typing. *Psychological Review*, *88*(4), 354- 364. doi:10.1037/0033- 295X.88.4.354.

Betsch, T., & Glöckner, A. (2010). Intuition in judgment and decision making: Extensive thinking without effort. *Psychological Inquiry*, *21*(4), 279-294. https://doi.org/10.1080/1047840X.2010.517737

Blackmore, S. J. (1994). Are women more sheepish?: Gender differences in belief in the paranormal. In L. Coly, R. A. White, L. Coly, R. A. White (Eds.) , *Women & parapsychology* (pp. 68- 89). New York, NY, US: Parapsychology Foundation.

Bosch- Domènech, A., Brañas- Garza, P. & Espín, A.M. (2014). Can exposure to prenatal sex hormones (2D:4D) predict cognitive reflection? *Psychoneuroendocrinology*, *43,* 1- 10. doi:10.1016/j.psyneuen.2014.01.023.

Bouvet, R., & Bonnefon, J. (2015). Non-reflective thinkers are predisposed to attribute supernatural causation to uncanny experiences. *Personality & Social Psychology Bulletin*, *41*(7), 955-961. doi:10.1177/0146167215585728

Brandon, D. (2013). *Intuition for Beginners: Easy Ways to Awaken Your Natural Abilities*. Woodbury, MN, US: Llewellyn Publishers

Campbell, N., Ali, F., Finlay, A. Y., & Salek, S. S. (2015). Equivalence of electronic and paper-based patient-reported outcome measures. *Quality of Life Research: An*

International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation, 24(8), 1949-1961. doi:10.1007/s11136-015-0937-3

Carey, M. P., Dusek, J. B., & Spector, I. P. (1988). Sex roles, gender, and fears: A brief report. *Phobia Practice & Research Journal*, *1*(2), 114-120. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1990-09637-001&site=ehost-live

Clark-Carter, D. (2004). *Quantitative psychological research: A Student*'s *handbook*. Hove, UK: Psychology Press.

Claxton, G. (1998). Knowing without knowing why: Investigating human intuition. *The Psychologist, 11*(5 (May 1998), 217-220.

Davis, E. (1990). *Women's Intuition*. Berkeley, CA, US: Celestial Arts

Dillon, K. M., Wolf, E., & Katz, H. (1985). Sex roles, gender, and fear. *Journal of Psychology: Interdisciplinary & Applied*, *119*(4), 355-359. https://doi.org/10.1080/00223980.1985.9915454

Donnelly, K., & Twenge, J. M. (2017). Masculine and feminine traits on the Bem Sex-Role Inventory, 1993-2012: A cross-temporal meta-analysis. *Sex Roles*, *76*(9-10), 556-565. doi:10.1007/s11199-016-0625-y

Djulbegovic, B., & Elqayam, S. (2017). Many faces of rationality: Implications of the great rationality debate for clinical decision-making. *Journal of Evaluation in Clinical Practice*, *23*(5), 915-922. https://doi.org/10.1111/jep.12788

Eagly, A. H., Karau, S. J., & Makhijani, M. G. (1995). Gender and the effectiveness of leaders: A meta-analysis. *Psychological Bulletin*, *117*(1), 125–145. https://doi.org/10.1037/0033-2909.117.1.125

Eagly, A.H. & Wood., W. (2012). Social Role Theory. In P. A.M. Van Lange, A.W. Kruglanski & T. Higgins (Eds.). *Handbook of theories of social psychology, Vol. 2*. London, UK: Sage.

Egan, S. K., & Perry, D. G. (2001). Gender identity: A multidimensional analysis with implications for psychological adjustment. *Developmental Psychology, 37*(4), 451-463. doi:10.1037/0012- 1649.37.4.451.

Ellis, P. D. (2010). *The essential guide to effect sizes: Statistical power, meta-analysis, & the interpretation of research results*. Cambridge, UK: Cambridge University Press.

Epstein, S. (2003). Cognitive- experiential self theory of personality. In T. Millon & M.J. Lerner (Eds.). *Handbook of psychology: Vol. 5. Personality & social psychology* (pp. 159-184). Hoboken, NJ, US: Wiley.

Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality & Social Psychology*, *71*(2), 390-405. https://doi.org/10.1037/0022-3514.71.2.390

Faul, F. (2008). G*Power version 3.0.10. Germany: University of Kiel. Available online via http://download.cnet.com/G-Power/3000-2054_4-10647044.html [Accessed 01 September 2018].

Field, A. (2013). *Discovering statistics using IBM SPSS statistics (4th ed.)*. London, UK: Sage.

French. C.C. & Stone, A. (2014). *Anomalistic psychology: Exploring paranormal belief & experience*. London, UK: Palgrave Macmillan.

Galvan, J. (2010). *The Sympathetic Medium: Feminine Channeling, the Occult, & Communication Technologies, 1859-1919*. Ithaca, NY, US: Cornell University Press

Gallagher, C., Kumar, V.K. & Pekala, R.J. (1994). The Anomalous Experiences Inventory: Reliability and validity. *Journal of Parapsychology*, *58*(4), 402- 428.

Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics & biases: The psychology of intuitive judgment*. New York, NY, US: Cambridge University Press.

Gigerenzer, G., Galesic, M., & Garcia-Retamero, R. (2014). Stereotypes about men's and women's intuitions: A study of two nations. *Journal of Cross-Cultural Psychology*, *45*(1), 62-81. doi:10.1177/0022022113487074

Gray, S. J., & Gallo, D. A. (2016). Paranormal psychic believers and skeptics: A large-scale test of the cognitive differences hypothesis. *Memory & Cognition*, *44*(2), 242-261. doi:10.3758/s13421-015-0563-x

Hand, S., Rice, L., & Greenlee, E. (2017). Exploring teachers' and students' gender role bias and students' confidence in STEM fields. *Social Psychology of Education: An International Journal*, *20*(4), 929-945. https://doi.org/10.1007/s11218-017-9408-8

Harris, M. B., & Miller, K. C. (2000). Gender and perceptions of danger. *Sex Roles: A Journal of Research, 43*(11-12), 843-863. https://doi.org/10.1023/A:1011036905770

Hayes, A.F. (2012- 2016). *PROCESS for SPSS* (Software macro). Available online via http://processmacro.org/index.html [Accessed 06 June 2016].

