

# Evidence Against a Typology: A Taxometric Analysis of the Sexuality of Male-to-Female Transsexuals

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**Abstract** Previous theories and research have suggested there are two distinct types of male-to-female (MF) transsexuals and these types can be distinguished by their sexuality. Using the scales Attraction to Femininity in Males, Core Autogynephilia, Autogynephilic Interpersonal Fantasy, and Attraction to Transgender Fiction as indicator variables, taxometric analysis was applied to an online-recruited sample of 308 MF transsexuals to investigate whether such a distinction is justified. In accordance with previous research findings, MF transsexuals categorized as “nonandrophilic” scored significantly higher on Core Autogynephilia than did those categorized as “androphilic”; they also scored significantly higher on Attraction to Femininity in Males and Attraction to Transgender Fiction. Results of one of the taxometric procedures, L-Mode, gave slightly more support for a dimensional, rather than taxonic (two-type), latent structure. Results of the two other taxometric procedures, MAMBAC and MAXCOV, showed greater support for a dimensional latent structure. Although these results require replication with a more representative sample, they show little support for a taxonomy, which contradicts previous theory that has suggested MF transsexuals’ sexuality is typological.

**Keywords** Autogynephilia · Transsexuals · Sexuality · Gender dysphoria · Taxometric analysis

## Introduction

The *latent structure* of a construct refers to whether it is categorical (variables either one category or the other) or dimensional (occurring on a continuum). Examples of categorical constructs include species, disease entity, job title, chemical element, or genotype. Examples of dimensional constructs include human height, IQ, and yearly income. Categorical constructs have what is referred to as a *taxonic latent structure*. Each individual category or *taxon* has objective boundaries to its membership, which are not imposed on a continuum by human social convention. For example, there is an objective boundary between the taxa “cat” and “dog” whereas there is no such boundary between “short” and “tall.” For further explanation of the distinctions between taxonic and dimensional latent structures, see Meehl (1992).

Blanchard (1989) proposed that there are two distinct types (taxa) of male-to-female (MF) transsexuals and these distinctions are characterized by their sexuality: “autogynephilic” or “homosexual.” According to Blanchard, autogynephilic MF transsexuals are sexually attracted to females (gynephilic), both sexes (bisexual), or neither sex (analloerotic); they are not unusually feminine in childhood; and prior to transitioning often live outwardly successful lives as males, frequently marrying and having children. These MF transsexuals also experience *autogynephilia*—a term which Blanchard (1989) used to refer to “a male’s propensity to be sexually aroused by the thought of himself as a female” (p. 616). Homosexual MF transsexuals are exclusively sexually attracted to males (androphilic), do not experience autogynephilia, are highly feminine in their childhood, do not generally have success with attempts to live in the male role, and tend to present for treatment of their gender dysphoria at a younger age. By splitting MF transsexuals into these two groups based on their sexual orientation, Blanchard (1985b,

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1988, 1989) and others (Freund, Steiner, & Chan, 1982; Johnson & Hunt, 1990; Nuttbrock et al., 2011a; Smith, van Goozen, Kuiper, & Cohen-Kettenis, 2005) have found evidence for the average differences between these groups that Blanchard proposed. However, these differences do not necessarily imply a typology exists. These results could also have been reached if there was a nontaxonic latent structure with a correlation between the sexual orientation of MF transsexuals and these other differences. Although Blanchard (1985a) found some evidence for a taxonic latent structure of the sexuality of MF transsexuals by obtaining cut-off scores for classifying MF transsexuals into two groups using an earlier version of the taxometric procedures described in this article, he did not specifically test whether the sexuality of MF transsexuals was taxonic or dimensional.

From studies of physiological measurements of sexual arousal, it has also been observed that the sexual orientation of biological males, including MF transsexuals, is more category-specific than in biological females (Chivers, Rieger, Latty, & Bailey, 2004; Lawrence, Latty, Chivers, & Bailey, 2005). This means that biological males are more likely to respond physiologically to those that they report sexual attractions to. Studies have also shown that androphilic MF transsexuals have a higher number of older brothers than nonandrophilics (Blanchard & Sheridan, 1992; Gómez-Gil et al., 2011; Green, 2000; but see Veale, Clarke, & Lomax, 2010b). While this finding is in accordance with Blanchard's typology, it is also plausible that fraternal birth order is related to sexual orientation but not gender identity in all biological males. There have been mixed findings of sexual orientation difference in studies examining other biological variables related to transsexualism (see Simon et al., 2013; Veale, Clarke, & Lomax, 2010a).

