Supplementary Material

Genetic specificity of hippocampal subfield volumes, relative to hippocampal formation, identified in 2,148 young adult twins and siblings

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TABLE S1 Genetic and Phenotypic Cross-Hemisphere Correlations, and Heritability, for Hippocampal Formation and Subfield Volumes (Shown with 95% Confidence Intervals) for the QTIM and HCP Cohorts

Raw Data Volume	**Genetic *r***	**Phenotypic *r***	**Heritability**	
			Left Hemisphere	Right Hemisphere
1. QTIM				
Hippocampal Formation	**1.00** (1.0, 1.0)	**0.89** (.88, .90)	**0.85** (.75, .89)	**0.90** (.82, .92)
CA1	**0.98** (.94, 1.0)	**0.80** (.78, .82)	**0.80** (.66, .85)	**0.83** (.72, .86)
Molecular Layer	**1.00** (1.0, 1.0)	**0.85** (.83, .86)	**0.81** (.69, .86)	**0.86** (.76, .89)
CA4/Dentate Gyrus	**1.00** (.93, 1.0)	**0.79** (.77, 81)	**0.77** (.66, .82)	**0.76** (.61, .84)
Subiculum	**0.99** (.95, 1.0)	**0.86** (.84, .87)	**0.81** (.66, .87)	**0.84** (.74, .87)
Presubiculum	**1.00** (.95, 1.0)	**0.80** (.77, .82)	**0.80** (.67, .85)	**0.76** (.62, .81)
CA2/3	**1.00** (1.0, 1.0)	**0.71** (.68, .74)	**0.64** (.48, .71)	**0.72** (.55, .79)
Fissure	**0.97** (.85, 1.0)	**0.63** (.59, .67)	**0.65** (.48, .72)	**0.53** (.31, .66)
Fimbria	**0.86** (.76, 1.0)	**0.65** (.61, .68)	**0.62** (.40, .77)	**0.58** (.38, .68)
HATA	**1.00** (1.0, 1.0)	**0.66** (.62, .69)	**0.53** (.33, .71)	**0.58** (.37, .67)
Parasubiculum	**0.96** (.88, 1.0)	**0.62** (.58, .65)	**0.67** (.54, .74)	**0.58** (.40, .66)
2. HCP				
Hippocampal Formation	**1.00** (.98, 1.0)	**0.92** (.91, .93)	**0.88** (.78, .92)	**0.91** (.85, .93)
CA1	**0.99** (.96, 1.0)	**0.85** (.84, .87)	**0.80** (.66, .86)	**0.83** (.73, .87)
Molecular Layer	**1.00** (1.0, 1.0)	**0.80** (.78, .82)	**0.74** (.64, .79)	**0.76** (.66, .81)
CA4/Dentate Gyrus	**0.99** (.97, 1.0)	**0.86** (.84, .88)	**0.85** (.74, .88)	**0.81** (.74, .85)
Subiculum	**0.98** (.95, 1.0)	**0.83** (.81, .85)	**0.73** (.58, .81)	**0.84** (.76, .88)
Presubiculum	**0.96** (.91, 1.0)	**0.77** (.74, .79)	**0.70** (.51, .77)	**0.76** (.67, .82)
CA2/3	**1.00** (.95, 1.0)	**0.75** (.72, .78)	**0.64** (.51, .72)	**0.68** (.57, .75)
Fissure	**1.00** (.96, 1.0)	**0.69** (.65, .72)	**0.63** (.51, .70)	**0.59** (.49, .67)
Fimbria	**0.96** (.88, 1.0)	**0.67** (.63, .71)	**0.58** (.37, .73)	**0.57** (.37, .67)
HATA	**0.97** (.90, 1.0)	**0.71** (.67, .74)	**0.58** (.37, .71)	**0.60** (.47, .68)
Parasubiculum	**0.99** (.89, 1.0)	**0.66** (.63, .70)	**0.57** (.41, .67)	**0.58** (.45, .66)

NOTE: Heritabilities were derived from bivariate ACE Cholesky decomposition. Variables are ordered from largest (Hippocampal Formation) to smallest (Parasubiculum).

TABLE S2 Twin Correlations for the Hippocampal Formation and Subfield Volumes are shown for the QTIM and HCP Cohorts (Shown with 95% Confidence Intervals)

	QTIM		**HCP**	
	Monozygotic (MZ) 163 pairs	**Dizygotic (DZ)** 208 pairs*	**Monozygotic (MZ)** 149 pairs	**Dizygotic (DZ)** 82 pairs*
Hippocampal Formation	**0.93** (.91, .94)	**0.43** (.29, .46)	**0.86** (.82, .89)	**0.47** (.35, .57)
CA1	**0.80** (.75, .84)	**0.40** (.28, .50)	**0.80** (.75, .85)	**0.45** (.32, .56)
Molecular Layer	**0.81** (.76, .85)	**0.45** (.33, .55)	**0.81** (.76, .85)	**0.48** (.35, .58)
Dentate Gyrus/CA4	**0.75** (.69, .80)	**0.39** (.27, .50)	**0.75** (.68, .80)	**0.42** (.28, .53)
Subiculum	**0.80** (.74, .84)	**0.41** (.29, .51)	**0.80** (.74, .84)	**0.44** (.31, .55)
Presubiculum	**0.77** (.70, .81)	**0.40** (.27, .51)	**0.77** (.70, .81)	**0.43 (**.29, .55)
CA2/3	**0.71** (.64, .77)	**0.37** (.25, .48)	**0.71** (.63, .77)	**0.34** (.20, .46)
Fissure	**0.64** (.54, .71)	**0.27** (.14, .39)	**0.63** (.53, .70)	**0.24** (.09, .38)
Fimbria	**0.61** (.51, .68)	**0.31** (.19, .42)	**0.61** (.51, .68)	**0.32** (.18, .44)
HATA	**0.64** (.55, .72)	**0.39** (.27, .50)	**0.65** (.55, .72)	**0.41** (.28, .52)
Parasubiculum	**0.65** (.57, .72)	0.29 (.15, .41)	**0.65** (.56, .72)	**0.36** (.21, .49)

*In variance components analyses for both cohorts, DZ pairs were supplemented with non-twin siblings, as both DZ twins and non-twin siblings have the same genetic relatedness (50% on average).
NOTE: The twin correlations are derived in OpenMX with analyses run on residuals after the effects of sex and age (as well as MRI acquisition for QTIM) are regressed out. The correlations indicate strong familial influences and relatively modest unique environmental influences (i.e. MZ correlations are moderate to high). Familial influences appear to have a strong additive genetic component (MZ correlation twice DZ correlation, e.g. CA1), but with some indications of small common environmental influences (DZ correlation > half the MZ correlation, e.g. HATA).

TABLE S3 Bivariate Analyses of Hippocampal Formation and the Individual Hippocampal Subfield Volumes Identify Additive Genetic Influences Specific to Subfield (i.e. Independent of Hippocampal Formation) for the Combined QTIM/HCP, QTIM and HCP Samples.

