

Guided Imagery Council: Feasibility, Acceptability, and Preliminary Effects of a Novel Group-Based Lifestyle Intervention in Predominantly Latino Adolescents

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Abstract

Background: The combination of higher stress and higher obesity rates suggests that Latino youth in the United States may be a population at particular risk for obesity-related adverse health outcomes. The objective of this article is to describe the feasibility, acceptability, and quantitative stress-related outcomes of a 6-week pilot lifestyle intervention using guided imagery (GI) council in order to reduce risk factors for obesity-related disease.

Methods: Seventeen urban, adolescents (12 females/5 males, 16 Latino, age 17 ± 1 years, grades 9–12, body mass index 22 ± 4) participated in the 6-week, after-school pilot intervention. The intervention consisted of three, 75-minute after-school sessions delivered weekly for 6 weeks. The 3 weekly sessions included 1 session each of nutrition education, physical activity education and practice, and GI delivered in council, a facilitated group process based on indigenous practices. Feasibility and acceptability were assessed by attendance and qualitative exit interview. Stress outcomes included salivary cortisol and perceived stress.

Results: The pilot intervention was found to be feasible to deliver in an after-school setting. The GI and council group format were well liked. A 31% reduction in salivary cortisol was observed following the stress-reduction GI sessions. Diurnal cortisol patterns did not change across the intervention, but change in perceived stress was correlated with change in cortisol awakening response.

Conclusions: The intervention was feasible to deliver and highly acceptable. Acute reduction in salivary cortisol was seen following group GI, while no change was seen in daily cortisol patterns. These results support the development of a full 12-week intervention using GI council to reduce obesity-related disease risk.

Keywords

guided imagery, council, adolescent obesity, stress, Latino, lifestyle intervention

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Introduction

Prior understandings that anxiety levels among adolescents have been increasing for decades¹ have been corroborated by more recent surveys suggesting that a significant proportions of today's youth suffer from

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stress-related anxiety, irritability, and feelings of overwhelmedness.² In addition, prevalence rates of obesity have risen among adolescents in the last several decades. The Latino adolescent population in the United States in particular has among the highest prevalence rates of childhood obesity³ and may additionally suffer from higher levels of psychosocial stress.⁴ This combination of higher stress and higher obesity rates suggests that Latino youth in the United States may be a population at particular risk for obesity-related adverse health outcomes.

Links between stress, obesity, and obesity-related adverse health outcomes have been well known for some time. In adults, stress promotes obesity by leading to the ingestion of higher calories, more fat, and calorically dense snack foods.^{5–7} Beyond this, chronic stress promotes dysfunction of the hypothalamic–pituitary–adrenal (HPA) axis leading to a central obesity phenotype characterized by visceral adiposity, insulin resistance, and metabolic syndrome/cardiovascular disease risk.^{8–12} We and others have previously shown that obese Latino adolescents have high rates of obesity-related morbidities such as diabetes,¹³ prediabetes,^{14,15} and metabolic syndrome,^{16,17} and that as in adults, these morbidities are associated with stress-related alterations in the HPA axis.^{18,19}

This relationship between stress and obesity-related disease risk suggests that interventional approaches to obesity that address dietary and physical activity (PA) habits alone may be inadequate to address a problem of such high complexity, with such strong social, cultural, and psychological components. Rather, interventions that address the higher stress levels faced by modern-day minority youth may be necessary. Guided imagery (GI) is a complementary/integrative, mind–body healing modality which involves a series of relaxation techniques followed by the generation of mental images in order to reduce stress or achieve other specific health outcomes (eg, pain relief, promoting healthy lifestyle behaviors).²⁰ We previously showed that Interactive Guided ImagerySM, when delivered to individual Latino adolescents, can reduce stress hormone levels (salivary cortisol) and improve PA behaviors.²¹ However, delivering a GI intervention on the individual level is a costly and labor-intensive use of resources and does not leverage teens' propensity to interact in groups.²² In contrast, if delivered in a group setting, GI has the potential to reach more people, making it a promising approach for dissemination of GI-based interventions to larger populations of adolescents. However, the optimal way to deliver group GI is not known, nor is its effect on salivary cortisol level reduction compared to individual GI.

The consideration to deliver a group-based GI intervention to adolescents in a school-based setting goes along with the understanding that strengths-based, community-centered, and family intervention strategies are needed to address the complex psychosocial and health

problems encountered by Latino youth.^{4,23} Furthermore, as developmental theories suggest, teenagers often feel more comfortable speaking and connecting with each other over adults and experience a deep desire to establish a sense of community among peers. In fact, the key developmental tasks of the adolescent stage of psychosocial development include increasing peer involvement while decreasing dependence on adults.²⁴ It is during this time that youth also begin to engage in abstract thinking, to plan for their future, and to develop a set of values and ethics to guide their behavior.²⁵ According to the Carnegie Council on Adolescent Development, all adolescents have basic human needs that must be met for a successful transition into adulthood.²⁶ They must find ways to earn respect, establish a sense of belonging in a valued group, develop a sense of mastery of useful skills, and learn how to establish rewarding human relationships and how to use the social support systems available to them.²⁵

Given these cultural and developmental perspectives, we elected to develop a group GI intervention utilizing the facilitated group empowerment process known as council. The term “council” is the English word Benjamin Franklin used to describe the meetings of the Haudenosaunee (Iroquois) nation.²⁷ Indeed, the process of council as a decision-making and group communication process is deeply rooted in the traditions of indigenous peoples on virtually every continent. Other examples include the omnichie of the Lakota nation in the U.S. plains states,²⁸ the darè of the Shona tribe in Zimbabwe,²⁹ and the practice of Ho'oponopono among indigenous Hawaiian peoples.³⁰ Beyond ancient indigenous practices, examples of council and council-like processes are also found in many contemporary forms.

