THE SCALE ABOUT THE MOTIVATION FOR PRE-NATAL COMMUNICATION (SMPNC): A NEW PSYCHOMETRIC INSTRUMENT DEDICATED TO THE ASSESSMENT OF THE COMMUNICATION OF THE PREGNANT WOMEN TO THE FETUS

Justo, J. M. R. M.
Assistant Professor at the Faculdade de Psicologia da Universidade de Lisboa
jjusto@psicologia.ulisboa.pt
Graça, C. S. S.
Clinical Psychologist
Martins, M. S. A.
Clinical Psychologist

Fecha de Recepción: 29 Enero 2019
Fecha de Admisión: 30 Abril 2019

ABSTRACT

Psychological changes in pregnant women induce communications towards the fetus. Maternal vocal behavior induces fetal reactions. Prenatal communication takes fetuses and newborns to perform auditory discriminations. Fetuses in risk pregnancies present difficulties in these matters. To study possible changes in vocal activity during healthy and risk pregnancies, SMPNC was organized with 28 items related with maternal vocal communication. SMPNC was submitted to pregnant women waiting for sonograms at the third trimester. Adequate indexes (KMO = .888; BTS, χ^2 = 2792.795, df = 378, p = .000) allowed the performance of several factorial analysis. Analysis with Equamax rotation identified five factors: Verbal Communication With the Baby, Engaging the Partner in the Communication Towards the Baby, Contents Shared in the Communication Towards the Baby, Perception About the Baby's Auditory Competence and Availability for the Communication Towards the Baby. Together the items of these factors constitute a Total Scale. Subscales and Total Scale were correlated with sociodemographic and clinical variables. Some subscales of SMPNC present negative correlations with variables related with reproductive status. These results suggest that maternal motivation for prenatal communication is especially high during the first gestation and decreases as mothers must divide their maternal attention for several sons.

Keywords: pregnancy; fetus; mother-fetus communication; motivation; scale about the motivation for pre-natal communication

INTRODUCTION

For several decades, pregnancy has been considered as both a period of crisis and as a period of development (Deutsch, 1945; Bibring, 1959, 1961a, 1961b; Benedek, 1970; Colman & Colman,

1991). The reason for this is the fact that pregnancy is most of all a period of change. Changes happening in a huge number, changes of different natures and also changes with different schedules turn pregnancy, especially when we are speaking of a first reproductive event, into a remarkable landscape where feminine identity is going to advance towards the grounds of maternal identity.

One of the most interesting fields of change in the life of pregnant women is behavior. During pregnancy, women's behavior change in different aspects like eating, sleeping, dreaming, intimate relationship with the partner and so on.

When, at the beginning of the second trimester, fetal movements are strong enough to enhance maternal sensibility towards behavior activity inside the womb, pregnant women feel especially motivated to start their communication with the future baby. At this point maternal responses towards the fetus may include hand touch on the belly where movements were detected. Perhaps these responses may be paralleled by physiological events like, for instances, changes of the cardiac rhythm. Sooner or later, many pregnant women will diversify their repertoire expanding it into the realm of verbal stimulation.

Maternal investment in the communication towards the fetus may be seen according to the psychological development of the future mother. At the same time that the mother to be answers to the several messages of the growing fetus she also grows in her capacity to imagine the future baby, to imagine her interaction with him after his birth as also to imagine her maternal competencies favoring the development of an individual and independent human being. But, more than that, maternal communication directed to the developing baby may be seen from the baby's point of view.

By the beginning of the third trimester, pregnant women become surprised not by the fact that the fetus moves but particularly by the regularity of his activity. Probably this regularity is revealing that the future baby already has a central nervous system very close to the one he is going to be equipped with at the moment of birth. Thanks to this central nervous equipment, during the final trimester of gestation, the fetus is sensitive to light (Del Giudice, 2011; Reid et al., 2017), he is capable of detecting maternal physical activity and notably he is able to listen to linguistic stimuli and to react to it (for a review, see Carvalho, Justo, Gratier & Rodrigues, 2019).

Since the eighties of the last century, research has pointed out several discriminative competencies of the fetus when exposed to human voices or to other auditory stimuli. These discriminations exhibited by human fetuses or by human newborns are detected by the observation of several parameters: fetal heart beat, fetal movements, fetal cerebral activation, newborns' sucking behavior, etc. Indeed the connection between discriminative tasks and observational parameters showed that the human fetus is far from being inactive from the auditory and linguistic points of view.

