**Analysis of Moderator mediator binary variables in psychological researches:
A study of the effect of mother attachment patterns and maternal depression on infant's sleeps disorders.**

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Abstract : This study explores the mediation models which focus on the methods of Bootstrapping and PROCESS. It also examines the effect of mother's attachment patterns and maternal depression, as independent variables, on infant's sleep disorders, as a dependent one, through the mediator variable represented in the infant attachment. The sample consists of 86 dyads (mother and infant) infant age between 10 and 36 months. Infant Scale attachments Q-sort, Adult Attachment Scale and the shortened Beck Depression Inventory (SBDI) have been applied. The results have shown that infant attachment does not mediate the relation between mother attachment and infants sleep disorders (either partial mediation or complete mediation), on the one hand, and the relation between maternal depression and infant sleep disorders on the other hand.
Keywords: Mediation ; maternal depression; infant's sleeps disorders. ; mother attachment ;infant attachment.

I-   Introduction :

Structural Modeling Equation (Henceforth SEM) is one of the most popular and recent topics that helps to analyze and interpret complex models. This technique have gained a deep interest among researchers, academicians and students, due to its flexibility and efficiency.

SEM is a statistical methodology that offers a set of procedures such as multiple regression techniques, factorial analysis, and analysis of covariance. It goes through the steps of model specification, data collection, model estimation, model evaluation and also model modification. SEM is used to test a theoretical model by applying a series of regression equations and its use provides a good possibility to analyze the explanatory models of socio-economic phenomena and other phenomena involving multiple and complex variables. (Barroso da Costa C., 2010) (Aimran, N.A, Ahmad, S. Afthanorhan, 2016).

The concept of causality according to Plato (428-347 BC) means the relation between an event called cause and another event called the result. The second event is the result of the first, and so causation is linked to the desire to know and seek truth. (Boudon, R., Gautier, M., Saint-Sernin B., 2015).

One central goal of science is to understand how processes work rather than simply to establish whether a total effect exists. In other words, applied researchers need to investigate whether the cause-effect relation between the two variables is accounted for by any intervening variables. (Ma, Z. & Zeng W., 2014).

Mediator variables were used by many researchers who started from psychology and later applied to other sciences. Psychologists call Mediator variable indirect effect because of the effect that shifts from the independent variable X to the dependent variable Y by a third variable. (Ghofran, I.K. & Gessem, B. S., 2017)

It should be noted that there are types of mediation, including simple mediation, which contains one mediator variable, parallel mediation and mediation series containing more than one mediator variable.

Mediation in its simplest form represents the addition of a third variable to this X → Y relation, whereby X causes the mediator, M, and M causes Y, so X → M → Y. (MacKinnon, D.P., Fairchild, A.J. & Fritz M.S., 2007)

Approaches to mediation analysis:

Mediation analysis uses one of the four methods:

‒ Analysis Baron and Kenny (1986)
‒ Sobel test (1982)
‒ Bootstrapping method (Preacher and Hayes: 2004 - 2008).
‒ PROCESS method Andrew F. Hayes (2013).

We will present only the last two methods as the newest and currently used in dealing with mediation models.

The bootstrap method developed by Preacher & Hayes (2004, 2008) is a non-parametric re-sampling test. The main feature of this test is that it does not rely on the assumption of normality, and thus fits for smaller sample sizes (Pardo, A., & Roman, M. , 2013) (Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. , 2014).

This test has an advantage over Sobel's test and can help determine the mediation.

