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Translating intentions into sunscreen use: An interaction of self-efficacy and appearance norms

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The study examines whether self-efficacy mediates between intention and behavior, and whether appearance norms and self-efficacy are additive or synergistic predictors of sunscreen use. At two measurement points in time, 14 weeks apart, 154 individuals responded to an online questionnaire. Moderated mediation was tested by hierarchical regression analyses. Self-efficacy mediated the intention–behavior relationship, whereas appearance norms emerged as a moderator of the self-efficacy–sunscreen use relationship. The model accounted for 22% of the behavior variance at Time 2. For individuals who believe that they would look more attractive with a tan, self-efficacy did not have a strong effect on behavior. Thus, for skin-protection motivation to become effective, self-efficacy is needed in conjunction with less positive appearance norms. Implications for public health promotion and mass media sunscreen use campaigns are discussed.

Keywords: sunscreen use; self-efficacy; appearance norms; intention; moderated mediation

Introduction

Sun exposure is associated with outdoor leisure time activities and a ''healthy tanned look.'' However, nowadays, due to ozone depletion and changes in ultraviolet (UV) rays quality, unprotected sun exposure has been shown to lead to skin cancer and premature aging of the skin. Thus, dermatologists recommend simple actions such as using sunscreen with a sun protection factor (SPF) of 15 or higher (Gonzales, Fernandez-Lorente, & Gilaberte-Calzada, 2008). Even though this represents an apparently effortless behavior, evidence shows that only around 29–50% of individuals adhere to adequate protection guidelines (Kasparian, McLoone, & Meiser, 2009). The question emerges why some people use sunscreen, while others do not?

Although individuals have, in principle, control over their conduct, many fail at successfully controlling their risk behaviors. Intention to change behavior is central to most health behavior models (Sniehotta, 2009). However, even if people sometimes have the best intentions to adopt healthy habits, they do not manage to translate their intentions into action. Intentions have been shown to have limited predictive value when it comes to behavior change. One model that explicitly includes post-intentional mediators to overcome this intention–behavior gap is the

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Health action process approach (HAPA; Schwarzer, 2008). This approach suggests a distinction between (a) preintentional motivation processes that lead to forming a behavioral intention, and (b) post-intentional volition processes that lead to the actual health behavior. Within the two phases, different patterns of social-cognitive predictors may emerge. In the initial motivation phase, people develop an intention to act based on their perceived risk (i.e. ''I am at risk of developing premature wrinkles due to unprotected sun exposure''), positive outcome expectations (i.e. ''if I use sunscreen my skin will stay healthy'') and self-efficacy toward adoption of the new behavior (i.e. ''I believe I can use sunscreen even if I really want to be tanned'').

After a person develops a motivation towards adopting a particular health behavior, the ''good intention'' has to be transformed into detailed instructions on how to perform the desired action. Moreover, once an action has been initiated, it needs to be maintained. This is not achieved through a single act of will, but involves self-regulatory skills and strategies. Thus, the post-intentional phase includes volitional constructs such as planning and self-efficacy. Previous studies have shown planning to mediate between intention and sunscreen use (Craciun, Schüz, Lippke, & Schwarzer, 2010, 2011; Jones, Abraham, Harris, Schulz, & Chrispin, 2001; Van Osch et al., 2007).

Perceived self-efficacy is defined as one's confidence in the ability to perform a novel or difficult action (Bandura, 1997). Such optimistic self-beliefs influence the goals people set for themselves, the course of action they choose to pursue, the effort they invest, and their perseverance in the face of obstacles. It has been found to mediate the intention–behavior relation (Schwarzer, 2008). For people with higher self-efficacy, it seems to be easier to translate their intentions into health-enhancing behaviors. In contrast, those who harbor self-doubts are less likely to act upon their intentions (Lippke, Wiedemann, Ziegelmann, Reuter, & Schwarzer, 2009). Self-efficacy was identified as one of the best predictors of both sun protection intention and behavior (Jones et al., 2001; Mahler, Fitzpatrick, Parker, & Lapin, 1997; Myers & Horswill, 2006). Thus, it is worthwhile to explore whether self-efficacy mediates between intention and sunscreen use. It can be expected that those who are not only motivated but also are confident about using sunscreen, despite existing barriers, would manage to adopt or maintain this sun protective behavior.

One important barrier toward applying sunscreen is represented by the belief that being tanned is attractive. Appearance norms about tanning in the context of this study represent the belief that a tan makes one more attractive. They constitute one of the best predictors of sun exposure in youth (Hillhouse & Turrisi, 2002). The belief that a tanned look is healthy and attractive strongly influences tanning intentions. The degree to which people engage in excessive tanning is more related to their belief that ''a tan makes someone more attractive'' than to the expected health risks of sun exposure (Leary & Jones, 1993). Sometimes, even if people are aware of the risks of unprotected sun exposure, this does not reduce the perceived attractiveness of tanning (Dennis, Lowe, & Snetselaar, 2009).

The literature on appearance norms in the context of sun protection reflects age and gender differences. Carmel, Shani, and Rosenberg (1994) showed that appearance reasons for tanning were more important in younger age groups, whereas for older participants the value of health prevailed. In the opinion of a majority of teenagers, a tan stands for emotional and physical good health, attractiveness, activity, a risk-taking, and cool personality (Calder & Aitken, 2008). Men who value a tan use hardly any sun protection methods (Broadstock, Borland,

& Gason, 1992; Maddock, Redding, Rossi, & Weinstock, 2005; Miller, Ashton, McHoskey, & Gimbel, 1990), whereas women use more sun protection methods (Baum & Cohen, 1998) even if they also report feeling more attractive, healthy, and confident with a tan (Broadstock et al., 1992; Cody & Lee, 1990).

In general, when the desire for a tan decreases, people tend to adopt more sun protection behaviors (Arthey & Clarke, 1995). Both self-efficacy toward sun protection and appearance norms have been shown to be good predictors of intention to use sunscreen (Jackson & Aiken, 2000). It would be important to see if and how appearance norms influence the intention–behavior relation and which role self-efficacy plays in this context.

Some studies have shown that even if people harbor self-efficacy for sun protection, they are unwilling to give up a tan due to their belief that a tan makes them appear more attractive (Turrisi, Hillhouse, & Gebert, 1998). Thus, appearance norms are particularly important in influencing sunbathing behavior. Further research on intervention effectiveness revealed that self-efficacy mediated the effect of a multi-component intervention on intention to protect oneself from the sun, whereas appearance norms mediated the effect of the intervention on intentions to sunbathe (Jackson & Aiken, 2006). Following up on these results, it would be interesting to examine the interplay between appearance norms and self-efficacy after people have developed an intention to use sunscreen. Appearance norms may represent an important barrier for developing self-efficacy toward using sunscreen, especially because this behavior is, technically, not difficult to perform.

To understand how appearance norms and self-efficacy act together and whether they influence the intention–sunscreen relation, putative moderation and mediation effects could be examined.

Mechanisms of health behavior change: Mediators and moderators

Mediation analyses show *how* behavior change takes place. To study *for whom* a particular change mechanism applies, one needs to look for moderators (MacKinnon, 2008). *Mediation* describes how an effect occurs, that is, how an independent variable affects a dependent variable via a third variable that constitutes the mediator. A mediator might emerge in one group (e.g. people with strong appearance norms), but not in another (e.g. individuals with weak appearance norms). In such a case, appearance norms operate as a *moderator* of the mediating relationship.

Self-efficacy has been shown to be a mediator of the intention–behavior relation for detection behaviors such as breast self-examination (Luszczynska & Schwarzer, 2003) and a moderator of the intention-planning–behavior relation for physical activity in adolescents (Luszczynska et al., 2010). Thus, it would be relevant to explore whether it represents a mediator also for simple preventive behaviors such as using sunscreen.

Aims of the study

The present study explores whether self-efficacy helps individuals to act upon their intentions in the context of sunscreen use. Furthermore, it sets out to examine the relation between intentions, self-efficacy, appearance norms, and sunscreen use. It is expected that self-efficacy mediates the intention – behavior relationship. Moreover,

appearance norms, as a putative moderator, influencing this relation are explored. It is examined whether appearance norms operate in conjunction with self-efficacy as reflected by an interaction between self-efficacy and appearance norms. Such a moderator effect could shed light upon the mechanisms that operate when people adopt or maintain sun safety behaviors. The main questions are whether an intention–self-efficacy–behavior chain exists and whether this chain is moderated by levels of appearance norms.

Method

Participants and procedure

Participants were recruited in university seminars and were invited to take part in an online study, for which they received course credits. The study was performed in accordance with the Helsinki Declaration. Individuals ($N = 181$) who were interested in the study gave informed consent for participation and provided their e-mail addresses, agreeing to receive the follow-up questionnaire. Baseline assessment took place in June (beginning of summer). Invitations for the completion of the follow-up questionnaire were sent out at the end of summer (about 14 weeks later). The final sample that completed the questionnaires at both points in time consisted of 154 individuals, of which 11 (7.1%) were men and 143 (92.9%) were women, with a mean age of 21.46 years (SD = 4.47), ranging from 18 to 48 years. Those who dropped out did not differ in any of the variables from those who completed the questionnaires at both measurement points in time.

Measures

Means, standard deviations, and intercorrelations are displayed in Table 1. All scales were tested in prior studies with respect to psychometric properties (see Schwarzer, 2008).

Intention to use sunscreen was measured at Time 1 (T1), with one item asking participants about their intentions during the next months: ''I intend to use sunscreen with a sun protection factor (SPF) 15+ when I am in the sun for a long time.'' Responses ranged from strongly disagree (1) to strongly agree (4).

Self-efficacy toward using sunscreen was measured at T1, with four items that asked about people's confidence that they can continue to apply sunscreen even if they face different barriers such as desiring a tan, friends not using sunscreen, having forgotten to bring sunscreen along, and the cost of sunscreen. The item content

Table 1. Means (M), standard deviations (SD), and intercorrelations for Time 1 (T1) intentions, self-efficacy and appearance norms, and Time 2 (T2) sunscreen use.

	Intention (T1)	Self-efficacy (T1)	Appearance norms (T1)	Sunscreen use (T2)
M	3.21	3.13	2.55	2.31
SD	0.78	0.57	0.87	0.91
Self-efficacy (T1)	0.61**	–		
Appearance norms (T1)	−0.02	−.13**	–	
Sunscreen use (T2)	0.39**	0.41**	−0.05	–

Note: **$p < 0.01$.

pertained to the volitional phase of health behavior change (coping self-efficacy) and were developed based on previous studies (Schwarzer, 2008) to follow a semantic rule that assures content validity: ''I am certain that I can do ... (behavior), even if ... (barrier) occurs.'' Responses were made on four-point scales ranging from not at all true (1) to exactly true (4). Cronbach's α was 0.83 for these four items.

Appearance norms were assessed at T1 by one item stating ''The tanner I am, the more attractive I feel.'' Participants were asked to rate on a scale from 1 (strongly disagree) to 4 (strongly agree) how much they agreed with this statement.

Sunscreen use was measured at T2 with one item asking participants if they applied sunscreen with an SPF 15+ repeatedly during the sunny days when they were outside. Responses ranged from strongly disagree (1) to strongly agree (4).

Analytical procedure

The analyses were based on procedures recommended by Preacher, Rucker and Hayes (2007). A moderated mediator model was tested, where appearance norms were chosen as a moderator of the intention–behavior relationship, using the MODMED macro (Version 1.1; Model 2) by Preacher et al. (2007). To test the interactions, variables were centered (Aiken & West, 1991). In the same model, the mediation of the intention–behavior relation by self-efficacy was tested. Sunscreen use at T2 was considered as the dependent variable, intention at T1 as the independent variable, self-efficacy (T1) as the mediator, whereas appearance norms (T1) were considered as a moderator. Moderated mediation is expressed by an interaction between self-efficacy and appearance norms on sunscreen use and by the mediation of the intention–behavior relation by self-efficacy.

Results

Figure 1 shows the path model of the moderated mediation analysis. The effect of intention on sunscreen use was partially mediated by self-efficacy. Furthermore, there was an interaction effect of appearance norms and self-efficacy on behavior, whereas appearance norms did not yield a direct effect on sunscreen use.