	Additive Genetic Influences		
	Total A as % of variance (95% CIs)	Specific A* as % of variance (95% CIs)	Specific A as % of Total A
1. Combined QTIM/HCP			
CA1	**81** (70, 87)	**08** (07,10)	10
Molecular Layer	**79** (68, 85)	**09** (07, 10)	11
Dentate Gyrus/CA4	**82** (71, 86)	**11** (08, 12)	13
Subiculum	**80** (70, 86)	**14** (11, 16)	18
Presubiculum	**72** (61, 82)	**25** (19, 29)	35
CA2/3	**74** (64, 78)	**31** (25, 35)	42
Fissure	**64** (57, 70)	**40** (32, 46)	63
Fimbria	**53** (38, 67)	**38** (24, 48)	72
HATA	**61** (47, 73)	**25** (14, 32)	41
Parasubiculum	**61** (49, 70)	**38** (30, 44)	62
2. QTIM			
CA1	**84** (66, 88)	**08** (05, 09)	10
Molecular Layer	**82** (67, 90)	**02** (01, 03)	02
Dentate Gyrus/CA4	**82** (66, 86)	**11** (06, 14)	14
Subiculum	**84** (68, 87)	**14** (11, 17)	17
Presubiculum	**83** (66, 86)	**24** (15, 28)	29
CA2/3	**75** (56, 81)	**35** (23, 41)	47
Fissure	**63** (49, 70)	**41** (31, 50)	65
Fimbria	**59** (36, 72)	**46** (24, 57)	78
HATA	**53** (32, 75)	**21** (08, 32)	40
Parasubiculum	**70** (54, 76)	**40** (25, 47)	57
3. HCP			
CA1	**81** (67, 88)	**09** (06, 12)	11
Molecular Layer	**73** (60, 82)	**14** (10, 18)	19
Dentate Gyrus/CA4	**80** (67, 86)	**09** (07, 11)	11
Subiculum	**77** (63, 85)	**14** (09, 17)	18
Presubiculum	**62** (45, 77)	**24** (14, 31)	39
CA2/3	**73** (58, 78)	**27** (15, 33)	37
Fissure	**67** (55, 74)	**36** (23, 46)	54
Fimbria	**48** (27, 67)	**30** (11, 44)	63
HATA	**63** (43, 74)	**21** (05, 33)	33
Parasubiculum	**51** (33, 65)	**35** (21, 46)	69

*Relative to Hippocampal Formation volume.
NOTE: Bivariate ACE Cholesky decomposition is run on residuals after the effects of sex and age (as well as MRI acquisition for QTIM) are regressed out. Heritabilities may be higher in bivariate compared to multivariate analyses. Multivariate analyses are better powered to detect common environmental influences (e.g. home environment for twins living together), which reduce A estimates. Heritability for Hippocampal Formation = 0.88 (i.e. accounting for 88% of total variance) for the combined QTIM/HCP sample; 0.80 for QTIM; 0.89 for HCP.

TABLE S4 Cholesky decomposition parameter estimates for additive genetic (A) influences shown as a percentage of total variance (95% confidence intervals shown for significant estimates) for the combined QTAB/HCP sample and for QTAB and HCP

Additive Genetic Factors From Multivariate Cholesky Decomposition: COMBINED SAMPLE												Total A	Specific A*
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11		
Hippocampal Formation	**83** (74, 90)											**83** (74, 90)	-
Molecular Layer	**67** (58, 74)	**08** (07, 10)										**75** (66, 83)	*07*
CA4/Dentate Gyrus	**67** (58, 74)	**.3** (<.1, 1)	**09** (07, 11)									**76** (67, 84)	*04*
CA2/3	**42** (34, 49)	*01*	**14** (08, 19)	**14** (09, 18)								**71** (60, 77)	*08*
CA1	**68** (59, 76)	**01** (.3, 02)	*00*	*00*	**07** (05, 08)							**76** (67, 84)	*07*
Subiculum	**62** (53, 70)	*00*	*01*	**04** (02, 06)	*00*	**08** (06, 10)						**75** (66, 83)	*07*
Presubiculum	**45** (37, 54)	**01** (<.1, 2)	**02** (04, 05)	**04** (02, 08)	**.6** (<.1, 2)	*00*	**15** (12, 19)					**69** (58, 79)	*14*
Parasubiculum	**22** (15, 28)	*01*	**01** (<.1, 4)	*00*	**02** (<.1, .1)	*00*	*01*	**32** (23, 38)				**58** (46, 66)	*26*
HATA	**35** (27, 44)	*00*	*01*	*00*	**04** (.7, 11)	*00*	*00*	**03** (.3, 09)	**14** (02, 23)			**57** (44, 69)	*08*
Fissure	**24** (18, 31)	*00*	*00*	*01*	*00*	**02** (.3, 07)	**01** (<.1, 4)	*01*	*03*	*32*		**64** (55, 70)	*32*
Fimbria	**16** (10, 22)	*01*	*01*	**02** (<.1, 9)	*00*	*01*	*01*	*01*	**10** (.6, 33)	*00*	*17*	**49** (35, 61)	*17*
Additive Genetic Factors From Multivariate Cholesky Decomposition: QTIM SAMPLE												Total A	Specific A*
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11		
Hippocampal Formation	**82** (70, 91)											**82** (70, 91)	-
Molecular Layer	**75** (62, 86)	**02** (01, 03)										**77** (64, 88)	*00*
CA4/Dentate Gyrus	**63** (50, 73)	**02** (<1, 06)	**08** (05, 11)									**74** (60, 84)	*03*
CA2/3	**34** (23, 45)	**04** (<1, 11)	**14** (06, 21)	**13** (07, 18)								**64** (48, 78)	*04*
CA1	**68** (54, 79)	**03** (01, 05)	*00*	*00*	**04** (01, 05)							**75** (60, 86)	*00*
Subiculum	**65** (52, 74)	*00*	**02** (<1, 04)	**04** (01, 07)	**01** (<1, 20)	**06** (03, 09)						**79** (65, 86)	*02*
Presubiculum	**54** (42, 66)	*00*	**04** (<1, 09)	**04** (01, 09)	*01*	*01*	**11** (06, 15)					**76** (61, 85)	*06*
Parasubiculum	**30** (19, 41)	*02*	*01*	*00*	*00*	*00*	*03*	**30** (17, 37)				**65** (48, 75)	*24*
HATA	**32** (19, 45)	*00*	*01*	*00*	**08** (01, 22)	*00*	*01*	*01*	**10** (<1, 20)			**53** (32, 73)	*06*
Fissure	**19** (11, 28)	*00*	*00*	*01*	*01*	*01*	*02*	*00*	**14** (<1, 44)	*21*		**58** (41, 69)	*10*
Fimbria	**14** (06, 24)	*01*	**04** (<1, 17)	*01*	*04*	**05** (<1, 19)	*03*	*01*	*03*	*09*	*09*	**52** (31, 68)	*09*
Additive Genetic Factors From Multivariate Cholesky Decomposition: HCP SAMPLE												Total A	Specific A*
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11		
Hippocampal Formation	**78** (67, 88)											**78** (67, 88)	-
Molecular Layer	**56** (45, 66)	**14** (08, 18)										**70** (57, 78)	*10*
CA4/Dentate Gyrus	**65** (54, 74)	*00*	**08** (05, 10)									**73** (62, 82)	*01*
CA2/3	**44** (33, 54)	*00*	**10** (03, 19)	**12** (03, 19)								**66** (52, 76)	*03*
CA1	**66** (55, 75)	**01** (<1, 03)	*00*	*00*	**07** (03,10)							**74** (62,83)	*02*
Subiculum	**57** (46, 67)	*01*	**01** (<1, 04)	**03** (<1, 07)	**01** (<1, 03)	**06** (03, 08)						**68** (57, 79)	*04*
Presubiculum	**37** (27, 48)	*02*	*01*	**05** (<1, 15)	*01*	*01*	**13** (04, 18)					**60** (44, 74)	*11*
Parasubiculum	**16** (08, 25)	*00*	*00*	*00*	**05** (<1, 20)	*00*	*00*	**27** (07, 39)				**48** (30, 62)	*08*
HATA	**39** (28, 51)	*00*	*01*	*00*	*03*	*00*	*00*	**08** (<1, 23)	*07*			**58** (41,72)	*02*
Fissure	**29** (20, 38)	*00*	*00*	*03*	*00*	**07 (<1, 25)**	*02*	*05*	*00*	*17*		**63** (50. 72)	*16*
Fimbria	**17** (10, 26)	*00*	*00*	**07** (<1, 25)	*00*	*02*	*01*	*01*	*09*	*00*	*04*	**43** (23, 59)	*04*

*These estimates are relative to all other variables in the multivariate Cholesky decomposition. They are derived when the subfield volume is placed last in the variable order.

Combined Sample: Additive genetic influence for all subfield volumes is largely overlapping with Hippocampal Formation (factor A1). Additional factors (A2 to A11), generally show greatest influence on the diagonal. Estimates on the diagonal include variance specific to that volume, and this pattern of results (i.e. largest factor estimate being on the diagonal) is suggestive of genetic influences specific to the first volume influenced by each factor. This is particularly the case for Presubiculum (A7), Parasubiculum (A8), Fissure (A10) and Fimbria (A11), where the estimate on the diagonal is relatively large while the off diagonal estimates are small or non-existent. In addition, the order of the variables allows inferences to be made. For example, 9% of genetic influence on CA1 (7/76) is independent of genetic influence on the other CA volumes (as well as genetic influence on Hippocampal Formation, and Molecular Layer). Genetic influences specific to each subfield volume were identified. However, none were significant, although, some of these influences are substantial (e.g. specific influence accounts for 50% of total additive genetic variance for Fissure, and total additive genetic variance for Fissure is significant). Non-significance may reflect a lack of power to detect the significance of tail-end estimates given the relatively large number of variables included in the multivariate analyses.

QTIM vs HCP: In general, consistent results were found for QTIM and HCP. Both have a strong factor influencing Hippocampal Formation and all subfields. All total A estimates have overlapping confidence intervals. No specific A estimates are significant for either cohort.

TABLE S5 Cholesky decomposition parameter estimates for common environment (C) influences shown as a percentage of total variance (95% confidence intervals shown for significant estimates) for the combined QTAB/HCP sample and for QTAB and HCP

	Common Environmental Factors From Multivariate Cholesky Decomposition: COMBINED SAMPLE											Total C
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	
Hippocampal Formation	**08** (01, 17)											**08** (01, 17)
Molecular Layer	**07** (0.3, 15)	00										**07** (0.3, 16)
CA4/Dentate Gyrus	**07** (0.4, 15)	00	00									**07** (01, 16)
CA2/3	02	01	00	00								03
CA1	**09** (01, 18)	00	00	00	00							**09** (01, 18)
Subiculum	**08** (01,16)	00	00	00	00	00						**08** (01, 17)
Presubiculum	**10** (0.3, 16)	00	00	00	00	00	00					**10** (01, 20)
Parasubiculum	**07** (0.3, 16)	00	00	00	00	00	00	00				**07** (01, 16)
HATA	07	04	01	00	00	00	00	00	00			**12** (01, 23)
Fissure	01	00	00	00	00	00	00	00	00	00		01
Fimbria	08	06	02	01	00	00	00	00	00	00	00	**16** (06, 27)

	Common Environmental Factors From Multivariate Cholesky Decomposition: QTIM SAMPLE											Total C
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	
Hippocampal Formation	**08** (<1, 20)											**08** (<1, 20)
Molecular Layer	09	00										09
CA4/Dentate Gyrus	08	00	00									**09** (<1, 22)
CA2/3	08	02	00	02								**12** (<1, 26)
CA1	09	00	00	00	00							10
Subiculum	05	00	00	00	00	00						06
Presubiculum	05	00	00	01	00	00	00					07
Parasubiculum	01	01	00	00	02	00	00	00				04
HATA	16	01	00	00	00	00	00	00	00			**18** (<1, 35)
Fissure	03	00	00	00	01	00	00	00	00	00		05
Fimbria	02	00	02	07	00	00	00	00	00	00	00	11

	Common Environmental Factors From Multivariate Cholesky Decomposition: HCP SAMPLE											
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	
Hippocampal Formation	**14** (04, 25)											**14** (04, 25)
Molecular Layer	**07** (<1, 18)	00										**08** (01, 19)
CA4/Dentate Gyrus	**11** (02, 22)	00	00									**12** (03, 22)
CA2/3	03	01	02	00								06
CA1	**11** (02, 22)	01	00	00	00							**12** (03, 23)
Subiculum	**13** (03, 24)	00	01	00	00	00						**14** (04, 25)
Presubiculum	**14** (03, 27)	00	01	00	00	00	00					**16** (03, 29)
Parasubiculum	**10** (01, 22)	01	00	00	00	00	00	00				**11** (02, 24)
HATA	03	00	01	05	00	00	00	00	00			10
Fissure	01	03	00	00	00	00	00	00	00	00		04
Fimbria	**14** (03, 29)	02	04	03	00	00	00	00	00	00	00	**22** (09, 35)

Combined Sample: Common environmental influences are those that are shared by co-twins, such as family and school environment. The pattern of common environmental influences suggests total C may be influenced by a common source (C1), and potentially, an additional source may also influence HATA and Fimbria (C2). With the relatively simple structure of common environmental influences, there is no remaining variance to be explained after the first 4-5 factors. Consequently, Cholesky decomposition is not best suited to identify common environmental influences specific to subfield, relative to all other subfields.
QTIM vs HCP: Estimates are generally a little larger for HCP than QTIM, and consequently, are more often significant for HCP than QTIM. Evidence suggesting one common environmental factor influences multiple subfields is only found for HCP (i.e. C1), although QTIM also shows a similar trend. For all estimates significant in both cohorts, confidence intervals are overlapping.

TABLE S6 Cholesky decomposition parameter estimates for unique environment (E) influences shown as a percentage of total variance (95% confidence intervals shown for significant estimates) for the combined QTAB/HCP sample and for QTAB and HCP