The mean of all bootstrap estimates is calculated from the point of the indirect effect. Because of the non-normal distribution, its importance lies in the conclusion of the indirect effect. The significance of the indirect effect is inferred from the confidence interval of its bootstrap distribution. If the confidence interval does not include zero, one can be statistically confident that the effect is different from zero. (Existence of the effect of mediator and moderator). (Demming, C. L. Steffen, J. & Boztug, Y., 2017) And it can be illustrated in the following diagram:
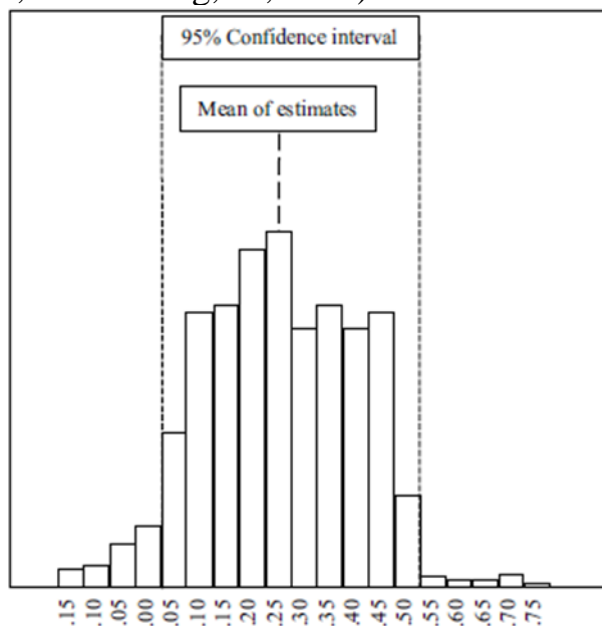

Diagram (1): Coefficients of indirect effect.
Source:(Demming, C. L. Steffen, J. & Boztug, Y., 2017)**.**

Estimation of mediation models by PROCESS:

PROCESS command includes a list of variables in the model which it should estimate, and a set of variable definitions that inform PROCESS what role various variables play in the model (i.e., independent variable, moderator(s), mediator(s), and dependent variable). The majority of the models' PROCESS estimates combine moderation and mediation analysis in some form, with various paths specified as unmoderated or moderated by one or two variables. A few of the models are mediation models without moderation (single, multiple parallels, or multiple serial), and a few are used for the analysis of moderation without a

mediation component, either simple multiple additives, or multiple multiplicative. (Andrew F. Hayes, 2012)

Moderator variables:
It is an effective way to promote psychological research designs and thus provide more realistic and accurate results. The moderator variable may be a qualitative variable such as (gender, marital status, ...) or quantitative variable (such as company size, financial leverage, and prices) which affects the strength and direction of the relation between the dependent variable (y) and the independent variable(x). (Namazi, M., Namazi,N.R., 2016).

Mediation Analysis with case of logistic regression (binary data):
Because of the nonlinear nature of the logistic regression, the previous methods for calculating the indirect effect of ab and c - c' are no longer equal. If M or Y is binary, there are many possible solutions to this problem found by some researchers (eg Imai, Keele, & Tingley, 2010). One of these methods is the unification of the variables and the calculation of the coefficient ab. The variance of the binary dependent variable should be considered when the path coefficient is standardized. For example, the path criterion will use the normal formula for converting a non-standard parameter to a standard parameter for the first path
$a^{\cdot} = a(S_x/S_M)$. But using a special calculation of the standard deviation relative to the binary variable $[M]$, $S_M = \sqrt{a^2 S_X^2 + \pi^2/3}$, Represents the mathematical constant π , Divided by 3 to estimate the difference in binomial distribution, if Y is also binary, a method similar to the second path b is used, the uniformity method approximates the deviation between ab و c-c' . (Newsom, J.T. , 2016).

Partial and Full Mediation:
To facilitate understanding of the meaning of partial and complete mediation we use the following form:
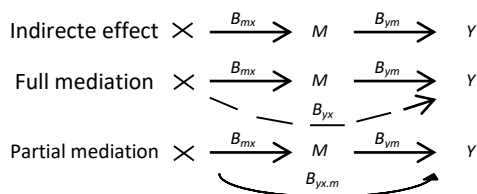

Figure (1): Partial and Full Mediation We summarize this diagram in the following analysis:
- The test of the effect of mediation depends on the type of indirect effect.
- The absence of a direct effect $X \rightarrow Y$ (β_{YX} either zero or statistically insignificant) is not evidence of the absence of mediation effect.
- So found three different cases are as follows:
1- Indirect effect ($\beta_{MX} \times \beta_{YM}$ statistically significant).
2 - Full mediation (β_{YX} statistically significant) but ($\beta_{YX.M}$ not statistically significant, path).
3-The existence of partial mediation (β_{YX} statistically significant) and ($\beta_{YX.M}$ not zero and statistically significant).
Partial versus full mediation might be viewed as an indication of the importance of a mediator variable in explaining the total effect (Cooper, B.K., 2015)

Others see that the importance of partial mediation is more commonly than full mediation. In other words, the mediator is likely to explain all the differences between x and y, suggesting that there may be additional mediators to be discovered.