The moderated mediation hypothesis was tested by regression analyses. First, self-efficacy was predicted by intention ($\beta = 0.40$, $p < 0.01$). Sunscreen use was predicted by intention ($\beta = 0.51$, $p < 0.01$), self-efficacy ($\beta = 0.55$, $p < 0.01$), and the interaction of appearance norms $\times$ self-efficacy ($\beta = -0.31$, $p < 0.05$), accounting for 20% of the behavior variance, $F(4,149) = 10.77$, $p < 0.001$,

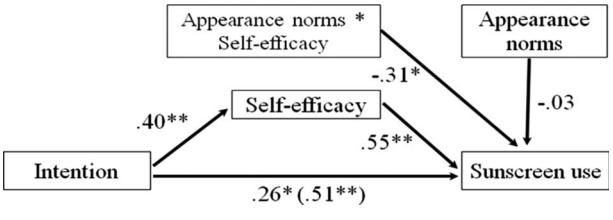

Figure 1. Standardized centered regression coefficients for the moderated mediation model with self-efficacy as the mediator and appearance norms as the moderator. The standardized centered regression coefficient between intention and sunscreen use before controlling for self-efficacy (0.51) is in parentheses.

$R = 0.47$. The appearance norms × self-efficacy interaction added 2% to the explained sunscreen use variance, $F(1,149) = 4.42$, $p < 0.05$.

For a closer look at the interaction effect, a simple slopes analysis was performed, as recommended by Aiken and West (1991). Figure 2 illustrates the joint effects of self-efficacy and appearance norms on sunscreen use, based on a hierarchical regression analysis with centered predictors and their product term. In this figure, the simple slopes are depicted for three selected values of the moderator variable: 1, the mean of the moderator variable; 2, the mean plus one standard deviation; 3, the mean minus one standard deviation. It indicates that for individuals with lower appearance norms, the relation between self-efficacy and sunscreen use is much higher than for those with high appearance norms.

Discussion

The present study explored the intention–self-efficacy–behavior relation in the context of sun protection. We started out from the premise that self-efficacy could constitute a mediator of the relation between intentions and sunscreen use, whereas appearance norms would moderate this relation. Results show that self-efficacy is significantly correlated to intention and sunscreen use, whereas appearance norms by themselves are not significantly related to using sunscreen. This could mean that appearance norms are good predictors of intentions to use sunscreen (Jackson & Aiken, 2000, 2006), but do not necessarily, directly, influence behavior adoption in this context. Self-efficacy mediated between the intention (to use sunscreen) and self-reported sunscreen use, whereas appearance norms moderated this relation.

The appearance norms × self-efficacy interaction added 2% to the explained sunscreen use variance. Although this might seem a small addition, this is in accordance with earlier studies stating that interaction effects in psychological field studies usually account for no more than 1–3% of variance (Champoux & Peters,

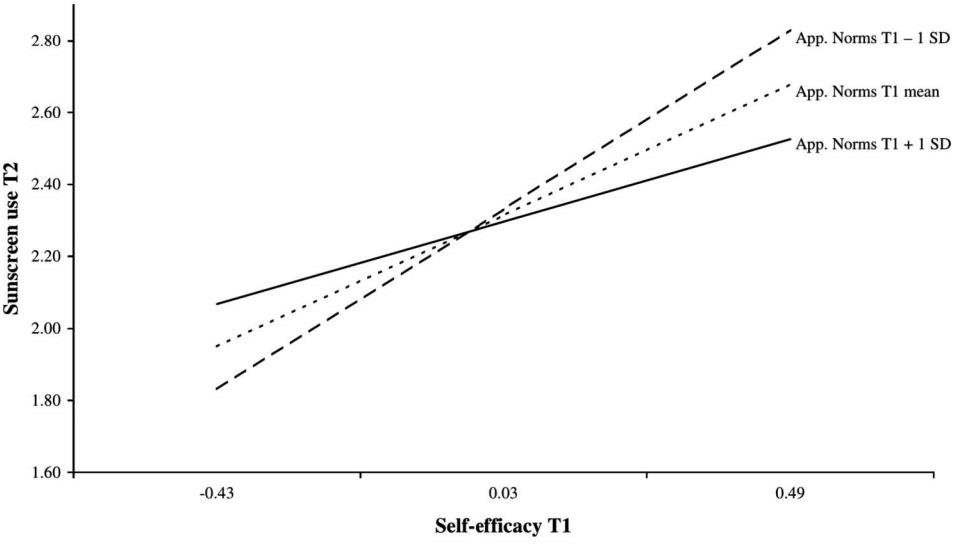

Figure 2. Regression of sunscreen use (Time 2) on self-efficacy (Time 1) at specific values of appearance norms.

1987). It is not the amount of variance that is crucial here, but the detection of a possible psychological mechanism.

Sunscreen use appears to be facilitated by a high level of self-efficacy for individuals who do not hold high appearance norms. However, if these individuals have strong appearance norms (i.e. strongly believing that with a tan, they appear more attractive to others), then self-efficacy does not facilitate the translation of intentions into sunscreen use. Thus, in order to help people who are motivated to use sunscreen to start applying it when spending time in the sun, one has to increase their self-efficacy towards sunscreen use. This can be done by raising their confidence to overcome barriers such as social pressure (friends are not using sunscreen) or appearance norms (belief that a tan is attractive).

Results confirm research showing that sun protection decisions are affect laden as they depend on positive attitudes towards tanning. Even if women have high self-efficacy for sun protection, they do not give up sunbathing if they consider a tan to be attractive (Turrisi et al. 1998), thus pointing to the important role played by appearance norms in taking up sunbathing. Moreover, sun protection and sunbathing have been shown to be distinct behaviors with appearance norms being good predictors of sunbathing intentions as opposed to self-efficacy being a predictor for sun protection (Jackson & Aiken, 2000, 2006). Present data add to the knowledge about the role played by self-efficacy in the context of sunscreen use (Dodd & Forshaw, 2010).

The novel theoretical aspect concerns the fact that self-efficacy is examined in a post-intentional (volitional) framework, mediating between intentions and behavior even for such an apparently simple action as applying sunscreen. Significant obstacles can come up and interfere with the good intentions of using sunscreen, and one needs to develop sunscreen-specific self-efficacy to deal with these factors. One such obstacle is represented by having high appearance norms. Present data point to the fact that even if appearance norms do not influence behavior directly, they play an important role as moderators of the intention–self-efficacy–behavior relation.

One relevant novel implication for practice is that we need to change both the sunscreen-specific self-efficacy as well as the appearance norms of people, even if they have developed an intention to use sunscreen. For instance, when designing health messages, one should point to the fact that intention does not necessarily lead to behavior adoption or maintenance, and that strong appearance norms can make even the most self-efficacious people stay away from sunscreen. Strategies such as modeling or verbal persuasion can be used to raise people's confidence that they can apply sunscreen regularly even if they value a tan. For example, self-efficacy could be enhanced by creating messages that promote the idea that using sunscreen is easy and can be applied just like a body moisturizer. Models with the characteristics of the target population can be used to demonstrate how sunscreen is applied, and they can emphasize the importance of its use. However, media messages sometimes paint a paradoxical picture, in which sun protection messages contradict the promotion of tanned models, who implicitly endorse the idea that a suntan is attractive (Dixon, Dobbinson, Wakefield, Jamsen, & McLeod, 2007). Thus, future sun protection campaigns could include self-efficacy messages for sunscreen use presented by models that embody the attractiveness of a pale look (Jackson & Aiken, 2006). Also, it would be appropriate to enhance self-efficacy for coping with existing tanning norms, for example, helping people believe that they can continue to use sunscreen even if they are afraid of not getting the desired tan. This is consistent with previous

research testing the effectiveness of adding social norms information to appearance norms interventions (Mahler, Kulik, Butler, Gerrard, & Gibbons, 2008; Mahler, Kulik, Gerrard, & Gibbons, 2010). Developing and testing interventions based on the present results can lend support to the existing evidence base on the effectiveness of appearance norms interventions in changing sun protective behavior (Mahler, Kulik, Gerrard, & Gibbons, 2007; Stapleton, Turrisi, Hillhouse, Robinson, & Abar, 2010), sun exposure (Jones & Leary, 1994), or indoor tanning (Abar et al., 2010).

A limitation of the study is that analyses were conducted only on a rather small sample of 154 individuals of university students. Future studies should try to replicate these findings in larger, more heterogeneous samples. Second, although the validity of self-reports for sun protection methods has been proven to be satisfactory (O'Riordan, Lunde, Steffen, & Maddock, 2006), further studies should also apply objective measures of sunscreen use for replication. Moreover, future research should employ psychometrically superior assessment procedures for testing concepts like appearance norms or sunscreen use such as multiple-indicator models.

In sum, the findings make a contribution to the literature by pointing to the role of self-efficacy and appearance norms in the post-intentional context of sun protection. Future research should look into other volitional factors such as action planning that may increase the effect of self-efficacy and decrease the influence of appearance norms in translating intentions into sunscreen use (Wiedemann, Lippke, Reuter, Ziegelmann, & Schwarzer 2011).

References

Abar, B.W., Turrsi, R., Hillhouse, J., Locken, E., Stapleton, J., & Gun, H. (2010). Preventing skin cancer in college females: Heterogeneous effects over time. *Health Psychology*, *29*, 574–582.

Aiken, L.S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Arthey, S., & Clark, V.A. (1995). Suntanning and sun protection: A review of the psychological literature. *Social Science and Medicine*, *40*, 265–274.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Baum, A., & Cohen, L. (1998). Successful behavioral interventions to prevent cancer: The example of skin cancer. *Annual Review of Public Health*, *19*, 319–333.

Broadstock, M., Borland, R., & Gason, R. (1992). Effects of suntan on judgement of healthiness and attractiveness by adolescents. *Journal Applied Social Psychology*, *22*, 157–172.

Calder, N., & Aitken, R. (2008). An exploratory study of the influences that compromise the sun protection of young adults. *International Journal Consumer Studies*, *39*, 579–587.

Carmel, S., Shani, E., & Rosenberg, L. (1994). The role of age and an expanded health belief model in predicting skin cancer protective behaviour. *Health Education Research*, *9*, 433–447.

Champoux, J.E., & Peters, W.S. (1987). Form, effect size, and power in moderated regression analysis. *Journal Occupational Psychology*, *l60*, 243–255.

Cody, R., & Lee, C. (1990). Behaviors, beliefs, and intentions in skin cancer prevention. *Journal of Behavioral Medicine*, *13*, 373–389.

Craciun, C., Schüz, N., Lippke, S., & Schwarzer, R. (2010). Risk perception moderates how intentions are translated into sunscreen use. *Journal of Behavioural Medicine*, *33*, 392–398. doi: 10.1007/s10865-010-9269-5

Craciun, C., Schüz, N., Lippke, S., & Schwarzer, R. (2011). A mediator model of sunscreen use: A longitudinal analysis of social-cognitive predictors and mediators. *International Journal of Behavioral Medicine*. doi: 10.1007/s12529-011-9153-x

Dennis, L.K., Lowe, J.B., & Snetselaar, L.G. (2009). Tanning behaviour among young frequent tanners is related to attitudes and not lack of knowledge about the dangers. *Health Education Journal*, *68*, 232–243.

Dixon, H., Dobbinson, S., Wakefield, M., Jamsen, K., & McLeod, K. (2007). Portrayal of tanning, clothing fashion and shade use in Australian's women magazines: 1987–2005. *Health Education Research*, *13*, 1–12.

Dodd, L.J., & Forshaw, M.J. (2010). Assesing the efficacy of appearance-focused interventions to prevent skin cancer: A systematic review of the literature. *Health Psychology Review*, *4*, 93–111.

Gonzales, S., Fernandez-Lorente, M., & Gilaberte-Calzada, Y. (2008). The latest on skin protection. *Clinics in Dermatology*, *26*, 614–626.

Hillhouse, J.J., & Turrisi, H. (2002). Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioral Medicine*, *25*, 395–409. doi: 0160-7715/02/0800-0395/0

Jackson, K.M., & Aiken, L.S. (2000). A psychological model of sun protection and sunbathing in young women: The impact of health beliefs, attitudes, norms, and self efficacy for sun protection. *Health Psychology*, *19*, 469–478.

Jackson, K.M., & Aiken, L.S. (2006). Evaluation of a multicomponent appearance-based sun-protective intervention for young women: Uncovering the mechanisms of program efficacy. *Health Psychology*, *25*, 34–46. doi: 10.1037/0278-6133.25.1.34

Jones, F., Abraham, C., Harris, P., Schulz, J., & Chrispin, C. (2001). Modeling the cognitive prerequisites of sunscreen use in Australian and UK samples. *Psychology & Health*, *16*, 191–206.

Jones, J.L., & Leary, M.R. (1994). Effects of appearance-based admonitions against sun exposure on tanning intentions in young-adults. *Health Psychology*, *13*, 86–90.

Kasparian, N.A., McLoone, J.K., & Meiser, B. (2009). Skin cancer-related prevention and screening behaviors: A review of the literature. *Journal of Behavioral Medicine*, *32*, 406–428.