Hayes, A.F. (2013). *Introduction to mediation, moderation, & conditional process analysis: A regression- based approach*. New York, NY, US: Guilford Press.

Hayes, J., Allinson, C. W., & Armstrong, S. J. (2004). Intuition, women managers and gendered stereotypes. *Personnel Review, 33*(4), 403-417. doi:10.1108/00483480410539489

Hill, O. W. (1987). Intuition: Inferential heuristic or epistemic mode? *Imagination, Cognition & Personality*, *7*(2), 137-154. https://doi.org/10.2190/2L9K-57WM-M917-6FWN

IBM (2012). *IBM SPSS Missing Values 21. Chicago, IL, US:* IBM Corporation

Irwin, H.J. (2009). *The psychology of paranormal belief: A researcher*'s *handbook*. Hatfield, UK: University of Hertfordshire Press.

Irwin, H.J. (2015). Thinking style and the formation of paranormal belief and disbelief. *Australian Journal of Parapsychology, 15,* 121–139.

Irwin, H. J., Dagnall, N., & Drinkwater, K. (2013). Parapsychological experience as anomalous experience plus paranormal attribution: A questionnaire based on a new approach to measurement. *Journal of Parapsychology*, 77, 39-53.

Irwin, H.J. & Watt, C.A. (2007). *An introduction to parapsychology (5th ed.)*. Jefferson, NC, US: McFarland & Co.

Jonason, P. K., & Davis, M. D. (2018). A gender role view of the Dark Triad traits. *Personality & Individual Differences, 125*,102-105. doi:10.1016/j.paid.2018.01.004

Kahneman, D. (2011). *Thinking, fast & slow*. London, UK: Penguin.

Keener, E., Mehta, C. M., & Smirles, K. E. (2017). Contextualizing Bem: The Developmental Social Psychology of Masculinity and Femininity. *Advances in Gender Research*, *23*, 1-18. https://doi.org/10.1108/S1529-212620170000023001

Lachowicz, M. J. (2017). A general measure of effect size for indirect effects in mediation analysis. *Multivariate Behavioral Research*, *52*(1), 109-110. doi:10.1080/00273171.2016.1263894

Lachowicz, M. J., Preacher, K. J., & Kelley, K. (2017). A novel measure of effect size for mediation analysis. *Psychological Methods*, doi:10.1037/met0000165

Lange, R., & Houran, J. (1998). Delusions of the paranormal: A haunting question of perception. *Journal of Nervous & Mental Disease*, *186*(10), 637- 645. doi:10.1097/00005053- 199810000- 00008

Lange, R. & Houran, J. (1999). The role of fear in delusions of the paranormal. *Journal of Nervous & Mental Disease*, *187*(3), 159- 166. doi:10.1097/00005053- 199903000- 00005

Lawrence, T., Edwards, C., Barraclough, N., & Church, S. (1995). Modeling childhood causes of paranormal belief and experience: Childhood trauma and childhood fantasy.

Personality & Individual Differences, *19*(2), 209-215. doi:10.1016/0191-8869(95)00034-4.

Leach, S., & Weick, M. (2018). Can people judge the veracity of their intuitions? *Social Psychological & Personality Science*, *9*(1), 40-49. https://doi.org/10.1177/1948550617706732

Leonard, T. J. (2005). *Talking to the Other Side: A History of Modern Spiritualism & Mediumship: A Study of the Religion, Science, Philosophy & Mediums that Encompass this American-Made Religion*. Lincoln, NE, US: iUniverse

MacCallum, R. C., Zhang, S., Preacher, K.J. & Rucker, D.D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods, 7*(1), 19 - 40. doi: 10.1037//1082 - 989X.7.1.19.

Maassen, G. H., & Bakker, A. B. (2001). Suppressor variables in path models: Definitions and interpretations. *Sociological Methods & Research, 30*(2), 241-270. doi:10.1177/0049124101030002004

Moore, R., L. (1975). The Spiritualist Medium: A Study of Female Professionalism in Victorian *America*. *American Quarterly, 27*(2), 200-221

Moreland, J. R., Harren, V. A., Krimsky-Montague, E & Tinsley, H. E. (1979). Sex role self-concept and career decision making. *Journal of Counseling Psychology, 26*(5), 329-336

Norris, P., & Epstein, S. (2011). An experiential thinking style: Its facets and relations with objective and subjective criterion measures. *Journal of Personality*, *79*(5), 1043-1079. doi:10.1111/j.1467-6494.2011.00718.x

Owen, A. (2004). *The Darkened Room: Women, Power, & Spiritualism in Late Victorian England*. Chicago, IL, US: University of Chicago Press.

Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio- bias phenomenon. *Journal of Personality & Social Psychology*, *76*(6), 972- 987. doi:10.1037/0022- 3514.76.6.972.

Pennycook, G., Cheyne, J. A., Seli, P., Koehler, D. J., & Fugelsang, J. A. (2012). Analytic cognitive style predicts religious and paranormal belief. *Cognition, 123*(3), 335-346. https://doi.org/10.1016/j.cognition.2012.03.003

Pennycook, G., Ross, R. M., Koehler, D. J., & Fugelsang, J. A. (2017). Dunning-Kruger effects in reasoning: Theoretical implications of the failure to recognize incompetence. *Psychonomic Bulletin & Review, 24*(6), 1774-1784. https://doi.org/10.3758/s13423-017-1242-7.