When adopting the Baron and Kenny (1986) method, one must first make sure that the model variables follow the normal distribution (using the Kolmogorov-Smirnov test or relying on the spindle and spline measurements).

Problematic:

In this study, an extension analysis, known as the bootstrap approach, has been used to confirm the type of mediation that exists in tow structural models.

We show the effect of the variables among them according to the following equations:

For the equations of the first structural model:

$$\hat{Y} = \beta_{01} + \beta_{32}M + e_1 \qquad (1)$$
$$\hat{M} = \beta_{02} + \beta_{21}X_1 + e_2 \qquad (2)$$
$$\hat{Y} = \beta_{03} + \beta_{21}X_1 + \beta_{32}M + e_6 (3)$$

The second structural model equations are as follows:

$$\hat{Y} = \beta_{04} + \beta_{32}M + e_4 \qquad (1)$$
$$\hat{M} = \beta_{05} + \beta_{22}X_2 + e_5 \qquad (2)$$
$$\hat{Y} = \beta_{06} + \beta_{22}X_2 + \beta_{32}M + e_6 (3)$$

The relationship of the mother to her infant has a significant impact during the early years of the life of the individual and plays a significant role in the development of personality, Attachment as an initial path begins in the first moments of life is a phenomenon studied and discussed a lot by several clinical research, especially the study of Bowlby (1969), Ainsworth (1978) and Main (1985) defined attachment as a social and emotional link that arises between the child and the person who takes care of him, and this link lasts for temps and places.

In his report to the World Health Organization (WHO), Bowlby explained the essential role of attachment in the formation of a child's emotional relationship.

Marty writes: "Since birth, the unity and cohesion of the infant have been largely assured by the" maternal function» due to the mother's relationship with her baby. " (Marty, P., 1976).

The maternal function is characterized by "Real appreciation of the needs and wishes of the infant through its signals by deep identification of the infant, and by the use of the organization of the time and use of methods of intervention or not at the level of several channels of communication with the child" (Marty, P., 1980).

The mother is considered an organizer and regulator of infant life before he is mature. She represents his first encounter with individuals, and plays the role of protector against excitation, which later leads to the formation of a series of individual defensive mechanisms. The defect in the maternal function is the origin of subsequent somatizations.

Among the psychosomatic disorders that commonly occur to the infant are sleep disorders, especially if they are more than normal, and occur frequently and takes a recurring form that appears in the difficulty of falling asleep or in the form of nights' waking. These disorders are often translated into a disorder of the mother's relationship with her infant or a reflection of the mother's mental illness.

Marcelli pointed out that "Psychosomatic symptom occupies an important arena of the mother-child interaction system". (Marcelli, D., 2006).

Severe and persistent sleep disorders during this period of life, though multi-factorial, appear to be a sensible, early detectable and measurable index of potential trouble in child's psychological development. Sleep disorders are also particular interest in research related to the assessment of mother-child interaction because the problem provides a perspective on both the child's behavior when falling asleep or awakening and on the mother-child interaction at that moment. (Guedeney, A. & Krisler, L. , 1987)

Zuckerman found that the mother's depression is the most psychological factor related to infant sleep disorders. (Owens J.L. , 1999).

Infants of depressed mothers are more likely to be less sociable and more fearful of strangers. They may have lower frustration tolerance, tend to have more behavioural problems such as sleep and eating problems, temper tantrums, separation difficulties, and are more often insecurely attached. (Van Doesum, K.T.M, 2005).

Good contact with the mother facilitates the separation of the baby. The baby, who has no safe attachment, exhibits multiple symptoms of the disorder.

In order to avoid separation, the infant must have close contact with loving and protective individuals. Intimacy provides the child who grows up a Sense of self-worth and that it is understood by others. This feeling lasts even outside the parental presence, and it lasts after the baby sleeps. (Daws, D. , 1999).

This study aims to apply structural modeling equations and the concept of mediation to identify the most appropriate model for the inter-relation between the variables of the phenomenon which are: mother's attachment, maternal depression, infant attachment, and infant's sleep disorders, the effect of the mediator variable (infant attachment) by using the method of structural equations, and the analysis of mediation according to data bifurcation, where we used the process Andrew F Hayes to test the hypotheses.

We formulated the hypotheses of the study as follows:

1- There is a significant effect of the mediator variable (the infant's attachment) between the mother's attachment and infant's sleep disorders at a significant level. $\alpha = 0.05$

2- There is a significant effect of the mediator variable (the infant's attachment) between maternal depression and infant's sleep disorders at a significant level. $\alpha = 0.05$

To illustrate the nature of the variables, we refer to the following diagram:
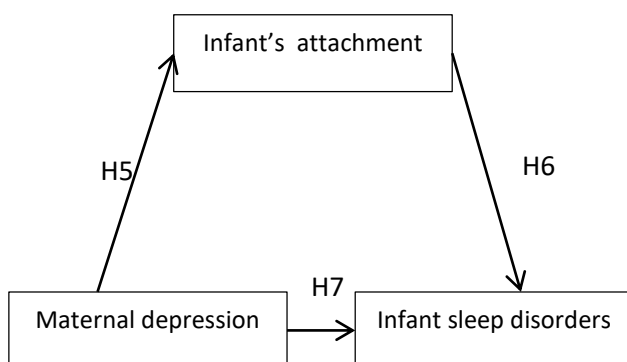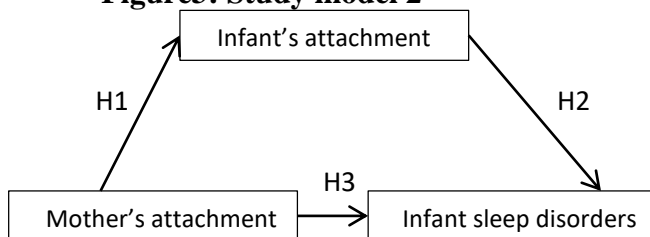
Figure 2: Study model 1

Figure3: Study model 2

The study is conducted in Laghouat municipality (south of Algeria), it requires mobility for homes because the measure of infant attachment is an intensive observation of the infant and his mother in his natural habitat, namely the home.

3. Method

Study Population:

The study population is composed of 14477 dyads infants-mothers originally from the municipality of Laghouat, Algeria. The data are collected from the year 2010 to year 2012.

Sample of the study:

By applying the sample size equation, we obtained 350 mothers- infants dyads from the original community with a margin error equal to 5, confidence level equal to 95% and the confidence interval "is equal to 50

A group of students was formed in Q-sort. 500 documents were distributed to them, of which about 200 documents were returned, deleted from them incorrect applications and that including incomplete data. The study sample was based on 86 dyads (24.5% of the statistical population).

Conditions of inclusion in the sample:

- The child's age ranges from 10 to 36 months. We limited our attention to the stage of breastfeeding. Because the application of the Q-sort does not exceed these age limits.
- The baby should not be preterm or disabled.
- The mother is the biological mother.

Sample Characteristics:

The table below shows the infant's age in months where the average age of infants was 20.86 Sd = 7.56

The gender and rank of the infant are also shown, with higher males than females in the sample.

The table (2) shows the age of the mothers, where we have an average age of 31.06 and a standard deviation Sd = 5.36 shows that most of the mothers of the group are young. Most of them have a good level of education, either secondary or university. More than half are housewives. There was no divorced mother in the sample, whereas we recorded the presences of three widow mothers.

Table (1): Characteristics of infants * The number in brackets represents the proportions

Characteristics	Number and percentage	M	D	range
Age by months				
10-18	41(48.83)	20.86	.56	10-36
19-27	23(26.74)			
28-36	22(25.58)			
gender				
Male	55(63.95)			
Female	31(36.04)			
Order				
1	32 (37.20)			
2	26 (30.23)			
3	18(20.93)			
4	7(8.13)			
	3(3.48)			

Table (2): Characteristics of Mothers. * The number in brackets represents the proportions.