Leary, M.R., & Jones, J.L. (1993). The social psychology of tanning and sunscreen use: Self-presentation motives as a predictor of health risk. *Journal of Applied Social Psychology*, *23*, 390–406.

Lippke, S., Wiedemann, A.U., Ziegelmann, J.P., Reuter, T., & Schwarzer, R. (2009). Self-efficacy moderates the mediation of intentions into behavior via plans. *American Journal Health Behavior*, *33*, 521–529.

Luszczynska, A., Cao, D.S., Mallach, N., Pietron, K., Mazurkiewicz, M., & Schwarzer, R. (2010). Intentions, planning and self-efficacy predict physical activity in Chinese and Polish adolescents: Two moderated mediation analyses. *International Journal Clinical Health Psychology*, *10*, 265–278.

Luszczynska, A., & Schwarzer, R. (2003). Planning and self-efficacy in the adoption and maintenance of breast-self-examination: A longitudinal study on self-regulatory cognitions. *Psychology & Health*, *18*, 93–108.

MacKinnon, D.P. (2008). *Introduction to statistical mediation analysis*. New York: LEA.

Maddock, J.E., Redding, C.A., Rossi, J.S., & Weinstock, M.A. (2005). Development and validation of an appearance motivation attitudes scale for sun protection. *Psychology & Health*, *20*, 775–788.

Mahler, H.I.M., Fitzpatrick, B., Parker, P., & Lapin, A. (1997). The relative effects of a health-based versus an appearance-based intervention designed to increase sunscreen use. *American Journal of Health Promotion*, *11*, 426–429.

Mahler, H.I.M., Kulik, J.A., Butler, H.A., Gerrard, M., & Gibbons, F.X. (2008). Social norms information enhances the efficacy of an appearance-based sun protection intervention. *Social Science Medicine*, *67*, 321–329.

Mahler, H.I.M., Kulik, J.A., Gerrard, M., & Gibbons, F.X. (2007). Long-term effects of appearance-based interventions on sun protection behaviors. *Health Psychology*, *26*, 350–360.

Mahler, H.I.M., Kulik, J.A., Gerrard, M., & Gibbons, F.X. (2010). Effects of upward and downward social comparison information on the efficacy of an appearance-based sun protection intervention: A randomized controlled experiment. *Journal of Behavioral Medicine*, *33*, 496–507.

Miller, A.G., Ashton, W.A., McHoskey, J.W., & Gimbel, J. (1990). What price attractiveness? Stereotype and risk factors in suntanning behavior. *Journal of Applied Social Psychology*, *20*, 1272–1300.

Myers, L.B., & Horswill, M.S. (2006). Social cognitive predictors of sun protection intention and behavior. *Behavioral Medicine*, *32*, 57–63.

O'Riordan, D.L., Lunde, K.B., Steffen, A.D., & Maddock, J.E. (2006). Validity of beachgoers' self-report of their sun habits. *Archives of Dermatology*, *142*, 1304–1311.

Preacher, K.J., Rucker, D.D., & Hayes, A.F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*, 185–227.

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology: An International Review*, *57*, 1–29.

Sniehotta, F. (2009). Towards a theory of intentional behavior change: Plans, planning and self-regulation. *British Journal of Health Psychology*, *14*, 261–273.

Stapleton, J., Turrisi, R., Hillhouse, J., Robinson, J.C., & Abar, B. (2010). A comparison of the efficacy of an appearance-focused skin cancer intervention within indoor tanner subgroups identified by latent profile analysis. *Journal of Behavioral Medicine*, *33*, 181–190.

Turrisi, R., Hillhouse, J., & Gebert, C. (1998). Examination of cognitive variables relevant to sunbathing. *Journal of Behavioral Medicine*, *21*, 299–313.

Van Osch, L., Reubsaet, A., Lechner, L., Candel, M., Mercken, L., & deVries, H. (2007). Predicting parental sunscreen use: Disentangling the role of action planning in the behavior-intention relationship. *Psychology & Health*, *23*, 1–19.

Wiedemann, A.U., Lippke, S., Reuter, T., Ziegelmann, J.P., & Schwarzer, R. (2011). How planning facilitates behaviour change: Additive and interactive effects of a randomized controlled trial. *European Journal of Social Psychology*, *41*, 42–51.