To investigate the latent structure of the sexuality of MF transsexuals, data collected online which examined the sexuality of MF transsexuals was analyzed using the taxometric method created by Meehl (1973, 1992). This method has been established as a robust and valid indicator of latent structure, withstanding skewed indicators, and is superior to other methods of detecting homogenous groups (e.g., cluster analysis) at detecting whether data are dimensional or taxonic (Meehl & Yonce, 1994, 1996; Ruscio, Haslam, & Ruscio, 2006).

## Method

### Participants

Participants were recruited for a survey investigating the sexuality of MF transsexuals through online forums and mailing lists and New Zealand transgender social and support groups. In total, 406 MF transsexuals responded to the survey.

The data from 98 participants could not be included because they did not complete all scales, leaving a sample of 308. Eleven of these responses were collected using a paper survey; the remainder was via an Internet survey.

The first 184 participants answered a 162-item mostly multiple-choice online questionnaire, which assessed demographics and 12 aspects of their sexuality (Veale, Clarke, & Lomax, 2008). These participants' ages ranged from 16 to 79 years, with an average age of 39.93 ( $SD = 14.16$ ). Participants identified as European (90 %), Asian (4 %), Maori (2 %), Pacific Island (1 %), "other" (3 %), and 4 % did not give an ethnicity. The questionnaire was then shortened to contain only the five scales used in this study with demographic questions omitted. This shortened questionnaire was completed by a further 124 participants.

### Measures

To identify which scales could be used for the taxometric analysis, the MAXCOV procedure (Meehl & Yonce, 1996) was used to classify MF transsexuals into two groups. Four of the 12 scales completed by the first 184 participants could distinguish these groups greater than the minimum of  $d = 1.25$  recommended by Ruscio et al. (2006). These four scales (Attraction to Feminine Males, Attraction to Transgender Fiction, Core Autogynephilia, and Autogynephilic Interpersonal Fantasy) were used as the indicator variables for the taxometric analysis.

#### *Attraction to Feminine Males* (Veale et al., 2008)

This scale measures sexual attraction to feminine features in males (e.g., long hair, feminine face). There were six items in the scale and participants responded on a 5-point response scale from *not at all* (0) to *extremely* (4). Among this sample, the internal reliability coefficient was  $\alpha = .94$ . From factor analysis, one factor emerged with an eigenvalue greater than 1; this factor accounted for 70 % of the variance and all six items loaded on the factor from .77 to .92 (Veale, 2005).

#### *Attraction to Transgender Fiction* (Veale et al., 2008)

This scale measured sexual attraction to themes found in transgender fiction (e.g., cross-dressing, female-male character swap). There were 12 items in the scale and participants responded on a 5-point response scale from *not at all sexually arousing* (0) to *extremely sexually arousing* (4). In this sample, the internal reliability coefficient was  $\alpha = .96$ . From factor analysis, one factor emerged with an eigenvalue greater than 1; this factor accounted for 70 % of the variance and all 12 items loaded on the factor from .78 to .87 (Veale, 2005).

### Core Autogynephilia Scale (Blanchard, 1989)

This 9-item scale measures sexual attraction to the fantasy of being a woman. It was created from an emerging factor from a factor analysis sampling 2,700 biological males presenting at a gender clinic and had an internal reliability of  $\alpha = .95$  (Blanchard, 1989). Among the present sample, the internal reliability coefficient was  $\alpha = .97$ . From factor analysis, one factor emerged with an eigenvalue greater than 1; this factor accounted for 81 % of the variance and all six items loaded on the factor from .70 to .95 (Veale, 2005).

### Autogynephilic Interpersonal Fantasy Scale (Blanchard, 1989)

This 4-item scale measures sexual attraction to being admired by another person as a woman. It was another emerging factor of the factor analysis among the sample of 2,700 and had an internal reliability of  $\alpha = .86$  (Blanchard, 1989). Among the present sample, the internal reliability coefficient was  $\alpha = .88$ . From factor analysis, one factor emerged with an eigenvalue greater than 1; this factor accounted for 74 % of the variance and all six items loaded on the factor from .63 to .94 (Veale, 2005).

Alterations were made to the Core Autogynephilia and Autogynephilic Interpersonal Fantasy scales from Blanchard's (1989) original versions. Response options were altered from 2-point *yes* or *no* scales to 6-point Likert scales from *never* (0) to *all the time* (5) to make the scales more sensitive to variations in participants' answers. Changes were made to the questions in the Core Autogynephilia scale so that participants were asked if they have ever been sexually aroused when picturing themselves with attractive or more attractive female physical features. The "attractive or more attractive" part was added to Blanchard's (1989) original version of the scale to make the questions more applicable to biological females who also responded to the questionnaire. The skip instructions were also changed so that participants answering negatively to the first two questions of the Core Autogynephilia Scale would skip the final two questions.