For example, it is accepted that the human fetus is able to discriminate between maternal voice and an unfamiliar female voice (DeCasper & Fifer, 1980; Kisilevsky et al., 2003). Jardri et al. (2012) showed that when the human fetus is stimulated by auditory stimuli its brain presents specific cerebral activations: a) the lower bank of the left temporal lobe shows a greater activation in response to maternal voice than in response to an unfamiliar female voice, b) the upper bank of the left temporal lobe shows a greater activation in response to an unfamiliar female voice than in response to maternal voice (as underlined by Rousseau et al., 2016) and c) the left temporal lobe presents a higher activation when stimulated by human voices than when stimulated by pure tones. Also the repetition of the reading of a linguistic content during the last weeks of pregnancy enables the newborn baby to discriminate between that content and a different one (DeCasper & Spence, 1986). It was also noticed that the fetus is able to discriminate between linguistic stimuli delivered in native language and linguistic stimuli delivered in a foreign language (Kisilevsky et al., 2009).

In a complementary way it was also observed that the responses of human fetuses to maternal voice become atypical when pregnancy is threatened by health conditions like hypertension (Lee,

Brown, Hains, & Kisilevsky, 2007), overweight (Kisilevsky, Gilmour, Stutzman, Hains, & Brown, 2012), fetal growth restriction (Kisilevsky, Chambers, Parker, & Davies, 2013) or if the pregnant woman keeps smoking during gestation and the fetus is less than 37 gestational weeks (Cowperthwaite, Hains, & Kisilewsky, 2007). In future research it would be interesting to investigate if some of these atypical responses could be linked with the psychological avoidance that pregnant women in obstetrical high risk experience relatively to the maternal investment that we expect to observe during pregnancy. This defensive effort usually called "stand-by reaction" (Justo, 2014) possibly leads to a reduction of the maternal linguistic stimulation delivered to the fetus.

Possibly the development and maturation of these fetal competencies is deeply rooted in the qualities of maternal stimulation. It is very difficult to understand how the human fetus may discriminate between maternal and non-maternal female voices, or to discriminate between linguistic and non-linguistic auditory stimuli or even to discriminate between familiar and unfamiliar linguistic contents without the support of a pregnant mother that talks directly and intentionally to her fetal baby.

This way it is particularly important for psychologists to evaluate the way and the intensity experienced by mothers when they realize that it is about time to start communicating with their fetus. For that reason a questionnaire was developed specifically to assess maternal motivation for the communication with the baby during pregnancy.

METHODOLOGY

Instruments

A Sociodemographic and Clinical Questionnaire was developed especially for this investigation. On the side of sociodemographic data, variables like participants' age and education, partners' age and education, household information, socioeconomic, marital and labor statuses were included. Relatively to clinical aspects, data on gestational time, obstetrical history and health problems during the present pregnancy were gathered.

The Scale About the Motivation for Pre-Natal Communication was created in order to evaluate maternal proneness to engage in communicative activities with the fetus. Items for this instrument were generated by Graça (2018) and Martins (2018) having in mind several aspects of communication that pregnant women may wish to address to their fetuses. These items were presented as statements. Participants' answers were recorded in scales in order to facilitate data appreciation according to statistical and psychometric procedures.

Participants

Participants (N = 140) were pregnant women at the third trimester of gestation waiting for sonograms at the Centro Ecográfico de Entrecampos a private clinic dedicated to obstetric sonograms in the center of Lisbon, Portugal. Participants received information about the main goals of the investigation. After that, written informed consent was asked. There were no refusals and all participants signed the form of Informed Consent. Then a Sociodemographic and Clinical Questionnaire was applied. Finally participants were asked to fill the questionnaire with the items of the SMPNC. Sociodemographic data are displayed in Table 1. As can be seen this is a sample with a good socioeconomic level, mostly active in professional contexts and with an educational background of university level. Clinical characteristics are displayed in Table 2. In general terms it can be said that this is a healthy sample, once that most of the participants planned their pregnancies, had obstetrical histories with very few interruptions and only a quarter suffered a health condition during the present pregnancy.

RESULTS

The development of the Scale About the Motivation for Pre-Natal Communication

Based at the available scientific literature, Graça (2018) and Martins (2018) generated 28 items related to several aspects of maternal verbal communication directed to the fetus: a) expectations about fetal auditory competencies, b) frequency of maternal verbalizations towards the fetus, c) partner's communication towards the fetus, d) pleasure during the communication with the fetus, e) verbal contents directed to the fetus, etc. These items were organized in a questionnaire where answers should be recorded in Likert scales varying from 0 (It totally disagree) to 5 (I totally agree). Data of these 28 items were submitted to a series of principal components analysis. Results of the Kaiser, Meyer, Olkin analysis (KMO = .888) as well as of the Bartlett Sphericity Test (Bartlett = 2792.795, p = .000) were inspected. Values of anti-image varied between .691 and .956. Among all factorial analysis the best one was obtained with Equamax Rotation and without restrictions relatively to the number of components extracted. The first six components were able to explain 70.16% of the total variance. Nevertheless the fifth component was excluded because it was related with less than three items. The other five components were related with enough items for a scale to be organized. For the attribution of the items relatively to the components it were only accepted factor loadings higher than .5. Items 5, 10, 18, 22, 24 and 26 were excluded because its factor loadings were lower than .5.

According to the factor loadings displayed in Table 3, 5 subscales resulted from this analysis. The first one, designated as Verbal Communication With the Baby, is composed by items 2, 3, 4, 7, 11 and 16. The second, Engaging the Partner in the Communication Towards the Baby, includes items 9, 21 and 28. The third, Contents Shared in the Communication Towards the Baby, is related to items 6, 12, 17, 19, and 23. The fourth, Perception About the Baby's Auditory Competence, includes items 1, 13, 15 and 25. Finally, the fifth, Availability for the Communication Towards the Baby, is composed by items 8, 14 and 27. Higher values in these five subscales mean higher maternal motivation for communication with the baby; as the items of the fifth subscale (Availability for the Communication Towards the Baby) are written in a negative sense, the items of this subscale (8, 14 and 27) must be reversed for all analysis including the computation of the Total Scale.

The five subscales, were submitted to internal consistency analysis. Cronbach's alfa were as follows: Verbal Communication With the Baby (α = .920), Engaging the Partner in the Communication Towards the Baby (α = .872), Contents Shared in the Communication Towards the Baby (α = .832), Perception About the Baby's Auditory Competence (α = .788) and Availability for Communication Towards the Baby (α = .737). Using together all the items included in the five subscales, it was possible to create a Total Scale (α = .910). Table 4 displays the descriptive statistics for the results obtained by the participants of our sample in the five subscales as well as in the Total Scale. Correlations among the subscales of the SMPNC including the Total Scale are displayed in Table 5. As can be seen coefficients are almost always positive and significant.

Relations between motivation for prenatal communication and sociodemographic and clinical variables.

In order to understand how the assessment of the motivation for prenatal communication works we decided to correlate the five subscales of the SMPNC as well as the Total Scale with some sociodemographic and clinical variables. Table 6 presents the coefficients resulting from correlations between data of the SMPNC and data related to sociodemographic and clinical characteristics. As can be seen, several variables of the SMPNC present negative and significant correlations with

some sociodemographic variables: duration of the present marital relationship, number of sons of the present marital relationship, number of sons of the present and past marital relationships, people living in the present household and partner's education. It seems that the longer the present marital relationship or that the grater the number of children the less the pregnant woman feel motivated for prenatal communication. In this sense we may think that maternal motivation for prenatal communication is at the top during a first pregnancy and possibly decreases when the pregnant woman must divide her attention with children already present at the household. Looking to correlations between SMPNC variables and clinical variables something similar is observable. Negative and significant correlations are detected with number of pregnancies ended at term. Because in our sample these pregnancies usually result in a viable offspring this also means that the higher the number of sons the lesser the motivation for prenatal communication. The negative and significant correlation with gestation type (single or twin) seems to have the same meaning.

If the number of sons is negatively related with the motivation for prenatal communication then it is possible that the averages of the SMPNC's variables may show significant differences between pregnant women without sons and pregnant women with one or more sons. In fact, *t*-tests showed that in subscales 2 and 5 as well as in Total Scale there are significant differences. These differences show that pregnant women with one or more sons tend to present lower values then pregnant women without sons.

Finally and harder to interpret is the fact that maternal preference for the baby's gender is positively correlated with three variables of the SMPNC (subscales 1 and 4 and Total Scale). We don't really know what it means for a pregnant woman to have a preference about the gender of her future baby. But whatever it is we may suppose that it is something related with the maternal psychological investment of the future child. So these three positive correlations suggest that the higher the maternal investment at the imaginary baby the higher the motivation for prenatal communication.