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	Total E	Specific E*
Unique Environmental Factors From Multivariate Cholesky Decomposition: COMBINED SAMPLE													
Hippocampal Formation	**09** (08, 11)											**09** (08, 11)	-
Molecular Layer	**10** (08, 13)	**08** (07, 09)										**18** (15, 21)	**06** (05,08)
CA4/Dentate Gyrus	**09** (07, 12)	*00*	**07** (06, 09)									**16** (14, 19)	**05** (04, 05)
CA2/3	**06** (04, 09)	*00*	**05** (03, 07)	**15** (12, 17)								**25** (21, 30)	**09** (08, 11)
CA1	**08** (06, 11)	*00*	**.4** (.1, .7)	*00*	**06** (05, 07)							**15** (13, 18)	**04** (04, 05)
Subiculum	**05** (04, 08)	**.2** (<.1, .7)	**01** (.4, 02)	**03** (02, 04)	**.3** (<.1, .7)	**08** (06, 09)						**17** (14, 20)	**07** (06, 08)
Presubiculum	**04** (02, 06)	**01** (.4, 02)	**02** (01, 03)	**01** (.6, 02)	**02** (02, 04)	*00*	**10** (08, 11)					**21** (17, 24)	**08** (07, 10)
Parasubiculum	**01** (.1, 03)	**01** (<.1, 2)	**01** (<.1, 2)	*00*	*01*	*00*	**02** (.7, 04)	**30** (26, 35)				**36** (30, 41)	**29** (25, 34)
HATA	**05** (02, 07)	**.4** (<.1, 01)	*00*	*01*	*00*	**.7** (.1, .2)	*00*	*00*	**24** (21, 28)			**31** (26, 36)	**23** (20, 28)
Fissure	**01** (.2, 03)	*00*	**01** (<.1, 2)	*00*	*00*	*00*	*00*	**01** (.3, 03)	*00*	**31** (26, 36)		**35** (30, 41)	**24** (20, 28)
Fimbria	**.4** (<.1, 02)	**.4** (<.1, 02)	*00*	**02** (<1, 04)	*00*	*00*	**01** (.3, 03)	*00*	**01** (.1, 02)	**.8** (.2, 03)	**28** (24, 33)	**35** (30, 41)	**28** (24, 33)
Unique Environmental Factors From Multivariate Cholesky Decomposition: QTAB SAMPLE												**Total E**	**Specific E***
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11		
Hippocampal Formation	**10** (08, 13)											**10** (08, 13)	-
Molecular Layer	**11** (09, 15)	**02** (01, 02)										**13** (10, 16)	**.5** (.4, .7)
CA4/Dentate Gyrus	**10** (07, 15)	**01** (<1, 01)	**06** (05, 08)									**17** (14, 22)	**03** (02, 04)
CA2/3	**09** (07, 15)	**.4** **(<1, 01)**	**05** (03, 08)	**09** (07, 12)								**24** (19, 30)	**05** (04, 06)
CA1	**10** (07, 14)	**01** (<1, 02)	**01** (<1, 01)	*00*	**04** (03, 05)							**16** (12,20)	**02** (01, 03)
Subiculum	**05** (03, 08)	**01** (<1, 02)	**02** (<1, 03)	**02** (<1, 03)	**02** (<1, 03)	**05** (04, 07)						**16** (12, 20)	**05** (04, 06)
Presubiculum	**04** (02, 06)	*00*	**02** (<1, 04)	**02** (01, 03)	**02** (01, 04)	**01** (<1, 02)	**07** (05, 08)					**17** (14, 21)	**06** (05, 07)
Parasubiculum	**01** (<1, 04)	*00*	**01** (<1, 03)	*00*	*00*	**01** (<1, 03)	**02** (<1, 05)	**24** (20, 30)				**30** (24, 38)	**22** (18, 28)
HATA	**07** (03, 12)	**01** (<1, 04)	*00*	**01** (<1, 02)	**01** (<1, 03)	*00*	*00*	*00*	**19** (16, 24)			**30** (24, 38)	**19** (15, 24)
Fissure	*01*	*00*	*00*	*00*	*00*	*00*	*01*	**03** (<1, 07)	*00*	**32** (25, 40)		**37** (29,46)	**30** (24, 38)
Fimbria	*00*	**03** (01, 07)	*00*	**02** (<1, 05)	*00*	*00*	*00*	*00*	*00*	*01*	**29** (23, 36)	**36** (29,45)	**29** (23, 36)
Unique Environmental Factors From Multivariate Cholesky Decomposition: HCP SAMPLE												**Total E**	**Specific E***
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11		
Hippocampal Formation	**08** (06, 10)											**08** (06, 10)	-
Molecular Layer	**09** (05, 14)	**14** (11, 17)										**22** (18, 28)	**08** (06, 10)
CA4/Dentate Gyrus	**08** (05, 11)	*00*	**07** (06, 09)									**15** (12,20)	**04** (03, 06)
CA2/3	**04** (01, 08)	*00*	**04** (01, 07)	**20** (16, 25)								**27** (21, 34)	**12** (09, 14)
CA1	**07** (04, 10)	**.2** (<1, 01)	**.5** (<1, 01)	*00*	**06** (05, 08)							**14** (11, 18)	**04** (03, 05)
Subiculum	**05** (03, 09)	**01** (<1, 02)	**01** (<1, 02)	**03** (02, 05)	**.3** (<1, 01)	**07** (05, 08)						**18** (14, 22)	**06** (05, 08)
Presubiculum	**05** (02, 09)	**02** (01, 04)	**02** (01, 05)	**01** (<1, 02)	**04** (02, 07)	*00*	**10** (08, 13)					**24** (19,31)	**08** (06, 11)
Parasubiculum	*01*	**02** (<1, 05)	**01** (<1, 03)	*00*	**01** (<1, 03)	**01** (<1, 03)	**01** (<1, 04)	**33** (27, 42)				**41** (33, 50)	**33** (27, 41)
HATA	**02** (<1, 06)	*00*	*01*	**01** (<1, 03)	*00*	**01** (<1, 03)	*00*	*00*	**27** (21-34)			**32** (26, 40)	**26** (20, 32)
Fissure	**02** (<1, 05)	*00*	**01** (<1, 04)	*00*	*00*	*00*	*00*	*00*	*00*	**28** (22, 36)		**33** (26,41)	**27** (22, 35)
Fimbria	*01*	*00*	*00*	**02** (<1, 05)	*00*	*00*	**04** (01, 08)	*00*	**01** (<1, 04)	**01** (<1, 17)	**26** (20, 33)	**35** (28,45)	**26** (20, 33)

*These estimates are relative to all other variables in the multivariate Cholesky decomposition. They are derived when the subfield volume is placed last in the variable order.

Combined Sample: A single unique environmental factor influences all subfield volumes (E1), although it accounts for little variance for some subfields (e.g. Fimbria). The strongest influences are on the diagonal, suggesting subfield specific influences, and this is confirmed by analyses run especially to identify influences specific to subfield. All specific influences are significant, with the Parasubiculum and Fimbria, following by Fissure and HATA, being the most independent in terms of unique environmental influence.

QTIM vs HCP: In general, consistent results were found for QTIM and HCP. However, a larger specific unique environmental influence was found for Molecular Layer in HCP compared to QTIM. This may reflect methodological differences in volume detection, with the inclusion of a T2-weighted scan in volume determination for HCP, but not QTIM.

TABLE S7 Additive genetic (A), common environment (C), and unique environmental (E) sources of variance (shown as percentage of total variance with 95% confidence intervals) derived from Bivariate and Multivariate Analyses