### Sex Linked Behaviors Questionnaire (McConaghy, 1998)

This questionnaire was used to determine sexual orientation. It contains eight items asking about sexual fantasy, sexual arousal, and sexual attraction to males or females (e.g., "Rate the degree to which in your current sexual fantasies you are aroused by males"). Response options were 6-point Likert scales from *never* (0) to *all the time* (5). In this study, the four items measuring sexual attraction to females (gynephilia) had an alpha coefficient of  $\alpha = .86$  and the four items measuring androphilia had an internal reliability coefficient of  $\alpha = .85$ .

### Data Analysis

Cluster analysis was undertaken using SPSS version 18. Taxometric data analysis was conducted using the software package provided by Ruscio et al. (2006) that uses the R environment.

The Mean Above Minus Below A Cut (MAMBAC) procedure searches for a cutting score that, if two groups exist, will be optimal for differentiating between taxonic groups. MAMBAC results—like the results of the other taxometric procedures used in this research—are produced on a graph. An optimal cutting score is illustrated by a curve with a peak or upside-down V shape on the graph. If a graph with this shape is produced, then this is evidence of a taxonic latent structure. If there is no peak to the curve, then there is no optimal cutting score, suggesting dimensional latent structure. For further explanation of the logic of this procedure, see Meehl and Yonce (1994) and Ruscio et al. (2006).

The Maximum Covariance (MAXCOV) procedure examines the covariance of indicators in subsamples of the data, referred to as *windows*. MAXCOV graphs produce low levels of covariance in windows that include only members of the same taxon. Windows that include a mixture of members from different taxa produce higher levels of covariance. Dimensional data only contain one taxon, so the level of covariance stays the same throughout the dataset. Taxonic data contain two taxa, so the covariance will be higher in the central windows where the taxa are mixed and lower at the extremes where the windows contain data from only one taxon. Therefore, peaked curves are evidence of taxonic latent structure for the MAXCOV analysis as well. The MAXCOV graphs we produce have a standardized input indicator (X-axis), with a score of 1 indicating one *SD*. For further explanation of the logic of the MAXCOV procedure, see Meehl and Yonce (1996) and Ruscio et al. (2006).

Unlike the MAMBAC and MAXCOV procedures which use coherent cut kinetics, Latent Mode (L-Mode) analysis calculates factor scores to separate taxa. L-Mode graphs plot the frequency distributions of the scores estimated based on factor extraction from factor analysis. In these graphs, taxonic structured data produces a bimodal distribution, while dimensional data produces a unimodal distribution (Ruscio et al., 2006).

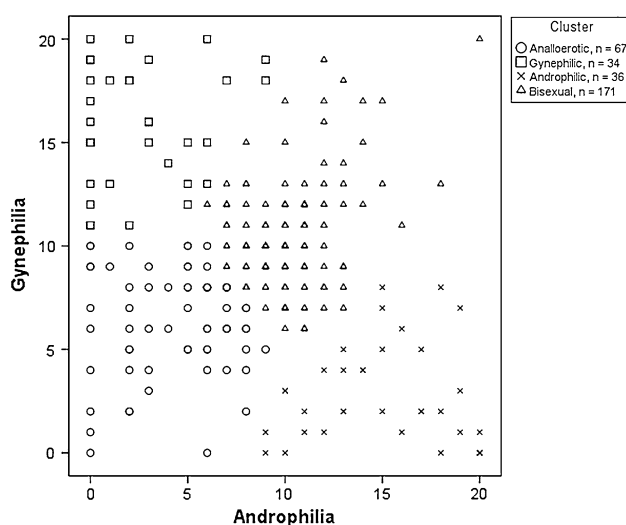
For the MAMBAC, MAXCOV, and L-Mode procedures, we simulated sampling distributions that replicated the data using bootstrapping procedures. A total of 100 of these distributions simulated taxonic distributions with the correlational and distributional attributes of the research data and 100 simulated dimensional distributions with these attributes (see Ruscio & Kaczetow, 2009). Comparison curve fit indices (CCFI) are also calculated to assess the relative fit of the dimensional and taxonic models; a score of 0 indicates the strongest support for the dimensional model, a score of 1 provides the strongest

support for the taxonic model, and a score of .5 indicates equally good or poor support for either structure (Ruscio et al., 2006).