Characteristics	Number and percentage	M	SD	Range
Age				
20-28	33(38.37)	31.06	5.36	20-43
29-37	42(48.83)			
37-43	11(12.79)			
Educational level				
Primary	6(6.97)			
Average	15(17.44)			
Secondary	32(37.20)			
University	33(38.37)			
Mother's work				
Worker	44 (36.04)			
Housewife	55(63.95)			
Family status				
Married	83(96.51)			
Divorced	0(0)			
Widow	3(3.48)			

Measures:

In this study, we used three techniques:

1 - Infant Scale Attachment Q-sort:

It is one of the most widely used psychometric methods after the strange situation and the most widespread in the world for measuring and checking the level of attachment of the child. It was designed by Waters & Deane (1985) in the laboratories of the University of New York, USA, and this scale does not give patterns of attachment as we find in the strange situation. However, it gives an indicator of safe attachment. 79 items written on cards were sorted out by the observer, whether the mother or the researcher. This scale was translated and validated into Arabic. We resorted to content validity. We found that the coefficient of agreement between the experts was W of Kendal: 0.89 with a significance level of 0.0001 and from it there is an agreement between the scores of the experts in the Arabic version of the scale. We calculated the reliability of

the scale by re-applying it to the same individuals. They have been 20 mother-infant two months dyads after the first application and found that the Pearson correlation coefficient between the results of the first application and the results of the second application was 0.68 which is a very acceptable coefficient.

2 – Adult Attachment Scale :

Designed by Abogazal and Jaradate, it is a measure to identify adult attachment patterns. This measure consists of (20) paragraphs, which are answered by the six-step Likert method, where the number (0) does not apply at all, and the number (5) applies exactly. Distributed over three dimensions: Secure attachment style, ambivalent – Anxious attachment style and Avoidant attachment style.

1. **The shortened Beck Depression Inventory (SBDI):**

Prepared by Beck, it provides a quick and robust assessment of the level of depression.

Its abbreviated form is composed of 13 items instead of 21, each item contains a set of 4 choices.

Statistical Analyses:

We examined the sample using standard descriptive statistics with SPSS program.

Results:

- Analysis of the mediation results of the first model:

For the first study model, we follow the following steps: ANALYZE, REGRESSION, and PROCESS. Results are:

Table (3): Variables of the model 1

Dependent, Independent, and Proposed Mediator Variables:
DV = y (Infant sleep disorders)
IV = x1 (mother's attachment)
MEDS = x3(infant attachment)
Sample size 86

Table (4): Track a (Independent - Medium)

IV to Mediators (a paths)			
	Coeff	se	t	p
X1	-0,0151	0,0388	-0,3896	0,6978

Table (4) presents the effect of the independent variable (mother's attachment x1) on the median variable (Infant's attachment (x3). The null hypothesis was as follows: there isn't a significant effect of mother's attachment on the infant's attachment at a significant level α =0.05

Refer to Table (4) showing acceptance of a null hypothesis because $p-value=0.6978>\alpha=0.05$.

Table (5): Track b (Mediator-dependent)

	Coeff	se	z	p	wald
	Direct Effects of Mediators on DV (b paths)				
x3	-2,0293	1,2961	-1,5658	0,1174	2,4517

Table (5) presents the effect of the mediator variable (Infant attachment x3) on the dependent variable (Infant sleep disorders y). The null hypothesis was formulated as follows: There is no significant effect of infant's attachment on infant's sleep disorders at a significant level α =0.05
Refer to Table (5) showing acceptance of the null hypothesis because $p-value = 0.1174 > α = 0.05$.

Table (6): Total Impact Track c (Independent - Dependent)

	Coeff	se	z	p	wald
	Total Effect of IV on DV (c path)				
x1	0,2488	0,4355	0,5713	0,5678	0,3264

Table (6) represents the effect of the independent variable (x1) on the dependent variable (Infant sleep disturbance y). The hypothesis was formulated as follows: there isn't a significant effect of mother's attachment on infant's sleep disorders at a significant level α =0.05.
Refer to Table (6) showing acceptance of the null hypothesis because $p-value = 0.5678 > α = 0.05$.

*
Table (7): Direct Impact Track c '(Independent - Dependent)

	Coeff	se	z	p	wald
	Direct Effect of IV on DV (c' path)				
x1	0,2295	0,4418	0,5193	0,6036	0,2697

Table (7) represents the effect of the independent variable (x1) on the dependent variable (Infant sleep disorders y), and the formulation of the null hypothesis is as follows: there isn't a significant effect of the mediator variable (infant's attachment) between mother's attachment and infant's sleep disorders infant's sleep disorders at a significant level α =0.05.
Refer to Table (7) showing acceptance of the null hypothesis because $p-value = 0.6036 > α = 0.05$

Table (8): Indirect effect Track ab (independent - dependent)

BOOTSTRAP RESULTS FOR INDIRECT EFFECTS				
Indirect Effects of IV on DV through Proposed Mediators (ab paths)				
	Data	Boot	Bias	se
Total	0,0307	0,0413	0,0106	0,1091
x3	0,0307	0,0413	0,0106	0,1091

Table (8) indicates the indirect effect which is the path ab (the effect of independent on the mediator × the effect of the mediator on the dependent).

