Supplemental Online Content

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eTable 1. Comparison of Astigmatism in Right Eye and Left Eye
eTable 2. Table of Contingencies for Left and Right Eyes
eTable 3. The Association of Parental Astigmatism on Child Astigmatism in
5708 Trios Using Different Cutoff Points for Astigmatism
eTable 4. The Association of Parental Astigmatism on Child Astigmatism in
5708 Trios Using Data from Different Eyes
eTable 5. Age and Sex Association Analysis on Child Astigmatism in 5708
Trios
eFigure. Different Combinations of Parental Astigmatism Severities on Child
Astigmatism
eAppendix. Hong Kong Children Eye Study Questionnaire

This supplemental material has been provided by the authors to give readers additional information about their work.

	Right eye	Left eye
Child's refractive astigmatism, D	-0.72 (0.68)	-0.77 (0.70)
Child's corneal astigmatism, D	1.25 (0.66)	1.29 (0.69)
Child's refractive astigmatism		
No	4319 (75.8%)	4102 (72.6%)
Yes	1379 (24.2%)	1550 (27.4%)
Child's corneal astigmatism		
No	2179 (39.4%)	2045 (37.0%)
Yes	3345 (60.6%)	3484 (63.0%)
Maternal refractive astigmatism, D	-0.79 (0.69)	-0.82 (0.75)
Maternal corneal astigmatism, D	1.07 (0.69)	1.12 (0.72)
Maternal refractive astigmatism		
No	4031 (70.8%)	3907 (68.8%)
Mild	1259 (22.1%)	1273 (22.4%)
High	407 (7.1%)	501 (8.8%)
Maternal corneal astigmatism		
No	3050 (54.5%)	2879 (51.7%)
Mild	2019 (36.1%)	2059 (37.0%)
High	525 (9.4%)	632 (11.3%)
Paternal refractive astigmatism, D	-0.91 (0.78)	-0.91 (0.80)
Paternal corneal astigmatism, D	1.03 (0.73)	1.05 (0.74)
Paternal refractive astigmatism		
No	3594 (63.0%)	3558 (62.7%)
Mild	1558 (27.3%)	1501 (26.5%)
High	662 (9.7%)	613 (10.8%)
Paternal corneal astigmatism		
No	3283 (58.8%)	3170 (57.0%)
Mild	1771 (31.7%)	1842 (33.1%)
High	532 (9.5%)	552 (9.9%)

eTable 1. Comparison of Astigmatism in Right Eye and Left Eye

Ch	nild's Refractive Ast	igmatism					
Left eye	eft eye No Yes						
Right eye							
No	3782		473				
Yes	292		1076				
C	Child's Corneal Astig	gmatism					
Left eye No Yes							
Right eye							
No	1534		627				
Yes	476		2828				
Ma	ternal Refractive As	stigmatism					
Left eye	No	Mild	High				
Right eye							
No	3448	509	60				
Mild	438	658	162				
High	21	106	279				
M	aternal Corneal Ast	igmatism					
Left eye	No	Mild	High				
Right eye	_						
No	2322	647	42				
Mild	511	1254	242				
High	21	154	343				
Pat	ernal Refractive As	tigmatism					
Left eye	No	Mild	High				
Right eye							
No	2903	592	73				
Mild	606	747	201				
High	High 49 162						
Pa	aternal Corneal Asti	gmatism					
Left eye	No	Mild	High				
Right eye							
No	2562	626	43				
Mild	537	1046	168				
High	30	159	338				

eTable 2. Table of Contingencies for Left and Right Eyes

Child refractive astigmatism was	defined as astigmatis	Child corneal astigmatism was defined as astigmatism of $\geq 0.75D$						
	Child Refractive	Astigmatism		Child Corneal A	stigmatism			
	OR ^a (95% CI)	P Value		OR ^a (95% CI)	P Value			
Maternal refractive astigmatism, D	0.85 (0.76-0.93)	0.001	Maternal corneal astigmatism, D	1.61 (1.38-1.87)	< 0.001			
Paternal refractive astigmatism, D	0.84 (0.77-0.92)	< 0.001	Paternal corneal astigmatism, D	1.39 (1.21-1.60)	< 0.001			
Child's age, years	0.94 (0.86-1.03)	0.16	Child's age, years	0.94 (0.84-1.05)	0.27			
Sex, male as reference	0.87 (0.75-1.00)	0.05	Sex, male as reference	1.03 (0.86-1.25)	0.75			
Child's spherical equivalent, D	0.92 (0.88-0.97)	0.001	Child's axial length, mm	0.81 (0.72-0.89)	< 0.001			
Outdoor time, hours per day	0.98 (0.85-1.13)	0.78	Outdoor time, hours per day	0.88 (0.75-1.05)	0.16			
Near work, diopter hours per day	1.00 (0.97-1.03)	0.92	Near work, diopter hours per day	1.03 (0.99-1.06)	0.18			
Family income per month, <hk< td=""><td>1.04 (0.86, 1.25)</td><td>0.71</td><td>Family income per month, <hk< td=""><td>1 02 (0 81 1 20)</td><td>0.83</td></hk<></td></hk<>	1.04 (0.86, 1.25)	0.71	Family income per month, <hk< td=""><td>1 02 (0 81 1 20)</td><td>0.83</td></hk<>	1 02 (0 81 1 20)	0.83			
\$20000 as reference	1.04 (0.80-1.23)	0.71	\$20000 as reference	1.05 (0.81-1.50)	0.85			
Mother education level, without	1 02 (0 85 1 21)	0.85	Mother education level, without	1 00 (0 87 1 25)	0.46			
post-secondary as reference	1.02 (0.83-1.21)	0.85	post-secondary as reference	1.09 (0.87-1.55)	0.40			
Father education level, without	0.86 (0.72, 1.02)	0.10	Father education level, without	0.01 (0.73, 1.13)	0.40			
post-secondary as reference	0.80 (0.72-1.03)	0.10	post-secondary as reference	0.91 (0.75-1.15)	0.40			
Child refractive astigmatism was	Child refractive astigmatism was defined as astigmatism of $\leq -1.25D$			Child corneal astigmatism was defined as astigmatism of ≥1.25D				
	Child Refractive	Astigmatism		Child Corneal Astigmatism				
	OR ^a (95% CI)	P Value		OR ^a (95% CI)	P Value			
Maternal refractive astigmatism, D	0.72 (0.64-0.80)	< 0.001	Maternal corneal astigmatism, D	1.71 (1.53-1.92)	< 0.001			

eTable 3. The Association of Parental Astigmatism on Child Astigmatism in 5708 Trios Using Different Cutoff Points for Astigmatism

Paternal refractive astigmatism, D	0.83 (0.74-0.93)	0.001	Paternal corneal astigmatism, D	1.42 (1.28-1.58)	< 0.001
Child's age, years	0.87 (0.77-0.97)	0.02	Child's age, years	1.03 (0.94-1.14)	0.48
Sex, male as reference	0.94 (0.77-1.14)	0.51	Sex, male as reference	0.91 (0.78-1.07)	0.26
Child's spherical equivalent, D	0.81 (0.77-0.87)	< 0.001	Child's axial length, mm	0.75 (0.69-0.83)	< 0.001
Outdoor time, hours per day	0.96 (0.80-1.16)	0.69	Outdoor time, hours per day	0.96 (0.83-1.11)	0.58
Near work, diopter hours per day	1.00 (0.96-1.04)	0.98	Near work, diopter hours per day	1.01 (0.98-1.04)	0.38
Family income per month, <hk< td=""><td>0.00 (0.77, 1.27)</td><td>0.02</td><td>Family income per month, <hk< td=""><td>1 01 (0 82 1 22)</td><td>0.02</td></hk<></td></hk<>	0.00 (0.77, 1.27)	0.02	Family income per month, <hk< td=""><td>1 01 (0 82 1 22)</td><td>0.02</td></hk<>	1 01 (0 82 1 22)	0.02
\$20000 as reference	0.99 (0.77-1.27)	0.92	\$20000 as reference	1.01 (0.85-1.25)	0.93
Mother education level, without	0.00 (0.78, 1.26)	0.04	Mother education level, without	0.06 (0.80, 1.16)	0.67
post-secondary as reference	0.99 (0.78-1.20)	0.94	post-secondary as reference	0.90 (0.80-1.10)	0.07
Father education level, without	0.85 (0.67.1.08)	0.10	Father education level, without	0.80 (0.74, 1.07)	0.20
post-secondary as reference	0.85 (0.07-1.08)	0.19	post-secondary as reference	0.89 (0.74-1.07)	0.20

Abbreviation: D, diopter; OR, odds ratio; CI, confidence interval.

^a OR was estimated by multiple logistic regression model.

Using Data from <i>Left Eye</i>									
Child Refractiv	ve Astigmatism ^c		Child Corneal Astigmatism ^d						
	OR ^a (95% CI)	P Value		OR ^a (95% CI)	P Value				
Maternal refractive astigmatism, D	0.76 (0.69-0.85)	< 0.001	Maternal corneal astigmatism, D	1.41 (1.26-1.57)	< 0.001				
Paternal refractive astigmatism, D	0.82 (0.74-0.90)	< 0.001	Paternal corneal astigmatism, D	1.32 (1.18-1.48)	< 0.001				
Child's age, years	0.96 (0.87-1.05)	0.36	Child's age, years	1.09 (0.99-1.20)	0.08				
Sex, male as reference	0.96 (0.82-1.13)	0.62	Sex, male as reference	0.89 (0.76-1.04)	0.15				
Child's spherical equivalent, D	0.87 (0.83-0.92)	< 0.001	Child's axial length, mm	0.77 (0.70-0.84)	< 0.001				
Outdoor time, hours per day	0.92 (0.79-1.08)	0.30	Outdoor time, hours per day	0.89 (0.77-1.03)	0.11				
Near work, diopter hours per day	1.00 (0.97-1.03)	0.95	Near work, diopter hours per day	1.02 (0.99-1.05)	0.33				
Family income per month, <hk< td=""><td>1.13 (0.92-1.40)</td><td>0.25</td><td>Family income per month, <hk \$20000<="" td=""><td>1 01 (0 83-1 24)</td><td>0.91</td></hk></td></hk<>	1.13 (0.92-1.40)	0.25	Family income per month, <hk \$20000<="" td=""><td>1 01 (0 83-1 24)</td><td>0.91</td></hk>	1 01 (0 83-1 24)	0.91				
\$20000 as reference	1.15 (0.92 1.10)	0.23	as reference	1.01 (0.05 1.21)					
Mother education level, without post-	1 11 (0 91-1 35)	0.31	Mother education level, without post-	1.00 (0.83-1.20)	0.95				
secondary as reference	1.11 (0.91-1.55)	0.31	secondary as reference	1.00 (0.85-1.20)	0.95				
Father education level, without post-	0.71 (0.58 0.87)	0.001	Father education level, without post-	0.94 (0.78, 1, 13)	0.52				
secondary as reference	0.71 (0.38-0.87)	0.001	secondary as reference	0.94 (0.78-1.13)	0.52				
		Using Data fron	n Average of Both Eyes						
Child Refractive	Astigmatism, D ^c		Child Corneal Astigmatism, D ^d						
	OR ^a (95% CI)	P Value		OR ^a (95% CI)	P Value				
Maternal refractive astigmatism, D	0.73 (0.65-0.82)	< 0.001	Maternal corneal astigmatism, D	1.72 (1.51-1.94)	< 0.001				

eTable 4. The Association of Parental Astigmatism on Child Astigmatism in 5708 Trios Using Data from Different Eyes

Paternal refractive astigmatism, D	0.78 (0.70-0.87)	< 0.001	Paternal corneal astigmatism, D	1.39 (1.23-1.56)	<0.001		
Child's age, years	0.92 (0.83-1.02)	0.10	Child's age, years	1.04 (0.95-1.14)	0.40		
Sex, male as reference	0.93 (0.78-1.10)	0.40	Sex, male as reference	0.86 (0.74-1.01)	0.07		
Child's spherical equivalent, D	0.84 (0.79-0.89)	< 0.001	Child's axial length, mm	0.75 (0.69-0.83)	< 0.001		
Outdoor time, hours per day	0.90 (0.76-1.07)	0.24	Outdoor time, hours per day	0.84 (0.73-0.97)	0.02		
Near work, diopter hours per day	1.00 (0.97-1.04)	0.93	Near work, diopter hours per day	1.02 (0.99-1.05)	0.30		
Family income per month, <hk \$20000 as reference</hk 	1.02 (0.81-1.27)	0.87	Family income per month, <hk \$20000<br="">as reference</hk>	1.02 (0.84-1.25)	0.81		
Mother education level, without post- secondary as reference	0.96 (0.78-1.19)	0.73	Mother education level, without post- secondary as reference	0.98 (0.82-1.18)	0.83		
Father education level, without post- secondary as reference	0.79 (0.64-0.98)	0.03	Father education level, without post- secondary as reference	0.88 (0.73-1.05)	0.16		
		Using Data	from <i>Worse Eye</i>				
Child Refractive	Astigmatism, D ^c		Child Corneal Astigmatism, D ^d				
	OR ^a (95% CI)	P Value		OR ^a (95% CI)	P Value		
Maternal refractive astigmatism, D	0.81 (0.74-0.89)	< 0.001	Maternal corneal astigmatism, D	1.58 (1.40-1.79)	< 0.001		
Paternal refractive astigmatism, D	0.85 (0.78-0.92)	< 0.001	Paternal corneal astigmatism, D	1.34 (1.20-1.51)	< 0.001		
Child's age, years	0.91 (0.83-0.99)	0.03	Child's age, years	1.10 (1.00-1.22)	0.06		
Sex, male as reference	0.89 (0.76-1.03)	0.12	Sex, male as reference	0.92 (0.78-1.09)	0.36		
Child's spherical equivalent, D	0.83 (0.79-0.88)	< 0.001	Child's axial length, mm	0.78 (0.71-0.86)	< 0.001		
Outdoor time, hours per day	0.92 (0.80-1.07)	0.29	Outdoor time, hours per day	0.91 (0.78-1.06)	0.25		
Near work, diopter hours per day	1.00 (0.97-1.03)	0.86	Near work, diopter hours per day	1.03 (1.00-1.07)	0.05		