## Results

### Sexual Orientation of Participants

Participants' sexual orientation was categorized in accordance with Blanchard (1989). Scores on the androphilia and gynephilia subscales were subjected to k-means cluster analysis with four clusters selected for output. Results of this cluster analysis



**Fig. 1** K-means cluster analysis of scores of sexual orientation

**Table 1** Descriptive statistics for indicator variables with results of a MANOVA test for sexual orientation group differences

	Possible range	<i>F</i> (1, 306)	Androphilic ( <i>n</i> = 36)		Nonandrophilic ( <i>n</i> = 272)	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attraction to feminine males	0–32	9.22**	3.81	4.17	8.57	9.29
Core autogynephilia	0–45	4.93*	14.08	14.66	19.00	12.21
Autogynephilic interpersonal fantasy	0–20	0.03	8.18	6.12	8.02	5.26
Attraction to transgender fiction	0–48	5.96*	6.24	9.99	11.67	12.80

\**p* < .05, \*\**p* < .01

are shown in Fig. 1. The relative cutoffs for clusters on scales of androphilia and gynephilia were almost equivalent to those found by Blanchard (see Fig. 1 of Blanchard, 1989, but note that a different measure of sexual orientation was used by Blanchard).

In accordance with Blanchard's theory, participants were also categorized as androphilic or nonandrophilic (by collapsing gynephilic, analloerotic, and bisexual categories). Differences between these two groups' average scores on the indicator variables used in this taxometric analysis were tested using a MANOVA. The results of this are shown in Table 1. Participants in the androphilic group scored lower, on average, on Core Autogynephilia, Attraction to Feminine Males, and Attraction to Transgender Fiction scales. There was no significant difference between the groups on average Autogynephilic Interpersonal Fantasy Score.

### MAMBAC

Figures 2 and 3 illustrate the results of the MAMBAC procedure. In Fig. 2, single variables are used as output indicators and the remaining three variables were summed to provide a composite input indicator, which has 50 cuts along its scale. These, and all of the settings used in subsequent graphs, were recommended by Ruscio (2009).

Figure 3 shows simulated taxometric and dimensional comparison data using the 100 simulated comparison data sets. The darker lines on the graphs in Fig. 3 represent the research data; the lighter lines represent the range of the comparison data. The graphs show that the simulated dimensional data provided a better fit for the research data. While there was a slight peak near the middle of the curve which is a characteristic of taxonic data, the outsides of the curve were upturned, which is a characteristic of dimensional data. This observation is backed-up up by the comparison curve fit index (CCFI) score of .33.

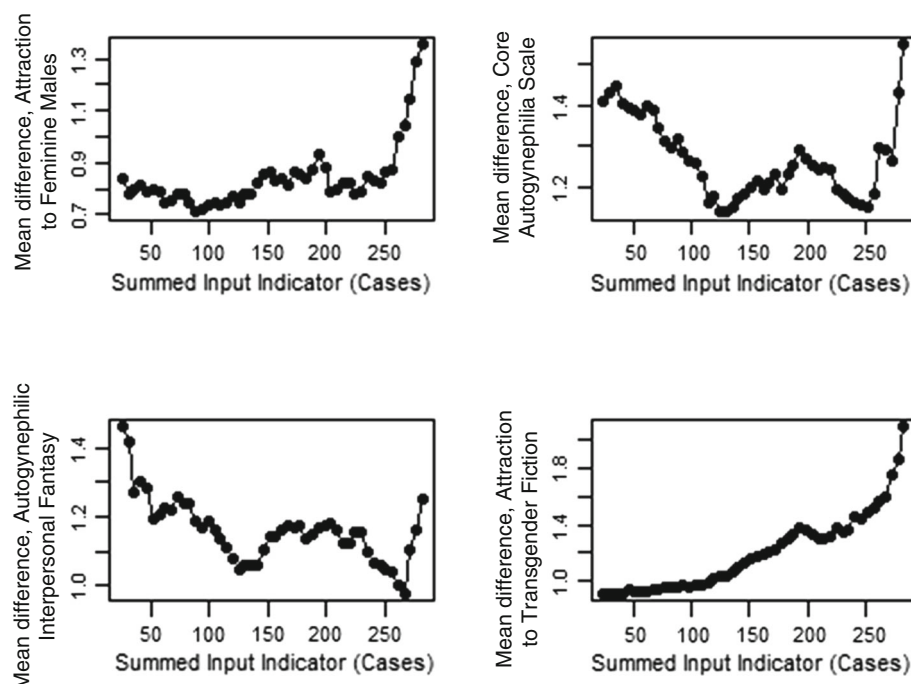
### MAXCOV

Figures 4 and 5 illustrate the results of the MAXCOV analysis. In Fig. 4, pairs of variables were used as output indicators and the remaining two variables were used as composite input indicators with 25 overlapping windows using a 90 % level of overlap.