		Derived from Bivariate Cholesky (Hippocampal Formation + Subfield)			**Derived from Multivariate Cholesky (Hippocampal Formation + 10 Subfields)**		
		Combined QTIM/HCP	QTIM	HCP	Combined QTIM/HCP	QTIM	HCP
Hippocampal Formation	A	**87** (77, 92)	**89** (74, 92)	**84** (72, 93)	**83** (74, 90)	**82** (70, 91)	**78** (67, 88)
	C	04 (00, 14)	01 (00, 16)	08 (00, 20)	**08** (01, 17)	**08** (<1, 20)	**14** (04, 25)
	E	**09** (08, 11)	**10** (08, 13)	**08** (06, 10)	**09** (07, 11)	**10** (08, 13)	**08** (06, 10)
CA1	A	**81** (70, 87)	**84** (66, 88)	**78** (65, 88)	**76** (67, 84)	**75** (60, 86)	**74** (62, 83)
	C	04 (00, 15)	01 (00, 18)	08 (00, 21)	**09** (01, 18)	09 (00, 23)	**12** (03, 23)
	E	**15** (12, 17)	**15** (12, 19)	**14** (11, 18)	**15** (13, 18)	**16** (12, 20)	**14** (11, 18)
Molecular Layer	A	**79** (69, 85)	**82** (67, 90)	**73** (60, 81)	**75** (66, 83)	**77** (64, 88)	**70** (57, 78)
	C	03 (00, 13)	05 (00, 20)	05 (00, 17)	**07** (0.3, 16)	**10** (0.1, 23)	**08** (01, 19)
	E	**18** (15, 21)	**13** (10, 16)	**22** (18, 28)	**18** (15, 21)	**13** (10, 16)	**22** (18, 28)
CA4/Dentate Gyrus	A	**82** (72, 86)	**82** (65, 86)	**81** (68, 87)	**77** (67, 84)	**74** (60, 84)	**73** (62, 82)
	C	02 (00, 12)	01 (00, 16)	05 (00, 17)	**07** (01, 16)	**09** (0.1, 22)	**12** (03, 22)
	E	**16** (13, 19)	**17** (14, 22)	**14** (11, 19)	**16** (14, 19)	**17** (14, 22)	**15** (12, 20)
Subiculum	A	**81** (70, 86)	**82** (68, 87)	**77** (63, 85)	**75** (66, 83)	**79** (65, 86)	**68** (57, 79)
	C	03 (00, 13)	02 (00, 15)	06 (00, 19)	**08** (01, 17)	05 (00, 19)	**14** (04, 25)
	E	**17** (14, 20)	**16** (12, 20)	**17** (14, 22)	**17** (14, 20)	**16** (12, 20)	**18** (14, 22)
Presubiculum	A	**72** (61, 82)	**81** (66, 86)	**62** (45, 76)	**69** (58, 79)	**76** (61, 85)	**60** (44, 74)
	C	07 (00, 18)	02 (00, 17)	**14** (01, 27)	**10** (01, 20)	07 (00, 21)	**16** (03, 29)
	E	**20** (17, 24)	**17** (14, 21)	**24** (19, 31)	**21** (17, 24)	**17** (14, 21)	**24** (19, 31)
CA2/3	A	**75** (64, 78)	**76** (56, 81)	**73** (58, 78)	**71** (60, 77)	**64** (48, 78)	**66** (52, 76)
	C	00 (00, 09)	01 (00, 18)	01 (00, 13)	04 (00, 13)	**12** (0.3, 26)	07 (00 18)
	E	**25** (22, 30)	**24** (19, 30)	**27** (21, 34)	**25** (22, 30)	**24** (19, 30)	**27** (21, 34)
Fissure	A	**64** (57, 70)	**63** (49, 70)	**67** (54, 74)	**64** (55, 70)	**58** (41, 69)	**63** (50, 72)
	C	00 (00, 05)	00 (00, 19)	00 (00, 09)	01 (00, 07)	05 (00, 17)	04 (00, 13)
	E	**36** (30, 42)	**37** (30, 46)	**33** (26, 42)	**35** (30, 41)	**37** (29, 46)	**33** (26, 41)
Fimbria	A	**53** (38, 67)	**59** (36, 72)	**49** (27, 67)	**49** (35, 61)	**52** (31, 68)	**43** (23, 59)
	C	**13** (01, 24)	06 (00, 25)	**18** (03 (33)	**16** (06, 27)	12 (00, 29)	**22** (09, 35)
	E	**34** (29, 40)	**35** (28, 43)	**34** (26, 43)	**35** (30, 41)	**36** (29, 45)	**35** (28, 45)
HATA	A	**61** (47, 72)	**54** (33, 74)	**58** (40, 72)	**57** (44, 69)	**52** (32, 73)	**58** (41, 72)
	C	08 (00, 20)	17 (00, 34)	10 (00, 23)	**12** (01, 23)	**18** (0.2, 35)	10 (00, 23)
	E	**31** (26, 36)	**29** (23, 37)	**32** (26, 41)	**31** (26, 36)	**30** (24, 38)	**32** (26, 40)
Parasubiculum	A	**58** (46, 67)	**70** (54, 76)	**45** (27, 59)	**58** (46, 66)	**65** (48, 75)	**48** (30, 62)
	C	07 (00, 16)	00 (00, 13)	**15** (04, 27)	**07** (01, 16)	05 (00, 19)	**11** (02, 24)
	E	**35** (30, 41)	**30** (24, 37)	**41** (33, 50)	**35** (30, 41)	**30** (24, 38)	**41** (33, 50)

TABLE S8 Phenotypic and additive genetic correlations derived from Cholesky decomposition for the Combined QTIM/HCP, QTIM and HCP Cohorts – shown with 95% confidence intervals (significant correlations only)

Phenotypic (lower triangle) and *Additive Genetic (upper triangle)*
Correlations from Multivariate Cholesky Decomposition: **COMBINED SAMPLE**

	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.94* (.93, .95)	*.93* (.92, .95)	*.78* (.72, .82)	*.95* (.94, .96)	*.91* (.89, .93)	*.81* (.78, .85)	*.61* (.54, .68)	*.78* (.72, .86)	*.61* (.54, .70)	*.56* (.47, .67)
2. Molecular Layer	**.91** (.91, .92)		*.90* (.88, .93)	*.76* (.70, .81)	*.93* (.91, .95)	*.85* (.81, .88)	*.73* (.68, .79)	*.54* (.46, .63)	*.73* (.66, .82)	*.59* (.51, .68)	*.49* (.38, .63)
3. CA4/Dentate Gyrus	**.91** (.90, .92)	**.85** (.83, .86)		*.88* (.85, .92)	*.90* (.88, .93)	*.81* (.76, .85)	*.69* (.63, .76)	*.51* (.43, .60)	*.69* (.61, .77)	*.57* (.49, .66)	*.47* (.36, .59)
4. CA2/3	**.70** (.68, .73)	**.67** (.64, .70)	**.82** (.80, .83)		*.76* (.70, .82)	*.55* (.46, .65)	*.42* (.32, .54)	*.37* (.26, .49)	*.54* (.44, .64)	*.52* (.44, .65)	*.26* (.12, .42)
5. CA1	**.92** (.92, .93)	**.87** (.86, .88)	**.84** (.82, .85)	**.66** (.63, .68)		*.83* (.80, .87)	*.72* (.67, .78)	*.51* (.43, .59)	*.82* (.75, .90)	*.61* (.53, .69)	*.52* (.42, .65)
6. Subiculum	**.86** (.85, .88)	**.77** (.75, .78)	**.72** (.70, .75)	**.40** (.36, .44)	**.77** (.75, .79)		*.84* (.81, .88)	*.58* (.50, .65)	*.70* (.61, .82)	*.59* (.51, .68)	*.62* (.52, .78)
7. Presubiculum	**.77** (.74, .78)	**.64** (.62, .67)	**.60** (.57, .63)	**.31** (.26, .35)	**.64** (.62, .67)	**.79** (.78, .81)		*.61* (.53, .69)	*.66* (.57, .78)	*.53* (.44, .64)	*.61* (.49, .76)
8. Parasubiculum	**.53** (.49, .56)	**.43** (.39, .47)	**.41** (.37, .45)	**.29** (.25, .33)	**.43** (.40, .47)	**.47** (.43, .51)	**.56** (.52, .59)		*.63* (.51, .77)	*.29* (.18, .42)	*.48* (.33, .65)
9. HATA	**.68** (.65, .70)	**.61** (.57, .63)	**.59** (.56, .62)	**.50** (.46, .53)	**.68** (.65, .70)	**.53** (.50, .57)	**.52** (.49, .56)	**.44** (.40, .48)		*.38* (.26, .52)	*.72* (.57, 90)
10. Fissure	**.50** (.47, .54)	**.47** (.43, .50)	**.43** (.40, .47)	**.36** (.32, .40)	**.49** (.46, .53)	**.48** (.45, .52)	**.43** (.39, .47)	**.16** (.11, .20)	**.28** (.24, .32)		*.23* (.08, .40)
11. Fimbria	**.46** (.42, .50)	**.37** (.32, .41)	**.37** (.33, .42)	**.13** (.08, .17)	**.42** (.38, .46)	**.49** (.46, .53)	**.46** (.42, .49)	**.36** (.32, .40)	**.47** (.43, .50)	**.10** (.06, .15)	