CONCLUSION

From now on there is a specific instrument dedicated to the assessment of maternal prenatal motivation for communication with the future baby. Possibly this instrument will be useful for researchers trying to understand how pregnant women evolve in terms of psychological investment during gestation. Also, research about high risk pregnancy may benefit with the dimensions assessed by the SMPNC. Not only we need to gather empirical data showing if pregnant women at risk do or do not decrease their motivation relatively to the communication with the fetus. We also need to know if psychological interventions in high risk obstetrics are able or not to induce significant changes in maternal prenatal motivation. In fact when gestation is threatened by medical conditions (of the mother, of the baby or of the placenta) negative changes in the emotional functioning of the pregnant woman are able to dominate the psychological landscape. Psychologists supporting these women need to be particularly aware about all contents spoken by them relatively to the future baby and to the communication with him. Possibly, clinical psychologists acquainted with the dimensions of the SMPNC will be prepared to detect and to react to these contents in a more effective way.

REFERENCES

Benedek, T. (1970). The psychobiology of pregnancy, In E. Anthony & T. Benedek (Eds.), *Parenthood: Its psychology and psychopathology* (pp. 137-151). Boston: Little Brown and Company.

Bibring, G. (1959). Some Considerations of the Psychological Processes in Pregnancy. *The Psychoanalytic Study of the Child, 14*, 113-121.

Bibring, G., Dwyer, T., Huntington, D., & Valenstein, A. (1961a). A Study of the Psychological Processes in Pregnancy and of the Earliest Mother-Child Relationship – I: Some Propositions and Comments. *The Psychoanalytic Study of the Child, 16*, 9-24.

Bibring, G., Dwyer, T., Huntington, D., & Valenstein, A. (1961b). A Study of the Psychological Processes in Pregnancy and of the Earliest Mother-Child Relationship – II: Methodological Considerations. *The Psychoanalytic Study of the Child, 16*, 25-72.

Carvalho, M. E., Justo, J., Gratier, M. & Rodrigues, M. (2019). The Impact of Maternal Voice on the Fetus: A Systematic Review. *Current Women`s Health Reviews, 15*(3). DOI: 10.2174/1573404814666181026094419

Colman, L. L., & Colman, A. D. (1991). *Pregnancy: The Psychological Experience (revised and expanded)*. New York: The Noonday Press.

Cowperthwaite, B., Hains, S. M., & Kisilewsky, B. S. (2007). Fetal behavior in smoking compared to non-smoking pregnant women. *Infant Behavior and Development, 30*, 422-430. DOI: 10.1016/j.infbeh.2006.12.004

Del Giudice, M. (2011). Alone in the Dark? Modeling the Conditions for Visual Experience in Human Fetuses. *Developmental Psychobiology, 53,* 214–219.
DOI: 10.1002/dev.20506

DeCasper, A. J., & Fifer, W. P. (1980). Of Human Bonding: Newborns Prefer their Mothers' Voices. *Science, New Series, 208*, 4448, 1174-1176.

DeCasper, A. J., & Spence, M. J. (1986). Prenatal Maternal Speech Influences Newborns' Perception of Peech Sounds. *Infant Behavior & Development, 9*, 133-150.

Deutsch, H. (1945). The Psychology of Women: A Psychoanalytic Interpretation. New York: Grune & Stratton.

Graça, C. S. S. (2018). *Comunicação Pré-Natal: O Impacto da Perda Gestacional Precoce.* Master Thesis in Psychology, Faculdade de Psicologia da Universidade de Lisboa.

Graffar, M. (1956). Une méthode de classification sociale d'échantillons de population. *Courrier, 6*(8), 455-459.

