

GENDER AND ITS RELATIONS WITH COGNITIVE STRUCTURING AND UNCERTAINTY

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Abstract: In our contribution, we try to fill up the content of gender concept in the context of acceptance of dichotomy instrumentality versus expressivity. We focus on specific cognitive variables and their potential to saturate typically (stereotypically) defined characteristics of masculinity and femininity. We were thinking of optimal combination of masculine and feminine features in relation with cognitive structuring of information affecting on humans, their need and ability to settle up with permanent information agency.

Keywords: masculinity, femininity, androgyny, need for cognitive structure, ability to achieve cognitive structure, uncertainty, certainty.

1 Masculinity, femininity and gender segregation

Gender can be understood as a social and cultural construct, a set of ideas and beliefs about how to behave, to present what roles they should have, what the men and women should be like (Lukšík, Supeková, 2003).

Masculinity and femininity as cardinal components of gender are social and cultural constructs that have been changed throughout the history and they have acquired different forms in various cultures. As mentioned in Lukšík and Supeková (2003), a man was considered being a dominated model in 18th century (one sex model). At the end of 19th century the man and woman were considered complementary beings. Now, there are valid two models in a society. The first model is the permeation into the other sex (man-like women, woman-like men), uncertainty and transitional forms of sex, or exemption from sex (androgyny). The second model is the convergence of the ideal woman as a model and a man as an athlete or a hero.

The vision of who the man and woman are, what unites them and what divides has been changed in the science and now we can identify three paradigms of the genus investigation (Bačová, 2009):

1. *Examination of gender differences* (1894-1936 – onwards)
Research in this period was focused on examining differences in mental abilities and verified the relationship between biological sex and intellectual abilities. No differences were detected between men and women in general intelligence. Work in the inter-individual differences experienced renaissance in 70's of 20th century, but the results again showed minimal differences between men and women in the intellectual, emotional and socio-relational fields.
2. *Gender as a personality variable* (1934-1982)
Masculinity and femininity were introduced into the psychology as general, global and contradictory personality traits in the years 1936-1954. Femininity is, according to this model, natural for women and not for men, masculinity is natural for men and not for women. Masculinity and femininity were seen as personality traits, as essences, as the extract of masculinity and femininity that governs human behaviour.
In 1954-1966, the research was focused on the development of "sex roles", when the girls and boys become men and women. Interest of man-researchers and women-researchers has been focused on processes of identification with same sex parent, learning the roles and combination of these processes. This trend was followed up in 1966-1974 by works of men and women „sex typing“. In the years 1974-1982, after a period of intellectual criticism in the 60's, there was proposed model of psychological androgyny as a personality type that combines and balances the masculine and feminine

quality (Bem, 1974). The starting point of paradigm "gender as a personality variable" is that sex and gender are represented in individuals as quantities of personal qualities of masculinity and femininity. The key question remains, however, measurement of this quantity.

3. *Gender as a social category* (since 1982)
Comparing the previous period, this period and paradigm maximize the differences between men and women. A turn from a personal variable to the social category is associated with the names Sandra L. Bem and Carol Gilligan.

Bem (1981) introduced together with other men-scholars and women-scholars into psychology the term of a gender scheme as a generalized predisposition of a person to process information about social and psychological world through masculine and feminine genders. A view to gender as a scheme was a turn from essence to cognitive representation. The problem of this concept is conceptualization of human-being as a passive recipient of social impacts that do not have the opportunity to actively participate in shaping their own gender (Hoffman, Borders, 2001).

Gilligan (1982 in Bačová, 1999) has risen in her work three topics:

- Survival and women's experiences are different than men experiences and survival. Therefore, women should be examined by their own standards.
- Men and women form different global 'I' and different moral positions and principles. Male's "I" is characterized by separateness and female's "I" is characterized by interconnection.
- Meaningful significant differences between men and women can and should be viewed positively. Methods of cognitive and moral evaluations of women are not inferior; they are part of humanity's access to basic human questions.

If we understand gender as a social category, we have to remember the implications arising from this conceptualization:

- Social representation surmounts simple reflection of gender as the only biological issue. It understands gender as a complex social and psychological phenomenon.
- Gender contributes to contest the tendency to explain survival and action of people from their stable internal qualities. Gender comes not only from the core but also outside.
- We need to consider gender in social and developmental context. Gender means at different life periods and in different life situations, something else. Gender is a historical and dynamic.
- Children learn masculinity and feminine from their culture, but also from specific people and specific relationships. That all has its point of intersection in the individual. Men and women and what gender means to them, cannot be omitted when considering the gender.
- The perception of gender as a social category adds to the traditional quantitative methodology qualitative processes and methods.

For the differentiating purposes of masculine and feminine roles, there are often used relatively simple dichotomies that define male and female "fundamentals". Probably the most common dichotomize is a dimension of instrumentality versus expressivity that for example Stake uses in his work (1997) in response to Angyal (1965), Spence (1974) Guisingera, Blatta (1994). Stake (1997) defines expressivity as a feminine feature. In sociological or socio-psychological sense, we could characterize the instrumentality of a masculine role by focusing on the leading and decisive powers in the person of a husband-father and expressiveness of feminine role with care and meeting

the emotional needs of family members through the wife-mother (Renzetti, Curran, 2003).

Ward (2000) uses categories „need for affiliation” and „need for achievement” to mark instrumentality and expressiveness, while their semantic content is understood like Stake.

Conway (2000) has done the research, where he focused on antagonistic categories – communality and agency. He has found out that participants attributed higher status to individuals with higher value “agency” (with instrumental behaviour) and lower status to individuals with higher value “communality” (with expressive behaviour).

Hofsede (1998) points out that dimension masculinity - femininity is sometimes understood wrongly as contradictions individualism - collectivism (I versus we) and argues that the dimensions of individualism - collectivism and masculinity - femininity are independent. Therefore, he suggests in his work to characterize the masculinity by a term ego enhancement and the femininity by a relationship enhancement.

On this basis, we can see that in our socio-cultural organization of the world we prefer model of sex-gender roles that are clearly defined for both women and men. We constantly attempt to structure female-male worlds as two separate realities, which inevitably lead to gender segregation.

As reported by Maccoby and Jacklin (1974 in Badinter, 1999), sexual segregation is saturated by biological factors, socialization and cognitive factors.

Biological factors have genetic and morphological features, which structure four levels of manifestation of sex. There belong genetic sex, gonadic sex, physical sex, and finally the external and internal genital organs together with secondary sexual characteristics, which we refer to as a civil sex (Badinter, 1999). On this basis, we are able to identify biologically given sex.

Socialization is a process we can look at, in terms of gender formation, through the various theories. An example is the psychoanalytic theory, cognitive-developmental theory, social learning theory and others.

Cognitive factors belong to area which is explored the least (Badinter, 1999). They represent not only elementary but also complex processes of cognitive information processing, from the perception (special social perception), discrimination up to structuring of stimulus material, mental representation and decision-making (especially in gender specific situations).

2 Cognitive structuring

We would like to enrich this field by a specific issue related to cognitive structuring in relation to uncertainty, or certainty. Our perception of cognitive structuring is based on work of Bar-Tal (1997), who understands the cognitive structuring as a two-dimensional orthogonally arranged concept consisting of two cardinal variables, namely from the need for cognitive structure and the ability to achieve cognitive structure.

Bar-Tal (1997) understands the variables as follows - the need for structure is defined as the preference of cognitive structuring, which is understood as (1) opposite to the piecemeal processing of information and (2) means leading to a sensing of certainty.

The ability to achieve cognitive structure relates to how the one is able to utilize the process of information processing, which is consistent with its need for cognitive structure. In the case of a high need for structure, it regards to (1) avoidance of information that the one cannot categorized in accordance with existing knowledge and (2) organizing of knowledge the way to be adapted to existing cognitive structure. In the case of a low need for structure, it regards to (3) active and systematic understanding of all available information. In general, the ability to achieve cognitive structure can be defined as the ability to use

its categories the same way as analytical information processing in accordance with the tasks that are the man asked.

Need for cognitive structure and ability to achieve cognitive structure are components of cognitive structuring process, which combination we can get four types related to processing of information:

- Low need for structure - low ability to achieve cognitive structure (in research is used abbreviation LPNS – LAACS),
- Low need for structure – high ability to achieve cognitive structure (LPNS – HAACS),
- High need for structure – low ability to achieve cognitive structure (HPNS – LAACS),
- High need for structure – high ability to achieve cognitive structure (HPNS – HAACS).

Particular characteristics of mentioned types are displayed in Table 1.

3 Uncertainty

Studies with uncertainty (Sarmany - Schuller, 1999) pointed to the fact that uncertainty is a phenomenon closely linked with the ability to categorize and structure the world (about the world).

Every person has a need for certainty, which is manifested in individual specific rate. Inability to meet such an important need, such as the need for certainty may lead to a feeling of losing control and stress (Paterson, Neufeld, 1987 in Bar-Tal, 1994). In accordance with Kruglansky's words (1988 in Bar-Tal, 1994), the need for certainty is a desire for knowledge that reduces ambiguity, doubt and confusion. The need for certainty activates epistemic activity based on categories and a piecemeal process is unused (Fiske, Linville, 1980, Fiske, Pavelchak, 1986 in Bar-Tal, 1994).

Uncertainty is a phenomenon directly related to inadequate form of processing the complaints stimuli through simple cognitive categories, representing static system that ignores relevant information influencing a person, or its cognitive system. From the perspective of Piaget's concept of intelligence, we could adequately categorize people with limited ability and to structure information about the world and to consider these people being unintelligent. These people are capable of processing information only based on existing categories, they do not permit their change, extension or their completely reorganizing to match the known experience.

4 Research

In our research we were interested whether sensing of uncertainty determined by a process of cognitive activity is associated with masculinity and/or femininity. To fulfil the objective of this research, we have chosen the following methodology:

Personal Need for Structure PNS (authors: Thopson, Naccarato, Parker, 1989) – questionnaire consists of 12 claims that are reviewed by 6-point scale. Items of questionnaire are designed to show the way of processing and organization of information, stereotyped reactions, external clues in the establishments of decisions, the processing of inconsistent information, efforts to enrich the existing knowledge (Hess, 2001). There are three scales in the output for statistical analysis: the desire to structure, a response to lack of structure and need for structure.

Ability to Achieve Cognitive Structure Scale AACCS (author: Bar-Tal, 1993) – questionnaire consists of 24 claims that participant reviews by 6-point scale. Items of questionnaire show 4 fields: easy usage of cognitive structuring, difficulties with using of cognitive structuring, easy to use piecemeal processing information, and difficulties in usage of piecemeal information processing (Bar-Tal, Rabin, Tabak, 1997). The output is a single number that characterizes the ability to achieve cognitive structure.

Table 1: Combination of need for cognitive structure and ability to achieve cognitive structure

		Need for cognitive structure	
		Low	High
Ability to achieve cognitive structure	Low	Low level of piecemeal structuring	Low level of cognitive structuring
		Unintended information processing	Hypervigilance
		Dysfunctional impulsivity	Low self-efficiency
		Low self-efficiency	High uncertainty
		High uncertainty	Obsessions, compulsions
		Frequent use of stereotypes	High sensitivity
		Low level of stress	Less frequent use of stereotypes
	High	High level of piecemeal structuring	The high level of cognitive structuring
		Intended information processing	Unintended information processing
		Vigilance	Functional impulsivity
		High self-efficiency	High self-efficiency
		Low certainty	High certainty
		High level of stress	High level of repression
			Frequent use of stereotypes
	Low level of stress		

Questionnaire of Uncertainty - Certainty U-C (author: Kováč, 1969) – questionnaire consists of 54 items with alternatives a) and b). Participant is supposed to decide between these two alternatives. If he/she is not able to choose any of them, he/she can choose the alternative c), which is not valid according to this methodology. The output for statistical processing has 5 scales which are at the same time the levels of uncertainty – certainty: normal uncertainty, increased uncertainty, pathological uncertainty, normal certainty and abnormal certainty.

The Scale of Masculinity and Femininity SMF (author: Kusá, 2000), this scale consists of 45 items which are divided into three categories: masculinity, femininity, demanding. Items shift regularly and participant has 6-point scale available for his/her decisions. The output for statistical processing has three scales: scale of masculinity, femininity and demanding.

Personal Attributes Questionnaire PAQ (authors: Spence, Helmreich, 1978) this questionnaire consists of 24 items questionnaire we use 16 items. Participant reviews items on a 5-point scale. The output for statistical processing have two scales: scale masculinity, femininity.

The total number of participants was 162, including 73 men and 89 women. 81 out of them we could characterize by masculinity or femininity as a „pure“ gender type. Therefore research sample consists of 81 participants.

- Consistent with theoretical models of gender, cognitive structuring and uncertainty, we hypothesized that:
- H1: masculine people can be characterised with high ability to achieve cognitive structure.
 - H2: masculine people can be characterised with high certainty.
 - H3: feminine people can be characterised with high need for cognitive structure.
 - H4: feminine people can be characterised with high uncertainty.

To test our hypothesis we used the calculator of probability to test the difference of cognitive structuring types point values (Table 2) and Mann-Whitney U-test to test the gender differences in uncertainty and certainty (Table 3). As a critical statistical value which indicates the statistical significance, we appointed the standard value of $p = 0,05$.