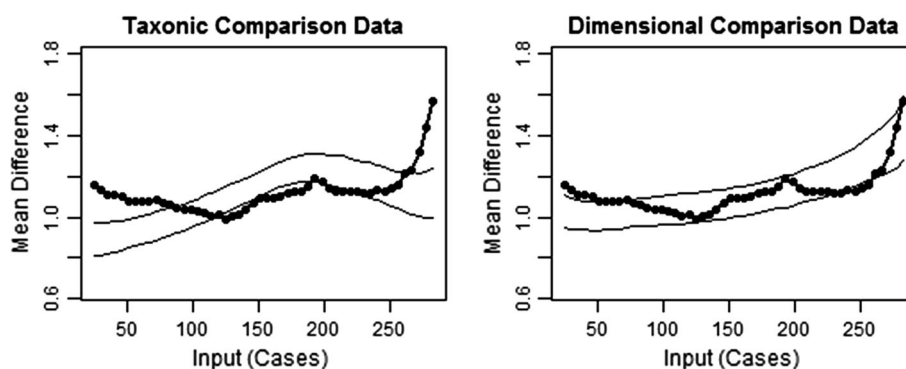
Figure 5 shows simulated taxometric and dimensional comparison data using 10 simulated comparison data sets. The graphs show that although the research data show some evidence of a peak in the middle, the simulated dimensional data provide a better fit for the research data. This is reflected in the CCFI score of .30.

The Attraction to Feminine Males Scale discriminated groups in the MAXCOV analysis at *d* = 1.60, the Attraction to Transgender Fiction scale discriminated groups at *d* = 2.50,

**Fig. 2** MAMBAC graphs using single variables as output and the composite of the remaining variables as input



**Fig. 3** MAMBAC graphs comparing research data to simulated taxonic and dimensional data



the Core Autogynephilia scale discriminated groups at  $d = 1.96$ , and the Autogynephilic Interpersonal Fantasy scale discriminated groups at  $d = 1.70$ .

The *Inchworm Consistency Test* was also used to extend the possibility of identifying small taxa. Each of the 25 windows in the previous MAXCOV analysis contains data from 91 cases, which is 29 % of the sample. If a taxon group were a smaller proportion of the sample than this (e.g., 10 % of the sample), then it would not be detectable in the above graphs. The *Inchworm Consistency Test* was performed using 50 and 100 windows so that each window contained data from as little as 9 % of the sample. This benefit of a lower sample size in each window was offset by the increase in sampling error characteristic of smaller samples. Figure 6 compares 100 window graphs to 50 window graphs using single indicators as input, and composite eigenvalues (summed from the covariance matrix) of the three other variables as output. No further information about the latent structure of the data could be obtained from these graphs.

#### L-Mode

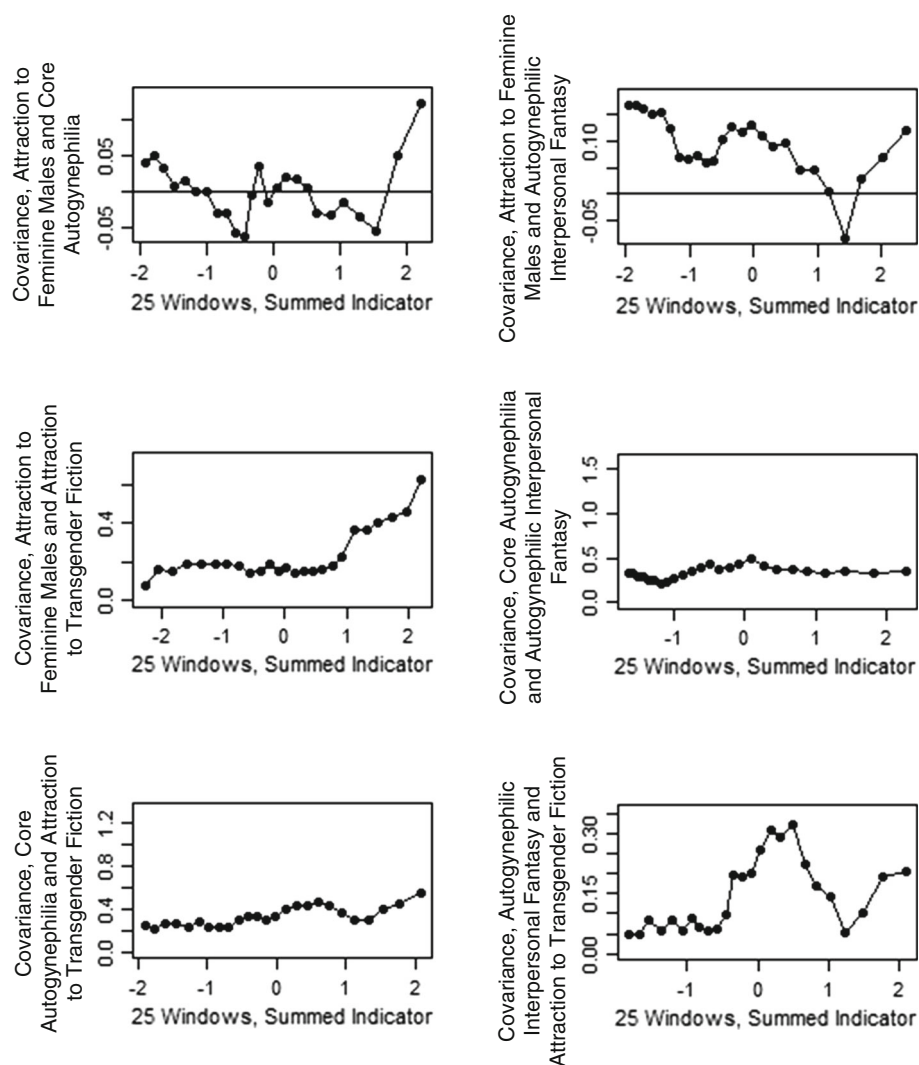
Results of L-Mode analysis are shown in Fig. 7. In the graph outlining the research and comparison data, the research data was plotted as the dark solid line, the average of the simulated taxonic data was plotted on a lighter solid line, and the average of the simulated dimensional data was plotted on a lighter dotted line. Figure 7 shows that the simulated dimensional data provided a slightly better fit for the research data. This is reflected in the CCFI score of .46.