Phenotypic (lower triangle) and *Additive Genetic (upper triangle)*
Correlations rom Multivariate Cholesky Decomposition: **QTIM SAMPLE**

	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.99* (.98, .99)	*.92* (.90, .95)	*.73* (.65, .81)	*.96* (.94, .97)	*.91* (.88, .94)	*.85* (.80, .90)	*.67* (.57, .80)	*.77* (.69, .89)	*.57* (.46, .68)	*.52* (.37, .69)
2. Molecular Layer	**.98** (.98, .98)		*.94* (.92, 97)	*.76* (.68, .83)	*.97* (.96, .99)	*.91* (.87, .94)	*.84* (.78, .90)	*.64* (.52, .78)	*.75* (.65, .89)	*.57* (.45, .70)	*.49* (.32, .68)
3. CA4/Dentate Gyrus	**.90** (.89, .91)	**.92** (.91, .93)		*.87* (.82, .92)	*.89* (.86, .94)	*.80* (.74, .87)	*.71* (.62, .82)	*.56* (.42, .73)	*.67* (.54, .81)	*.52* (.39, .67)	*.35* (.18, .55)
4. CA2/3	**.70** (.67, .74)	**.74** (.71, .77)	**.85** (.83, .87)		*.73* (.64, .83)	*.51* (.38, .64)	*.41* (.26, .59)	*.40* (.22, .62)	*.49* (.30, .67)	*.46* (.30, .65)	*.17*
5. CA1	**.93** (.92, .94)	**.95** (.95, .96)	**.85** (.83, .86)	**.68** (.64, .71)		*.86* (81, .90)	*.79* (.71, 87)	*.60* (.48, .76)	*.82* (.73, .94)	*.59* (.46, .73)	*.54* (.37, .74)
6. Subiculum	**.87** (.85, .88)	**.86** (.85, .88)	**.72** (.69, .75)	**.43** (.37, .48)	**.79** (.76, .81)		*.84* (.79, .90)	*.61* (.50, .74)	*.68* (.55, .84)	*.52* (.39, .66)	*.58* (.43, .76)
7. Presubiculum	**.79** (.77, .82)	**.77** (.74, .79)	**.61** (.57, .65)	**.31** (.25, .37)	**.69** (.66, .73)	**.78** (.75, .80)		*.70* (.60, .79)	*.69* (.56, .86)	*.50* (.36, .66)	*.55* (.40, .74)
8. Parasubiculum	**.56** (.51, .60)	**.51** (.46, .56)	**.42** (.36, .47)	**.27** (.21, .33)	**.48** (.43, .53)	**.49** (.44, .54)	**.62** (.58, .66)		*.63* (.44, .85)	*.38* (.21, .65)	*.52* (.32, .75)
9. HATA	**.70** (.67, .73)	**.67** (.63, .70)	**.59** (.55, .63)	**.49** (.43, .53)	**.73** (.70, .76)	**.56** (.51, .60)	**.57** (.53, .61)	**.46** (.40, .51)		*.31* (.07, .52)	*.70* (.46, .96)
10. Fissure	**.47** (.42, .52)	**.46** (.41, .51)	**.41** (.35, .46)	**.34** (.29, .40)	**.47** (.41, 52)	**.42** (.37, .48)	**.41** (.35, .46)	**.18** (.11, .24)	**.30** (.24, .36)		*.04*
11. Fimbria	**.39** (.33, .44)	**.34** (.28, .40)	**.26** (.19, .32)	**.05**	**.38** (.32, 43)	**.43** (.37, .48)	**.43** (.38, .49)	**.37** (.31, .42)	**.45** (.39, .50)	**-.03**	

Phenotypic (lower triangle) and *Additive Genetic (upper triangle)*
Correlations from Multivariate Cholesky Decomposition: **HCP SAMPLE**

	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.90* (.86, .94)	*.94* (.92, .96)	*.81* (.74, .89)	*.94* (.93, .97)	*.91* (.88, .95)	*.79* (.72, .86)	*.57* (.45, .69)	*.82* (.72, .93)	*.67* (.57, .79)	*.64* (.51, .82)
2. Molecular Layer	**.85** (.83, .87)		*.86* (.80, .92)	*.74* (.65, .84)	*.89* (.84, .96)	*.78* (.70, .87)	*.63* (.52, .78)	*.51* (.35, .68)	*.74* (.61, .89)	*.63* (.51, .77)	*.52* (.35, .73)
3. CA4/Dentate Gyrus	**.91** (.90, .93)	**.77** (.74, .80)		*.90* (.84, .96)	*.91* (.87, .95)	*.81* (.75, .88)	*.69* (.59, .81)	*.51* (.37, .64)	*.73* (.62, .85)	*.62* (.51, .76)	*.61* (.47, .79)
4. CA2/3	**.70** (.67, .74)	**.61** (.57, .65)	**.79** (.76, .81)		*.79* (.70, .89)	*.59* (.46, .77)	*.46* (.30, .66)	*.42* (.24, .63)	*.59* (.46, .73)	*.63* (.49, .83)	*.35* (.15, .61)
5. CA1	**.92** (.90, .93)	**.79** (.76, .81)	**.84** (.81, .86)	**.64** (.60, .68)		*.81* (.76, .87)	*.68* (.58, .79)	*.44* (.30, .57)	*.83* (.72, .94)	*.63* (.53, .74)	*.57* (.43, .79)
6. Subiculum	**.86** (.84, .88)	**.66** (.62, .70)	**.73** (.69, .76)	**.38** (.32, .44)	**.76** (.72, .78)		*.86* (.81, .92)	*.55* (.42, .70)	*.75* (.61, .92)	*.67* (.56, .79)	*.74* (.59, .94)
7. Presubiculum	**.74** (.71, .77)	**.52** (.47, .57)	**.60** (.55, .64)	**.31** (.25, .37)	**.60** (.55, .64)	**.81** (.79, .83)		*.50* (.32, .68)	*.69* (.53, .88)	*.59* (.44, .75)	*.74* (.54, .98)
8. Parasubiculum	**.49** (.44, .54)	**.35** (.29, .41)	**.41** (.35, .47)	**.31** (.25, .37)	**.39** (.33, .44)	**.45** (.39, .50)	**.49** (.44, .54)		*.69* (.50, .87)	*.17*	*.48* (.23, .79)
9. HATA	**.66** (.62, .70)	**.54** (.49, .59)	**.60** (.55, .64)	**.52** (.47, .56)	**.63** (.59, .67)	**.51** (.46, .56)	**.48** (.43, .53)	**.43** (.37, .48)		*.47* (.29, .69)	*.75* (.53, .94)
10. Fissure	**.55** (.50, .59)	**.48** (.43, .53)	**.47** (.42, .52)	**.38** (.32, .44)	**.53** (.47, .57)	**.55** (.50, .60)	**.46** (.40, .51)	**.14** (.07, .20)	**.27** (.20, .33)		*.45* (.24, .74)
11. Fimbria	**.53** (.48, .58)	**.39** (.33, .45)	**.50** (.45, .55)	**.22** (.15, .28)	**.47** (.41, .52)	**.57** (.52, .61)	**.48** (.43, .53)	**.35** (.29, .40)	**.49** (.44, .54)	**.24** (.18, .31)	