Perry, D. G., Pauletti, R. E., & Cooper, P. J. (2019). Gender identity in childhood: A review of the literature. *International Journal of Behavioral Development*, *43*(4), 289-304. https://doi.org/10.1177/0165025418811129

Phillips, W. J., Fletcher, J. M., Marks, A. G., & Hine, D. W. (2016). Thinking styles and decision making: A meta-analysis. *Psychological Bulletin*, *142*(3), 260-290. doi:10.1037/bul0000027

Preacher, K. J. (2006). Testing complex correlational hypotheses with structural equation models. *Structural Equation Modeling*, *13*(4), 520-543. doi:10.1207/s15328007sem1304_2

Rattet, S.L. & Bursik, K. (2001). Investigating the personality correlates of paranormal belief and precognitive experience. *Personality & Individual Differences*, *31*(3), 433-444. doi:10.1016/S0191-8869(00)00148-3.

Risen, J. L. (2016). Believing what we do not believe: Acquiescence to superstitious beliefs and other powerful intuitions. *Psychological Review*, *123*(2), 182- 207. doi:10.1037/rev0000017.

Robinson M. E., Gagnon C. M., Riley J. L., III, & Price DD. (2003). Altering gender role expectations: effects on pain tolerance, pain threshold, and pain ratings. *Journal of Pain*, *4*(5), 284-288.

Rogers, P., Caswell, N., & Brewer, G. (2017). 2D:4D digit ratio and types of adult paranormal belief: An attempted replication and extension of Voracek (2009) with a UK sample. *Personality & Individual Differences*, *104*92- 97. doi:10.1016/j.paid.2016.07.038.

Rogers, P., Fisk, J.E. & Lowrie, E.L. (2018). Paranormal belief, thinking style preference and susceptibility to confirmatory conjunction errors. *Consciousness & Cognition, 65*, 182-196. doi.org/10.1016/j.concog.2018.07.013

Rogers, P., & Lowrie, E.L., (2016). Varieties of childhood maltreatment as predictors of adult paranormality and New Age Orientation. *Personality & Individual Differences*, *92*, 37-45. doi:10.1016/j.paid.2015.12.019.

Rogers, P., & Lowrie, E.L., (2018). Predicting facets of adult paranormality from childhood exposure to inappropriate styles of parenting. *Imagination, Cognition & Personality, 0*(0), 1-34. doi: 10.1177/0276236618757207

Rogers, P., & Wiseman, R. (2010). Testing the claims of self-perceived high intuitives: Predicting relationship outcomes. In B. Ruelas & V. Brisefio (Eds.). *Psychology of Intuition* (pp. 115-137), Hauppauge, NY, US: Nova Science.

Roxburgh, E. C., & Roe, C. A. (2014). Reframing voices and visions using a spiritual model: An interpretative phenomenological analysis of anomalous experiences in mediumship. *Mental Health, Religion & Culture*, *17*(6), 641-653. doi:10.1080/13674676.2014.894007

Sadler-Smith, E. (2011). The intuitive style: Relationships with local/global and verbal/visual styles, gender, and superstitious reasoning. *Learning & Individual Differences*, *21*(3), 263-270. doi:10.1016/j.lindif.2010.11.013

Simmonds- Moore, C.A. & Moore, S.L. (2009). Exploring how gender role and boundary thinness relate to paranormal experiences, beliefs and performance on a forced- choice clairvoyance task. *Journal of the Society for Psychical Research*, *73*(896[3]), 129- 149.

Sladek, R. M., Bond, M. J., & Phillips, P. A. (2010). Age and gender differences in preferences for rational and experiential thinking. *Personality & Individual Differences, 49,* 907-911. http://dx.doi.org/10.1016/j.paid.2010.07.028

Sorek, T. (2009). The only place where an Arab can hit a Jew and get a medal for it: Boxing and masculine pride among Arab citizens of Israel. *Sport in Society*, *12*(8), 1065-1074. doi:10.1080/17430430903076357

Spiegler, M. D., & Liebert, R. M. (1970). Some correlates of self-reported fear. *Psychological Reports, 26*(3), 691-695. https://doi.org/10.2466/pr0.1970.26.3.691

Spinelli, S.N., Reid, H.M. & Norvilitis, J.M. (2002). Belief in and experience with the paranormal: Relations between personality boundaries, executive functioning, gender role and academic variables. *Imagination, Cognition & Personality, 21(4),* 333- 346 doi:10.2190/G54A- 7VFM- MLMR- 8J2G.

Ståhl, T., & van Prooijen, J.-W. (2018). Epistemic rationality: Skepticism toward unfounded beliefs requires sufficient cognitive ability and motivation to be rational. *Personality & Individual Differences*, *122*, 155–163. https://doi.org/10.1016/j.paid.2017.10.026

Stanovich, K. E., & West, R. F. (1997). Reasoning independently of prior belief and individual differences in actively open-minded thinking. *Journal of Educational Psychology*, *89*(2), 342-357. doi:10.1037/0022-0663.89.2.342

Starr, C. & Zurbriggen, E. (2017). Sandra Bem's Gender Schema Theory After 34 Years: A Review of its Reach and Impact. *Sex Roles*, *76*(9-10), 566-578. https://doi.org/10.1007/s11199-016-0591-4

Stone, A. (2016). Rational thinking and belief in psychic abilities: It depends on level of involvement. *Psychological Reports*, *118*(1), 74-89. doi:10.1177/0033294115625261

Tucker, M., & Bond, N. W. (1997). The roles of gender, sex role, and disgust in fear of animals. *Personality & Individual Differences*, *22*(1), 135-138. https://doi.org/10.1016/S0191-8869(96)00168-7

Voracek, M. (2009). Who wants to believe? Associations between digit ratio (2D:4D) and paranormal and superstitious beliefs. *Personality & Individual Differences*, *47*(2), 105-109. doi: 10.1016/j.paid.2009.01.051.

Voracek, M., Pietschnig, J., Nader, I. W., & Stieger, S. (2011). Digit ratio (2D:4D) and sex-role orientation: Further evidence and meta- analysis. *Personality & Individual Differences*, *51*(4), 417- 422. doi:10.1016/j.paid.2010.06.009

Wang, Y., Highhouse, S., Lake, C. J., Petersen, N. L., & Rada, T. B. (2017). Meta-analytic investigations of the relation between intuition and analysis. *Journal of Behavioral Decision Making, 30*(1), 15-25. https://doi.org/10.1002/bdm.1903

Witt, M. G., & Wood, W. (2010). Self-regulation of gendered behavior in everyday life. *Sex Roles: A Journal of Research*, *62*(9–10), 635–646. https://doi.org/10.1007/s11199-010-9761-y

Wood, W. & Eagly, A.H. (2010) Gender. In S. Fiske, D. Gilbert, and G. Lindzey (Eds.), *Handbook of Social Psychology* (*5th edition, Vol. 1*) (pp. 629–667). New York, NY, US: Oxford University Press.

Table 1: Reliability, Descriptive and Skew Statistics for Paranormality, Gender Role, Thinking Style Subscales (Main Study)[a]

Scale	Subscale	Reliability	Descriptives		Skew[a]			
		(α)	*M*	*(SD)*	*IS*	(*SE*)	*Z*	
AEI	experiences	.96	2.43	(1.24)	.91	(.13)	6.86	***
	belief	.92	3.29	(1.47)	.48	(.13)	3.61	***
	abilities	.95	2.02	(1.18)	1.39	(.13)	10.52	***
	fear	.84	2.46	(1.37)	.97	(.13)	7.35	**
BSRI	masculinity	.86	4.46	(.80)	-.01	(.13)	-.11	
	femininity	.84	4.71	(.73)	-.30	(.13)	-2.24	
REI	intuitive	.90	3.76	(.61)	-.30	(.13)	-2.26	
	rational	.93	3.31	(.71)	-.19	(.13)	-1.41	

[a] Anomalous Experiences Inventory (AEI) from 1 ‘strongly disagree’ to 7 ‘strongly agree’; Bem Sex Role Inventory (BSRI) from 1 'never or almost never true' to 7 'always or almost always true' of me; Rational-Experiential Inventory (REI) from 1 ‘extremely uncharacteristic’ to 5 ‘extremely characteristic’ of me'; Index of Skew (IS) tests with cut-off for excessive skew set at p=.01 (Clark-Carter, 2004); significant at the *p<.05 **p<.01 and ***p<.001 levels (two-tailed; n=343).

Table 2: Partial Correlations between Adult Paranormality, Gender Role, Thinking Style & Demographic Measures (Main Study: Controlling for Sample Type)[a]

Scale	Subscale	anomalous experiences		anomalous belief		anomalous ability		anomalous fear		masculinity		femininity		intuitive thinking		rational thinking		biological sex		age		ethnicity	occup
AEI	experiences																						
	belief	.87	***																				
	ability	.91	***	.80	***																		
	fear	.15	**	.27	***	.09																	
BSRI	masculinity	.04		.03		.01		-.16	**														
	femininity	.34	***	.40	***	.29	***	.23	***	-.08													
REI	intuitive	.50	***	.57	***	.42	***	.11	*	.11	*	.31	***										
	rational	-.11	*	-.06		-.12	*	-.17	**	.25	***	-.04		-.06									
Demogs	sex[b]	.14	*	.18	**	.10		.15	**	-.06		.22	***	.19	**	-.06							
	age	.00		-.03		.03		-.12	*	.03		-.07		.00		.14	*	-.17	**				
	ethnicity[b]	-.09		-.03		-.14	*	-.07		.00		-.14	*	.00		.12	*	.02		.09			
	occupation[b]	-.08		-.08		-.09		.05		-.05		.03		-.04		.01		.10		-.29	***	.09	
	qualifications	-.24	***	-.21	***	-.20	***	-.08		.01		-.11	*a*	-.08		.17	**	.06		.05		.03	.00

[a] Partial correlations given by $r_{xy.z}$ coefficient [b] Correlations for two dichotomised measures given by *phi* (φ) with higher scores indicating female (vs. male) biological sex, Caucasian (vs. non-Caucasian) ethnicity and student (vs. non-student) occupational status; all significant at the *p<05 **p<.01 *** p<.001 levels; *a*=approaches significance (two-tailed; all *df*'s=332)

Table 3: Multiple Mediator Model: Total and Direct Effects of Predictor & Moderator(s) on Anomalous Fear (Main Study)[a]

		Total Effect							Direct Effect 1							Direct Effect 2						
		IV on Fear (*c* paths)							IV on Thinking Style (*a* paths)							IV and Mediator(s) on Experiences (*d* paths)						
Pred (IV)	Med (M_N)	*Beta*	*p*		*Upr*	*Lwr*	Sig.	*ES*	*Beta*	*p*		*Upr*	*Lwr*	Sig.	*ES*	*Beta*	*p*		*Upr*	*Lwr*	Sig.	*ES*
fem	--	.35	<.001	***	.15	.55	yes	.12	.28	<.001	***	.18	.39	yes	.08	.30	<.001	***	.13	.46	yes	.09
	intuit	--	--		--	--	--	--	--	--		--	--	--	--	.72	<.001	***	.55	.90	yes	.52
	expers	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	belief	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	ability	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
fem	--	.31	.004	**	.10	.52	yes	.10	.04	.337		-.05	.14	no	.00	.30	<.001	***	.13	.46	yes	.09
	ration	--	--		--	--	--	--	--	--		--	--	--	--	-.10	.303		-.30	.09	no	.01
	expers	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	belief	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	ability	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
masc	--	-.19	.036	*	-.37	-.01	yes	.04	.14	.002	**	.05	.23	yes	.02	.04	.580		-.10	.18	no	.00
	intuit	--	--		--	--	--	--	--	--		--	--	--	--	.72	<.001	***	.55	.90	yes	.52
	expers	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	belief	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	ability	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
masc	--	-.25	.005	**	-.42	-.07	yes	.06	.19	<.001	***	.11	.26	yes	.04	.04	.580		-.10	.18	no	.00
	ration	--	--		--	--	--	--	--	--		--	--	--	--	-.10	.303		-.30	.09	no	.01
	expers	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	belief	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--
	ability	--	--		--	--	--	--	--	--		--	--	--	--	--	--		--	--	--	--

