Electronic Supplementary Material (ESI) for Photochemical & Photobiological Sciences.

Supplementary Material

Description of Kidskin Study questionnaire variables

The responses to the Kidskin Study parent questionnaires were categorical: time outdoors was recorded as “no time”, “less than 1 hour”, “1 hour up to 2 hours”, “2 hours up to 3 hours”, “3 hours up to 4 hours” and “4 hours or more”. Responses to the questions regarding use of sunscreen or hat when outdoors at these venues included “None or hardly any of the time”, “Some of the time”, “About half of the time”, “Most of the time”, and “All of the time”. Number of days spent at each venue was recorded as “no days”, “1 to 2 days”, “3 to 6 days”, “7 to 14 days”, “15 or more days”. We assumed that a child was outdoors at a maximum of one venue on any given day.

Calculation of Kidskin Study parent-reported time spent in the sun, proportion of time in the sun spent wearing a hat and proportion of time in the sun spent wearing sunscreen

To calculate the time in sun, hat use and sunscreen use variables from the Kidskin Study data, we first assigned numeric values to the categorical responses. For time spent outdoors on an average day questions, the values were assigned as follows: <½ hour = 0.25 hours, ½ to 1 hour=0.75 hours, 1 to 2 hours=1.5 hours, 2 to 3 hours=2.5 hours, 3 to 4 hours=3.5 hours and >4 hours=5 hours. For days spent at each venue over the holidays, values were assigned as: no days=0 days, 1 to 2 days=1.5 days, 3 to 6 days=4.5 days, 7 to 14 days= 10.5 days and 15 or more days =15days. Categories of proportion of time wearing sunscreen or a hat were assigned values of 0, 0.25, 0.50, 0.75, and 1 in keeping with the natural order of the groups.

As the Kidskin Study parent-reported time outdoors data represents time between 8am and 4pm, 8am and 5pm or 11am and 5pm depending on the year of Kidskin Study follow-up and

outdoor venue, we made these more consistent with each other and with the KYAMS data by calculating a proportion of possible time spent outdoors at each venue. This was achieved by dividing Kidskin Study parent-reported time spent outdoors (e.g. 2.5 hours) by the length of the relevant time period (e.g. 8 hours for an 8am to 4pm period). We then multiplied this proportion of possible time spent outdoors by the length of an average summer day, assumed to be 12 hours, to calculate the amount of time spent outdoors on a 12 hour day (e.g. (2.5/8) x 12 = 3.75 hours). The daily average amount of time spent outdoors over the summer holidays was then calculated by multiplying the amount of time spent outdoors on an average 12 hour day at each venue by the number of days spent at each venue, and dividing this by the total number of days in the summer school holidays (Equation 1). The school holidays were assumed to be 45 days long as the Australian school holidays are usually around 7 weeks and the maximum possible total number of days spent at all three venues combined was 45 days. A similar process was followed to calculate variables for total proportion of time outside wearing sunscreen or a hat, but the process was simpler as these data were initially reported as proportions. The proportion of time using sunscreen or a hat at each of the pool, beach and around the house or neighbourhood was multiplied by the number of days spent at each venue and divided by the number of days in the school holidays to obtain a daily average proportion of time spent outdoors using a hat or sunscreen (Equation 2).

Equation 1

$$Average\ time\ outdoors = \frac{\sum_{venue} ((\frac{Time_{venue}}{Period_{venue}} \times 12)\ \times Days_{venue})}{45}$$

Where venue = beach, pool or outdoors around the house

Time = Parent-reported average time spent outdoors at venue

Period = the length of the time period which the question referred to e.g. if question asked how many hours did child spent outdoors between 8am and 5pm then length of time period would be 9 hours.

Days = Number of days spent at venue over the summer holidays

Equation 2

$$Sun\ protection\ use\ = \frac{\sum_{venue} (Proportion_{venue} \times Days_{venue})}{45}$$

Where sun protection refers to hat or sunscreen

venue = beach, pool or outdoors around the house

Proportion = Parent-reported average proportion of time spent outdoors using sun protection at venue

Days = Number of days spent at venue over the summer holidays.