One contemporary articulation of council practice describes the process as a form that

honors the spirit of ancient ceremonies without the pretense of being traditional . . . We believe that the many forms of council belong to all people who gather in the [council] circle to embrace the challenge of listening and speaking from the heart.³¹

Indeed, structured, cultural dialogic practices which bear similarity to the council of indigenous peoples are found panculturally and have been utilized within multiple disciplines, including those found in world religions (eg, the Hindu Satsang,³² the Islamic Sobhet, the Jewish Havurah, Christian Listening Circles, and Quaker Friends Meetings), organizations and business,^{33,34} contemporary scientific fields (eg, the “Bohm Dialogues” of theoretical physics³⁵), and in the field of education.^{36,37} In this latter field, a 3-year (2006–2009) study of the application of council in 15 schools in the Los Angeles Unified School District showed that an overwhelming

majority of student participants: (1) liked having council in their classrooms, (2) endorsed positive beliefs about the value and effectiveness of council, and (3) felt council made them more connected to peers and adults on the campus.³⁸

These considerations led us to develop an after-school randomized controlled trial (RCT), the Imagine HEALTH Study, to fully test the effects of a 12-week GI council (GIC) intervention on lifestyle behavior and stress outcomes. The full protocol of this clinical trial has been previously described.³⁹ As part of the development phase for this intervention, we conducted a preliminary 6-week pilot trial of the major intervention components to test for the feasibility, acceptability, and early signs of efficacy of new aspects of the intervention that were different from our prior work. The primary objective of this article is therefore to more fully describe the qualitative and quantitative outcomes from this 6-week pilot intervention that informed the subsequent development of the final RCT intervention. Specifically, we sought to determine using mixed qualitative and quantitative methods: (1) the feasibility and acceptability of delivering the group GI lifestyle intervention to urban high school students as an after-school program; (2) the acceptability of council as the group format to deliver the group GI; (3) the effect of group stress-reduction GI (SRGI) on acute salivary cortisol levels, hypothesizing that group SRGI delivered in the council format would acutely lower salivary cortisol to a similar degree as that previously seen following SRGI delivered to individuals²¹; and (4) the preliminary effects of the 6-week pilot intervention on changes in perceived stress and diurnal salivary cortisol patterns.

Methods

Study Population

Seventeen urban, adolescents (12 females/5 males, 16 Latino, age 17 ± 1 years, grades 9–12, body mass index 22 ± 4) participated in the 6-week, after-school pilot intervention. Students were recruited through direct oral presentations to classrooms, and consent forms sent home for parental signature. Study staff were available to parents by telephone to answer questions related to the protocol. Inclusion and exclusion criteria were the same as for the planned full RCT.³⁹ Parents signed informed consent, and students signed informed assent documents. The protocol was approved by the USC Internal Review Board.

Intervention Structure

The intervention consisted of three, 75-minute after-school sessions delivered weekly for 6 weeks.

The 3 weekly sessions included 1 session of nutrition education, 1 session of PA education and practice, and 1 session of group GIC, as previously described in detail.³⁹

Council

Our rationale for using council derived from our prior experiences in young adults with diabetes, showing that council promoted trust among group members, allowed for deep communication, and provided a therapeutic counseling-like setting that would be conducive to the optimal delivery of group-GI.⁴⁰ The council process as we used it has been fully described previously.³⁹ All GIC sessions in this pilot were cofacilitated by authors MJW and JP. Briefly, the essential conduct of council consists of the following processes:

1. All participants sit in a circle, minimizing hierarchy between facilitators and students.
2. A designated object (the “talking piece”) is used to focus the communication and identify the speaker. The talking piece empowers one person to speak at a time (speak from the heart), and all others to listen actively (listen from the heart), and eliminates cross talk.
3. Participants are encouraged to speak spontaneously (ie, what is present in the moment) and “leanly” (ie, speaking “to the heart” of what they wish to communicate, without meandering narratives).
4. All communications are held confidentially within the circle. Students are told that any communication indicating a threat or event involving self-harm or harm to others would necessitate further questioning and potential reporting to appropriate systems.

Guided Imagery

The content of the 6 weekly GI sessions are summarized in Table 1. One critical objective for this pilot was to determine the feasibility of delivering these exercises in a group format, rather than to individual subjects as was done previously.²¹ While we were quite confident of our ability to deliver the SRGI exercises (sessions 1–3), we did not know whether such group imagery would be as effective in lowering salivary cortisol as when it was delivered individually. In addition, we had not previously attempted to deliver in group format the more complicated lifestyle behavior GI exercises (sessions 4–6). All GI scripts were written and delivered by author MJW. At the end of each session, participants were encouraged to practice their GI at home for 10 minutes a day between the weekly sessions. Research staff also sent text reminders on a daily basis to remind students to

Table 1. GI Session Content.

Session	Session Title	GI Content
1	Relaxation Breathing and Progressive Muscle Relaxation (PMR)	Mindful focused breath, followed by relaxation of muscle groups in conjunction with breath, progressing from head to toe
2	Relaxing Place Image	Following focused breath and PMR, exploration of an image of a place that represents just comfort and relaxation
3 ^a	a. Conditioned Relaxation b. Hunger-Fullness Image	a. Repeat of relaxing place imagery, followed by a second imaginal exploration of relaxing place after only 3-focused breaths (conditioned relaxation) b. Imagery of a symbol that represents the state of fullness and hunger, to use as an aid in portion control
4 ^a	a. Healthy Eating Image b. Physical Activity Image	a. Imagery of oneself eating healthily b. Imagery of oneself participating in physical activity
5	Inner Advisor Image	Imagery of an Inner Advisor figure to obtain guidance to eat more healthily and increase physical activity
6	Inner Warrior Image	Imagery of an Inner Warrior figure to elicit ways to overcome challenges to eating healthily and being physically active

Abbreviation: GI, guided imagery.

^aSessions 3 and 4 consisted of GI exercises that elicited 2 separate images as shown.

practice the imagery exercises. Practice frequency was assessed weekly using a brief self-report survey.³⁹

Qualitative Outcome Measures

After completion of the 6-week intervention, a 2-hour semistructured group interview was conducted by a research staff member well-trained in both qualitative research methods and council methodology who had not participated in the intervention. The facilitator utilized a semistructured interview guide developed by the investigative team designed to elicit feedback regarding the major themes of feasibility of conducting the program as envisioned, the acceptability of the program components, and the acceptability of the council process in general. The group interview was held after school in the room where the intervention had taken place. Twelve of the 17 participants took part in the interview, which was conducted in council format, whereby students sat in the council circle and passed a talking piece (a stick) which had an audio recorder attached. Following each question from the facilitator, a participant would pick up the talking piece and address the question, after which the piece was passed sequentially around the circle allowing each participant a chance to speak to the question. Students were allowed to pass, that is, not answer, but chose to do so infrequently, sometimes indicating that someone previously had said what they were going to say or that they had nothing more to add. The group interview was audiotaped and transcribed verbatim. Two coders (authors DF and MP) independently reviewed the transcript to thematically analyze the data using a standard qualitative description approach.⁴¹ Coders periodically met to review codes and attribute accurate meaning to the students' account of events. Participant quotes were

identified and extracted that supported each interview theme.