Model: $F(12,322)=8.38$; $p<.001$; $R^2=.49$; *adj* $R^2=.24$

[a] Anomalous fear represents the "final" outcome measure; IV = gender role (femininity or masculinity); mediators (M) are as follows: M_1=thinking style (intuitive or rational); M_2=anomalous experiences; M_3=anomalous beliefs; M_4=anomalous ability; DV=anomalous ability; *data* indicates observed *beta* weights with lower and upper 95% confidence interval (CI_{95}) bounds; *boot* indicates bootstrapped *beta* weight estimates; *bias* equals *boot* minus *data;* all analyses control for respondents' biological sex, age, Caucasian (vs. non-Caucasian) ethnicity, general qualifications and sample type (face-to-face vs. online); figures to 2 decimal places; significant at the *p<.05; **p<.01 and ***p<.001 levels; *a*=approaches significance (two-tailed; *n*=335); effects are significant if upper and lower CI_{95} bounds exclude zero; effect size (*ES*) given by squared semi-partial correlations ($r^2_{XY.M}$); grey text indicates path was omitted from hypothesised model.

Table 3: Multiple Mediator Model: Total and Direct Effects of Predictor & Moderator(s) on Anomalous Fear (Main Study) (continued)[a]

		Direct Effect 3							Direct Effect 4							Direct Effect 5						
		IV and Mediator(s) on Belief (*d* paths)							IV and Mediator(s) on Ability (*d* paths)							IV and Mediator(s) on Fear (*b* paths)						
Pred (IV)	Med (M_N)	*Beta*	*p*		*Upr*	*Lwr*	*Sig.*	*ES*	*Beta*	*p*		*Upr*	*Lwr*	*Sig.*	*ES*	*Beta*	*p*		*Upr*	*Lwr*	*Sig.*	*ES*
fem	--	.19	.001	**	.08	.30	yes	.04	-.03	.403		-.11	.05	no	.00	.20	.063	*a*	-.01	.40	no	.04
	intuit	.34	<.001	***	.21	.46	yes	.12	-.06	.165		-.15	.03	no	.00	-.16	.194		-.39	.08	no	.03
	expers	.91	<.001	***	.84	.98	yes	.83	.82	<.001	***	.74	.91	yes	.67	-.14	.405		-.47	.19	no	.02
	belief	--	--		--	--	--	--	.05	.162		-.02	.13	no	.00	.55	<.001	***	.35	.76	yes	.30
	ability	--	--		--	--	--	--	--	--		--	--	--	--	-.35	.017	*	-.64	-.06	yes	.12
fem	--	.19	.001	**	.08	.30	yes	.04	-.03	.403		-.11	.05	no	.00	.20	.063	*a*	-.01	.40	no	.04
	ration	.10	.134		-.03	.23	no	.01	-.03	.564		-.12	.06	no	.00	-.31	.012	*	-.55	-.07	yes	.10
	expers	.91	<.001	***	.84	.98	yes	.83	.82	<.001	***	.74	.91	yes	.67	-.14	.405		-.47	.19	no	.02
	belief	--	--		--	--	--	--	.05	.162		-.02	.14	no	.00	.55	<.001	***	.35	.76	yes	.30
	ability	--	--		--	--	--	--	--	--		--	--	--	--	-.35	.017	*	-.64	-.06	yes	.12
masc	--	-.04	.430		-.13	.06	no	.00	-.04	.224		-.11	.02	no	.00	-.20	.024	*	-.37	-.03	yes	.04
	intuit	.34	<.001	***	.21	.46	yes	.12	-.06	.165		-.15	.03	no	.00	-.16	.194		-.39	.08	no	.03
	expers	.91	<.001	***	.84	.98	yes	.83	.82	<.001	***	.74	.91	yes	.67	-.14	.405		-.47	.19	no	.02
	belief	--	--		--	--	--	--	.05	.162		-.02	.13	no	.00	.55	<.001	***	.35	.76	yes	.30
	ability	--	--		--	--	--	--	--	--		--	--	--	--	-.35	.017	*	-.64	-.06	yes	.12
masc	--	-.04	.430		-.13	.06	no	.00	-.04	.224		-.11	.02	no	.00	-.20	.024	*	-.37	-.03	yes	.04
	ration	.10	.134		-.03	.23	no	.01	-.03	.564		-.12	.06	no	.00	-.31	.012	*	-.55	-.07	yes	.10
	expers	.91	<.001	***	.84	.98	yes	.83	.82	<.001	***	.74	.91	yes	.67	-.14	.405		-.47	.19	no	.02
	belief	--	--		--	--	--	--	.05	.162		-.02	.13	no	.00	.55	<.001	***	.35	.76	yes	.30
	ability	--	--		--	--	--	--	--	--		--	--	--	--	-.35	.017	*	-.64	-.06	yes	.12

Model: $F(12,322)=8.38$; $p<.001$; $R^2=.49$; *adj* $R^2=.24$

[a] Anomalous fear represents the "final" outcome measure; IV = gender role (femininity or masculinity); mediators (M) are as follows: M_1=thinking style (intuitive or rational); M_2=anomalous experiences; M_3=anomalous beliefs; M_4=anomalous ability; DV=anomalous ability; *data* indicates observed *beta* weights with lower and upper 95% confidence interval (CI_{95}) bounds; *boot* indicates bootstrapped *beta* weight estimates; *bias* equals *boot* minus *data;* all analyses control for respondents' biological sex, age, Caucasian (vs. non-Caucasian) ethnicity, general qualifications and sample type (face-to-face vs. online); figures to 2 decimal places; significant at the *p<.05; **p<.01 and ***p<.001 levels; *a*=approaches significance (two-tailed; n=335); effects are significant if upper and lower CI_{95} bounds exclude zero; effect size (*ES*) given by squared semi-partial correlations ($r^2_{XY.M}$); grey text indicates path was omitted from hypothesised model.