In addition to these newly created continuous variables, we also categorised these data to match the responses of the KYAMS sun calendar. Time outdoors data was classified according to daily time spent outdoors (e.g. <0.5 hours, 0.5-1 hour etc.). The variables for proportion of time outdoors spent wearing sunscreen or a hat were categorised as follows: proportion ≤ 0.10 = “never”, >0.10 and <0.4 = “less than half of the time”, ≥0.4 and ≤0.6 = “half of the time”, >0.6 and <0.90 = “more than half of the time”, and ≥0.90 = “all of the time”. These classifications were chosen to best fit with the description of each group and to

keep the median value of each group close to the numeric values previously assigned to the parent-reported categories (i.e. 0, 0.25, 0.50, 0.75 and 1).

Supplementary Table 1 Comparison of baseline variables at each follow-up and KYAMS

	1995	1997	1999	2001	K-YAMS
Number of respondents	1692	1609	1518	1013	301
Female, n (%)	815 (48.2%)	772 (48.0%)	754 (49.7%)	506 (50.0%)	186 (61.8)%
p value[a]		0.94	0.42	0.39	<0.001
Baseline tendency to sunburn					
Severe sunburn & blistering	200 (11.9%)	168 (11.5%)	159 (11.5%)	123 (12.3%)	36 (12.4%)
Painful sunburn	708 (42.1%)	633 (43.3%)	606 (43.7%)	453 (44.9%)	127 (43.8%)
Mild sunburn	677 (40.3%)	577 (39.5%)	550 (39.7%)	392 (38.9%)	110 (37.9%)
No sunburn	97 (5.8%)	83 (5.7%)	72 (5.2%)	40 (4.0%)	17 (5.9%)
p value*		0.92	0.78	0.14	0.90
Baseline sun tan end of summer					
Very tanned	578 (34.4%)	497 (34.0%)	468 (33.7%)	339 (33.6%)	81 (27.9%)
Moderately tanned	699 (41.6%)	606 (41.5%)	578 (41.7%)	423 (42.3%)	138 (47.6%)
Lightly tanned	353 (21.0%)	316 (21.6%)	299 (21.6%)	219 (22.0%)	63 (21.7%)
No suntan at all	52 (3.1%)	42 (2.9%)	42 (3.0%)	28 (2.8%)	8 (2.8%)
p value[a]		0.96	0.98	0.92	0.15
Intervention group					
Control	732 (43.3%)	749 (46.6%)	684 (45.1%)	415 (41.0%)	100 (33.2%)
Moderate	532 (31.4%)	485 (30.1%)	476 (31.4%)	343 (34.9%)	111 (36.9%)
High	428 (25.3%)	375 (23.3%)	358 (23.6%)	255 (25.2%)	90 (29.9%)
p value[a]		0.15	0.46	0.38	0.005
Baseline hair colour					
Black or dark brown	447 (36.9%)	392 (37.0%)	366 (36.4%)	289 (37.3%)	78 (37.7%)
Light Brown	397 (32.8%)	352 (33.2%)	336 (33.4%)	256 (33.0%)	65 (31.4%)
Blond or Fair	335 (27.6%)	291 (27.4%)	279 (27.7%)	212 (27.4%)	59 (28.5%)
Red or Auburn	33 (2.7%)	26 (2.5%)	25 (2.5%)	18 (2.3%)	5 (2.4%)
p value[a]		0.98	0.98	0.95	0.97

[a] Comparison to baseline using Pearson chi square test

Supplementary Table 2 Similarities in responses across years within the KYAMS self-reported sun calendar and within the parent-reported questionnaires of the Kidskin Study.

	Kappa[a] Age 6 vs Age 8	Kappa[a] Age 6 vs Age 10	Kappa[a] Age 6 vs Age 12	Kappa[a] Age 8 vs Age 10	Kappa[a] Age 8 vs Age 12	Kappa[a] Age 10 vs Age 12
Time spent outdoors in sun						
KYAMS	0.93	0.84	0.70	0.89	0.74	0.83
Kidskin Study				0.28	0.19	0.19
Proportion of time spent wearing hat						
KYAMS	0.95	0.83	0.60	0.88	0.63	0.72
Kidskin Study	0.40	0.32	0.11	0.40	0.16	0.27
Proportion of time spent wearing sunscreen						
KYAMS	0.96	0.91	0.76	0.94	0.79	0.84
Kidskin Study	0.35	0.34	0.24	0.30	0.28	0.31

[a] Weighted kappa using the numeric differences between groups as the weights. A higher weighted kappa indicates a higher number of individuals selecting the same response at the two compared years