TABLE S9 Unique and common environmental correlations derived from Cholesky decomposition for the Combined QTIM/HCP, QTIM and HCP Cohorts – shown with 95% confidence intervals (significant correlations only)

Unique Environment (lower triangle) and *Common Environment (upper triangle)* Correlations from Multivariate Cholesky Decomposition: **COMBINED SAMPLE**											
	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.99* (.83, 1.0)	*.97* (.62, 1.0)	*.72*	*.99* (.81, 1.0)	*.97* (.67, 1.0)	*.99* (.63, 1.0)	*.98* (.43, 1.0)	*.76*	*.78*	*.70* (.09, 1.0)
2. Molecular Layer	**.75** (.70, .80)		*.96*	*.78*	*.97* (.60, 1.0)	*.95*	*.98*	*.95*	*.82*	*.77*	*.62*
3. CA4 Dentate/ Gyrus	**.74** (.69, .79)	**.56** (.49, .63)		*.75*	*.99* (.72, 1.0)	*.92*	*.93* (.30, 1.0)	*.96* (.27, 1.0)	*.76*	*.89*	*.78* (.19, 1.0)
4. CA2/3	**.49** (.40, .57)	**.38** (.29, .47)	**.65** (.58, .71)		*.67*	*.54*	*.64*	*.59*	*.96*	*.66*	*.27*
5. CA1	**.75** (.70, .80)	**.55** (.47, .62)	**.45** (.37, .53)	**.31** (.21, .41)		*.97* (.63, 1.0)	*.98* (.53, 1.0)	*.99* (.47, 1.0)	*.71*	*.85*	*.77* (.23, 1.0)
6. Subiculum	**.56** (.48, .63)	**.34** (.24, .43)	**.26** (.16, .36)	**-.13** (-.2, <0)	**.37** (.27, .46)		*.99* (.67, 1.0)	*.99* (.46, 1.0)	*.60*	*.72*	*.73* (.14, 1.0)
7. Presubiculum	**.45** (.36, .53)	**.18** (.08, .28)	**.12** (.02, .23)	**-.10**	**.16** (.06, .27)	**.51** (.43, .59)		*.99* (.42, 1.0)	*.71*	*.75*	*.66* (.06, 10)
8. Parasubiculum	**.17** (.06, .28)	**.03**	**.03**	**.08**	**.07**	**.07**	**.33** (.24, .42)		*.65*	*.82*	*.75* (.09, 1.0)
9. HATA	**.38** (.29, .47)	**.21** (.11, 31)	**.30** (.20, .40)	**.32** (.22, .41)	**.32** (.22, .41)	**.05**	**.11** (0.4, .21)	**.06**		*.72*	*.20*
10. Fissure	**.19** (.08, .30)	**.16** (.05, .26)	**.05**	**-.02**	**.17** (.07, .28)	**.23** (.12, .33)	**.19** (.09, .29)	**-.13** (-.2, <0)	**.06**		*.64*
11. Fimbria	**.11** (<.1, .22)	**.01**	**.02**	**-.15** (-.3, <0)	**.04**	**.14** (.03, .14)	**.05**	**.07**	**.17** (.06, .27)	**-.15** (-.3, <0)	

Unique Environment (lower triangle) and *Common Environment (upper triangle)* Correlations from Multivariate Cholesky Decomposition: **QTIM SAMPLE**											
	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.99*	*.95*	*.81*	*.98*	*.98*	*.84*	*.50*	*.94*	*.85*	*.39*
2. Molecular Layer	**.94** (.92, .95)		*.98*	*.86*	*.98*	*.97*	*.80*	*.41*	*.88*	*.82*	*.38*
3. CA4 Dentate/ Gyrus	**.78** (.72, .83)	**.80** (.74, .85)		*.86*	*.97*	*.94*	*.71*	*.30*	*.83*	*.78*	*.46*
4. CA2/3	**.62** (.51, .70)	**.62** (.52, .71)	**.78** (.72, .83)		*.84*	*.76*	*.41*	*.11*	*.73*	*.69*	*-.04*
5. CA1	**.80** (.73, .85)	**.83** (.77, .87)	**.55** (.44, .65)	**.42** (.29, .54)		*.99*	*.80*	*.51*	*.92*	*.74*	*.40*
6. Subiculum	**.57** (.46, .67)	**.60** (.50, .69)	**.30** (.16, .43)	**.02**	**.40** (.26, .52)		*.88*	*.59*	*.92*	*.74*	*.46*
7. Presubiculum	**.46** (34, .27)	**.40** (.27, .51)	**.14**	**-.07**	**.22** (.07, .36)	**.45** (.33, .56)		*.75*	*.80*	*.66*	*.58*
8. Parasubiculum	**.21** (.06, .35)	**.15** (<.01,.3)	**.04**	**.01**	**.13**	**.10**	**.41** (.28, .52)		*.68*	*.17*	*.26*
9. HATA	**.48** (.35, .59)	**.37** (.37, .23)	**.31** (.17, .44)	**.35** (.21, .48)	**.43** (.30, .55)	**.14**	**.19** (.05, .33)	**.10**		*.76*	*.25*
10. Fissure	**.13**	**.12**	**.06**	**.03**	**.12**	**.15**	**.15** (<.01,.3)	**-.20** (-.06,-.3)	**.17** (.02, .32)		*.23*
11. Fimbria	**.06**	**-.05**	**-.04**	**-.16** (-.01,-.3)	**-.01**	**.08**	**.13**	**.14**	**.13**	**-.18** (-.04,-.3)	

Unique Environment (lower triangle) and *Common Environment (upper triangle)* Correlations from Multivariate Cholesky Decomposition: **HCP SAMPLE**											
	1	2	3	4	5	6	7	8	9	10	11
1. Hippocampal Formation		*.98* (.67, 1.0)	*.97* (.83, 1.0)	*.68*	*.96* (.80, 1.0)	*.95* (.76, 1.0)	*.96* (.69, 1.0)	*.93* (.50, 1.0)	*.54*	*.47*	*.80* (.42, 1.0)
2. Molecular Layer	**.63** (.51, .72)		*.92* (.36, 1.0)	*.74*	*.89* (.30, 1.0)	*.91* (.31, 1.0)	*.94* (.24, 1.0)	*.84*	*.56*	*.28*	*.73* (.61, 1.0)
3. CA4 Dentate/ 4. Gyrus	**.71** (.62, .78)	**.40** (.26, .52)		*.70*	*.97* (.76, 1.0)	*.89* (.53, 1.0)	*.89* (.44, 1.0)	*.95* (.51, 1.0)	*.57*	*.58*	*.89* (.54, 1.0)
5. CA2/3	**.37** (.22, .51)	**.22** (.08, .36)	**.52** (.40, .62)		*.51*	*.42*	*.53*	*.48*	*.74*	*-.10*	*.65*
6. CA1	**.69** (.60, .77)	**.35** (.21, .48)	**.36** (.22, .48)	**.22** (.07, .36)		*.96* (.70, 1.0)	*.92* (.51, 1.0)	*.99* (.56, 1.0)	*.44*	*.69*	*.84* (.42, .84)
7. Subiculum	**.55** (.43, .65)	**.17** (.02, .31)	**.23** (.08, .37)	**-.25** (-.1, -.4)	**.34** (.21, .47)		*.97* (.78, 1.0)	*.94* (.47, 1.0)	*.36*	*.59*	*.70* (.26, 1.0)
8. Presubiculum	**.45** (.31, .57)	**.05**	**.11**	**-.11**	**.11**	**.56** (.44, .65)		*.92* (.31, 1.0)	*.56*	*.46*	*.61* (.10, 1.0)
9. Parasubiculum	**.14**	**-.07**	**.01**	**.09**	**.05**	**.05**	**.33** (18, .46)		*.52*	*.74*	*.78* (.22, 1.0)
10. HATA	**.27** (.12, .41)	**.09**	**.29** (.14, .42)	**.30** (.16, .43)	**.19** (.04, .33)	**-.03**	**.02**	**.03**		*.06*	*.30*
11. Fissure	**.24** (.08, .39)	**.16** (.01, .31	**.03**	**-.06**	**.23** (.08, .37)	**.28** (.14, .42)	**.22** (.07, .36)	**-.02**	**-.06**		*.57*
12. Fimbria	**.16**	**.05**	**.08**	**-.14**	**.05**	**.17** (.02, .32)	**-.03**	**.02**	**.22** (.07, .36)	**-.13**	