Table 4: Multiple Mediator Model: Total, Total Indirect and Net Direct Effects on Anomalous Fear (Main Study)[a]

		Total Effect							Total Indirect Effect							Net Direct Effect						
		IV on Fear (*c* paths)							IV x Mediator(s) on Fear (Σ[*ab* and *abd*] paths)							Unique IV on Fear (*c'* paths)						
Pred (IV)	Med (M_N)	*Beta*	*p*		*Upr*	*Lwr*	Sig.	*ES*	*Data*	*Boot*	*Bias*	*Lwr*	*Upr*	Sig?	*ES*	*Beta*	*p*		*Upr*	*Lwr*	Sig.	*ES*
fem	--	.35	<.001	***	.15	.55	yes	.12	.08	.03	-.05	.03	.14	yes	.01	.20	.063	*a*	-.01	.40	no	.04
	intuit	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	expers	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	belief	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	ability	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
fem	--	.31	.004	**	.10	.52	yes	.10	.06	.02	-.04	.02	.11	yes	.00	.20	.063	*a*	-.01	.40	no	.04
	ration	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	expers	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	belief	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	ability	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
masc	--	-.19	.036	*	-.37	-.01	yes	.04	.01	.02	.01	-.04	.05	no	.00	-.20	.024	*	-.37	-.03	yes	.04
	intuit	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	expers	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	belief	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	ability	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
masc	--	-.25	.005	**	-.42	-.07	yes	.06	-.03	.02	.05	-.08	.02	no	.00	-.20	.024	*	-.37	-.03	yes	.04
	ration	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	expers	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	belief	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	
	ability	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	

Model: $F(12,322)=8.38$; $p<.001$; $R^2=.49$; *adj* $R^2=.24$

[a] Anomalous fear represents the "final" outcome measure; IV = gender role (femininity or masculinity); mediators (M) are as follows: M_1=thinking style (intuitive or rational); M_2=anomalous experiences; M_3=anomalous beliefs; M_4=anomalous ability; DV=anomalous ability; *data* indicates observed *beta* weights with lower and upper 95% confidence interval (CI_{95}) bounds; *boot* indicates bootstrapped *beta* weight estimates; *bias* equals *boot* minus *data;* all analyses control for respondents' biological sex, age, Caucasian (vs. non-Caucasian) ethnicity, general qualifications and sample type (face-to-face vs. online); figures to 2 decimal places; significant at the *p<.05; **p<.01 and ***p<.001 levels; *a*=approaches significance (two-tailed; n=335); effects are significant if upper and lower CI_{95} bounds exclude zero; effect size (*ES*) given by squared semi-partial correlations ($r^2_{XY.M}$); grey text indicates path was omitted from hypothesised model

Table 5: Multiple Mediator Model: Indirect Effects (*ab* paths) on Anomalous Fear (Main Study)[a]

Path No.	Predictor (iv)	Mediator(s) (M_1→ M_2→M_3→ M_4)	Outcome (DV)	*Data*	*Boot*	*Bias*	CI_{95} *Lwr*	CI_{95} *Upr*	CI_{95} Sig.	*ES*
01.	femininity →	intuitive →	fear	-.02	.02	.04	-.06	.01	no	.00
02.	femininity →	intuitive → experiences →	fear	-.02	.02	.04	-.05	.02	no	.00
03.	femininity →	intuitive → belief →	fear	.03	.01	-.02	.01	.05	yes	.00
04.	femininity →	intuitive → ability →	fear	.00	.00	.00	-.00	.01	no	.00
05.	femininity →	intuitive → experiences → belief →	fear	.06	.02	-.04	.03	.10	yes	.01
06.	femininity →	intuitive → experiences → ability →	fear	-.03	.02	.05	-.07	-.01	yes	.00
07.	femininity →	intuitive → belief → ability →	fear	-.00	.00	.00	-.00	.00	no	.00
08.	femininity →	intuitive → experiences → belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
09.	femininity →	experiences →	fear	-.02	.03	.05	-.08	.03	no	.00
10.	femininity →	experiences → belief →	fear	.08	.03	.11	.04	.15	yes	.02
11.	femininity →	experiences → ability →	fear	-.05	.02	.07	-.11	-.01	yes	.01
12.	femininity →	experiences → belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
13.	femininity →	belief →	fear	.06	.02	-.04	.02	.10	yes	.01
14.	femininity →	belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
15.	femininity →	ability →	fear	.01	.01	.00	-.00	.03	no	.00
01.	femininity →	rational →	fear	-.01	.01	.02	-.03	.01	no	.00
02.	femininity →	rational → experiences →	fear	.00	.00	.00	-.00	.01	no	.00
03.	femininity →	rational → belief →	fear	.00	.00	.00	-.00	.01	no	.00
04.	femininity →	rational → ability →	fear	.00	.00	.00	-.00	.00	no	.00
05.	femininity →	rational → experiences → belief →	fear	-.00	.00	.00	-.00	.00	no	.00
06.	femininity →	rational → experiences → ability →	fear	.00	.00	.00	-.00	.01	no	.00
07.	femininity →	rational → belief → ability →	fear	.00	.00	.00	-.00	.00	no	.00
08.	femininity →	rational → experiences → belief → ability →	fear	.00	.00	.00	.00	.00	no	.00
09.	femininity →	experiences →	fear	-.02	.03	.05	-.08	.03	no	.00
10.	femininity →	experiences → belief →	fear	.08	.03	-.05	.03	.14	yes	.02
11.	femininity →	experiences → ability →	fear	-.04	.02	.06	-.11	-.01	yes	.01
12.	femininity →	experiences → belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
13.	femininity →	belief →	fear	.05	.02	-.03	.02	.10	yes	.01
14.	femininity →	belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
15.	femininity →	ability →	fear	.01	.01	.00	-.00	.03	no	.00
01.	masculinity →	intuitive →	fear	-.01	.01	.02	-.04	.00	no	.00
02.	masculinity →	intuitive → experiences →	fear	-.01	.01	.02	-.04	.01	no	.00
03.	masculinity →	intuitive → belief →	fear	.02	.01	-.01	.01	.03	yes	.00
04.	masculinity →	intuitive → ability →	fear	.00	.00	.00	-.00	.01	no	.00
05.	masculinity →	intuitive → experiences → belief →	fear	.03	.01	-.02	.01	.06	yes	.00
06.	masculinity →	intuitive → experiences → ability →	fear	-.02	.01	.03	-.04	-.00	yes	.00
07.	masculinity →	intuitive → belief → ability →	fear	-.00	.00	.00	-.00	.00	no	.00
08.	masculinity →	intuitive → experiences → belief → ability →	fear	-.00	.00	.00	-.01	.00	no	.00
09.	masculinity →	experiences →	fear	-.00	.01	.01	-.04	.01	no	.00
10.	masculinity →	experiences → belief →	fear	.01	.02	.01	-.03	.06	no	.00
11.	masculinity →	experiences → ability →	fear	-.01	.01	.02	-.04	.01	no	.00
12.	masculinity →	experiences → belief → ability →	fear	-.00	.00	.00	-.00	.00	no	.00
13.	masculinity →	belief →	fear	-.01	.02	.03	-.05	.02	no	.00
14.	masculinity →	belief → ability →	fear	.00	.00	.00	-.00	.00	no	.00
15.	masculinity →	ability →	fear	.01	.01	.00	-.00	.03	no	.00
01.	masculinity →	rational →	fear	-.04	.02	.06	-.07	-.01	yes	.00
02.	masculinity →	rational → experiences →	fear	.00	.00	.00	-.00	.01	no	.00
03.	masculinity →	rational → belief →	fear	.01	.01	.00	-.00	.02	no	.00
04.	masculinity →	rational → ability →	fear	.00	.00	.00	-.00	.01	no	.00
05.	masculinity →	rational → experiences → belief →	fear	-.01	.01	.02	-.02	.00	no	.00
06.	masculinity →	rational → experiences → ability →	fear	.00	.00	.00	-.00	.02	no	.00
07.	masculinity →	rational → belief → ability →	fear	-.00	.00	.00	-.00	.00	no	.00
08.	masculinity →	rational → experiences → belief → ability →	fear	.00	.00	.00	-.00	.00	no	.00
09.	masculinity →	experiences →	fear	-.00	.01	.01	-.04	.01	no	.00
10.	masculinity →	experiences → belief →	fear	.01	.02	.01	-.03	.06	no	.00
11.	masculinity →	experiences → ability →	fear	-.01	.01	.02	-.04	.01	no	.00
12.	masculinity →	experiences → belief → ability →	fear	-.00	.00	.00	-.00	.00	no	.00
13.	masculinity →	belief →	fear	-.01	.02	.03	-.05	.02	no	.00
14.	masculinity →	belief → ability →	fear	.00	.00	.00	-.00	.00	no	.00
15.	masculinity →	ability →	fear	.01	.01	.00	-.00	.04	no	.00