Quantitative Outcome Measures

Acute salivary cortisol change across individual SRGI council sessions was assessed by collecting saliva using Salivettes as previously described,²¹ immediately before and immediately after the completion of each of the three, 75-minute GI sessions specifically designed for stress reduction (intervention sessions 1–3). Salivettes were transported back to the laboratory immediately after each session, centrifuged at 2500 rpm for 10 minutes, and the supernatant was frozen at -80°C until assayed for cortisol using a commercially available ELISA (Salimetrics, Inc; interassay coefficients of variation (CVs) of 3.75% [high] and 6.41% [low]). The difference between pre- and postsession cortisol values was calculated to determine the acute change in salivary cortisol across each session.

Salivary cortisol diurnal pattern was assessed before and after the 6-week intervention. As previously detailed,³⁹ saliva was collected for both pre- and posttest at home on 3 separate days at 3 timepoints: awakening, 30-minutes postawakening (+30), and in the evening. Average cortisol awakening response (CAR) was calculated by averaging the differences between cortisol level upon awakening and 30-minutes postawakening across the 3 days, and diurnal cortisol slope (DCS) was calculated by averaging the differences between cortisol levels from awakening to evening. Changes in perceived stress from pre- to postintervention were assessed using the Perceived Stress Scale (PSS; 17-item modified version previously validated in Latino youth^{42,43}) that asks about the subject's perception of stress in the preceding month.

Statistical Analyses

Absolute changes in salivary cortisol across each individual session, and changes in CAR, DCS, and perceived stress across the full 6-week intervention, were computed using paired *t* test or Wilcoxon signed rank tests, depending on the normality of data. For ease of interpretation, some results are presented as percentage change (eg, Figure 1). Bivariate associations between change in CAR and change in perceived stress across the intervention were determined by Spearman correlation. Analyses were performed in SPSS (v.24).

Results

Feasibility Outcomes: Attendance, Content Deliverability, and Home Practice

The overall average attendance for the 6 GIC sessions was 70.6%. For 4 of the 6 GIC sessions attendance was >75% (range 77%–94%), 1 session attendance was 65%, and one of the sessions had attendance of 24%, after having to be rescheduled at very short notice due to an unanticipated school conflict with Advanced Placement (AP) testing. Average attendance at the nutrition classes was 59% (range 35%–77%). The 3 PA classes were less well attended, with an average attendance rate of 29%. Participant responses suggested that the 3 classes a week were generally acceptable and that they could have spent even more time doing the GI program. Participants indicated that time conflicts from unexpected school activities were the primary reason for missing sessions. They also felt that their attendance had been generally “good” and that they prioritized the intervention sessions (Table 2).

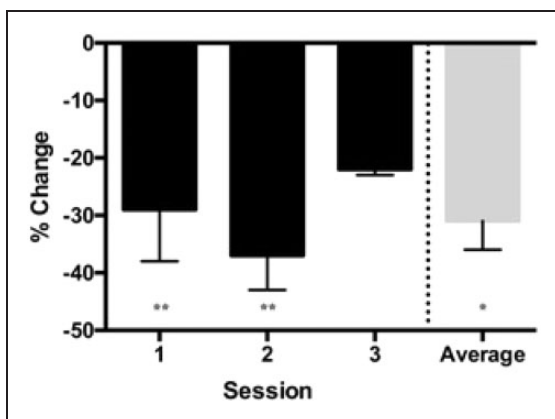


Figure 1. Acute Changes in Salivary Cortisol Across Individual Stress-Reduction-Guided Imagery Sessions. Bars indicate percentage decrease (mean \pm SEM) in salivary cortisol across each of the 3 stress-reduction-guided imagery sessions. Average baseline salivary cortisol concentration for each of the 3 sessions was 0.12, 0.16, and 0.14 $\mu\text{g}/\text{dL}$, respectively. * $P < .05$; ** $P < .01$.

We found that both the stress-reduction and lifestyle behavior GI exercises were readily deliverable in group format. Participants seemed very engaged in each weekly session, participated readily in all GI exercises, and readily shared the experiences of their imagery in debriefing conversations after the delivery of each GI exercise.

Participants indicated that they made time for routine home practice of the GI exercises and also used their new techniques as stressful situations came up in their lives (Table 2). The mean number of days of reported practice in weeks 2 to 6 was 4.1 ± 1.7 per week, with an average daily practice time of 20.1 ± 36.0 minutes. Participants described several challenges to practicing at home, most commonly lack of privacy or quiet space and time at home. Participants did not like being reminded by the investigative team to do their home practice via mobile text messaging.

Acceptability Outcomes

General themes derived from the exit interview are summarized in the text that follows, while specific quotes supporting the thematic findings are shown in Table 2.

Acceptability of intervention components (GI and lifestyle classes). Participants positively accepted the GI and suggested that their participation in GI helped with stress management. Participants felt it was the GI that helped them respond differently to stressful life circumstances and thus create new behaviors and relationships. It is through the GI stress-reduction techniques that the participants could better manage every day stressors because of their stronger self-care habits of focused relaxation breathing and utilizing helpful imagery exercises. Participants indicated that the nutrition program was less dynamic and less exciting than the GI sessions, though they did acknowledge that it was valuable information. Students reported liking the PA classes and enjoying the new ways they learned to improve their physical health.