Table (9): bias, correction of areas of confidence

Bias Corrected Confidence Intervals		
	Lower	Upper
Total	-0,1262	0,3658
x3	-0,1262	0,3658

Table (9) represents bias, correcting the areas of confidence, and we use this to test the hypothesis about the influence of the mediator between the independent variable and the dependent variable, and the formulation of the hypothesis is as follows: There isn't a significant effect of the mediator variable (the infant's attachment) between mother's attachment and infant's sleep disorders at a significant level α = 0.05.

The previous tables show that there is no significant indirect effect of the mediator

Statistically.

If the area of confidence does not include zero, we can say that we are statistically confident that the effect is different from zero (the existence of effect of the mediator variable), and in Table (9) we observe that zero is the median of the pathway confidence (mother's attachment, infant's attachment and infant's sleep disorders) [-0,1262   0,3658] Table (9) is normal because this path did not achieve the first condition $sig = 0,6978 > \alpha = 0,05$) For path a Table (4) and ($sig = 0,1174 > \alpha = 0,05$) for path b Table (5)

Therefore, we conclude that there is no significant effect of the median variable (infant attachment) between the independent variable (mother attachment) and the dependent variable (infant sleep disorders) and from that, we accept hypothesis because the field of confidence is $[-0,1262   0,3658]$ interspersed with zero Table (9).

Table (10): Summary of some logistic regression indicators

Logistic Regression Summary for DV Model					
-2LL	Model LL	McFadden	Coxsnell	Nagelkrk	n
115,5726	2,9035	0,0245	0,0332	0,0444	86

Table (10) is a summary of some logistic regression indicators: R-deux de Nagelkerke and R-deux de Cox et Snell Which have the goal of counting R^2 in multiple linear regression, as well as log-likelihood and McFadden's pseudo-R squared

Analysis of the mediation results of model 2:

As for the second study model, we obtained the following results:

Table (11): model 2 variables

Dependent, Independent, and Proposed Mediator Variables:
DV =   y(Infant sleep disorders)
IV =   x2(maternal depression)
MEDS = x3(infant attachment)
Sample size 86

Table (12): Track a (Independent - Medium)

IV to Mediators (a paths)				
	Coeff	se	t	p
x3	-0,0761	0,0408	-1,8651	0,0657

Table (12) represents the effect of the independent variable (x2 maternal depression) on the median variable (infant attachment x3), and the formulation of the hypothesis is as follows: There isn't a significant effect of maternal depression on infant's attachment at a significant level α = 0.05.

Refer to table (12) showing acceptance of the null hypothesis because $p-value=0.0657>\alpha=0.05$

Table (13): Track b (mediator-dependent)

Direct Effects of Mediators on DV (b paths)					
	Coeff	se	z	p	wald
x3	-1,3814	1,3159	-1,0498	0,2938	1,102

Table (13) shows the effect of the mediator variable (infant's attachment x3) on the dependent variable (Infant sleep disorders y). The hypothesis was formulated as follows: There isn't a significant effect of infant's attachment on infant's sleep disorders at a significant level α =0.05.

Refer to Table (13) showing acceptance of the null hypothesis because $p-value=0.2938>\alpha=0.05$

Table (14): Total Impact in Track (Independent- dependent)

Total Effect of IV on DV (c path)					
	Coeff	se	z	p	wald
x2	1,5328	0,5033	3,0458	0,4135	9,2768

Table (14) represents the effect of the independent variable (x2 maternal depression) on the dependent variable (Y infant's sleep disorders). The hypothesis

was as follows: There is not a significant effect of maternal depression on infant's sleep disorders at a significant level α =0.05.