#### Discussion

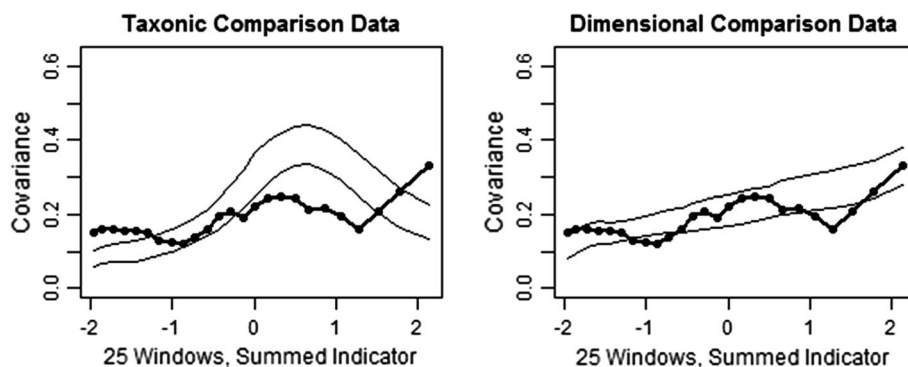
Overall, this taxometric analysis found evidence for a dimensional latent structure for the sexuality of MF transsexuals. Results of the MAMBAC and MAXCOV analysis supported a dimensional latent structure. The L-Mode result was more