Acceptability of council. Participants found all aspects of the council process to be acceptable. The egalitarian structure of council was viewed favorably, as a noted contrast to their typical school experience, and participants valued the rules that protected their ability to speak in an uninterrupted manner. Use of simple rituals, ceremonies, and talismans (such as using a talking piece, or placing stones, plants and other objects at the center of the council circle as a central focusing cue) were viewed favorably. The council processes promoted group cohesion, self-acceptance, and empathy and were described as the basis for a successful and meaningful experience. The council processes allowed trust to grow among participants and allowed each student to

Table 2. Semistructured Interview Quotes.

Feasibility issues

Program attendance

- “What made me come was because this program’s really interesting and fun too. So I really enjoyed it a lot, actually. I would actually prefer coming here than my other class, so—that was a good thing, but my other class was really important—but yeah . . .”
- “Oh—well, I attended, I’m pretty sure I attended every imagined health, that guided imagery one. Yeah, I’m pretty sure I did. I don’t remember missing, but what made me attend every one of them was that, I knew if I were to be—because overall, each class is—except for the physical activity one, I don’t think I attended the last one. I just attended this one because it was like, the most fun, and it just like—I don’t know, it made me feel so open-minded, and it made me not feel self-conscious anymore.”
- “One thing that was pretty suckish about the program was, I had this other program that I needed to attend for my school, and it was like a requirement, and it kind of like affected me in that way, because then I wouldn’t be able to kind of do these 2 things at once, since they would happen at the same time.”
- “Okay, and then, also—I don’t know, like—the times I would miss, it was because I wouldn’t feel good, or like, I would have too much in my head, since I’m a junior, you know, it’s hard. Because stress, my stress level must be up, because I’m stressing out over all these tests, and AP courses and stuff—and my grades, so I wouldn’t feel like I should—yeah.”
- “I attended all of them except like, 2 or one—because I was doing my applications for colleges, and I also had like a program for the school requirement, but I also preferred this one because it was more relaxing.”

Home guided imagery practice

- “It’s something I do in my free time, and it makes me clear my mind, and also get more ideas.”
- “When I practiced it at home, I had the intention of not falling asleep every time, but then I just fell asleep, so I would practice at night in my bed for like 5 minutes, but that was kind of my way of going to sleep every night, so—yet I still do it every night.”
- “Well, it’s hard to do at home, because like, there’s a lot of distractions—like, here you can do it because it gets quiet, and then at home, there’s people talking at you and stuff.”
- “It helped practicing at home, because once I got here, it was easier to like, get into the mode or whatever, and it was hard because there was other things going on, like going homework and all that.”
- “I actually did practice at home a lot, but at the same time, it was kind of hard because at some points I would be like trying to go to sleep, but then here I think it’s because I wouldn’t listen to his voice on the mp3, but that’s because I didn’t know how to turn on the mp3, so—yeah. But overall, it was good. It was quiet, so it was fine.”
- “Actually, I didn’t practice as much as I would have liked to, because most of the time, I didn’t have time because of work, or like maybe I was tired, like whatever, I didn’t have time. So, I tried to practice every day, but sometimes I couldn’t, or sometimes it would just be 5 minutes.”
- “I wish I could have done it longer, and then also, a lot of the time, there still was a lot of distractions, especially since at my house, I share my room with my siblings—so I can’t really do it in my room, because they were always there, and then they’re loud, and then also the living room is loud, and then—well, my parents’ room, I can’t go in there. So yeah—but I tried to do it, but yeah, so it didn’t really work out.”

Acceptability of intervention components

Stress-reduction guided imagery sessions

- “[It] help[ed] us relax more, because by the end of the day, as we get to this program, we’re—I feel like I just want to go home, but at the same time, when I come here, it’s like the same thing as coming home, relaxing—but this way here was way more relaxing than it is at my house”
- “It’s something I do in my free time, and it makes me clear my mind, and also get more ideas—yeah, because you’re using your brain all day, so it needs like a little break. It made mine, in that sense, stronger.”
- “Well, I enjoyed being in this program because it showed me a lot. It has actually helped me improve my relationship with my parents at home, so that’s really good, and also I’ve learned some new techniques to help me out through stress—so now I know how to manage my stress, and I feel better about myself because I’m not thinking too much about stuff anymore, so yeah, this really has helped me a lot.”
- “Let’s say my Mom gets mad, and she starts screaming at me and stuff, telling me things that would trigger me off. Well, before I would scream back, and like—not scream back, but talk back, or try to defend myself. What she considers talking back—Now I just stay quiet, and I think about it, and I just listen. Or, I take like the deep breaths how they showed us, like 3 deep breaths, and I calm down—like, my anger releases—so yeah, that’s what I learned.”

Lifestyle (nutrition and physical activity) classes

- “Oh—I’m sorry. I didn’t really like the nutrition one, although it was informative, it was kind of boring, and this one was pretty relaxing and enjoyable, and we all had fun, got somewhat comfortable with each other.”
- “I get distracted, because it’s too slow talking for me, and I just can’t concentrate. And also, with the nutrition, it was really, really slow—yeah.”

(continued)

Table 2. Continued

Feasibility issues

- “I really liked it, because, I mean—the whole reason why I signed up for this was because I wanted to learn like, how to change like my health and my lifestyle so I could live a healthy life—so I wanted to be there, and I actually liked the nutrition classes, because they were very informative, and I liked this one because I felt more relaxed—like, I learned to relieve my stress, and the fitness one, so I just like working out. Like, it’s fun.”
- “I loved the guided imagery, but I kind of didn’t like the nutrition one because, as someone stated before of the lectures, I’m not really good with that, but I did enjoy like, listening and stuff, because it taught me well—because now, each time I look at food, I look at the ingredients more—like, literally, my eyes open when I look at the ingredients—I stay there staring at it for more than 10 seconds.”

Acceptability of council

Use of simple rituals, ceremony, and talismans

- “I liked how they had a lot of centerpieces and stuff, because—well, like my energy would kind of go to that, and it was just nice overall hearing everyone’s opinions on what they had to ask about.”
- “I think it was really helpful, and making the circle and making everyone united and also when you have to choose an item, it loses the focus of everything on you only, focused on the item, and everyone too, just like really equal—and it connects to other people when they introduce an idea.”
- “The talking pieces were really cool, because I just—I really like talking, because in class, people are so disrespectful, and I don’t like it that others talk when other people are talking who are trying to announce something important, and how they feel and what their opinion is, and I just liked it because I was able to share anything that I could say, no matter what, and I was being the only one heard.”
- “. . . You express yourself, and then you wouldn’t know that other people would be listening—because in, like, real conversations, sometimes people won’t listen to you, so you know they’re going to listen to you, and that’s why I like the talking piece things, because it makes sure that only the person who is holding it will be talking.”

