Introduction to behavioral genetics

PSYCH 3102 Dr Hewitt

HOMEWORK #4 QUESTION SHEET

1. Complete the table on the answer sheet showing the expected correlations due to the narrow heritability, h^2, for the following types of relative:

   MZ twins DZ twins Parent with adopted child

   Parent with biological child Adoptive siblings

   Biological full siblings Biological half siblings

   Cousins

   Ignore environmental or other contributions to family resemblance.

   Write on your table the corresponding numerical value for a narrow heritability estimate of 60%.

2. The following table gives the reported same-sex correlations for 4 traits. Assume that the sample sizes were large.

TRAIT	MZ CORRELATION	DZ CORRELATION
Height (HT)	0.93	0.46
General cognitive (IQ)	0.86	0.60
Neuroticism (N)	0.48	0.24
Extraversion (EXT)	0.50	0.13

Based on the data given above, and assuming the validity of the twin study method, for each trait answer the following questions:

i. Is the trait influenced by genes?

ii. Is there evidence of shared family environmental effects?

iii. Is there evidence for non-additive genetic effects?

iv. Does the non-shared environment account for more than 10% of the variance?

3. A population of individuals is genetically identical for all relevant genes determining a given genetic trait. What is the heritability of this trait in this situation? Explain.

4. State, with reasons, whether you think the following statements are true or false regarding the term 'heritability' as defined in class:

a. Heritability is the proportion of a phenotype that is passed on to the next generation
b. High heritability implies genetic determinism
c. Heritability is informative about the nature of between-group differences
d. A large heritability implies genes of large effect.

5. The following data was obtained from a case/control study investigating the possibilityof an association between polymorphisms at the DAT1 locus (alleles 9 and 10) and conduct disorder (CD) diagnosis (Schulz-Heik et al, 2008).

		Alleles	9/9	9/10	10/10
Number with CD	Controls (n=162)		9	55	98
	Cases (n=210)		10	71	129

Perform a chi-square test to see if there is a significant association.

INTRODUCTION TO BEHAVIORAL GENETICS

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ANSWER SHEET

NAME_____

ID _____

1. **Type of relative**	**Expected correlation in terms of h^2**	**Numerical value if $h^2 = 0.6$**
MZ twins	h^2	
DZ twins		
Parent w. adopted child		
Parent w. biological child		0.30
Adoptive siblings		
Biological full sibs	½ h^2	
Biological half sibs		
Cousins		0.075

2. **TRAIT**

	HT	**IQ**	**N**	**EXT**

i.Is the trait influenced by genes?

Reasons:-

ii.Is there evidence of shared

family environmental effects?

Reasons:-

iii.Is there any evidence for

non-additive genetic effects?

Reasons:-

iv.Does the non-shared environment

account for more than 10% of variance?

Reasons:-

3. Heritability for this trait is
Because

4. a.

b.

c.

d.

5. Chi-square test for association between alleles at DAT 1 locus and conduct disorder: