



Instrument Development through Exploratory Mixed Methods to Estimate Sun Protection



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STATEMENT OF THE PROBLEM AND STUDY PURPOSE

Problem Statement: WHO (2004) estimated 2-3 million non-melanoma skin cancers and 132,000 melanoma skin cancers occur globally each year. **More than 1 million new cases of skin cancer occur annually in U.S.** (Maguire-Eisen, Rothman, & Demierre, 2005; WHO, 2008). Basal cell and squamous cell carcinoma are the two most common skin cancers; both are curable. Melanoma is the most deadly skin cancer type.

ACS (2007) reported that **1 out of 5 Americans will develop skin cancer in their lifetime.** In 2007, more than half of 59,940 cases of melanoma were concentrated in 10 "Sun Belt" states [CA, FL, TX, PA, NY, OH, NJ, MI, IL, MA].

Healthy People 2020 includes targets to avoid sunburns, increase sun protective behaviors among adults and children, and reduce melanoma death rates (USDHHS, 2010). CDC and ACS identified a need to develop new strategies to protect against skin cancer including children and adolescents. Comprehensive sun protection programs may enhance awareness of health risks associated with ultraviolet (UV) radiation and alter behaviors to reduce prevalence of skin cancer (Glanz, Saraiya & Wechsler, 2002).

It is a *misperception* that skin cancer is not a threat to youth, as exposure accumulates. **Primary prevention must begin during early childhood to reduce excessive exposure to UV radiation** (Armstrong & Kricker, 1993). Cumulative exposure is also a risk factor for non-melanoma skin cancers. It is necessary to limit sun exposure, using sun protective measures when outdoors, avoiding artificial tanning equipment, and ensuring skin cancer prevention education in schools and communities (Elwood & Jopson, 1997; WHO, 2002).

Study Purpose: An exploratory mixed methods study of two phases explored participant views about sun protection and skin cancer, with the intent of using this information to **develop and test an instrument with a sample of adolescent athletes.** The first phase was a qualitative exploration of the predisposing factors of sun protection. The investigator conducted cognitive interviews with 14 adolescent athletes in AL.

Themes suggested from the qualitative interviews were used to revise the previously developed **Sun Protection for Athletes (SPA)** instrument (Fulmore, 2006). During phase two, researchers estimated the reliability and validity of the instrument and examined the properties of each item.

The central *qualitative* research question: **What factors affect adolescent athletes' knowledge, outcome expectations and behaviors of sun protection?**

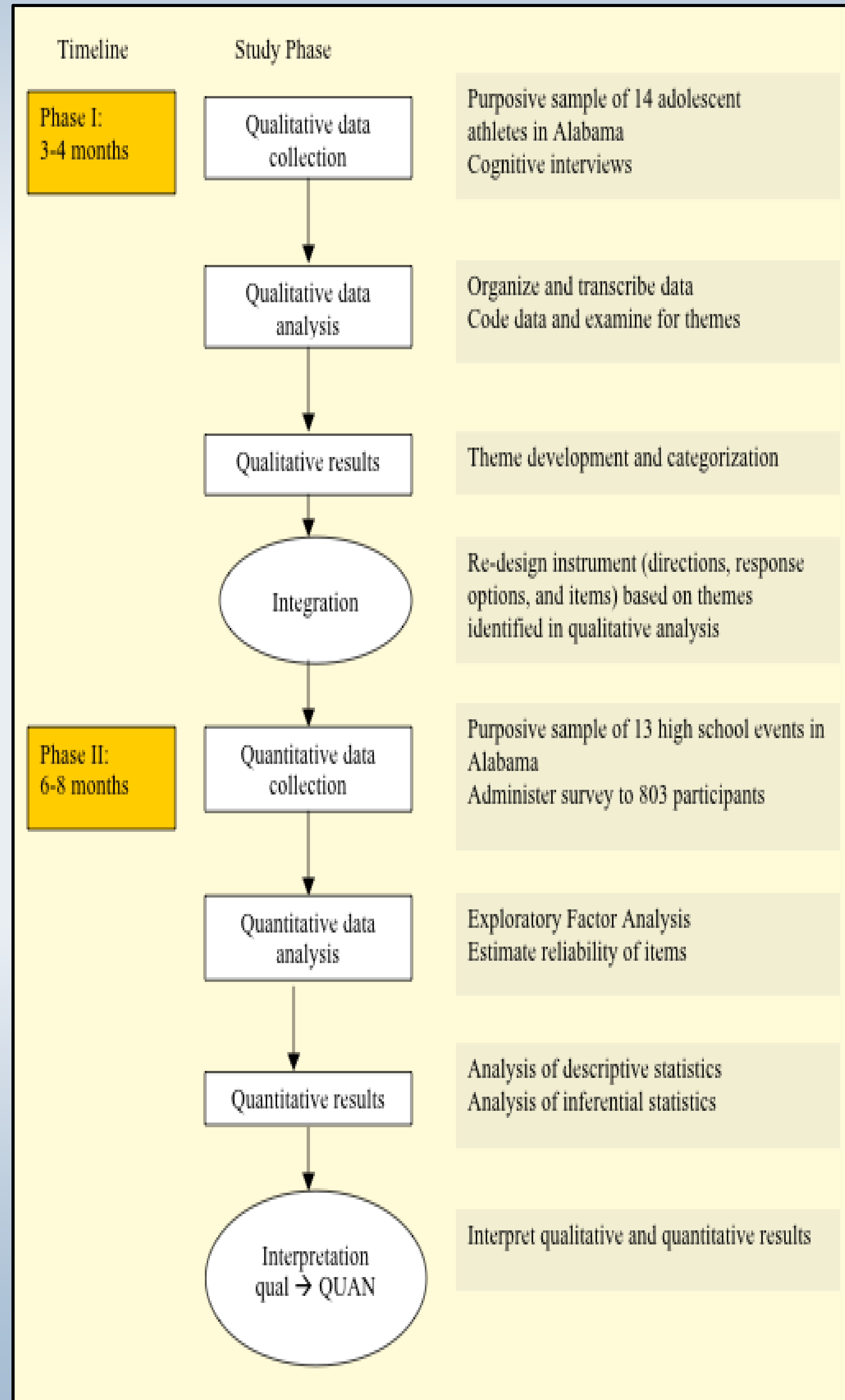
The central *quantitative* research question: **How valid and reliable is the Sun Protection in Athletes (SPA) instrument?**