Egalitarian structure

- “Everyone had a chance to talk, and not everyone would be—like, everyone won’t be talking at the same time, so like everyone had their turn.”
- “At first, I actually thought it was like really weird, I guess, because I wasn’t used to, like, talking like that, where like, everybody gets a turn—like, I’m kind of just used to like, talking, you know, like back and forth with other people—but after a while, I got used to it, and I liked it because it gave everyone a chance to like, talk, and then you express yourself, and then you wouldn’t know that other people would be listening—because in, like, real conversations, sometimes people won’t listen to you, so you know they’re going to listen to you, and that’s why I like the talking piece things, because it makes sure that only the person who is holding it will be talking”

Relatedness, trust, empowerment, empathy

- “I really liked the idea of the 4 things you’ve got to do, the council—like think with your heart and do all that stuff, because sometimes in classes, you need to use your brain a lot, and you don’t listen to your heart. It’s just brain, like—you come to school, and that’s the only thing you use—the brain and a hand to write. . . .”
- “I think the program has helped me like, view people differently, because like, the whole thing we have about the heart, how you have to like, speak from your heart and listen from your heart all that, I have to think about other people’s feelings and then, listen through like what they tell me, like what they’re going through, and it has helped [me] to imagine what they’re going through, and kind of understand them. So now, instead of just listening to the problems, I should think about how they feel.”
- “I think that it did work, because everybody did talk, and so that kind of helped us, because it kind of encouraged us to talk, because like, since we knew that people weren’t going to judge us, so we were open to that, and I guess a lot of time, people don’t want to talk because they think that people are going to judge them, so they’re afraid of what others might say—but this way, like everybody kind of knew that they could just say what they wanted to say.”
- “And no one in the group can judge you, and they give their word that they won’t judge you—and you give your trust to that, and your trust eventually falls deeper and deeper into that, and you could just feel like you can say whatever you want. And I realized that, probably everyone else feels this way too, like you could say anything during the program, but even though we’re not that comfortable with one another, because I’m pretty sure that all of us barely knew one another until this program”
- “What I learned, my perspective has grown onto me about other people—don’t say anything negative about them before you even get the chance to know them—I barely learned this word, I feel empathy for others, and to realize maybe they’re going through something—as someone says, like something bad in the group, or how they’re feeling, they feel like, tired, or they feel like they had a bad day”
- “Like everyone said before—well, some people—they said that they’ve put themselves in their shoes, and that’s what I’ve done, so it’s changed that—so now I know like, how other people feel, and it has also taught me that—to not judge people also—like, to be less judgmental, and to be open-minded.”

(continued)

Table 2. Continued

Feasibility issues

- “I really liked that idea (what is said in the circle, stays in the circle), because . . . Here we gain trust more, and here we elaborate on how we feel without being judged, because if you say something during class or in school, someone will have something to say, and they’ll say it without considering that that could actually hurt the other one’s feelings, and here—it’s like you’re not allowed to do that, you can’t do that. But it also helps all of us feel empathy for one another, think why are they saying that—oh, it’s probably because this is going on, that’s going on—they probably have something behind what that causes for them saying all this bad stuff, or saying this good stuff, like maybe something good happened, maybe something bad happens—overall, we do feel empathy for one another, and I really like, because they just helped us with communicating, and with confidence and trust.”
- “Oh, wow—before, I would, like, hold grudges, like—I can’t let go of things like, easily—so I would like, whoever did me wrong or something, like, I would isolate them from the rest, but after this, I’m slowly beginning to realize that that’s how people are—I can’t do nothing to change it, so I just have to let them be, and like, not be mad about it all of my life—so, yeah”
- “My overall opinion, and perspective of this program, was—I thought it was absolutely fantastic, because I just got to say anything that I just wanted to say by the end of the day, because I just can’t talk during class, because I guess I make too much trouble.”

Abbreviation: AP, Advanced Placement.

Table 3. Changes in Cortisol Patterns and Perceived Stress Across 6-Week Intervention.

	Preintervention	Postintervention	<i>P</i>
Cortisol awakening response ($\mu\text{g/dL}$)	0.20 ± 0.12	0.16 ± 0.17	.29
Diurnal cortisol slope ($\mu\text{g/dL}$)	-0.24 ± 0.12	-0.25 ± 0.19	.41
Perceived Stress Scale	24.5 ± 6.6	27.2 ± 6.0	.15

Data indicate mean + standard deviation for each variable at baseline (preintervention) and after the 6-week intervention.

express themselves honestly and receive positive attention without judgment from the group, increasing their sense of relatedness. Participants said that council helped them grow more positive relationships with group members and also provided them with tools to use outside of the group in interactions with family members and others in their lives.

Quantitative Outcomes

Acute reductions in salivary cortisol were seen across each of the three, 75-minute group SRGI sessions (Figure 1). This reduction in salivary cortisol was statistically significant in SRGI sessions 1 and 2. The mean percentage reduction across the 3 stress reduction sessions was $31.2 \pm 20.0\%$ ($P < .05$; range 22%–37%).

