Preventing Skin Cancer: High School- and College-Based Interventions

Summary Evidence Tables for Updated Search Period (June 2000 – May 2011)

Author/Year: Title; Design; Execution; Location	**Population characteristics:** Target population; Setting (School level); Demographics: (Age/Grade, Gender, Race/ethnicity, Skin type)	**Intervention Characteristics:** Intervention; Intervention (component used); Type of message (Health- vs. appearance-based); Control group	**Outcome measures:** Implementation period; Follow-up period; Outcomes of Interest	**Results:** Population size (n) Effect Estimate (95% CI/ P-value)
White, 2010; Testing a belief-based intervention encouraging sun-safety among adolescents in a high risk area; Greatest (NRT with control); Fair; Australia, Queensland	Secondary school children; 2 secondary schools in metropolitan areas in Queensland: one government state secondary school and other private secondary school; Gender: 59.5% female Age: Adolescents aged 13–16 years (14.53±0.69 years) Grade:NR Skin type: 64% fair-skinned Race/Ethnicity: NR SES: NR	Theory of planned behavior intervention; Three sessions (one hour/ week in school sessions); Educational (session 1: behavioral beliefs about sun protection; session 2: normative support for sun protection (normative beliefs); session 3: perceptions of control over using sun protection (control beliefs); Health-based; No known intervention applied to control group (Participants in the control group had the opportunity to receive the intervention materials after project completion);	Intervention implementation period: October–November, 2007 and May–June, 2008; **BL:** 1 week before the intervention; **FU:** 1 week after the intervention; **Behavioral outcomes** **Protective behaviors:** (observed by teachers) 1.<u>Overall sun protection behaviors</u>	**N:** I= Pre: 34; Post: 25 C= Pre: 46; post: 29 <u>Protective behaviors:</u> (mean change in composite scores) 1.Combined protective behavior: Pre (SD) Post (SD) Intervention 2.96 (0.37) 3.88 (0.37) Control 3.93 (0.33) 3.44(0.33) Absolute mean change: 1.14 (p=0.04)

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Dobbinson, 2009; Adolescents' use of purpose built shade in secondary schools: cluster randomized controlled trial; Greatest (Group NRT); Good; Australia, Melbourne	Secondary school students; 51 secondary schools in outer metropolitan areas of Melbourne; Gender: NR Age/ Grade: 7-12 grade Skin type:NR Race/Ethnicity: NR SES: NR	Shade sails installed at secondary schools; Environmental: Shade sails were installed at full sun study sites to increase available shade for students in the school grounds to be used during passive activities such as eating lunch; NA; No intervention;	January 2005; **BL:** 2004-05(16 weeks of observation during spring and summer) **FU:** 2005-06 (14 weeks of observation during spring and summer); Outcomes measured: **Behavioral outcomes** **Protective behaviors:** <u>Change in use of primary site- site selected for shade building</u> (Change in the mean number of students using the primary site during lunch)	**N:** Total participating schools= 51 (intervention= 25; control=26) **Behavioral outcomes** **Protective behaviors:** <u>Use of shade</u> (mean change in numbers of students observed to use primary site from pre-test to post-test by group) : Mean (SD) Pre / Post / Mean change Intervention: 3.24 (2.83) / 5.87 (4.70) / 2.63(4.26) Control: 3.49 (2.82) / 3.46 (2.69) / -0.03 (2.78) Mean change= 2.66 (0.65 to 4.68) p=0.011

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Roberts, 2009 Comparison of interventions to reduce sun exposure; Greatest (Group RCT); Good; USA- Midwestern university	White undergraduate students who were travelling to sunnier environs (< 35° latitude) for spring break; Private university campuses (2); Gender: 73% female. Age: Average age: 20.6 years Skin type/ Race/ Ethnicity: White (100%) SES: NR	Community-based informational campaign (A program '"Definitely a 15"' based on the American Cancer Society's (ACS); Educational:2 arms Arm 1: ACS posters emphasized both health- and appearance related effects of sun exposure, messages about sun exposure and skin cancer via informational booths, free posters, t-shirts printed with program slogans, student newspapers etc. Arm 2: Combination of the campaign and a cognitive-behavioral small group intervention (weekly 45-minute sessions for 3 weeks in small groups of 4–6 people) Environmental:) sample of sunscreen (10% reported receiving free samples) and sunless tanners; Both (Health + appearance); No intervention	3 weeks prior to spring break (March); **BL:** 4 weeks prior to spring break **FU:** week following spring break; **Behavioral outcomes** **Protective behaviors:** Sunscreen Use (Number of days using sun screen (≥15 SPF) while outside during spring break) Overall protective behaviors (SR- protective behaviors when in the sun for more than 15 minutes (eg, wear a hat, use a sunscreen with SPF of 15 or greater)- 5 point Linkert scale, items summed to give score) **Risky behaviors:** Sun exposure (Average hours of sun exposure and during peak hrs. (10 a.m.-3 p.m.) during spring break **UV exposure** Change in skin color and	**N:** Intervention: (one college) Community campaign group (31) Combination intervention (30) Control: another college (27) **Protective behaviors:** Sunscreen Use (mean change in number of days using sunscreen) BL: 1.4 days FU: Absolute mean change: Arm 1: 0.4 days Arm 2: 1.0 days P=0.07 Overall protective behaviors (Composite score score) BL: 31.6 (7.4) FU: Absolute mean change: Arm 1: -2.7 Arm 2: no change (significant) **Risky behaviors:** Incidence of sun exposure (Total hrs) Arm 1: BL: Total hrs (SD): 17.3 (9.3) FU: (Absolute mean change) Total hrs. Peak hrs. +5.3 hrs +3.4 hrs Arm 2:

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			<u>skin tan</u> Skin color (Skin color (range of 12 skin colors) after spring break (1 week) Skin tan (Degree of tan (no tan to very tan) after spring break (1 week) **Health outcomes** <u>Sun burn incidence</u> (Average no. of days with sunburn during spring break)	BL Mean hrs (SD): 12.4 (6.1) FU: (Absolute mean change) Total hrs. Peak hrs. +1.0 hrs +0.1 hrs **UV exposure:** <u>Skin Color</u> (absolute mean change in skin color scale) Arm 1 Arm 2 BL: Mean score 5.0 (2.2) 4.9 (2.3) FU: -0.02 -0.08 (significant) <u>Skin tan</u> (absolute mean change) Arm 1 Arm 2: BL: 1.0 (0.9) 0.9 (1.0) FU: no change -0.08 (significant) **Health outcomes**: <u>Sun burn incidence</u> (absolute mean change) Arm 1 Arm 2 BL (mean days): 1.3 days FU: 0.3 days (NS) .5 days (NS)
Swindler, 2007; Can sun protection knowledge change behavior in a resistant population?; Before and after/ least;	High school students; High school; Gender: 47% males Age/ Grade: Average student age: 15-16 yrs. (13-14 years 26.1%; 15-16 years –	RAYS (Raising awareness about your skin) project; Educational: A standardized educational lecture on proper skin protection and UV radiation damage;	January and February (year not provided); **BL:** Immediately before the intervention **FU1**:Immediately after the intervention **FU2**(June): 4 months after the intervention;	**N:** Intervention: Males: n= 244 Female: n= 273 **Behavioral outcomes** **Protective behaviors:** <u>Sunscreen Use</u> (% of students)

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Fair; USA, Ohio	62.3%; >=17 years 11.6%) Skin type: Mostly with Fitzpatrick skin types II or III Race/Ethnicity: NR SES: NR	Health- based; NA	**Behavioral outcomes** **Protective behaviors:** Sunscreen Use (Have you used (overall) sunscreen in past 4 months) **Risky behaviors:** Tanning bed use: (How often do you use a tanning bed (have you used tanning bed in past 4 months)	Males / Females BL/FU (4 m.) / BL/FU (4 m.) Overall Use 70.1% / 27% / 87.2%/ 43.6% ES (absolute pct. pt. change) -43.0%(CI:-51,-35) / -43.5%(CI:-51,-36) **Risky behaviors:** <u>Tanning bed use:</u> Males / Females BL/FU (4 m.) / BL/FU (4 m.) a)Overall Use 4.5% / 7.0% / 34.1%/ 34.8% Absolute pct. pt. change: 2.5% (CI:-1.6, 6.6) / 0.7%(CI:-7.3, 8.7) b)> 20X 3.3%/3.7% / 31.5%/23.4% ES (absolute pct. pt. change) 2.1%(CI:-0.5,4.7) / 8.8%(CI:4.6,13.0)
Liu, 2001; One-year followup on the impact of a sun awareness curriculum on medical students' knowledge, attitudes, and behavior; Before and after/ least; Fair;	First-year medical students (class of 2001); University of Western Ontario; Gender: 54% male Age/ Grade: First year medical students Skin type: Race/Ethnicity: Caucasian (54%), Oriental (23%), East Indian (20%), Native (1%),	Sun awareness curriculum; Educational: A one week curriculum that included a case presentation on melanoma and lectures and small group discussions on sun awareness, protection, and skin cancer; Health -based	April 1998 (one week curriculum); **BL:** April 1998 **FU1:** May 1998 (immediate post-curriculum survey) **FU2:** May 1999 (I yr. after); **Behavioral outcomes** **Protective behaviors:** Sunscreen use (use of sunscreen (SPF≥15) on face and body and	**N:** BL=98; FU2= 71 **Behavioral outcomes** **Protective behaviors:** <u>Sunscreen use</u> (% of answers) A) On the body and extremities: SPF BL(%) FU2(%) Absolute pct pt ≥15 23.1% 50.4 % 27.3% (CI:13.0,41.6) B) On face ≥15 17.2% 50.0% 32.8% (CI:19.0,46.6)