TABLE S10 Comparison of Heritability derived from Multivariate Cholesky (i.e. Additive Genetic Influence (A), shown as a percentage of variance) and from Genome-wide Association (Single Nucleotide Polymorphism (SNP)) Analysis

		Derived From Multivariate Cholesky (Hippocampal Formation + 10 Subfields)	**Derived From Multivariate Cholesky (effects of Hippocampal Formation regressed out)**	**SNP Heritability (%) (as reported in van der Meer et al. (2020): effects of Hippocampal Formation regressed out)**
		Combined QTIM/HCP	Combined QTIM/HCP	
CA1	A C E	**76** (67, 84) **09** (01, 18) **15** (13, 18)	**54** (41, 62) 02 (00, 11) **44** (38, 52)	22
Molecular Layer	A C E	**75** (66, 83) **07** (0.3, 16) **18** (15, 21)	**54** (39, 61) 01 (00, 12) **45** (39, 52)	21
CA4/Dentate Gyrus	A C E	**77** (67, 84) **07** (01, 16) **16** (14, 19)	**57** (44, 63) 01 (00, 11) **42** (36, 49)	22
Subiculum	A C E	**75** (66, 83) **08** (01, 17) **17** (14, 20)	**53** (42, 60) 01 (00, 07) **46** (39, 54)	22
Presubiculum	A C E	**69** (58, 79) **10** (01, 20) **21** (17, 24)	**59** (45, 66) 02 (00, 13) **39** (34, 46)	21
CA2/3	A C E	**71** (60, 77) 04 (00, 13) **25** (22, 30)	**58** (43, 67) 03 (00, 14) **39** (33, 46)	24
Parasubiculum	A C E	**58** (46, 66) **07** (01, 16) **35** (30, 41)	**51** (39, 59) 01 (00, 09) **48** (41, 55)	14

NOTE: Data have been corrected for sex and age effects (as well as MRI effects for QTIM). Volumes are in size order from largest (CA1) to smallest (Parasubiculum).
van der Meer et al. (2020). Brain scans from 21,297 individuals reveal the genetic architecture of hippocampal subfield volumes. *Mol Psychiatry, 25*(11), 3053-3065. doi:10.1038/s41380-018-0262-7

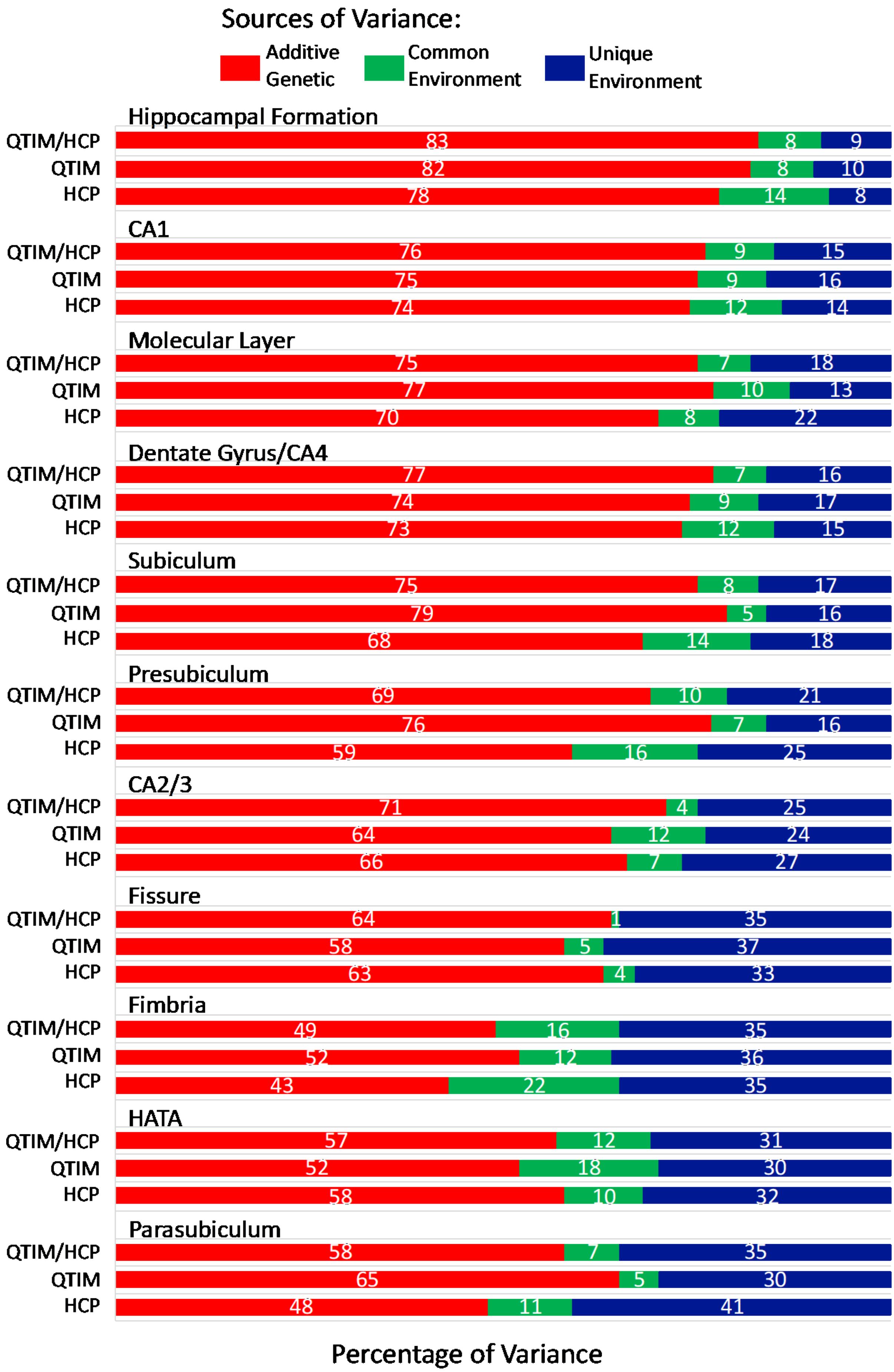

FIGURE S1 Percentage of total variance influenced by additive genetic, common environmental, and unique environmental sources (derived from multivariate Cholesky decomposition as reported in Tables S4-S6)

References

van der Meer, D., Rokicki, J., Kaufmann, T., Cordova-Palomera, A., Moberget, T., Alnaes, D., . . . Genetics, S. (2020). Brain scans from 21,297 individuals reveal the genetic architecture of hippocampal subfield volumes. *Mol Psychiatry, 25*(11), 3053-3065. doi:10.1038/s41380-018-0262-7