Jardri, R., Houfflin-Debarge, V., Delion, P., Pruvo, J.-P., Thomas, P., & Pins, D. (2012). Assessing fetal response to maternal speech using a noninvasive functional brain imaging technique. *International Journal of Developmental Neuroscience, 30*(2), 159-161. DOI: 10.1016/j.ijdevneu.2011.11.002

Justo, J. (2014). A defensive "stand-by reaction" at critical moments of the reproductive life cycle. *International Journal of Developmental and Educational Psychology, 4*(1), 209-214.
DOI: infad.eu/RevistaINFAD/OJS/index.php/IJODAEP/article/view/604/542

Kisilevsky, B. S., Chambers, B., Parker, K., & Davies, G. (2013). Auditory Processing in Growth-Restricted Fetuses and Newborns and Later Language Development. *Clinical Psychology Sciences, 2*(4), 495-513. DOI: 10.1177/2167702613509371

Kisilevsky, B., Hains, S., Lee, K., Xie, X., Huang, H., Ye, H. H., Zhang, K., & Wang, Z. (2003). Effects of experience on fetal voice recognition. *Psychological Science; 14*(3), 220-224. DOI: 10.1111/1467-9280.02435

Kisilevsky, B., Hains, S., Brown, C., *et al.* (2009). Fetal sensitivity to properties of maternal speech and language. *Infant Behavior and Development, 32*(1), 59-71.
DOI: 10.1016/j.infbeh.2008.10.002

Kisilevsky, B., Gilmour, A., Stutzman, S., Hains, S. M., & Brown C. (2012). Atypical fetal response to the mother's voice in diabetic compared with overweight pregnancy. *Journal of Developmental Behavioral Pediatrics, 33*(1), 55-61.

DOI: 10.1097/DBP.0b013e31823e791e.

Lee, G. Y., & Kisilevsky, B. S. (2014). Fetuses Respond to Father's Voice but Prefer Mother's Voice after Birth. *Developmental Psychobiology, 56*(1), 1-11. DOI: 10.1002/dev.21084

Lee C., Brown C, Hains S, Kisilevsky B. (2007). Fetal development: voice processing in normotensive and hypertensive pregnancies. *Biological Research for Nursing, 8*(4), 272-282. DOI: 10.1177/1099800406298448

Martins, M. S. A. (2018). *A Voz Materna: Fatores Determinantes na Comunicação Pré-Natal*. Master Thesis in Psychology, Faculdade de Psicologia da Universidade de Lisboa.

Reid, V. M., Dunn, K., Young, R. J., Amu, J., Donovan, T., & Reissland, N. (2017). The Human Fetus Preferentially Engages with Face-like Visual Stimuli. *Current Biology, 27*, 1825–1828. DOI: org/10.1016/j.cub.2017.05.044

Rousseau, F., Studholme, C., Jardri, R., & Thomason, M. E. (2016). In Vivo Human Fetal Brain Analysis Using MR Imaging. In: N. Reissland, & B. S. Kisilewsky, Eds. *Fetal development: Research on brain and behavior, environmental influences, and emerging technologies*, pp. 407-427. London: Springer.

Table 1.
Sociodemographic data of the sample (N = 140).

		M	SD	min.	max.
Age		34.80	4.02	25	48
Education*		15.61	2.33	9	22
Duration of MR**		10.12	5.74	1	32
Number of past MRs		1.03	.88	0	3
Sons of the present MR		.61	.68	0	3
Sons of past MRs		.14	.49	0	3
Partner's age		36.57	4.99	24	53
Partner's education*		14.32	3.50	4	20
		Frequency		Percentage	
Nationality	Portuguese	138		98.6	
	English	1		.70	
	Brazilian	1		.70	
Marital Status	Married	78		55.7	
	LTOW***	59		42.1	
	Single	1		.70	
	Divorced	2		1.4	
Labor status	On its own	25		17.9	
	Employed	111		79.3	
	Unemployed	4		2.9	
Socio-economic status****	Level I	67		47.9	
	Level II	64		45.7	
	Level III	9		6.4	

* number of successful years at school; ** marital relationship; *** living together out of wedlock; **** Graffar system (1956).

Table 2.
Clinical characteristics of the sample (N = 140).

		M	SD	min.	max.
Gestational time*		32.09	1.90	27	37
Previous pregnancies		1.08	.98	0	4
Deliveries at term		.62	.70	0	2
Preterm deliveries		.11	.34	0	2
Spontaneous abortions		.31	.50	0	3
Voluntary abortions		.01	.05	0	1
Abortions by MA**		.02	.15	0	1
Fetal death		.01	.85	0	1
		Frequency		Percentage	
Pregnancy planning	not planned	29		20.7	
	planned	111		79.3	
Type of pregnancy	single	138		98.6	
	twin	2		1.4	
Baby´s gender	male	74		37.1	
	female	64		62.9	
	both	2		1.4	
MPBG	no	80		57.1	
	yes	60		42.9	
In case of preference	for male	23		38.3	
	for female	37		61.3	
HPDG	no	104		74.3	
	yes	36		25.7	

* Gestational weeks; MA- medical advice; MPBG- maternal preference for baby's gender; HPDG- health problems during gestation.

Table 3.
Factor loadings for the components of SMPNC according to principal component analysis, Equamax Rotation and no restrictions on the number of components extracted.

Items	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
1	.530	.223	.065	.544	.038	.112
2	.719	.174	.098	.303	.107	-.297
3	.727	.173	.161	.207	.236	-.402
4	.724	.177	.146	.138	.293	-.286
6	.460	.208	.629	-.138	.173	.102
7	.602	.386	.154	.396	.143	.011
8	-.015	-.048	.036	-.108	.046	.827
9	.186	.741	.067	.183	.295	-.230
11	.551	.395	.311	.276	.369	-.139
12	.085	.175	.831	.045	-.064	-.064
13	.052	.059	.192	.806	.132	-.063
14	.023	-.044	-.189	-.013	.049	.836
15	.492	.247	.158	.549	.392	.026
16	.551	.275	.148	.496	.327	.014
17	.132	.156	.525	.299	.453	-.017
19	.027	.022	.885	.182	-.002	-.077
20	.039	.555	.088	.376	-.296	-.023
21	.265	.817	.167	.124	.164	-.006
23	.139	.064	.631	.266	.308	-.236
25	.368	.311	.200	.578	.157	-.115
27	-.173	.101	-.003	.142	-.282	.678
28	.090	.872	.116	.066	.230	.073

Table 4.
Descriptive statistics for the results obtained in the five subscales and in the Total Scale of the SMPNC.

	M	SD	Skewness	Kurtosis	min.	max.
Subscale 1	24.079	6.766	-1.472	1.761	0	30
Subscale 2	11.914	3.517	-1.668	2.617	0	15
Subscale 3	10.443	6.223	.150	-.688	0	25
Subscale 4	15.671	3.986	-1.208	1.041	3	20
Subscale 5	9.900	4.167	-.597	-.539	0	15
Total Scale	72.007	18.179	-.548	-.222	19	104

Subscale 1- Verbal Communication with the Baby; Subscale 2- Engaging the Partner in the Communication Towards the Baby; Subscale 3- Contents Shared in the Communication Towards the Baby; Subscale 4- Perception About the Baby's Auditory Competence; Subscale 5- Availability for the Communication Towards the Baby.

Table 5.
Correlations among the subscales and with the Total Scale of the SMPNC.

	Subscale 2	Subscale 3	Subscale 4	Subscale 5	Total Scale
Subscale 1	.587**	.527**	.737**	.288**	.894**
Subscale 2		.390**	.510**	.103	.681**
Subscale 3			.512**	.170*	.765**
Subscale 4				.105	.791**
Subscale 5					.438**

Subscale 1- Verbal Communication with the Baby; Subscale 2- Engaging the Partner in the Communication Towards the Baby; Subscale 3- Contents Shared in the Communication Towards the Baby; Subscale 4- Perception About the Baby's Auditory Competence; Subscale 5- Availability for the Communication Towards the Baby.
* $p < .05$ (2 tailed); ** $p < .01$ (2 tailed).

Table 6.
Correlations between variables of the SMPNC and sociodemographic and clinical variables (N = 140)

	DPMR	NSPMR	NSPPMR	NPLPH	PE	GT	MPBG	PET
Subscale 1					-.179*		.166*	
Subscale 2		-.326**	-.276**	-.376**				-.289**
Subscale 3						-.193*		
Subscale 4	-.174*						.215*	
Subscale 5		-.170*						-.182*
Total Scale		-.225**		-.222**			.170*	-.175*

DPMR- duration of the present marital relationship; NSPMR- number of sons of the present marital relationship; NSPPMR- number of sons of the present and past marital relationships; NPLPH- number of people living in the present household; PE- partner's education (number of successful years at school); GT- gestation type (single, twin); MPBG- maternal preference for baby's gender (yes, no); PET- pregnancies ended at term. Subscale 1- Verbal Communication with the Baby; Subscale 2- Engaging the Partner in the Communication Towards the Baby; Subscale 3- Contents Shared in the Communication Towards the Baby; Subscale 4- Perception About the Baby's Auditory Competence; Subscale 5- Availability for the Communication Towards the Baby.
* $p < .05$ (2 tailed); ** $p < .01$ (2 tailed).