[a] Anomalous ability represents the "final" outcome (DV) measure; IV = gender role (femininity or masculinity); mediators (M) are as follows: M1=thinking style (intuitive or rational); M_2=anomalous experiences; M_3=anomalous beliefs; M_4=anomalous ability; *data* indicates observed *beta* weights with lower and upper 95% confidence interval (ci_{95}) bounds; *boot* indicates bootstrapped *beta* weight estimates; *bias* equals *boot* minus *data;* indirect effects completely standardised (cf. Hayes, 2013); all analyses control for respondents' biological sex, age, Caucasian (vs. non-Caucasian) ethnicity, general qualifications and sample type (face-to-face vs. online); figures to 2 decimal places; significant at the **p*<.05; ***p*<.01 and ****p*<.001 levels; *a*=approaches significance (two-tailed; *n*=335); effects are significant if upper and lower CI_{95} bounds exclude zero; effect size (*ES*) given by squared semi-partial correlations ($r^2_{xy.m}$); grey text indicates path was omitted from hypothesised model depicted in Figure 1.

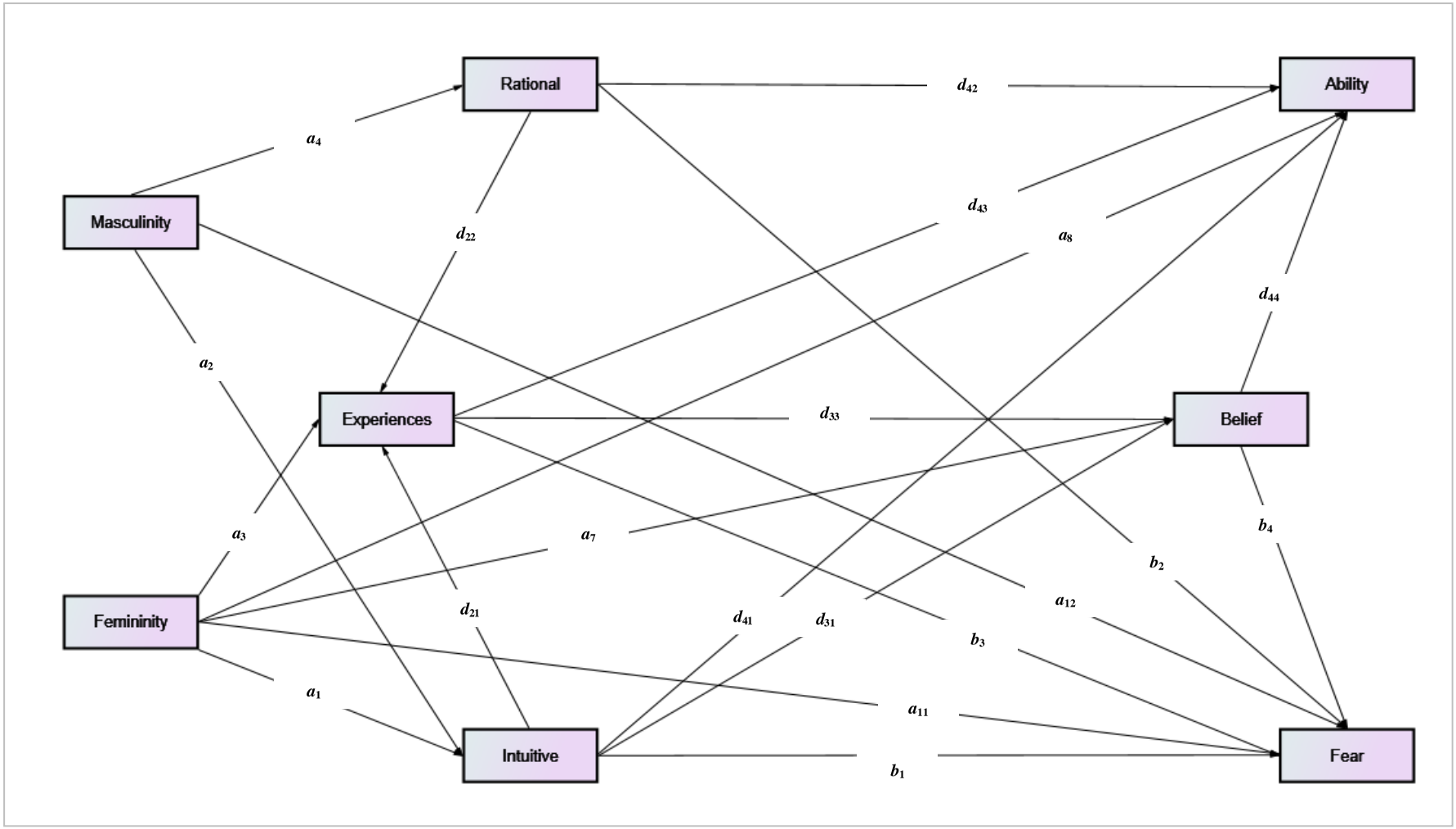

Figure 1: Path Analysis: Direct and Indirect Predictors of Anomalous Fear (Hypothesized Paths)[15]

[15] Anomalous fear serves as final outcome measure for computational purposes; predictor-to-mediator (*a*) paths, mediator-to-outcome (*b*) paths and mediator-to-mediator (*d*) paths displayed (cf. Hayes, 2013); correlates not illustrated for reasons of visual clarity.

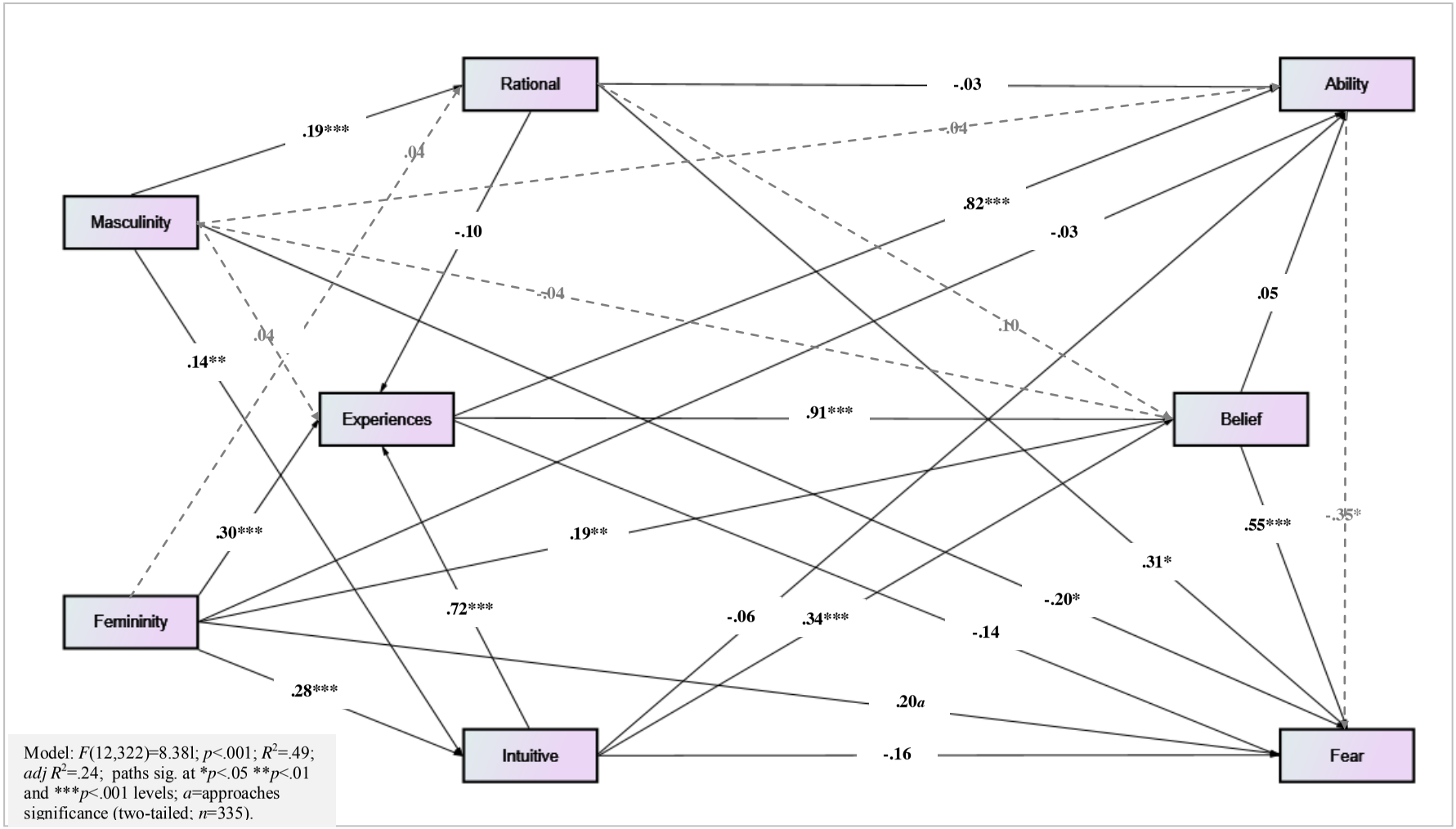

Figure 2: Path Analysis: Direct and Indirect Predictors of Anomalous Fear (Observed Paths) [16]

[16] Correlates not illustrated for reasons of visual clarity; dashed (--) pathways not hypothesized.