Seeing May Not Mean Believing: Examining Student’s Understandings & Beliefs in Evolution

Author
Ann M.L.Cavallo, David McCall

Abstract
Science education currently has incomplete understandings of potential relationships between students' beliefs in Nature of Science (NOS) and evolution, and how these beliefs may be related to scientific understandings of evolution. Because of evolution's prominence in science education, curricula decisions, and the future of science teaching and learning, it is important to gain more information on teaching and learning evolution through research. This study attempts to contribute to the knowledge base surrounding evolution in science education by exploring interrelationships among students' beliefs about the nature of science and evolution, and their scientific conceptual understandings of this theory. This study was conducted in a suburban/rural high school freshman campus located in the Midwestern part of the United States. The students in the study were those enrolled in three ninth-grade biology classes. The data was collected by having students complete questionnaires regarding their beliefs about the nature of science and their beliefs about evolution. Results show that student beliefs did not change during the course of the instruction.

Citation

For more information, please contact Ann Cavallo at cavallo@uta.edu

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Citation

For more information, please contact Ann Cavallo at cavallo@uta.edu
Effect of Diathermy on Muscle Temperature, Electromyography, and Mechanomyography

Author
Sarah M. Mitchell, Cynthia A. Trowbridge, A. Louise Fincher, Joel T. Cramer

Abstract
This study examined the effects of pulsed shortwave diathermy on intramuscular temperature, surface electromyography (EMG), and mechanomyography (MMG) of the vastus lateralis. Thirty-five men were assigned to diathermy (n = 13), sham-diathermy (n = 12), or control (n = 10) groups. Each subject performed isometric maximal voluntary contractions (MVCs) and incremental ramp contractions (10%–90% MVC) before and after treatment. Torque, intramuscular temperature, EMG, and MMG were recorded. Temperature for the diathermy group increased (P < 0.05). MMG amplitude and instantaneous mean frequency (IMF) increased (P < 0.05) during the MVCs with the greatest increases observed for the diathermy group. During ramp contractions, MMG amplitude and IMF increased at all percentages of MVC (10%–90%) for the diathermy group only (P < 0.05). There were no changes in MVC torque, EMG amplitude, or IMF. Diathermy treatments may decrease musculotendinous stiffness, but not absolute strength or motor control strategies that influence force production.

Citation

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Clinical Instruction for Professional Practice

Author
Greg Gardner, Patrick Sexton, Susan Guyer, Sean Willeford, Linda S. Levy, Mary G. Barnum, A. Louise Fincher

Abstract
Objective: To present the principles of adult learning and mentoring to help clinical instructors better educate athletic training students (ATSs) during their clinical experiences, with the end result being a better-prepared, competent entry-level practitioner.

Background: The principles of adult learning must be applied to ATS clinical education in order to develop more task mature and knowledgeable entry-level practitioners. Because clinical instructors are typically educated as clinicians rather than educators, they are generally not well-versed in the principles of adult learning, and generally do not spend a great deal of time designing learning experiences, appropriate supervision techniques, or mentoring strategies within the students’ clinical experiences.

Description: Concepts of adult learning, such as task maturity, self-concept, and self-directed learning, are keys to the development of competent practitioners. As espoused by Knowles, the Dreyfus five stage model of skill acquisition supports the concepts of adult learning and is easily applied to clinical education of the ATS. Modifications of this model and other adult learning models place students along a learning continuum where their progress can be enhanced or delayed depending on the instructional strategies employed by their clinical instructor (CI).

Clinical Advantages: If instructional strategies are changed to correctly match the learner’s progression, the learner will continue to move toward becoming a competent entry-level practitioner. These instructional adjustments will also allow the student to become more competent and self-confident in his or her clinical and decision-making skills.

Citation

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Description: Concepts of adult learning, such as task maturity, self-concept, and self-directed learning, are keys to the development of competent practitioners. As espoused by Knowles, the Dreyfus five stage model of skill acquisition supports the concepts of adult learning and is easily applied to clinical education of the ATS. Modifications of this model and other adult learning models place students along a learning continuum where their progress can be enhanced or delayed depending on the instructional strategies employed by their clinical instructor (CI).