There were no statistically significant differences in CAR, DCS, or perceived stress across the 6-week intervention (Table 3). Although there were no absolute changes in diurnal cortisol patterns across the 6 weeks, the change in perceived stress across the 6 weeks of intervention directly correlated with the change in CAR across this time period (Figure 2, $r_s = .75$, $P < .01$,

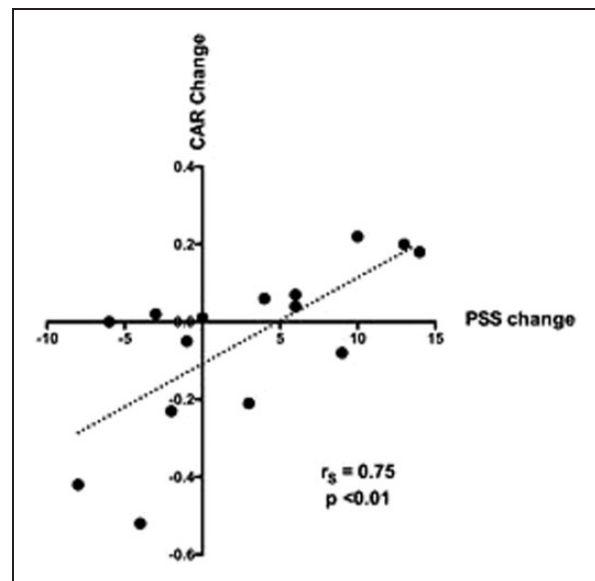


Figure 2. Bivariate Spearman Correlation (r_s) Between Change in Perceived Stress and Change in CAR Across the 6-Week Intervention. CAR, cortisol awakening response; PSS, Perceived Stress Scale.

$n = 15$). In contrast, there was no association between change in perceived stress and change in DCS ($r_s = .08$, $P = .78$, $n = 15$).

Discussion

In this article, we describe the findings from a 6-week pilot intervention designed to aid in the subsequent development of a full 12-week after-school GI lifestyle intervention. Our mixed-methods findings suggest that we met our principle aims in determining feasibility and acceptability issues of the proposed GIC as well as

determining preliminary effects of the stress reduction group GI on salivary cortisol levels.

Attendance to the GI intervention sessions, along with qualitative findings from the exit interview, established the feasibility and acceptability of delivering the group GI lifestyle intervention to urban, predominantly Latino high school students as an after-school program. One particular GI session had very poor attendance, but this was clearly an outlier due to a concurrent, unanticipated school conflict (an AP exam prep classes). The overall attendance rate for GI and nutrition sessions was acceptable, although the PA class attendance lagged behind the others. Despite this, the students indicated that they did not find the schedule of 3 sessions per week an overwhelming burden. However, since the full intervention will be 12 weeks in duration, we cannot be sure that this level of adherence can be maintained beyond the 6 weeks upon which this conclusion was based.

Adherence to the suggested home GI practice seemed acceptable in this 6-week pilot. This is important, since other mind-body interventions have suggested that home practice of meditation exercises is critical.⁴⁴ Interestingly, although our participants were tech savvy youth, a number of them reported to research staff that they did not appreciate the frequent text message reminders to practice their imagery at home. This was an important unexpected finding and perhaps indicates that such texts were viewed as interfering with their autonomy in deciding when and how much to practice. Since the underlying theoretical construct of the intervention is self-determination theory (SDT), in which supporting the autonomy of the participants to make health behavior change is an essential element, such text reminders will not be utilized in the future RCT.

The ability to deliver specific GI exercises in group format, as different from the individual GI format previously used, was clearly demonstrated during our conduct of the pilot intervention. This was true of both the SRGI sessions and the more complicated lifestyle behavior GI exercises that attempt to motivate increased PA or improved eating habits. The average acute reduction in salivary cortisol of ~31% following group stress reduction was similar in degree to the 38% reduction previously reported following individual SRGI.²¹ This was critical to demonstrate, since GI will be delivered in group format in the anticipated RCT, as necessitated by the size and scope of that future trial. The slightly lower reduction of salivary cortisol in session 3 (22% reduction from baseline cortisol) was likely due to the fact that 2 separate images were generated and explored in that session and that the second image in the latter part of the session (Hunger-Fullness Image) was not specifically related to stress reduction. This suggests that the actual symbolic content of the images can

differentially effect the physiological response, rather than the cortisol reduction being a nonspecific finding of the entire process independent of the specific images engaged.

The use of council as the facilitated group process to deliver the GI content was highly acceptable to the participants. Students seemed to appreciate the comfort, trust, and nonjudgmental character of the group circle and the method of communicating in council and spoke sincerely regarding their experiences. The council processes clearly supported a sense of relatedness, empowerment, and self-acceptance among participants. This supports and extends similar findings seen among young adults with type 1 diabetes, who reported increased group relatedness and reduction in stress following participation in a council-based group intervention.⁴⁰ Similar findings of increased relatedness among group members have also been seen when council has been used in the field of education, where council increased students' feelings of connection both to their fellow students and to their teachers in a council program utilized in Los Angeles Unified School District elementary, middle, and high schools.³⁸ This suggests that the Council facilitated group process may be useful across multiple disciplines and age groups in order to promote connections between group members to establish a place of safety, trust, and comfort from which change and healing can occur. This is supported by Pranis' conclusion that council circles bring people together as equals to have an honest exchange about issues, such as stress management, and to help facilitate change.⁴⁵ The findings from the exit interview also suggest that participants felt an increase in empathy toward their fellow group members through the use of the council process. Using a talking piece to avoid cross talk and committing to the group norm of listening from the heart and speaking from the heart may have contributed to this. This unexpected finding is particularly intriguing, given that empathy between peers increases motivation to express concern and kindness toward others and contributes to prosocial behaviors.⁴⁶ The acceptability of council in this study, as well as its use in multiple other fields and contexts, suggests it may offer a process by which significant social conflicts can be resolved through the development of relatedness and empathy between the conflicting parties. This is supported by the detailed description of the use of council along with other traditional tribal practices to resolve deep community conflicts in Canadian First Nations communities.⁴⁷

Participants reported using their new SRGI skills outside the program in their "real" lives, without instructions to do so, speaking strongly to the acceptability of the process for them. This also replicates findings from our prior work with young adults with type 1 diabetes.⁴⁰ Thus, the use of GI for stress reduction was not limited

to the time in sessions but was generalized into the “real world” of the students where it was found useful in their interactions with other students, siblings, parents, and peers and appeared to have a positive impact on their psychosocial well-being. Our findings suggest that the GIC provided space for students to experiment with new stress management and health-promoting behaviors, many of which they brought back to their families and communities. Through engaging the 4 core principles of council: (1) listening from the heart, (2) speaking from the heart, (3) speaking spontaneously, and (4) speaking to the heart of the matter, strong peer relationships were cultivated and the freedom to work autonomously within a group and community context was created thereby honoring culture, the development stage of development, and the tenets of SDT.