**Fig. 4** MAXCOV graphs using two variables as output and the composite of the remaining variables as input



**Fig. 5** MAXCOV graphs comparing research data to simulated taxonic and dimensional data

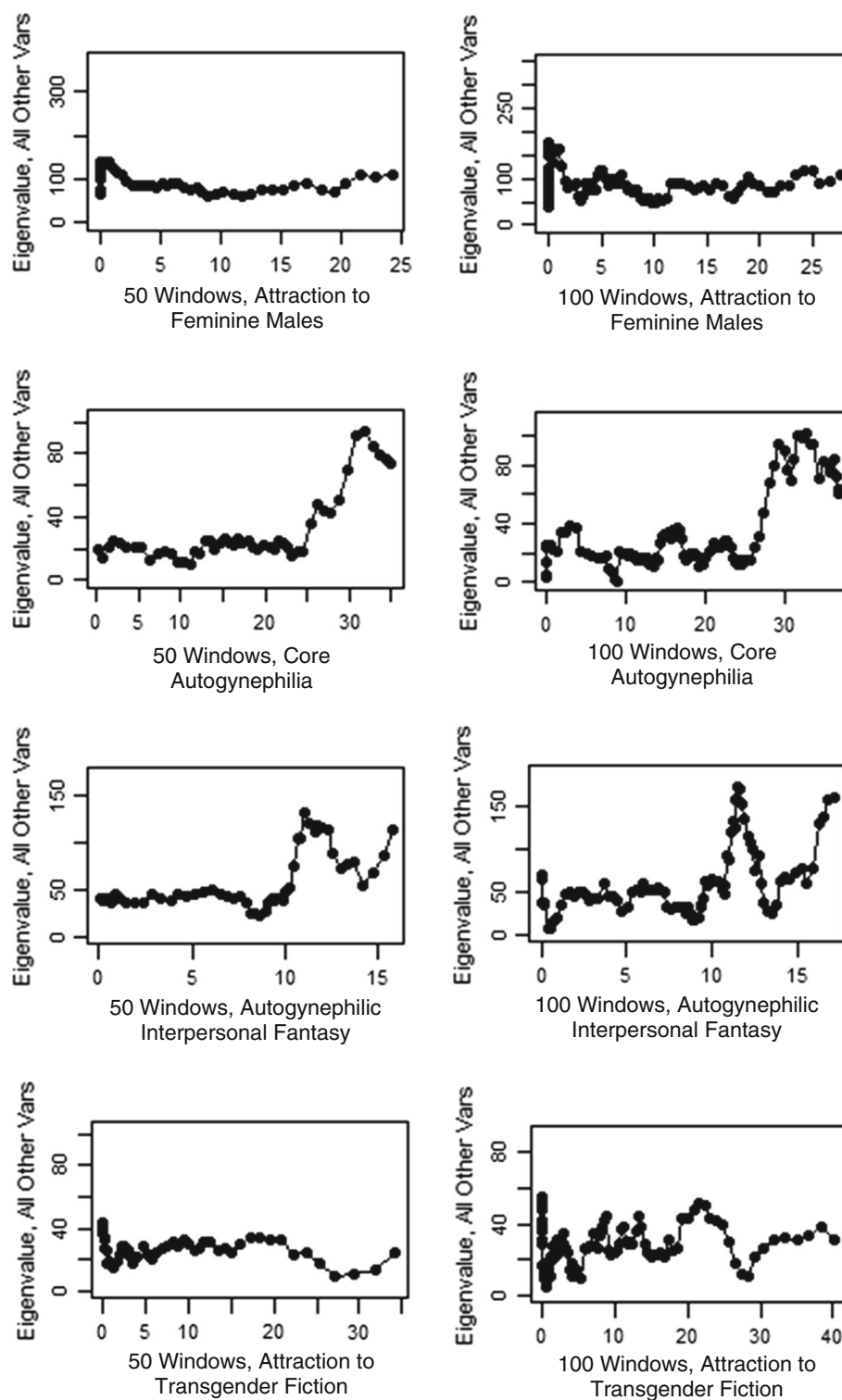


ambiguous, but still slightly more suggestive of dimensional structure.

Blanchard's (1989) typological theory proposed two distinct etiological pathways of MF transsexualism based on sexuality, which should manifest in a taxonic latent structure of MF transsexuals' sexuality, especially in measures related to this theory. This study's finding of evidence for a dimensional latent struc-

ture is inconsistent with Blanchard's theory. More recent theories that explain this sexuality diversity of transsexuals and other people with gender-variant identities using social and psychological factors do not rely on a typological distinction. Nuttbrock et al. (2011a) found that transvestic fetishism, a component of autogynephilia, was positively related to age and White ethnicity. They argued that expression of a gender-variant identity in

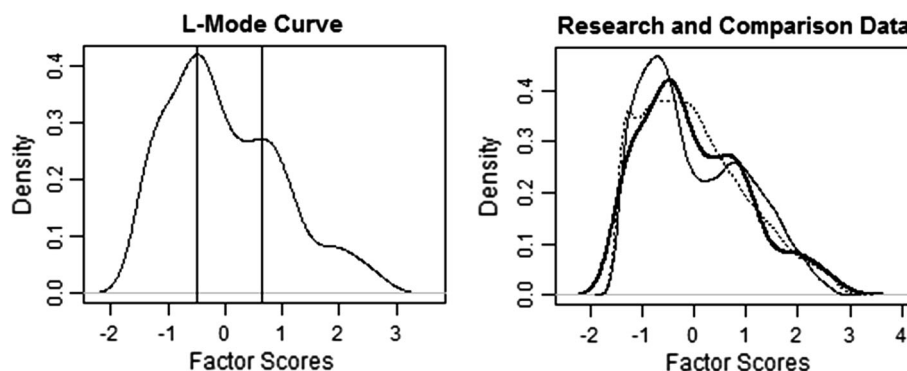
**Fig. 6** Inchworm Consistency Test graphs comparing 50 windows with 100 windows for the four indicators as input; composite eigenvalues of the remaining four variables are used as output



older and White people tends to be more secretive and therefore experienced as exotic and associated with physiological and emotional arousal, leading to the sexual arousal component. In a follow-up article, Nuttbrock, Bockting, Rosenblum, Mason, and Hwahng (2011b) found evidence that secretive cross-dressing partially mediated the relationship between transvestic fetishism

and both age and ethnicity. Veale, Lomax, and Clarke (2010c) independently proposed a similar theory to account for autogynephilia. As well as these social factors, their Identity-Defense Theory proposed that personality factors and coping style/defense mechanism use may also account for some of this difference. The findings of this study were more

**Fig. 7** L-Mode curve and comparisons to simulated taxonomic and dimensional data



consistent with these recent theories than Blanchard's typological theory.