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Canada, Ontario	and Black (1%) SES:NR		extremities in past year) Use of hat (use of hat in past year- 'converted from did not use') Use of clothing Overall protective behavior (In this past year, I did use some form of sun protection when outdoors) **Risky behaviors:** Sun exposure (Outdoor activities scheduled during extreme hours in past year) Use of tanning salons (in past year) **Health Outcomes** Sunburn incidence (in previous year)	Use of hat: (% of answers) BL(%) FU2(%) Absolute pct pt Used* 71.8% 57.7% -14.1%(CI: -28.6, 0.4) (*'Not used' numbers converted to get 'used' numbers) Use of clothing: (% of answers) BL(%) FU2(%) Absolute pct pt Shorts+ T-shirt 69.2% 70.4% 1.2%(CI:-12.8,15.2) Shorts + LSS* 3.9% 1.4% -2.5%(CI:-7.2,2.2) LP**+T-shirt 24.4% 23.9% -0.5%(CI:-13.6,12.6) LP + LSS*** 2.6% 4.2 % 1.6% (CI:-4.0,7.2) * long-sleeved shirt; ** Long pants; ***long-sleeved shirt Overall: (% of answers) BL(%) FU2(%) Absolute pct pt Usually/always 41.0% 64.3% 23.3%(8.5, 38.1) **Risky behaviors:** (% of answers) Sun exposure (Outdoor activities during extreme hours) BL(%) FU2(%) Absolute pct pt Around noon 19.2% 14.3% -4.9%(CI:-16.2,6.4) Use of tanning salons (% of answers) BL(%) FU2(%) Absolute pct pt Used* 20.5% 7.1% -13.4%(CI:-23.4,-3.4) Routinely 1.3% 0.0% -1.3%(CI: -3.5, 0.9) (*'Not used' numbers converted to get 'used' numbers)

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				Health Outcomes <u>Sunburn incidence</u> (% of answers) BL FU (1 Absolute pct pt 53.8% 31.0% -22.8%(CI:-37.4,-8.2)

Studies that Assessed the Effects of Message Testing

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Mahler, 2010; Effects of upward and downward social comparison information on the efficacy of an appearance-based sun protection intervention: a randomized, controlled experiment; RCT/ Greatest; Fair; USA, San Diego	Undergraduate (psychology class); University of California, San Diego (UCSD); Gender: 76% female Age/ Grade: 18 to 34 (M = 19.94, SD = 2.36) Skin type: NR Race/Ethnicity: Caucasian (59.5%), Asian (25.4%),	Appearance focused (social comparison); Educational: <u>Arm 1:</u> Basic Intervention (BI) comprises of combination of their UV photograph and photoaging information <u>Arm 2:</u> BI + downward social comparison information - received a combination of BI plus others' UV photographs	Spring term (April to early May); BL: NR FU1: Immediately following intervention FU2: 5 weeks; **Behavioral outcomes** **Protective behaviors:** Sun protection index: (calculated mainly by sunscreen use during both intentional and incidental sun exposure)	**N:** Intervention only (30) Intervention + Downward comparison photos (30) Intervention + upward comparison photos (32) Control (33) **Behavioral outcomes** **Protective behaviors:** (mean change in z-scores**)** <u>Overall sun protection Index</u> (mean (S.D.)- lower z-score less protection Mean (SD) Intervention Mean (SD) Control

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	Hispanic (4.8%), African-American (.8%), both Asian and Caucasian (4.0%), Caucasian and Hispanic (2.4%), Caucasian and Native American (.8%), Hispanic and Native American (.8%), and other (1.6%) SES: NR	depicting less skin damage than their own ("in college students like themselves") <u>Arm3</u>: BI + others UV photographs depicting more skin damage than their own ("in college students like themselves"); Appearance- based; No intervention	**Risky behaviors:** Sun exposure (during incidental and intentional exposure) Overall index of sun exposure by standardizing and averaging the foregoing single intentional and two incidental sun exposure* measures. (An index of baseline sun exposure was similarly created using the corresponding baseline measures of sun exposure) *Intentional and Incidental sun exposure: a)Intentional: estimated number of hours of <u>sunbathing</u> since the intervention b) Incidental: average number of hours they had spent in the sun while engaged in activities other than sunbathing on a typical weekday and weekend, respectively	Arm 1: 0.15 (0.54) -0.18 (0.65) (More protection in intervention group (p= 0.01) Arm 2: -0.18 (0.67) -0.18 (0.65) (Same protection as in control) Arm 3: 0.21 (0.69) vs. -0.18 (0.65) (More protection in intervention group (NS) (basic intervention increased sun protective behavior during the subsequent 5 weeks) **Risky behaviors:** (mean change in z-scores) <u>Sun exposure index</u>: mean (S.D.)- lower z-score less exposure Mean (SD) Intervention / Mean (SD) Control Arm 1: 0.02 (0.70) 0.09 (0.68) (NS) Arm 2: -0.06 (0.86) 0.09 (0.68) (NS) Arm 3: -0.06 (0. 70) 0.09 (0.68) (NS) (No difference in intervention conditions in how much sun exposure they reported compared to controls - no difference between 3 intervention groups)
Carli, 2008; The use of commercially available personal UV-meters does cause less safe tanning habits: a	University students (21-23 yrs. old volunteers); University of Florence Medical school;	Commercially available UV meters; a)Educational: Short leaflet with statements about advice for safe sun exposure in accordance	May,2004; **Post only:** July and August of 2004; **Behavioral outcomes**	**N:** Intervention (post only): n=46 Control (post only): n=40 **Protective behaviors:** (% of days/frequency of days with protective behaviors)

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randomized-controlled trial; Greatest (RCT); Fair; Italy, Florence	Gender: 74% females Age/ Grade: Mean age: 24.0 yrs. Race/Ethnicity/ Skin type: Fair: 43%; Intermediate: 47%; Olive: 10% Phototype: I: none; II: 41% ; III: 48%; IV: 11% Hair color: Black / dark brown: 72%; Light brown: 22%; Blond: 7% Eye color: Black /brown: 63%; Green: 22%; Grey /blue: 15% SES: NR	with the UV-I value b) Environmental: Received a commercially available UV-I sensor with brief instructions for its use; Health- based; Educational leaflet and diary for data recording	**Protective behaviors:** (Overall use of protective behaviors according to daily diary log) Sunscreen Use Clothing (t-shirt) Use Hat Use Sunglasses Use **Risky behaviors:** Sun Exposure (Average time (min) of sun exposure during peak hours – daily diary log) **Health outcomes** Sunburn Incidence (Average days with sunburns during overall sun exposure)	Sunscreen Use: # of days (intervention)=311; (Control): 364 Intervention Control % of days with sun protection: 41.4% 47.2% Absolute pct pt change: -5.8% days ; p-value = 0.02 Clothing Use: # of days (intervention)=190; (Control): 185 Intervention Control % of days with sun protection: 25.3% 24.0% Absolute pct pt change: +1.3% day; p-value = 0.56 Sunglasses Use: # of days (intervention)=180; (Control): 239 Intervention Control % of days with sun protection: 23.9% 30.8% Absolute pct pt change: -6.9% days; p-value = 0.003 Hat: # of days (intervention)=48; (Control): 185 Intervention Control % of days with sun protection: 6.4% 10.2% Absolute pct pt change: -3.8% days; p-value = 0.004 **Risky behaviors:** Sun Exposure (Average time (min) of sun exposure during peak hours in 2 months – daily diary log) Intervention Control 129.2 mins 106.0 mins Change in minutes: +23 mins; p-value: <0 .001

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				Health outcomes: <u>Sunburn Incidence</u> (Proportion of days with sunburns during overall peak exposure in spring break) Intervention Control % of days with sun burn: 27.8% 21.5% Absolute change in days of sunburn: +6.3 (2.0, 10.6)
Hillhouse, 2008 (Related papers- Hillhouse 2010; Abar, 2010; Stapleton, 2010)**;** A Randomized Controlled Trial of an Appearancefocused Intervention to Prevent Skin Cancer; Greatest (NRT); Fair; USA, Eastern states	Female university students; University (2 in the eastern United States); Gender: 100% female Age:Median age=18.6 years (S.D. 0.78) Grade: NR Skin type:NR (in one of the related papers mentioned briefly that participants were mostly caucasian) Race/Ethnicity: NR SES: NR	Appearance based booklet for indoor tanners; Educational: Prototype booklet (24 page booklet) written at an eighth grade reading level developed by a professional commercial art firm. The booklet contained 6 sections; Appearance- based; No intervention	October, 2006; BL: October (3-month assessment for the period of August through October) FU: Ist FU: 1 month (August through October) 2nd FU(6 month) – 3 month assessment in April from the period of Feb. throu' April (Participants also completed biweekly diaries of IT behavior as a validity check of the global self-reports); **Behavioral outcomes** **Risky behaviors:** Indoor tanning behavior (Mean change in IT frequency for the past 3, 6, and 12 months)	**N:** Intervention: n=200 Control: n=230; **Behavioral outcomes** **Risky behaviors:** <u>Indoor tanning behavior:</u> (Mean # of visits in last 6 months): Intervention Control Mean (SE) Mean (SE) BL 4.48 (0.55) 4.67 (0.60) FU (6 mos) 10.90 (0.93) 6.80 (0.93) Mean change in indoor tanning visits: -4.29 visits; p<0.001
Mahler, 2008; Social norms	Undergraduate students;	Appearance-based sun protection intervention;	NR;	N= 25 students randomly selected for all 4 arms of intervention and control group.

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information enhances the efficacy of an appearance-based sun protection intervention; RCT/ Greatest; Fair; USA, San Diego	University of California, San Diego; Gender: 83.2% female Age/ Grade: ranged from 18 to 38 years Skin type: NR Race/Ethnicity: 56.8% Caucasian, 32.0% Asian, 4.0% Hispanic, 0.8% African-American, 0.8% Native American, and 4.0% as ''other'' SES: NR	NR; Educational: Arm1: Basic intervention (BI) - UV photo and photoaging information only Arm 2: BI + injunctive norms information (information about what one should do to prevent photoaging) Arm 3: BI + descriptive norms information (delivered orally by the experimenter and presented a bogus "focus group" discussion among college students on information about the number of their peers who currently use regular sun protection) Arm 4: BI + both injunctive and descriptive norms information; Appearance-based; No intervention	BL FU1:Immediately following intervention FU2 : 1 month following intervention; **Behavioral outcomes** **Protective behaviors:** Combined- Sun protection index (Overall index of sun protection by using sunscreen and other protective measures, purchase of sun screen) Sunscreen use (proportion of students using sunscreen during sun exposure)	**Results:** **Behavioral Outcomes** **Protective behaviors** <u>Sun protection index</u>: Means (and standard deviations)- algorithm provided, z scoring and average (lower z-scores= less use) Mean(Control Arm 1 -0.02. -0.28(0.44) (p<0.001) Arm 2 0.10 -0.28(0.44) (ns) Arm 3 -0.03 -0.28(0.44) (ns) Arm 4 0.23 -0.28(0.44) (p=0.04) (those who received the BI reported significantly greater sun protection at the 1-month follow-up (M= 0.09) than did controls (M= - 0.28), t (102) = 3.70, p < 0.001, effect size d= 0.94.) <u>Sunscreen Use</u>: (proportion of participants used sunscreen) On Face: % Used Absolute pct. pt.) Arm 1 39.0% 25 (1.5, 48.5) Arm 2 38.0% 24(0.6, 47.4) Arm 3 31.0% 17(-5.7, 39.7) Arm 4 57.0% 43(19.3, 66.7) Control 14.0% On body: % Used ES (absolute pct. pt.) Arm 1 51.5% 22.5 (-4.0, 49.0) Arm 2 50.0% 21(-5.5, 47.5) Arm 3 50.0% 21(-5.5, 47.5) Arm 4 61.5% 32.5 (6.4, 58.6) Control 29.0%
Turrisi, 2008; A comparison of 2	Undergraduates from an introductory health	Brief intervention to decrease indoor tanning;	November;	**N:** PMI: n= 39

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brief intervention approaches to reduce indoor tanning behavior in young women who indoor tan very frequently; RCT/ Greatest; Fair	course; A large northeastern US university; Gender: Female (100%) Age/ Grade: Undergrads Skin type: NR Race/Ethnicity: NR SES: NR	 Educational: Arm 1: Peer- delivered Motivational Interview (PMI)- Tailored health and appearance information provided by <u>one-on-one counseling</u> based on participants current indoor tanning behavior and normative beliefs about tanning- effects, problems, and financial costs Arm 2: Personalized graphic feedback (PGF)- same as above but via mail. No personal contact; Both appearance –based and health related	**BL:** before intervention **FU:** 3 months after intervention (Dec – Feb); **Behavioral outcomes** **Risky Behaviors** <u>Use of indoor tanning sessions</u> **(**Total number of indoor tanning sessions in 3 months (Dec.- Feb.)	PGF: n= 34 Control: n= 32 **Results:** **Behavioral outcomes** **Risky Behaviors** <u>Use of indoor tanning sessions</u> (Mean number of indoor tanning sessions in past 3 months) Arm 1 (PMI) (Absolute mean change) Intervention Mean (SD) / Control Mean (SD) / ES / p-value 4.40 (7.74) / 11.78 (13.03) / -7.38 / <0.006 Arm 2 (PGF): No significant change
Mahler, 2007; Long-term effects of appearance-based interventions on sun protection behaviors; RCT/ Greatest; Fair; USA, San Diego	Undergraduate psychology students; University of California, San Diego; Gender: women (80%); men (20%) Age:18-44 Skin type: NR Race/Ethnicity: 45% white; 35.3% Asian, 11.3% Hispanic, 1.5% both Asian and white, 0.8% both Hispanic	UV photography in College students; Educational: Arm 1: Photoaging information: 11-min. video- depicted photo aging caused by sun exposure (including graphic photos of extreme cases of wrinkles and age spots), discussed effective practices for minimizing photo aging, provided	April-May (year not specified); **BL:** Immediately following intervention **FU1:** 4-5 months following intervention (after summer break- late September) **FU2:** 1 year; **Behavioral outcomes** <u>Protective behaviors:</u> Combined- Sun protection	**Behavioral** **Protective behaviors** <u>Sunscreen use</u> (Sun protection index: Frequencies of sunscreen use on face and body during both intentional and incidental exposure (Average of 8- item indices – z-scores) Arm 1: FU1(Post summer / FU2(1 yr.) Intervention: 0.14 (0.10) / -0.02 (0.10)