BACKGROUND

Fulmore (2006) previously developed survey items using three SCT constructs (knowledge, outcome expectations, and behavior). Fulmore (2006) used a systematic four-task approach (McKenzie, Wood, Kotecki, Clark, & Brey, 1999) to develop and estimate content validity of a new instrument. The four tasks included: creating an initial draft of the instrument, establishing a jury or panel of experts to evaluate the instrument, completing an initial qualitative review of the instrument by content jurors, and conducting a quantitative review of the instrument by content jurors. Only three previous studies (Cohen, Tsai, & Puffer 2006; Hamant & Adams, 2005; Dobbinson, Doyle & Effendi, 2005) assessed the predisposing factors of sun protection with adolescent athletes.

A sample of 334 high school coaches in Alabama responded to an online survey indicating personal sun protection practices among those who may influence adolescent athletes' behaviors (Geiger & Fulmore, 2008). Three-fourths reported wearing sunglasses when outdoors between 10 a.m. and 5 p.m. on the day of survey administration, as well as 1, 2, 3 and 4 days prior. Fewer than half wore long pants; less than one-third wore a long-sleeved shirt and hat with a wide brim during each of these periods. The least frequently reported sun protection behaviors were wearing sun screen and seeking shade during daylight hours. In summary, there is a low level of practice of five specific protective behaviors among athletic coaches who responded to the statewide survey.

VISUAL DESIGN REPRESENTATION TO CONSTRUCT SPA INSTRUMENT



RESULTS

Phase I: Cognitive interviews prompted several changes to the first two versions of the SPA instrument. The changes focused on two broad areas of concern: item clarity and survey format. As a result of feedback from the interviews, 3 items were revised, 14 items were eliminated, and 6 items were added. Changes made to the format of the instrument focused on issues related to the appearance and complexity, usefulness of the directions, and appropriateness of the response options. Student athletes from the first round of interviews were provided the opportunity to comment and make additional suggestions regarding how their comments had been incorporated into the second version of the instrument. Suggestions from the second round of cognitive interviews necessitated a few minor changes before the revised version was pilot tested with student athletes during phase two of the study.

Phase II: Data gathered during phase II of the study provided the researcher with a large enough sample (n=803) to explore the underlying factor structure of the instrument and the proposed scales. The researcher used an exploratory maximum likelihood factor analysis technique to extract factors and performed an oblique rotation procedure (direct oblimin) to assess the pattern and structure matrix of each scale. The process was strengthened by data gathered during the cognitive interviews and the integration of qualitative and quantitative data to determine the simplest solution.

As a result of the factor analysis process employed by the researcher, the opinion section of the instrument yielded a three-factor solution of performance, tanning and sunscreen. The behavior section yielded a four-factor solution of sunscreen, sunglasses, tanning, and shade-seeking. The knowledge section yielded a two-factor solution of sun protection and risk.

DISCUSSION AND RECOMMENDATIONS

Summary: Few research studies reported the use of a theoretically-based instrument to gather data related to sun protection and adolescent athletes. Additionally, there is a dearth of research that has used a systematic process to estimate the content and construct validity of a new instrument related to sun protection. **Using Social Cognitive Theory (Bandura, 1977; 1986) to construct items for a new instrument provided a solid foundation for the dissertation.**

Recommendations for Future Research: The initial step to understand the knowledge, opinions, and behaviors of a particular population is development of an instrument with an acceptable level of validity and reliability based on theory. The following recommendations are provided to guide future research and/or practice.

1. Pilot test the SPA instrument with adolescent athletes outside of Alabama to examine the validity and reliability of the factors with other populations.
2. Continue to identify items that may strengthen the factor structure of the proposed instrument.
3. Explore relationships among different demographic variables and the proposed factors, for instance, gender and risk behaviors or age and sun protection knowledge.
4. Utilize research data to inform decision-makers and recommend enhanced sun protection to reduce exposure among adolescent athletes.

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