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Clinical Instructor Characteristics, Behaviors and Skills in Allied Health Care Settings: A Literature Review

Author
Linda S. Levy, Patrick Sexton, Sean Willeford, Mary G. Barnum, Susan Guyer, Greg Gardner, A. Louise Fincher

Abstract
The purpose of this literature review is to compare both clinical instructor and student perceptions of helpful and hindering clinical instructor characteristics, behaviors and skills in athletic training and allied health care settings. Clinical education in athletic training is similar to that of other allied health care professions. Clinical education is used to practice didactic information in a hands-on environment, with the goal of integrating theory and practice in a controlled setting. Students are taught skills, behaviors and attitudes required to enter into professional practice. Athletic training clinical education evolved from the medical education model for training physicians and is currently based on the nursing model. Other allied health care professionals employ similar practices.

Objective: To provide an overview of helpful and hindering clinical instructor characteristics, behaviors and skills in athletic training and in other allied health professions.

Data Sources: MEDLINE, Health Source: Nursing/Academic, PubMed, SPORTDiscus, Academic Search Premier, ERIC and PsychArticles served as the data sources for the allied health fields that included athletic training, nursing, medicine, optometry, clinical psychology, occupational therapy, physical therapy, speech and language pathology, radiography.

Data Synthesis: Athletic trainer, allied health profession, and student perceptions of clinical instructor characteristics, behaviors and skills were reviewed and summarized.

Conclusions/Recommendations: This review presents literature suggesting that clinical education, regardless of the profession or setting, contains similarities. Clinical instructor characteristics, behaviors and skills are important and need to be the focus of clinical education in order to promote helpful, while minimizing hindering, behaviors. Effective clinical instructors enhance the learning process. Focusing on improved supervisor and supervision services should be employed to teach athletic trainers helpful clinical instructor behaviors.

Citation

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This document is available in alternative formats upon request.
Situational Supervision for Athletic Training Clinical Education

Author
Linda S. Levy, Greg Gardner, Mary G. Barnum, Sean Willeford, Patrick Secton, M. Susan Guyer, A. Louise Fincher

Abstract
Introduction: The medical education model provides the basis for athletic training students to learn theoretical and practical skills. Clinical rotations are completed where they apply what they have learned under the direct supervision of a clinical instructor (CI) or approved clinical instructor (ACI). Approved clinical instructors are taught how to evaluate athletic training students’ clinical skills and proficiencies, yet are left to decide for themselves how students should be supervised. No formal supervision training is required for potential CIs/ACIs. Situational Supervision is one potential model that can be used by athletic training educators to provide guidance to CIs/ACIs regarding student supervision. This model provides a method for students to be supervised according to their knowledge base, experience and self-confidence.

Objective: To present the Situational Supervision Model that can be used to develop athletic training students’ clinical skills.

Background: Based on Blanchard and Hersey’s Situational Leadership, Situational Supervision provides CIs/ACIs with one supervision model that can be used in athletic training clinical education.

Description: As students become more comfortable with clinical skills and mature in motivation and competence, CIs/ACIs need to adapt supervision styles to match the students’ progressing development.

Clinical Advantages: Using situational supervision, clinical instruction becomes a cooperative interaction between CIs/ACIs and athletic training students that is dependent on the students’ needs and abilities, which may result in higher satisfaction and production for both the students and the CIs/ACIs.

Citation

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Questioning of Feedback in Athletic Training Clinical Education

Author
Mary G. Barnum, M. Susan Guyer, Linda S. Levy, Sean Willeford, Patrick Sexton, Greg Gardner, A. Louise Fincher

Abstract
The purpose of this article is to provide clinical instructors with information and ideas on how to utilize questioning and feedback during clinical experiences. Definitions, purpose, and examples of different questioning skills are provided. Corrective and directive feedback methods are defined with purposes and examples provided of each.