Table 2: Gender differences in a relationship to cognitive structuring

Variable	Cognitive structuring type comparing	Point values	Point difference	p
M ^{SMF}	HPNS-LAACS vs LPNS-LAACS	49,93-57,29	7,36	0,024
	HPNS-LAACS vs LPNS-HAACS	49,93-60,13	10,20	0,004
F ^{SMF}	HPNS-LAACS vs HPNS-HAACS	49,93-57,93	8,00	0,027
	HPNS-LAACS vs LPNS-HAACS	65,46-58,19	7,27	0,049
M ^{PAQ}	HPNS-LAACS vs HPNS-HAACS	16,71-20,32	3,61	0,009
	HPNS-LAACS vs LPNS-HAACS	16,71-20,68	3,97	0,003
F ^{PAQ}	HPNS-HAACS vs LPNS-LAACS	20,32-17,43	2,89	0,027
	LPNS-HAACS vs LPNS-LAACS	20,68-17,43	3,25	0,008
F ^{PAQ}	Nonsignificant differences	-	-	-

PNS= personal need for structure, AACs= ability to achieve cognitive structure, H= high, L= low, M= masculinity, F= femininity. SMF = The Scale of Masculinity and Femininity, PAQ = Personal Attributes Questionnaire

On the base of results shown in Table 2 we can state, there is a relation of masculinity with a high ability to achieve cognitive structure and femininity with a high need of cognitive structure. If the masculinity is in relation to achieve the cognitive structure which determines the experience of certainty and femininity in relation to the need cognitive structure which determines the experience of uncertainty, we can assume the influence of masculinity and femininity to experience uncertainty, or certainty.

For this purpose we have the Table 3. It is clear in it that masculine participants always scored higher in scale of certainty and feminine participants always scored higher in scales of uncertainty (except N1 while using SMF). We have found out statistically significant differences in pathological uncertainty dimensions N3 (PAQ) and increased uncertainty N2 (SMF) for the benefit of feminine participants and in abnormal certainty I3 dimension (PAQ and SMF) for the benefit of masculine participants.

We could characterize the masculinity by the ability to achieve cognitive structure. This fact might be an indication showing the predisposition of a masculine type to cope with uncertainty actively, because ability to achieve cognitive structure is a factor reducing uncertainty.

Table 3: Gender differences in dimensions of uncertainty – certainty

	Gender	PAQ				SMF			
		N	AM	U	p	N	AM	U	p
U1	M	17	25,71	1,703	0,088	24	30,29	1,135	0,256
	F	15	29,40			25	29,20		
U2	M	17	6,12	0,228	0,820	24	5,50	2,604	0,009
	F	15	6,53			25	8,08		
U3	M	17	0,59	2,191	0,028	24	0,79	0,919	0,358
	F	15	1,13			25	1,04		
C1	M	17	13,82	0,152	0,879	24	14,42	0,825	0,410
	F	15	13,60			25	13,72		
C3	M	17	2,76	2,955	0,003	24	2,21	2,064	0,039
	F	15	1,13			25	1,44		

U1 = normal uncertainty, U2 = increased uncertainty, U3 = pathologic uncertainty, C1 = normal certainty, C3 = abnormal certainty; M = masculinity, F = femininity

On the other hand, we could characterize femininity by need for cognitive structure. High need for cognitive structure in case it is not saturated with a high ability to achieve cognitive structure, represents a predisposition of inadequate sensing of uncertainty, or inability to reduce the uncertainty. For feminine person is necessary from the aspect of uncertainty experience how his/her ability to achieve cognitive structure is developed.

We allege that we can support all hypotheses we designated. But we do not forget that the next research will have to be realised to confirm the results obtained by this research sample.

5 Conclusions

In the context of increasing gender sensitivity in the educational process as an indicator of humanistic education we suggest:

- To socialize a person in the direction of androgyny, which we consider a balanced personality construct integrating masculinity and femininity.
- In the process of education to strengthen children's ability to make decisions, choose between possible routes, to create their own algorithms and heuristics.
- To strengthen "instrumentality" in order to reduce uncertainty in the ability to create a cognitive structure.
- To exploit the possibilities of problem teaching and learning at the expense of giving tasks, in which it is possible and necessary to obtain a solution using a single, pre-specified algorithm.

We could recommend an ambition for complex development of the personality for pedagogical and psychological practice in terms of integration of psychological androgyny, thus blending, mixing, or situational use of masculine and feminine gender roles (as highlights for instance Stake (1997)). We believe, like Jung, that every man has his feminine soul (anima) and every woman has her male soul (animus), and they necessarily complement each other. As Szondi says: "God is not a man and is not a woman either. God is a perfect hermaphroditical being" (Szondi, 2009, p. 17). He means that every person, man and woman, tries for perfection of androgynous beings.

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