We had previously reasoned that delivering a GI intervention through the use of council, with an important theoretical underpinning based on SDT, could provide a culturally sensitive and developmentally appropriate space from which to shift to healthy lifestyle behaviors.³⁹ SDT posits that healthy development involves integrating autonomy (inner organization and self-regulation) with connectedness (integration of oneself with others).⁴⁸ This approach to human motivation posits that there are 3 innate human psychological needs that form the basis for optimal self-motivation: competence, relatedness, and autonomy. Social environments that fulfill these 3 basic needs support psychological growth and personal well-being, and our previous report suggested that council can achieve this.⁴⁰ The GIC supports competence by providing a standardized GI curriculum, weekly GI practice as a group and individually, the opportunity for each participant to share his/her GI experiences in a nonjudgmental and supportive environment, and adherence to the GI practice and self-determined healthy lifestyle choices made by individuals in the group. Since council creates a strengths-based, welcoming, and safe environment where each member is of equal value and worth, a sense of relatedness is fostered and council group members feel empowered.⁴⁰ This may be particularly relevant to Latinos and other groups with a history of disempowerment, where an empowerment approach in providing services is beneficial to assessment and intervention processes.⁴ Each participant is encouraged to share his/her personal experiences with GI and to practice outside of the group process, thereby addressing the need for autonomy and self-exploration. Lastly, through the sharing of such experiences, the circle becomes a caring community, and it is this sense of community that might support long-term adherence to self-determined, healthy lifestyle choices made through the intervention.

We did not observe significant changes in perceived stress, nor in diurnal salivary cortisol stress biomarker

patterns (CAR and DCS) after this brief 6-week pilot intervention. Nonetheless, the strong correlation between CAR and perceived stress suggest that these may be related markers of objective and subjective stress across time. To our knowledge, this is the first time such a relationship has been demonstrated that links change in self-reported perception of stress to change in CAR in youth. This contrasts with findings in adults, where the longitudinal associations between changes in perceived stress and cortisol measures (including CAR) have been inconsistent.⁴⁹ We are hesitant to draw too many conclusions from this finding given the small study numbers and the lack of control group, but this finding will warrant replication in the larger study to follow.

The primary limitation of this study is that this was a small pilot study without a control group, thus lacking power to fully detect changes in important variables and generalize conclusions. Although there was no control group with which to compare the reduction of salivary cortisol seen across the 3 SRGI sessions, historical controls from 2 prior reports showed no substantial change in salivary cortisol among control group Latino adolescents across a similar period of time in the late afternoon. Confounders, such as the fact that the sixth session occurred in the same week as school final exams, may have impacted the pre- and postintervention measurement comparisons of CAR and PSS. While feasibility and acceptability seemed generally good in this 6-week intervention and supported our assumptions, the full RCT intervention will be expanded to 12 weeks, so we cannot be sure of maintaining the acceptability over a longer period of intervention. In addition, the discrepancy between good qualitative reports regarding the PA classes and the poor attendance to these sessions further highlights the need for strong attention to program attendance/adherence issues during the conduct of the full trial.

In conclusion, the findings of this pilot study supported the feasibility and acceptability of GIC as our planned intervention platform for a future 12-week RCT lifestyle intervention in high school students. The magnitude of cortisol reduction supports the use of group delivery of SRGI in council format, important for future dissemination efforts. Although this study did not demonstrate significant effects on stress or stress biomarkers in the relatively short term (6-weeks) of this pilot intervention, it did suggest a relationship between the subjective perception of stress in one's life and the diurnal cortisol pattern (CAR), which can be further clarified in the future long-term study. The study results also encourage further research in complementary/integrative group-based interventions for Latino adolescent populations and more detailed investigation of the role of relatedness and empathy in such interventions.

