MODERATION AND MODERATED MEDIATION IN THE ANALYSIS OF NON-NUTRITIVE SUCKING PATTERN OF PRETERM

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Introduction

The effect of maturation (Gestational Age (GA)) versus experience on sucking remains under debate. Recent developmental theories highlight the importance of experience or practice in obtaining better movement capacity.
Spontaneous activity and experience play important roles in the selection of the neural circuits that are generated by maturation.

Aim

This study aims to understand the effect of maturation and experience on the development of sucking.

Methods

We hypothesize that sucking rhythm depends on maturation (GA), influenced by newborns (NB) experience (moderator).

Dependent variable: number of suctions per burst.
Independent variables: post conceptional age (GA), maturation, and time of oral experience (TEXP - experience)

Sample of 34 NB with mean GA 33.2 weeks and mean TEXP 14.7 days (Table 1).

There was a positive correlation between the independent variables (GA and TEXP). To reduce this correlation, we obtained new standardized variables (Z) still correlated $(X - \frac{MeanX}{Standard\ deviation\ X})$.

Their product yielded a variable of interaction between independent variable and moderator (Table 2).

Through linear regression, the independent variable did not explain the number of suctions.

Mediation can be defined as an indirect effect and occurs when there is an effect of a particular independent variable (predictor) on a dependent variable (result) that is transmitted by a mediator (figure 1). The total effect (c) of the independent predictor variable (X), on the dependent variable (Y) is decomposed into the indirect effect of X on Y quantified by the product axb and on the direct effect of X on Y with the effect of the removed mediator quantified by c '(c = ab + c ')

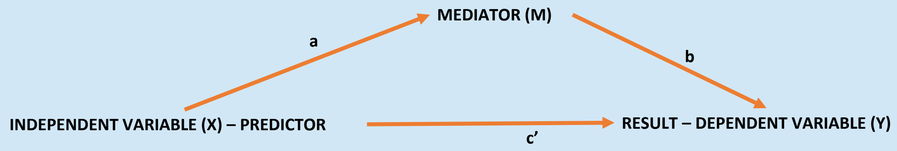

Table 1 - Sample demographics

N= 34	Mean ± SD		Minimum	Maximum
Gestational Age (weeks)	33.3	2.44	28	40.6
Time of Experience (days)	14.7	13.5	0	67
Number of Sucks per Burst	6.6	2.3	2	12

Table 2 - Variables Pearson´s correlation (p-value)

	GA	TEXP	Nº Sucks Burst	ZGA	ZTEXP
Time of Experience (TEXP)	0,772 (<0.001)				
Number of Sucks per Burst	0.004 (0.004)	0.412 (0.015)			
Z Gestational Age (ZGA)	1.000 (<0.001)	0.772 (<0.001)	0.477 (0.004)		
Z Time of Experience (ZTEXP)	0.772 (<0.001)	1.000 (<0.001)	0.412 (0.015)	0.772 (<0.001)	
ZGA x ZTEXP	0.769 (<0.001)	0.988 (<0.001)	0.421 (0.013)	0.769 (<0.001)	0.988 (<0.001)

Using Hayes AF methodology (PROCESS macro to the SPSS®), the curves obtained with the plot slopes show a dichotomous interaction between maturation and experience in the number of suctions.
At lower GA (≤30 weeks), greater experience shows a tendency for fewer suctions; at higher GA (≥35 weeks), more experience seems to increase the number of suctions. The cut-off point appears to be at 32 weeks GA (Figure 2). However, this trend did not show statistically significant difference (between z scores; p>0.05).

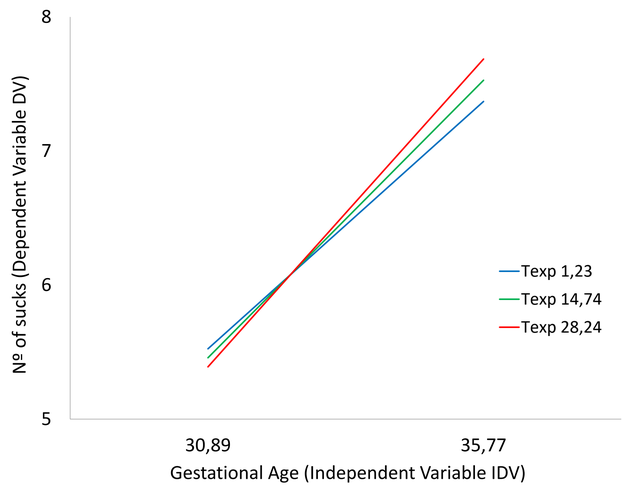

Figure 2: Variation in the number of suctions with low gestational age (≤30 w) or high (≥35 w) and according to the low, medium or high experience time. Point of intersection 32.3 weeks GA.

Conclusions

The most recent developmental theories point to an important role of experience in the development of sucking patterns.

However, in the first phase, the existence of several neurons with identical function, as well as the existence of alternative neuronal synapses involved in the production of the same movement, contribute to a greater variability that progressively will give place to a better performance and a reduced energy expenditure.

The classic statistical models do not allow to effectively separate the mediation of experience on sucking pattern maturation. The use of PROCESS highlights, like in other biological phenomena, that an initial phase of apparent disorganization will be replaced by a stable condition of equilibrium, as demonstrated.

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