Citation

For more information, please contact Louise Fincher at lfincher@uta.edu

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Supervised Autonomy

Author

Abstract
Objective: The primary objective of this paper is to present the evolution, purpose, and definition of direct supervision in the athletic training clinical education. The secondary objective is to briefly present the factors that may negatively affect the quality of direct supervision to allow remediation and provide higher quality clinical experiences for athletic training students.

Background: Athletic training educators and clinical instructors often engage in discussions regarding the direct supervision of ATSs. These discussions tend to center around concerns about ATS preparation, and how the current level of preparedness differs from that of the past. Some believe that direct supervision, rather than unsupervised practice, retards the ATSs’ development; however, there is no current literature to support this concept.

Description: Supervision means to watch or direct, while mentoring means to tutor, instruct, or guide; therefore, mentoring may be more descriptive of the desired/intended interaction between an ATS and their clinical instructor (CI). The intent of supervision is for an ATS to refine and improve their clinical proficiencies under CI guidance. For this to occur, the CI must alter their interactions with the ATS as the student evolves.

Clinical Advantages: Developing the CIs’ understanding of the intent and continuum of expectations associated with direct supervision will allow them to maximize their students’ education and position them to become highly skilled and confident Athletic Trainers.

Citation

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Perpetuation of Racial Comfort and Discomfort at a Community College

Author
Douglas B. Price, Adrienne E. Hyle, Kitty V. Jordan

Abstract
Interviews with 17 African American students and 19 White students were employed to examine interracial relations at a predominantly White community college campus. Seen through the lens of Granovetter's strength of ties theory, the interview findings revealed that strong intraracial ties and the absence of weak interracial ties inhibited communication between White and African American students, perpetuating the feelings of racial discomfort that students brought with them to the college campus. These findings illuminate the need for higher education to intentionally deconstruct racial discomfort through an analysis of the social structures that perpetuate the status quo of uncomfortable race relations.

Citation

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Resurrecting Pragmatism as a Philosophical Frame for Understanding, Researching, and Developing Performance in the Small-district Superintendency

Author
Gary Ivory, Rhonda McClellan, Adrienne E. Hyle

Abstract
In this article, the authors propose that pragmatism is a perspective with great promise for understanding and researching the work of small district superintendents and developing the abilities of both pre-service students and in-service practitioners to do that work. They maintain, based on their reading of focus group interviews with small district superintendents, that pragmatism adds important dimensions to understanding, researching, and developing the superintendency largely absent in other philosophical frames currently in use. They discuss how they are inspired by their reading of the transcripts and their considering the perceptions of their participants to review philosophical perspectives currently in-use in scholarship on educational leadership. They contrast pragmatism with three other commonly-used epistemological frames: (1) positivism/postpositivism; (2) postmodernism/poststructuralism; and (3) critical theory to explain why they think pragmatism brings a perspective essential to researching and developing the superintendency. (Contains 2 endnotes.)

Citation

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Developing a Data-Driven Assessment for Early Childhood Candidates

Author
Joohi Lee, Joo Ok Lee, Jill Fox

Abstract
One hundred forty-nine teacher candidates participated in a yearlong study to investigate what a well-prepared early childhood teacher candidate knows about teaching and learning. This study provides findings on assessments used to determine candidates’ knowledge of pedagogy at program entry and exit. The general question this study explored was: What claims can we make about the knowledge and skills of our early childhood teacher candidate graduates? Pre- and postassessments were administered to 147 EC-4 teacher candidates to measure the growth of their knowledge from program entry to exit. The following four major domains were assessed: Designing Instruction and Assessment; Creating a Positive and Productive Environment; Implementing Effective, Responsive Instruction and Assessment; and Fulfilling Professional Roles and Responsibilities. Results show that, among the four domains, candidates’ knowledge grew the most on Creating a Positive, Productive Classroom Environment.

Citation

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Exploring Children’s Understanding of Death Concepts

Author
Joo Ok Lee, Joohi Lee, Sung Seek Moon

Abstract
This study is an investigation of the effects of death education on children and their understanding of death. The participants of this study were eighty 5- and 6-year-olds who were enrolled in a suburban kindergarten in Korea. To examine the level of children's understanding of death, researchers interviewed each child in both the control and experimental groups. After the interview, researchers provided an intervention (11 educational activities) to the experimental group. No educational intervention was provided to the control group. Researchers re-interviewed children in both groups after the treatment. The overall mean score of the experimental group was significantly higher than that of the control group on all five categories of the death concept: causality, old age, irreversibility, finality, and inevitability. Implications regarding how death education can be approached in early childhood settings are also discussed.

Citation

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June 2009

Multiple Predictors of Asian American Children’s School Achievement

Author

Sung Seek Moon, Joohi Lee

Abstract

Research Findings: A structural equation model (SEM) and multiple indicators and multiple causes (MIMIC) model were used to test family factors, parent psychological well-being, parent-child home activity, and parent school involvement in relation to children's school achievement. Data for this study were drawn from the Early Childhood Longitudinal Study-Kindergarten (ECLS-K), conducted by the U.S. Department of Education's National Center for Education Statistics (NCES). The sample for this study was 1,100 Asian American kindergartners and their parents. Practice or Policy: The results of this study are as follows: (a) Family factors, especially parental education levels and family income, were significantly associated with Asian American students' school achievement; (b) parent-child home activity was significantly related to students' school achievement but in a negative direction; (c) parental school involvement was not found to be significant in predicting students' school achievement; (d) parental psychological well-being was significantly associated with both parent-child home activity and students' school achievement; (e) family income was significantly associated with parental psychological well-being, parental school involvement, and children's school achievement; and (f) family structure was not significantly associated with school achievement.

Citation


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Children’s Communication and Socialization Skills by Types of Early Education Experiences

Author
Joohi Lee, Jill Fox

Abstract

Abstract. This study is an investigation of children’s communication skills and socialization by the types of their early education experiences (e.g., child care centers, private schools, public schools, home, or other). A total of 244 children (average age: 61 months) and their parents participated in this study. According to the results of this study, there were significant mean score differences found on children’s expressive, written language, and interpersonal relationship skills, based on the types of children’s early education experience.

Citation

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Time Here, Time There, Time Everywhere: Teaching Young Children Time Through Daily Routine

Author
Joohi Lee, Joo Ok Lee, Jill Fox

Abstract
According to Piaget, 5- or 6-year-old children gradually acquire the concept of time based on events (Piaget, 1969). In his experiment of investigating children's time concepts, Piaget found that children of these ages were able to place pictures based on sequential events with some errors; the younger children made more errors. The National Association for the Education of Young Children (NAEYC, 1997) indicates that while children from 6 to 8 years old have some understanding of time, they still do not fully grasp its relationship to length of time. This article offers ways of teaching young children time through daily routine.

Citation

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Teaching Early Childhood Teacher candidates How to Assess Children’s Inquiry Skills in Science Learning

Author
Joohi Lee, Ji Yoon Yoon

Abstract

This article presents pragmatic information on teaching early childhood teacher candidates how to assess children’s inquiry process skills. The authors list three important steps in choosing inquiry skills. They generated behavioral indicators for each inquiry skill, and designed an assessment rubric using number grading or a satisfactory/unsatisfactory rubric system.

Citation


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Whole Body Heat Stress Attenuates Baroreflex Control of Muscle Sympathetic Nerve Activity During Postexercise Muscle Ischemia

Author
Jian Cui, Manabu Shibasaki, Scott L. Davis, David A. Low, David M. Keller, Craig G. Crandall

Abstract
Both whole body heat stress and stimulation of muscle metabolic receptors activate muscle sympathetic nerve activity (MSNA) through nonbaroreflex pathways. In addition to stimulating muscle metaboreceptors, exercise has the potential to increase internal temperature. Although we and others report that passive whole body heating does not alter the gain of the arterial baroreflex, it is unknown whether increased body temperature, often accompanying exercise, affects baroreflex function when muscle metaboreceptors are stimulated. This project tested the hypothesis that whole body heating alters the gain of baroreflex control of muscle sympathetic nerve activity (MSNA) and heart rate during muscle metaboreceptor stimulation engaged via postexercise muscle ischemia (PEMI). MSNA, blood pressure (BP, Finometer), and heart rate were recorded from 11 healthy volunteers. The volunteers performed isometric handgrip exercise until fatigue, followed by 2.5 min of PEMI. During PEMI, BP was acutely reduced and then raised pharmacologically using the modified Oxford technique. This protocol was repeated two to three times when volunteers were normothermic, and again during heat stress (increase core temperature ~ 0.7°C) conditions. The slope of the relationship between MSNA and BP during PEMI was less negative (i.e., decreased baroreflex gain) during whole body heating when compared with the normothermic condition (−4.34 ± 0.40 to −3.57 ± 0.31 units·beat⁻¹·mmHg⁻¹, respectively; P = 0.015). The gain of baroreflex control of heart rate during PEMI was also decreased during whole body heating (P < 0.001). These findings indicate that whole body heat stress reduces baroreflex control of MSNA and heart rate during muscle metaboreceptor stimulation.

Citation

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Cutaneous Vascular Responses to Hypercapnia During Whole-Body Heating

Author
Jonathan E. Wingo, David A. Low, David M. Keller, Craig G. Crandall

Abstract

Introduction: Hypercapnia may be encountered in lung disease as well as during situations involving rebreathing of previously expired air (e.g., occupational diving). Inhibitory effects of elevated arterial carbon dioxide partial pressure on the central nervous system may result in impaired thermoregulation. This study tested the hypothesis that in heat-stressed subjects, cutaneous vascular responsiveness [expressed as cutaneous vascular conductance (CVC)] would be reduced during hypercapnic exposure.

Methods: Four men and three women (mean ± SD; age: 35 ± 7 yr) rested supine while wearing a tube-lined suit perfused with 34°C water (normothermia). Following normothermic data collection, 50°C water was perfused through the suit to increase internal temperature approximately 1°C (whole-body heating). In both thermal conditions, a normoxic-hypercapnic (5% CO₂, 21% O₂, balance N₂) gas mixture was inspired while forearm skin blood flux (laser-Doppler flow-metry) was measured continuously and was used for calculation of CVC (skin blood flux/mean arterial pressure).

Results: End-tidal CO₂ increased similarly throughout hypercapnic exposure during both normothermic and whole-body heating conditions (7.9 ± 2.4 and 8.3 ± 1.9 mmHg, respectively). However, CVC was not different between normocapnia and hypercapnia under either thermal condition (normothermia: 0.42 ± 0.24 vs. 0.39 ± 0.21 flux units/mmHg for normocapnia and hypercapnia, respectively; heat stress: 1.89 ± 0.67 vs. 1.92 ± 0.63 flux units/mmHg for normocapnia and hypercapnia, respectively).

Discussion: Based on these findings, mild hypercapnia is unlikely to impair heat dissipation by reducing cutaneous vasoconstriction.

Citation

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Effect of Elevated Local Temperature on Cutaneous Vasoconstrictor Responsiveness in Humans

Author
Jonathan E. Wingo, David A. Low, David M. Keller, R. Mathew Brothers, Manabu Shibasaki, Craig G. Crandall

Abstract
Cutaneous vascular conductance (CVC) increases in response to local skin heating. Although attenuation of vasoconstrictor responsiveness due to local heating has been demonstrated, the mechanism(s) responsible for this attenuation remains unclear. Nitric oxide has been shown to at least partially contribute to this response, but other mechanisms also may be involved. The purpose of this study was to test the hypothesis that local heating diminishes cutaneous vasoconstrictor responsiveness through a nitric oxide-independent mechanism by altering postsynaptic reactivity to norepinephrine. A follow-up protocol tested the hypothesis that local heating attenuates the presynaptic release of neurotransmitters that cause vasoconstriction, also via non-nitric oxide mechanisms. In protocol I, CVC was assessed in eight subjects during administration of increasing doses of norepinephrine (via intradermal microdialysis) at adjacent sites separately heated to 34°C and 40°C. In protocol II, which was identical to, but separate from, protocol I, CVC was assessed in seven subjects during administration of increasing doses of tyramine, which causes release of neurotransmitters from adrenergic nerves. At each site for both protocols, nitric oxide synthesis was inhibited (via microdialysis administration of \( N^2 \)-nitro-L-arginine methyl ester) and flow was matched (via microdialysis administration of adenosine); therefore, temperature was the only variable that differed between the sites. For both protocols, nonlinear regression analysis revealed no difference \( (P > 0.05) \) in the effective drug concentration causing 50% of the vasoconstrictor response. Minimum CVC [6.3 ± 2.0 and 9.0 ± 4.0% of peak CVC (mean ± SD) for protocol I and 19.3 ± 9.3 and 20.5 ± 11.9% of peak CVC for protocol II at 34°C and 40°C sites, respectively] was not different between sites. Independent of nitric oxide, local skin heating to 40°C does not attenuate adrenergically mediated cutaneous vasoconstriction through pre- or postsynaptic mechanisms.

Citation

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Sustained Impairments in Cutaneous Vasodilation and Sweating in Grafted Skin Following Long-Term Recovery

Author
Scott L. Davis, Manabu Shibasaki, David A. Low, Jian Cui, David M. Keller, Jonathan E. Wingo, Gary F. Purdue, John L. Hunt, Brett D. Arnoldo, Karen J. Kowalske, Craig G. Crandall

Abstract
We previously identified impaired cutaneous vasodilation and sweating in grafted skin 5 to 9 months postsurgery. The aim of this investigation was to test the hypothesis that cutaneous vasodilation, but not sweating, is restored as the graft heals. Skin blood flow and sweat rate were assessed from grafted skin and adjacent noninjured skin in three groups of subjects: 5 to 9 months postsurgery (n=13), 2 to 3 years postsurgery (n=13), and 4 to 8 years postsurgery (n=13) during three separate protocols: 1) whole-body heating and cooling, 2) local administration of vasoactive drugs, and 3) local heating and cooling. Cutaneous vasodilation and sweating during whole-body heating were significantly lower (P<.001) in grafted skin when compared with noninjured skin across all groups and demonstrated no improvements with recovery time postsurgery. Maximal endothelial-dependent (acetylcholine) and endothelial-independent (sodium nitroprusside) cutaneous vasodilation remained attenuated (P<.001) in grafted skin up to 4 to 8 years postsurgery, indicating postsynaptic impairments. In grafted skin, cutaneous vasoconstriction during whole-body and local cooling was preserved, whereas vasodilation to local heating was impaired, regardless of the duration postsurgery. Split-thickness skin grafts have impaired cutaneous vasodilation and sweating up to 4 to 8 years postsurgery, thereby limiting the capability of this skin's contribution to thermoregulation during a heats stress. In contrast, grafted skin has preserved vasoconstrictor capacity.

Citation

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Acute Volume Expansion Preserves Orthostatic Tolerance During Whole-Body Heat Stress in Humans

Author
David M. Keller, David A. Low, Jonathan E. Wingo, R. Mathew Brothers, Jeff Hastings, Scott L. Davis, Craig G. Crandall

Abstract
Whole-body heat stress reduces orthostatic tolerance via a yet to be identified mechanism(s). The reduction in central blood volume that accompanies heat stress may contribute to this phenomenon. The purpose of this study was to test the hypothesis that acute volume expansion prior to the application of an orthostatic challenge attenuates heat stress-induced reductions in orthostatic tolerance. In seven normotensive subjects (age, 40 ± 10 years: mean ± s.d.), orthostatic tolerance was assessed using graded lower-body negative pressure (LBNP) until the onset of symptoms associated with ensuing syncope. Orthostatic tolerance (expressed in cumulative stress index units, CSI) was determined on each of 3 days, with each day having a unique experimental condition: normothermia, whole-body heating, and whole-body heating + acute volume expansion. For the whole-body heating + acute volume expansion experimental day, dextran 40 was rapidly infused prior to LBNP sufficient to return central venous pressure to pre-heat stress values. Whole-body heat stress alone reduced orthostatic tolerance by ~80% compared to normothermia (938 ± 152 versus 182 ± 57 CSI; mean ± S.E.M., P < 0.001). Acute volume expansion during whole-body heating completely ameliorated the heat stress-induced reduction in orthostatic tolerance (1110 ± 69 CSI, P < 0.001). Although heat stress results in many cardiovascular and neural responses that directionally challenge blood pressure regulation, reduced central blood volume appears to be an underlying mechanism responsible for impaired orthostatic tolerance in the heat-stressed human.