Refer to Table (14) showing acceptance of the null hypothesis because $p-value = 0.4135 > \alpha = 0.05$

Table (15): Direct Impact Track c '(Independent - Dependent)

	Coeff	se	z	p	wald
Direct Effect of IV on DV (c' path)					
x2	1,4466	0,511	2,831	0,0046	8,0146

Table (15) presents the effect of the independent variable (x2 maternal depression) on the dependent variable (Y infant sleep disorders). The hypothesis was formulated as follows: there isn't a significant effect of maternal depression on infant's sleep disorders at a significant level α =0.05.

Refer to Table (15) showing rejection of the null hypothesis $p-value = 0,0046 < \alpha = 0,05$.

There is a significant effect of maternal depression on infant's sleep disorders at a significant level.

Table (16): Indirect effect Track ab (independent - dependent)

BOOTSTRAP RESULTS FOR INDIRECT EFFECTS				
Indirect Effects of IV on DV through Proposed Mediators (ab paths)				
	Data	Boot	Bias	se
ToTaL	0,1052	0,1011	-0,004	0,1341
x3	0,1052	0,1011	-0,004	0,1341

Table (16) shows that the indirect effect is the path ab (the effect of independent on the mediator × the effect of the mediator on the dependent).

Table (17): bias, correction of areas of confidence

Bias Corrected Confidence Intervals		
	Lower	Upper
Total	-0,0753	0,5059
x3	-0,0753	0,5059

Table (17) represents bias, correcting the areas of confidence, and we use this to test the hypothesis about the influence of the mediator variable (infant's attachment) between the independent variable and the dependent variable, and the formulation of the null hypothesis is as follows: There isn't a significant effect of the mediator variable (the infant's attachment) between maternal depression and infant's sleep disorders at a significant level α = 0.05.

The previous tables show that there is no significant indirect effect of the mediator (Maternal depression → Infant′s attachment → Infant′s sleep disorders)

If the area of confidence does not include zero, we can say that we are statistically confident that the effect is different from zero (the effect of the variable of the mediator) [−0,0753 0,5059]

Table (17) is normal because this path did not achieve the first condition $sig = 0,0657 > \alpha = 0,05$.

Thus, we conclude that there is no significant effect on the mean variable (infant attachment) between the independent variable (maternal depression) and the dependent variable (infant sleep disorders)

And from that we accept because the field of confidence [-0.0753 0.5059] Interspersed with zero.

Table (18): Summary of some logistic regression indicators

Logistic Regression Summary for DV Model									
	-2LL	LL	Model	n	McFadde	ll	Coxsne	k	Nagelkr	n
1	107,27 8		11,204		0,0946		0,1222		0,1634	6	8

Table (18) is summary of some logistic regression indicators: R-deux de Nagelkerke, R-deux de Cox et Snell, Which have the goal of counting in multiple linear regression, as well as log-likelihood and McFadden's pseudo-R squared.

Discussion:

The results obtained from the mediation study show that in each of the two proposed models we did not find an effect of the mediator variable. There is no effect of infant's attachment as a mediator variable between mother's attachment patterns and infant's sleep disorders.

Also, there is no effect of infant attachment as a mediator variable between maternal depression and infant's sleep disorders.

Leon Kreisler and Michel Fan have hypothesized that sleep disorders in an infant are psychosomatic disorders arising from a parent-child relationship disorder.

Lozoff (1985) cited five key factors for sleep disorders which are consistent with external events to the mood of the mother are: accident or illness, unaccustomed absence of mother during the day, maternal depressed mood, co-sleep with parents and maternal ambivalence toward the child). She confirms that sleep disorders occur especially in children whose mother's psychological attention had been withdrawn from them. (Guedeney, A. & Krisler, L. , 1987)

Many scientists, including Guedeny & Kreisler (1987), Lozoff & al (1985) and Zuckerman & al (1987) attributed infant sleep disorders to maternal depression.

Studies of Richman & al (1993) and Van tassel (1985) found that babies with sleep disorders had mothers with higher levels of depression. (France, G.K. & Blampied, M.N., 1999).

Other studies also report that mothers of infants with sleep disorders have many depressive symptoms and more problems in the dyadic interactions mother- infant. (Dittrichova, J. & al., 1994) (Morrell, J. & Steele, H, 2003)

This is consistent with the Merigeaud S. & Dumel F. (2006) study which shows that the risk of developing sleep disorders in an infant is three times higher if the mother is depressed. (Merigeaud, S. & Dumel, F. , 2006)

Thus, a woman's depression has a negative impact on the relationship between the mother and her child.