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	and white, 0.8% both Asian and Hispanic, and 5.3% as other. SES: NR	general information about sunscreen Arm 2: UV photo-highlights the non-uniform epidermal pigmentation that results from chronic sun exposure compared with natural light instant photo to show existing underlying damage that would get worse if not protected Both appearance –based and health related; Control: Treated control (2X2 factorial design (photoaging video vs no video) x (UV photo vs no UV photo);	index (Frequencies of sunscreen use on face and body during both intentional and incidental exposure) **Risky behaviors** <u>Sun Exposure</u> <u>Intentional exposure:</u> estimated number of hours of <u>sunbathing</u> since the intervention <u>Incidental exposure:</u> average number of hours they had spent in the sun while engaged in activities other than sunbathing on a typical weekday and weekend, respectively	Control: -0.11(0.09) 0.07(0.09) Absolute mean change: 0.25 (S) 0.05 Arm 2: FU1(Post summer) FU2(1 yr.) Intervention: 0.02 (0.09) -0.05 (0.09) Control: 0.02 (0.09) 0.03 (0.09) Absolute mean change: No change -0.08 (NS) **Risky behaviors** <u>Sun Exposure</u> <u>Intentional exposure</u> Arm 1: FU1(Post summer) FU2(1 yr.) Intervention: -0.13(0.16) -0.12(0.16) Control: 0.09(0.14) 0.10(0.11) Arm 2: FU1(Post summer) FU2(1 yr.) Intervention: 0.06 (0.15) 0.21(0.15) Control: -0.10 (0.15) -0.24(0.15) <u>Incidental exposure:</u> Arm 1: FU1(Post summer) FU2(1 yr.)

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				Intervention: -0.17 (0.16) -0.23 (0.16) Control: 0.22 (0.15) 0.28 (0.15) Arm 2: FU1(Post summer) FU2(1 yr.) Intervention: -0.14 (0.15) 0.15(0.15) Control: 0.19 (0.15) -0.11 (0.15) **UV exposure:** Change in skin color (Higher exposure site): Arm 1: Significant lighter skin compare to control (RR: 3.58, , p<0.006) Arm 2: Lighter skin compare to control group (RR: 7.34, p<0.01)
Jackson, 2006; Evaluation of a multicomponent appearance-based sun-protective intervention for young women: Uncovering the mechanisms of program efficacy; Group RCT/ Greatest; Fair; USA (Arizona)	Young college females; University; Gender: Female 100% Age/ Grade: NR Skin type: NR Race/Ethnicity: Non-Hispanic Caucasian SES: NR	An appearance-based sun-protection intervention; **Educational:** Multiple sessions of dual-sided messages- benefits of sun exposure and threats of unattractive appearance due to skin cancer and photoaging via video tape and slides. Plus education about the sun protective strategies and changing norms for suntanning. **Environmental:** Sunscreen samples, information about the	Late March and April of 1997; BL: Before the intervention FU1:immediately after the test FU: after two weeks (mailed questionnaire); **Behavioral Outcomes** **Protective behaviors:** Sunscreen Use (use of free sunscreen sample by the participants in past 2 weeks) Combined sun protection: (6 point Likert for all except behavior) – coefficient alpha values	**N:** Intervention =105 (3 to 15 people per session group), Control =106; **Results:** **Behavioral Outcomes** **Protective behaviors:** Sunscreen Use (proportion of participants used sunscreen) Intervention Control Absolute pct. pt.) 47% 24% 23.0%(7.5, 38.5) Overall sun protection (Means of sun protective behaviors) Intervention Control ES Pre/ Post Pre/ Post N= (105/ 74) (106/ 65)

Author/Year: Title; Design; Execution; Location	**Population characteristics:** Target population; Setting (School level); Demographics: (Age/Grade, Gender, Race/ethnicity, Skin type)	**Intervention Characteristics:** Intervention; Intervention (component used); Type of message (Health- vs. appearance-based); Control group	**Outcome measures:** Implementation period; Follow-up period; Outcomes of Interest	**Results:** Population size (n) Effect Estimate (95% CI/ P-value)
		least expensive sunscreen (locations, brand, pleasant smelling); Appearance- based; Stress management intervention; also free sunscreen samples	provided**)** On face- calculated by most highly endorsed score of sunscreen on face, hat use, sun avoidance On body: highest score of sunscreen use on all exposed body parts, protective clothing, and sun avoidance **Risky Behaviors** Sun Exposure (number of hrs. were assessed with a single item with 9 response scale	On face: 3.75/4.39 3.61/ 3.97 0.3 (p<0.05) On body: 3.01/3.61 2.74/2.88 0.5 (p<0.05) **Risky Behaviors** 1.Sun Exposure (Means of sunbathing hrs) Intervention Control ES Pre/ Post Pre/ Post N= (105/ 74) (106/ 65) .85/1.69 1.80/ 1.94 -0.3 hrs (p<0.01)
Mahler, 2005; Effects of UV photographs, photoaging information, and use of sunless tanning lotion on sun protection behaviors; RCT/ Greatest; Fair; USA, Southern California	Undergraduate psychology students; California State University, San Marcos and University of California, San Diego; Age: Mean age (SD) of 22.21 (4.66) yrs Race: White 67.8; Asian 16.4; Hispanic 6.8; African American 2.1; Other 6.9 Skin type: Burns, never tans 7.6; Burns easily, then develops light tan	An appearance based intervention; <u>Educational:</u> Arm 1: Basic intervention (BI): 12 minute video and UV facial photograph and natural light photograph for comparison <u>Environmental:</u> Sunscreen sample to all participants; Arm 2: BI+ 177ml of sunless tanning lotion; Both appearance –based and health related; Free sunscreen samples	NR; BL: NR FU1: immediately following intervention FU2: one month later; **Behavioral Outcomes** **Protective behaviors:** Sun protection index (Sun protection index: Frequencies of sunscreen use on face and body during both intentional and incidental exposure) **Risky Behaviors** Sun exposure (Estimated hours of sunbathing during both intentional	**N=** Intervention: Arm 1= 50; Arm 2= 45; Control=50 **Results:** **Behavioral Outcomes** **Protective behaviors:** <u>Sun protection index</u> (sunscreen use) a)During intentional exposure (sunbathing) Group (n) adjusted means (SD) ES Arm 1 (8) -0.08 (0.94) -0.26 Arm 2 (3) 0.72 (0.12) 0.54 Control (9) 0.18 (0.75) p>0.11(because of small sample size) b) During incidental exposure (sun exposure other than sun bathing)

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	24.1; Burns moderately, then develops light tan 22.1; Burns minimally, then develops moderate tan 24.1; Does not burn, develops dark tan 15.9; Does not burn, naturally dark skin 6.2		and incidental exposure since the intervention)	Group (n) (adjusted means (SD) ES Intervention: Arm 1 (42) 0.06 (0.87) 0.16 Arm 2 (14) 0.45 (0.68) 0.55 Control (47) -0.10 (0.84) p<0.02 **Risky behaviors:** <u>Sun exposure</u> (sunbathing): Estimated mean no. of hrs. of sunbathing during last month No significant change in both groups (participants reported very few hours of intentional sun exposure both before and after the intervention)
Gibbons a, 2005; Using UV photography to reduce use of tanning booths: a test of cognitive mediation; RCT/ Greatest; Fair; USA (California)	Introductory psychology; University; Males (49%); Age/ Grade: Skin type: NR Race/Ethnicity: NR SES: NR	Appearance based intervention; Educational: 2 photos taken- UV and normal light photo to educate about the damage already incurred from UV exposure, followed by 2- minute oral presentation on how to protect from further damage Appearance- based; No intervention	Late March; BL: Late March, year not given (previous booth use in last 6 months) FU: 4 weeks; **Behavioral Outcome**s **Risky Behaviors** <u>Use of tanning booth</u> ("How many times have you gone to a tanning booth since the beginning of spring break?" (which was about 3 weeks earlier)- on a 10-point scale, ranging from 1 (*None*) to 10 (*9 or more times*)	**N:** Pre=70; Post= 58 **Results:** **Behavioral changes** **Risky behaviors** <u>Tanning booth use:</u> (proportion of students using tanning booths) BL: FU (4 weeks) pvalue Intervention: 1.2% 16.0% <0.01 Control: 8.1% 46.9% Absolute pct pt change: -34.0% (-56.5, -11.5)

Author/Year: Title; Design; Execution; Location	**Population characteristics:** Target population; Setting (School level); Demographics: (Age/Grade, Gender, Race/ethnicity, Skin type)	**Intervention Characteristics:** Intervention; Intervention (component used); Type of message (Health- vs. appearance-based); Control group	**Outcome measures:** Implementation period; Follow-up period; Outcomes of Interest	**Results:** Population size (n) Effect Estimate (95% CI/ P-value)
Gibbons b, 2005; Using UV photography to reduce use of tanning booths: a test of cognitive mediation; RCT/ Greatest; Fair; USA	Undergraduate students; University; Males (54%); Age/ Grade:NR Skin type:NR Race/Ethnicity:NR SES: NR	Appearance based intervention; Educational: Same as above Appearance- based; Received a natural- light photo of their faces. After completing first survey debriefing for all students about sun exposure harms and sun protection	Not specified; Not specified; **Behavioral Outcomes** **Risky Behaviors** <u>Use of tanning booth</u> ("How many times have you gone to a tanning booth since the beginning of spring break?" (which was about 3 weeks earlier)- on a 10-point scale, ranging from 1 (*None*) to 10 (*9 or more times*)	N: Pre=134; Post= 109 **Results:** **Behavioral changes** **Risky behaviors** <u>Tanning booth use:</u> (proportion of students using tanning booths) BL: FU (4 weeks) pvalue Intervention: 47.0% 27.1% <0.01 Control: 44.3% 38.5% Absolute pct pt change: -14.1 (-31.5, 3.3)
Greene, 2003; Messages influencing college women's tanning bed use: Statistical versus narrative evidence format and a self-assessment to increase perceived susceptibility; RCT/ Greatest; Fair; USA (SE)	Caucasian female college students from undergraduate Courses; College (a midsized southeastern University); Gender: 100% female Age/ Grade: 19 to 26 yrs. (M=21.4; SD¼1.41). Skin type: NR Race/Ethnicity: NR SES: NR	Type of message effectiveness; Educational: Arm 1: Statistical (evidence of risk of use of tanning beds and information about skin cancer); Arm 2: Narrative (told history of young women who used tanning beds and developed cancer); Health-based; No intervention	6 weeks prior to the spring break; BL: Pre-intervention FU: 3-4 weeks after pre-survey (by phone call); **Behavioral outcomes** **Risky behaviors:** Tanning bed use: (''How many times have you used a tanning bed in the past month?'')	**N:** Intervention: Arm 1: n=50 Arm 2: n=50 Control: n=45 **Behavioral outcomes** **Risky behaviors:** <u>Tanning bed use:</u> (mean change in tanning bed use in past 1 month) Arm 1: Difference in mean change in intervention vs. control group): -2.37 sessions; p<0.05 Arm 2: Difference in mean change in intervention vs. control group): - 2.04 sessions; p>0.05

Author/Year: Title; Design; Execution; Location	**Population characteristics:** Target population; Setting (School level); Demographics: (Age/Grade, Gender, Race/ethnicity, Skin type)	**Intervention Characteristics:** Intervention; Intervention (component used); Type of message (Health- vs. appearance-based); Control group	**Outcome measures:** Implementation period; Follow-up period; Outcomes of Interest	**Results:** Population size (n) Effect Estimate (95% CI/ P-value)
Hillhouse, 2002; Examination of the efficacy of an appearance-focused intervention to reduce UV exposure; RCT/ Greatest; Fair; USA (SE)	Female college students who reported indoor tanning at least monthly; Mid-sized south eastern university; Gender: 100% female Age/ Grade: The mean age of this sample was 20.8 (SD= 3:1) Skin type: (I (6:8%); II (21:8%); III (48:3%); Race/Ethnicity: NR SES: NR	Appearance focused intervention; Educational: Short workbook (11 pages long) - Focused on the appearance-damaging effects of tanning generally, and indoor tanning specifically; Appearance-based	January to May 1994; BL: None FU1 – 2 weeks FU2 – 2 months; **Behavioral outcomes** Risky behaviors: Tanning bed use: (Frequency last 2 months – mean number of visits)	N= Pre: 147; Post: 106 **Behavioral changes** **Risky behaviors:** <u>Change in tanning bed use: (</u>Mean number of visits during last 2 mos (SD) Intervention Mean (SD) / Control Mean (SD) BL: 9.78 (11.69) / 7.77 (6.37) FU 2: 4.16 (7.04) / 7.48 (11.25) Change in mean # of visits in last 2 months: -5.33 visits (significant)