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Short Note

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Sleep and Dream Characteristics in Twins

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A study of sleep and dream characteristics has been carried out by questionnaire on a sample of 77 MZ and 76 DZ same-sex twin pairs of two age groups, 6–8 and 16–18 years. Genetic effects could not be detected in the younger age group and appeared to be rather limited in the older one, possibly as a result of the limited variability of the considered variables and of the levelling influence of the common environment.

Key words: Sleep duration, Dream contents, Twins

INTRODUCTION

Sleep characteristics may be very concordant in twins, as suggested by cases such as that reported by Gedda [3] of the 23-year-old MZ twin sisters who could both sleep up to 15 hours a day. Geyer [6] reported concordance for a number of sleep characteristics to be higher between MZ than DZ twin partners, and we ourselves, studying enuresis in twins, noted a high degree of genetic conditioning and a clear chronogenetic family pattern in the reestabilshment of a normal control of diuresis during sleep time [4, 5].

These and similar findings would point to the existence of a genetic component of sleep characteristics. They are, however, in contrast with Anokhine's interesting observations on the xyphodymus conjoined twins, Ira and Galia, one of which could laugh and play while the co-twin would sleep [1]. Because these twins had a shared circulation but clearly distinct central nervous systems, this observation also appeared to contradict Piéron's hypothesis viewing the sleep state as controlled by an accumulation of circulating hypnotoxins [9] and was held by Anokhine to support Pavlov's theory [8] which viewed sleep as the result of an "internal inhibition" of the nerve cell.

MATERIALS AND METHODS

As an attempt to contribute to the assessment of possible genetic effects on sleep characteristics, as well as on the related phenomenon of dream, a questionnaire twin study included items addressed to these two aspects. A total of 400 unselected twin pairs, subdivided into the two age-groups, 6–8 and 16–18 years, were invited to record, over seven consecutive nights and, if needed, with the help of their parents, the time they went to sleep, the time they woke up, and the presence or absence of dreams. Whereas individual twin recordings were requested, in the case dream was reported to have been present, cotwins were invited to assess concordance or discordance of contents. Complete answers by both cotwins with reliable zygosity assessment, based on the usual questionnaire methods supplemented by genetic markers, were obtained for 153 pairs as described in Table 1.

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TABLE 1. The Twin Sample

Age group	MZ pairs (n = 77)		DZ pairs (n = 76)		Total		
	MM	FF	MM	FF	MM	FF	Total
6–8 yrs	23	24	21	24	44	48	92
16–18 yrs	13	17	15	16	28	33	61
Total	36	41	36	40	72	81	153

TABLE 2. Variability in Duration of Sleep and Reported Dream Frequency

Age group	Sleep duration (no. of hrs)						Reported dream frequency (no. of nights)					
	Males		Females		Total		Males		Females		Total	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
6–8 yrs	9.7	0.8	9.8	0.7	9.8	0.8	3.5	1.0	3.4	1.5	3.5	1.3
16–18 yrs	8.7	0.8	8.4	0.9	8.5	0.9	3.9	1.6	4.7	1.7	4.3	1.7

TABLE 3. Analysis of Variance, Test of Equality of Total Variances, and Estimates of Genetic Variance [2]

	Sleep duration		Reported dream frequency	
	6–8 yrs	16–18 yrs	6–8 yrs	16–18 yrs
MZ pairs				
n	47	30	35	35
AMS	3.19	3.67	3.86	4.33
WMS	1.93	1.45	1.48	1.32
DZ pairs				
n	45	31	26	30
AMS	3.06	3.04	4.02	3.96
WMS	1.98	2.02	1.49	1.58
Test of Variance Equality				
$\sigma^2_{MZ} = \sigma^2_{DZ}$, P value	ns	ns	ns	ns
Estimates of genetic variance				
Within pair	0.05	0.57*	−0.01	0.26*
Among components	0.09	0.60	−0.08	−0.31

AMS = Among–pair mean squares; WMS = Within–pair mean squares.

RESULTS AND DISCUSSION

Little or no variability in duration of sleep and reported frequency of dreams was found between sexes. However, duration of sleep appeared to considerably decrease with age–a far from surprising finding–and the reported frequency of dream to increase with age (Table 2).

Table 3 summarizes the results of the analysis of variance, including a test of equality of total variances of the two zygosity groups and estimates of genetic variance, derived as suggested by Christian [2].

It can be seen that no genetic effect is detected in the younger age group–a finding that can be interpreted in the light of the limited variability both of sleep duration (largely a function of age is well as of family habits) and of dream frequency (apparently more underreported in the younger age group. In fact, within-pair correlations overlap in the two zygosity groups for both variabiles–sleep duration: rMZ 0.71, rDZ 0.71; reported

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dream frequency: rMZ 0.67, rDZ 0.65. With these values, even an heritability estimate such as Jensen's h^2 [7], yields 0 in both cases. However, when increased individual variability in the older age group allows the detection of genetic effects, these appear to be rather limited, correlation values being rMZ 0.97 vs rDZ 0.85 for sleep, and rMZ 0.71 vs rDZ 0.55 for dream. Even h^2 values are as low as 0.23 and 0.32, respectively.

Finally, Table 4 shows the number of pairs having had a similar dream at least once in the seven nights over the number of pairs of both co-twins remembering dream contents for the given subsample. It can be seen that the concordance values are higher in female than male pairs and tend to increase with age. However, no zygosity effect is found.

TABLE 4. Concordance of Dream Contents

	MZ pairs			DZ pairs			Total		
	MM	FF	Total	MM	FF	Total	MM	FF	Total
6–8 yrs	1/21	1/19	2/40	0/19	1/20	1/39	1/40	2/39	3/79
16–18 yrs	0/11	4/16	4/27	1/14	2/13	3/27	1/25	6/29	7/54

Our findings consistently indicate that genetic effects in sleep and dream characteristics as considered in this study are far from relevant and likely to be masked by the limited variability of the phenomena, possibly increased by the levelling influence of the common environment.

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