A dimensional latent structure of the sexuality of MF transsexuals could fit with recent findings of notable overlap in the reported autogynephilia in different sexual orientation subtypes of MF transsexuals. Nuttbrock et al. (2011a) found that gynephilic MF transsexuals (82 %) were significantly more likely to report lifetime transvestic fetishism than bisexuals (68 %). Lawrence (2010) reminded us that Blanchard (1985b) also reported similar findings and described this difference between gynephilic and bisexual MF transsexuals as “theoretically unimportant” (p. 1012). In response to this, Nuttbrock, Bockting, Rosenblum, Mason, and Hwahng (2010) maintained that these differences, along with the finding that bisexuals were more likely to not report transvestic fetishism into adolescence could be important to understanding the phenomena. Using the same sample as this study, Veale et al. (2008) found none of those categorized as analloerotic were also categorized as autogynephilic and this was the lowest frequency out of the four sexual orientation categories. A dimensional latent structure is also in accordance with the qualitative data collected on this sample in which many of the transsexuals felt Blanchard's typology was too narrow and did not allow for experiences that did not fit completely into one of his two categories (Veale, Clarke, & Lomax, 2012).

In addition to the taxometric evidence, this study produced a number of other interesting findings. In accordance with previous research (Blanchard, 1989; Freund et al., 1982; Johnson & Hunt, 1990; Nuttbrock et al., 2011a; Smith et al., 2005), androphilic MF transsexuals scored significantly lower than nonandrophilics on Core Autogynephilia. This difference was also seen for the Attraction to Transgender Fiction and Attraction to Feminine Males scales, which was expected given that these are measuring phenomena closely relating to autogynephilia. Veale et al. (2008) reported similar findings using this sample with groups based on cluster analysis. In the present study, though, participants were grouped using cutoff scores estimated as what these cutoffs would be if a taxonomic latent structure exists, using simulated taxonomic data. It is notable that feminine males were reported as

significantly more attractive to the nonandrophilic group even though many of these participants would, by definition, not be attracted to males at all. Related to this is the observation that MF transsexuals sometimes report attractions to other MF transsexuals and will often partner with them (Lawrence, 2013).

It is also notable that the Attraction to Transgender Fiction scale had greater ability to separate potential taxa in the MAXCOV analysis than the Core Autogynephilia scale. This finding suggests that what differentiates sexuality in MF transsexuals most may not be “core autogynephilia,” but rather attraction to themes found in transgender fiction. However, this finding could also be explained by validity concerns with the way core autogynephilia was measured. Participants may have ascribed different meanings to questions asking of sexual attraction to oneself as a woman, whereas questions of attraction to transgender fiction do not have such ambiguity. Also, autogynephilia was not measured on the binary response scale that Blanchard proposed and was instead measured on a 6-point Likert scales from *never* to *all the time*. The amount of time a person is sexually attracted to something is not consistent with standard definitions of sexual attraction (Sell, 1997). Another notable finding is that androphilic and nonandrophilic MF transsexuals did not differ in Autogynephilic Interpersonal Fantasy. However, this finding was consistent with Blanchard's (1989) study and can be explained by gynephilic and analloerotic MF transsexuals having similar levels of Autogynephilic Interpersonal Fantasy to androphilics.

Another point of discussion is that the measures of sexual orientation did not reach the cut-off of  $d = 1.25$  to be included in the taxometric analysis. This is likely to be because singularly the two sexual orientation scales lacked the ability to discriminate between Blanchard's subtypes—those in Blanchard's homosexual subtype would be expected to score high on sexual attraction to males and low on sexual attraction to females. However, high scores of sexual attraction to males would also be expected among bisexual and low scores of sexual attraction to females would also be expected among analloerotic (autogynephilic) transsexuals. The sexual orientation questions were also altered so that the responses indicated the amount of time the participants



experienced sexual attraction to males or females, not fitting with standard definitions of sexual orientation (see above).

This research was conducted on a mostly internet sample that was not representative of the wider transsexual population. With regard to Blanchard's MF transsexual subtypes, this method of sampling has been criticized for significantly under-representing the androphilic subtype (Lawrence & Bailey, 2009). However, using the same analysis method as Blanchard (1989), 36 out of 308 participants were categorized as androphilic (12 % of the sample). Ruscio et al. (2006) suggested a minimum sample size of 300 with the smallest taxon constituting a minimum of 10 % of the sample. This study meets those minimum requirements. There was no further evidence of taxonomic latent structure from the InChworm Consistency Test—a procedure for identifying small taxa.

Although these results need replication using a more representative sampling strategy, they provide evidence against a typology of the sexuality of MF transsexuals as Blanchard (1989) proposed.

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