It may lead to sleep disorders. Therefore, attention must be paid to the mental health of women, and the diagnosis and treatment of this disorder to avoid negative consequences that may affect the infant.

That is, the more depressed the mother is, the lower the degree of attachment in the infant is. A depressed mother is often affected by all levels of

interaction between her and her infant. And slow down and tend to passivity. The quality of the reaction and its quantity vary. This affects the emotional and social growth of her baby. Depressed mothers may be "unavailable" or have inadequate responses, affecting the quality of their infant's attachment.

Several studies, including Lyons-Ruth and others, have found an association between insecure attachment measured at 12 months of age using strange situation and the presence of high levels of depression in the mother. Murray found a statistically significant association between the incidence of postpartum depression and insecurity of attachment in an infant measured at the age of 18 months. With avoidance being the prominent insecure attachment profile.This relation has also been demonstrated in other samples including Teti et al(1995) as well as Campbell and Cohn(1997). (Murray, L. et Cooper, P.J., 1997)

In their study of Parisian infants, Rosenblum O. et al found that the dimensions of maternal depression determine the type of infant's attachment as these infants develop an insecure attachment. They are characterized by diminution of positive affective facial expressions and vocalizations. The babies are either more restless or more aloof; they pay less attention to their mother. They are less involved and no harmony in emotional interaction. (Rosenblum, O., 1977)

The analytical synthesis of Martin and Gaffan

In 2000, seven studies all gave a statistically significant consensus that depressed mothers negatively affect the quality of attachment in their infants. Avoidant and disorganized patterns were the most common. (Martins, C. & Gaffan, E.A., 2000)

We note that the suffering of these mothers prevents them from actually doing the basic thing of separating from their babies. They are not able to separate as a result of their suffering, nor do they help our infants to separate and to move towards the path of uniqueness and separation, which according to Margaret Mahler is essential for self-formation

In addition to the emotional and negative lack of a depressed mother, the infant (who is not yet able to express his feelings and desires) develops abnormal physical responses called psychosomatic sleep disorders. It is an expression of a relationship in which security, briefing, and protection are lacking. It cannot reach a safe, if temporary, break during sleep.

According to Lyons-Ruth (1986), Murray (1992), and Radke-Yarrow (1985) depressed mothers of infants in their first year of life suffer from unsafe attachment. (Rosenblum, O., 1977)

In a pioneering study by Mary Main et al (1985), they found that the quality of attachment of children to their parents at the age of 1 and 6 years of age is remarkably correlated with specific patterns of parental response to Berkeley's adult interview.

(Berkeley Adult Attachment Interview).

Regarding attachment theory, Bowlby believes that the attachment of the infant to his mother begins during the second half of the life of the child. The maternity band or the attachment of the mother to the infant begins immediately after birth if not before. Inge Bretherton (1989) conducted a study on maternal attachment patterns with a new method, Parent attachment interview and linked to the attachment in the infant at the age of 25 months and 36 months measured by two means are strange position. (Bretherton I. et al., 1989)

Our study was contrary to the previous research and did not achieve the hypotheses of the study; this does not diminish the value of research, but adds a lot. This means that the child or all the children become insecure. Other things and variables may interfere in the formation of the child's attachment, such as his mood and his willingness to form an unsafe attachment.

Or the mother may take compensatory behavior with the infant to avoid the deprivation she has been exposed to, and provide the necessary attention and care.

Conclusion:

To understand the nature of the mediation analysis, its types were discussed theoretically, and the formulation of a practical model through our research, which is the study of the effect of attachment patterns and maternal depression on infant sleep disorders.

The results showed that direct and indirect pathways were not significant in both models (1 and 2), where there was no effect of the mediator of (infant attachment)

This was after using the Process Andrew F Hayes, In light of this, it cannot be assumed that attachment to the infant does not mediate (partial mediation or complete mediation) the relationship between mother attachment and infant sleep disorders on the one hand, On the other hand, mother depression and infant sleep disorders.

In this study, we can also conclude that the method of bootstrapping and Process Andrew F Hayes is a powerful tool for mediation analysis, which is more effective according to the macro process, so we suggest this technique to analyze mediation for researchers in the field of psychology and education.

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