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References

- Twenge JM. The age of anxiety? Birth cohort change in anxiety and neuroticism, 1952-1993. *J Pers Soc Psychol*. 2000;79(6):1007.
- American Psychological Association. Stress in America: are teens adopting adults' stress habits. *Stress in America Surveys*. <http://www.apa.org/news/press/releases/stress/2013/stress-report.pdf>. Published 2014. Accessed April 5, 2019.
- Ogden CL, Carroll MD, Lawman HG, et al. Trends in obesity prevalence among children and adolescents in the United States, 1988-1994 through 2013-2014. *JAMA*. 2016;315(21):2292-2299.
- Organista K. *Solving Latino Psychosocial and Health Problems: Theory, Practice, and Populations*. Hoboken, NJ: John Wiley & Sons, Inc; 2007.
- Oliver G, Wardle J, Gibson EL. Stress and food choice: a laboratory study. *Psychosom Med*. 2000;62(6):853.
- Wardle J, Steptoe A, Oliver G, Lipsey Z. Stress, dietary restraint and food intake. *J Psychosom Res*. 2000;48(2):195.
- McCann BS, Warnick GR, Knopp RH. Changes in plasma lipids and dietary intake accompanying shifts in perceived workload and stress. *Psychosom Med*. 1990;52(1):97.
- Bjorntorp P, Rosmond R. Neuroendocrine abnormalities in visceral obesity. *Int J Obes Relat Metab Disord*. 2000;24(Suppl 2):S80.
- Chrousos GP. The role of stress and the hypothalamic-pituitary-adrenal axis in the pathogenesis of the metabolic syndrome: neuro-endocrine and target tissue-related causes. *Int J Obes Relat Metab Disord*. 2000;24(Suppl 2):S50.
- Shively C, Register T, Clarkson T. Social stress, visceral obesity, and coronary artery atherosclerosis in female primates. *Obesity*. 2009;17(8):1513-1520.
- Rosmond R, Dallman MF, Bjorntorp P. Stress-related cortisol secretion in men: relationships with abdominal obesity and endocrine, metabolic and hemodynamic abnormalities. *Journal of Clinical Endocrinology and Metabolism* 1998;83(6):1853.
- Epel ES, McEwen B, Seeman T, et al. Stress and body shape: stress-induced cortisol secretion is consistently greater among women with central fat. *Psychosom Med*. 2000;62(5):623.
- Dabelea D, Bell RA, D'Agostino RB Jr, et al. Incidence of diabetes in youth in the United States. *JAMA*. 2007;297(24):2716-2724.
- Goran MI, Bergman RN, Avila Q, et al. Impaired glucose tolerance and reduced beta-cell function in overweight Latino children with a positive family history for type 2 diabetes. *J Clin Endocrinol Metab*. 2004;89(1):207-212.
- Weigensberg MJ, Ball GD, Shaibi GQ, Cruz ML, Goran MI. Decreased beta-cell function in overweight Latino children with impaired fasting glucose. *Diabetes Care*. 2005;28(10):2519-2524.
- Cruz ML, Weigensberg MJ, Huang TT, Ball G, Shaibi GQ, Goran MI. The metabolic syndrome in overweight Hispanic youth and the role of insulin sensitivity. *J Clin Endocrinol Metab*. 2004;89(1):108-113.
- Weiss R, Dziura J, Burgert TS, et al. Obesity and the metabolic syndrome in children and adolescents. *N Eng J Med*. 2004;350(23):2362.
- Weigensberg MJ, Toledo-Corral CM, Goran MI. Association between the metabolic syndrome and serum cortisol in overweight Latino youth. *J Clin Endocrinol Metab*. 2008;93(4):1372.
- Toledo-Corral CM, Myers SJ, Li Y, Hodis HN, Goran MI, Weigensberg MJ. Blunted nocturnal cortisol rise is associated with higher carotid artery intima-media thickness (CIMT) in overweight African American and Latino youth. *Psychoneuroendocrinology*. 2013;38(9):1658-1667.
- Astin JA, Shapiro SL, Eisenberg DM, Forsys KL. Mind-body medicine: state of the science, implications for practice. *J Am Board Fam Pract*. 2003;16(2):131.
- Weigensberg MJ, Lane CJ, Avila Q, et al. Imagine HEALTH: results from a randomized pilot lifestyle intervention for obese Latino adolescents using Interactive Guided ImagerySM. *BMC Complement Altern Med*. 2014;14(1):28.
- Fibkins W. *The Emotional Growth of Teens: How Group Counseling Intervention Works for Schools*. Lanham, MD: Rowman & Littlefield Publishers; 2014.
- Elder JP, Ayala GX, Parra-Medina D, Talavera GA. Health communication in the Latino community: issues and approaches. *Annu Rev Public Health* 2009;30:227-251.
- Eamon M. Social-demographic, school, neighborhood, and parenting influences on academic achievement of Latino young adolescents. *J Youth Adolesc*. 2005;34:163-174.
- Malekoff A. *Group Work With Adolescents: Principles and Practice*. 3rd ed. New York: Guilford Press, 2014.
- Carnegie Corporation of New York. *Great Transitions: Preparing Adolescents for a New Century*. New York, NY: Carnegie Corporation; 1995.
- Grinde DA, Johansen BE. *Exemplar of Liberty: Native America and the Evolution of Democracy*. Los Angeles, CA: American Indian Studies Center, University of California Los Angeles; 1991.
- Voss RW, Douville V, Little Soldier A, Twiss G. Tribal and shamanic-based social work practice: a Lakota perspective. *Social Work*. 1999;44:228-241.
- Metzger D. *Entering the Ghost River: Meditations on the Theory and Practice of Healing*. Topanga, CA: Hand to Hand; 2002.
- Veary N. *Change We Must: My Spiritual Journey*. Honolulu, HI: Institute of Zen Studies; 1989.

31. Coyle V, Zimmerman J. *The Way of Council*. Ojai, CA: Bramble Books; 1996.
32. Louchakova O, Wall K. Evolution of consciousness in responses to terrorist attacks: towards a transpersonal theory of cultural transformation. *Humanist Psychol*. 2002;30:252–273.
33. Senge P. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York, NY: Doubleday; 2006.
34. Isaacs W. *Dialogue and the Art of Thinking Together*. New York, NY: Doubleday; 1999.
35. Bohm D, Nichol L. *On Dialogue*. London, England: Routledge; 2004.
36. Spock M. *The Art of Goethian Conversation*. Spring Valley, NY: St. George Publications; 1983.
37. Glasser W. *Schools Without Failure*. New York, NY: Harper & Row; 1975.
38. Dietsch B, Abdullah-Welsh N. Los Angeles Unified School District Council Practitioners' Center Evaluation Report. Herb Alpert Foundation. WestEd, San Francisco, CA, 2008-2009.
39. Weigensberg MJ, Spruijt-Metz D, Wen CKF, et al. Protocol for the Imagine HEALTH study: guided imagery lifestyle intervention to improve obesity-related behaviors and salivary cortisol patterns in predominantly Latino adolescents. *Contemp Clin Trials*. 2018;72:103–116.
40. Weigensberg MJ, Vigen C, Sequeira P, et al. Diabetes Empowerment Council: integrative pilot intervention for transitioning young adults with type 1 diabetes. *Glob Adv Health Med*. 2018;7:1–15.
41. Sandelowski M. Focus on research methods: whatever happened to qualitative description? *Res Nurs Health*. 2000;23:334–340.
42. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385–396.
43. Nguyen-Rodriguez ST, Chou CP, Unger JB, Spruijt-Metz D. BMI as a moderator of perceived stress and emotional eating in adolescents. *Eat Behav*. 2008;9(2):238–246.
44. Bostock S, Crosswell AD, Prather AA, Steptoe A. Mindfulness n-the-go: effects of a mindfulness meditation app on work stress and well-being. *J Occup Health Psychol*. 2019;24:127–138.
45. Pranis K. *The Little Book of Circle Process: A New Old Approach to Peacemaking*. Intercourse, PA: Good Books; 2005.
46. Laible DJ, Carlo G, Roesch SC. Pathways to self-esteem in late adolescence: the role of parent and peer attachment, empathy, and social behaviours. *J Adolesc*. 2004;27:703–716.
47. Ross R. *Returning to the Teachings: Exploring Aboriginal Justice*. Toronto, Canada: Penguin Books; 2006.
48. Ryan R, Deci E. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000;55(1):68–78.
49. Mikkelsen S, Forman JL, Fink S, et al. Prolonged perceived stress and saliva cortisol in a large cohort of Danish public service employees: cross-sectional and longitudinal associations. *Int Arch Occup Environ Health*. 2017;90:835–848.