Family income per month, <hk \$20000 as reference</hk 	1.05 (0.86-1.28)	0.63	Family income per month, <hk \$20000<br="">as reference</hk>	1.05 (0.85-1.29)	0.67
Mother education level, without post- secondary as reference	1.04 (0.86-1.25)	0.72	Mother education level, without post- secondary as reference	1.04 (0.86-1.27)	0.69
Father education level, without post- secondary as reference	0.76 (0.63-0.92)	0.004	Father education level, without post- secondary as reference	0.86 (0.71-1.04)	0.13

Abbreviation: D, diopter; OR, odds ratio; CI, confidence interval.

^a OR was estimated by multiple logistic regression model.

^b *P*-trend of parental influence was estimated by univariate analysis.

^c Age, sex, child's spherical equivalent, outdoor time, near work, family income and parental education level were adjusted in refractive astigmatism model.

^d Age, sex, child's axial length, outdoor time, near work, family income and parental education level were adjusted in corneal astigmatism model.

Age (years)	Estimated mean RA ^a (D)	Estimated mean CA ^a (D)
6	-0.76 (-0.81 to -0.72)	1.28 (1.24-1.33)
7	-0.71 (-0.75 to -0.67)	1.25 (1.21-1.29)
8	-0.69 (-0.74 to -0.64)	1.22 (1.17-1.27)
P-trend ^b	0.04	0.13
Sex		
Male	-0.74 (-0.78 to -0.71)	1.24 (1.21-1.28)
Female	-0.71 (-0.75 to -0.67)	1.27 (1.23-1.31)
P Value ^c	0.18	0.34

eTable 5. Age and Sex Association Analysis on Child Astigmatism in 5708 Trios

^a Estimated mean values were generated by univariate analyses.

^b P trend was calculated with the adjustment of parental astigmatism, sex, child's spherical equivalent, outdoor time, near work, family income and parental education level.

^c P values was calculated with the adjustment of parental astigmatism, age, child's axial length, outdoor time, near work, family income and parental education level.



eFigure 1. Different Combinations of Parental Astigmatism Severities on Child Astigmatism



eAppendix. Hong Kong Children Eye Study Questionnaire

Please tick the average number of *hours per day* that your child spends doing the following activities (*e.g. if your child does 15 hours of outdoor leisure activities per week, then the average number of hours per weekday is 3 hours*). If your child spends *more than 3 hours* on a particular activity, please specify *the amount of hours spent*.

								0	n a vac	ation	day
0								((e.g. summer and		
Un a school weekday			Un a school weekend			kend		winter	break	()	
	than	1-2	3 or		than	1-2	3 or	Not	than	1-2	3 or
Not at	1 hour	ho	more	Not at all	1 hour	ho	more	at	1 hour	hou	more
an	noui	uis	nours	at all	noui	uis	nours	an	noui	15	nours
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Hong Kong Children Eye Study Questionnaire

mobile phone, Gameboy, iPad/tablet)		hours		hours		hours
m) Playing with and						
caring for pets		hours		hours		hours
n) Going shopping		hours		hours		hours
o) Playing chess, cards						
or board games		hours		hours		hours

Hong Kong Children Eye Study Questionnaire

1) What is the highest level of education completed by the *mother*?

- □ Never attended school
- Primary school
- High school
- □ Associate degree or higher diploma
- University, CAE or some other tertiary institute degree
- Higher degree including a Masters or PhD

Total amount of years spent in school: _____years

- 2) What is the highest level of education completed by the *father*?
 - □ Never attended school
 - □ Primary school
 - High school
 - □ Associate degree or higher diploma
 - University, CAE or some other tertiary institute degree
 - Higher degree including a Masters or PhD

Total amount of years spent in school: _____years

Please tick the appropriate box and answer the following questions in Hong Kong dollars.

- 3) What's your family income?
 - □ <\$5,000
 - \$5,000--10,000
 - □ \$10,000 11,999
 - \$12,000 14,999
 - □ \$15,000 19,999
 - \$20,000 24,999
 - \$25,000 29,999
 - \$30,000 34,999
 - \$35,000 39,999
 - □ \$40,000 49,999
 - □ \$50,000 59,999

 - □ \$60,000 79,999
 - \$80,000 99,999
 - \$100,000 144,999
 - \$150,000 199,999
 - □ ≥ \$200,000