Citation

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May 2009

Dynamic Cerebral Autoregulation During Passive Heat Stress in Humans

Author
Davis A. Low, Jonathan E. Wingo, David M. Keller, Scott L. Davis, Jian Cui, Rong Zhang, Craig G. Crandall

Abstract
This study tested the hypothesis that passive heating impairs cerebral autoregulation. Transfer function analyses of resting arterial blood pressure and middle cerebral artery blood velocity (MCA V<sub>mean</sub>), as well as MCA V<sub>mean</sub> and blood pressure responses to rapid deflation of previously inflated thigh cuffs, were examined in nine healthy subjects under normothermic and passive heat stress (increase core temperature 1.1 ± 0.2°C, P < 0.001) conditions. Passive heating reduced MCA V<sub>mean</sub> (change (Δ) of 8 ± 8 cm/s, P = 0.01), while blood pressure was maintained (Δ = 1 ± 4 mmHg, P = 0.36). Coherence was decreased in the very-low-frequency range during heat stress (0.57 ± 0.13 to 0.26 ± 0.10, P = 0.001), but was >0.5 and similar between normothermia and heat stress in the low- (0.07–0.20 Hz, P = 0.40) and high-frequency (0.20–0.35 Hz, P = 0.12) ranges. Transfer gain was reduced during heat stress in the very-low-frequency (0.88 ± 0.38 to 0.59 ± 0.19 cm·s⁻¹·mmHg⁻¹, P = 0.02) range, but was unaffected in the low- and high-frequency ranges. The magnitude of the decrease in blood pressure (normothermia: 20 ± 4 mmHg, heat stress: 19 ± 6 mmHg, P = 0.88) and MCA V<sub>mean</sub> (13 ± 4 to 12 ± 6 cm/s, P = 0.59) in response to cuff deflation was not affected by the thermal condition. Similarly, the rate of regulation of cerebrovascular conductance (CBVC) after cuff release (0.44 ± 0.22 to 0.38 ± 0.13 CBVC units/s, P = 0.16) and the time for MCA V<sub>mean</sub> to recover to precuff deflation baseline (10.0 ± 7.9 to 8.7 ± 4.9 s, P = 0.77) were not affected by heat stress. Counter to the proposed hypothesis, similar rate of regulation responses suggests that heat stress does not impair the ability to control cerebral perfusion after a rapid reduction in perfusion pressure, while reduced transfer function gain and coherence in the very-low-frequency range during heat stress suggest that dynamic cerebral autoregulation is improved during spontaneous oscillations in blood pressure within this frequency range.

Citation

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Heat Acclimation of an Adult Female With a Large Surface Area of Grafted Skin

Author
Jonathan E. Wingo, David A. Low, David M. Keller, Scott L. Davis, Karen J. Kowalske, Gary F. P undue, John L. Hunt, Craig G. Crandall

Abstract
Grafted skin has impaired blood flow and sweating responses necessary for heat dissipation. Heat acclimation improves temperature regulation in healthy individuals, but it is unknown whether heat acclimation improves temperature regulation of individuals with large areas of grafted skin. A 33-year-old woman with 75% total body surface area grafted skin 14 years postinjury performed upright cycling exercise at 45% peak oxygen uptake (50 W) for seven consecutive days in a climatic chamber set to 40°C and 30% relative humidity. The daily goal was for this patient to exercise 90 minutes (with a 5-minute break at minute 45); however, exercise was stopped when an internal temperature (T_c) limit of 39.5°C was reached. The T_c limit was reached during minute 46 of exercise on day 1 of acclimation, but not until minute 65 of exercise on day 7 of acclimation. The increases in T_c and heart rate during the first 45 minutes of exercise (the minimum duration completed for all acclimation bouts) were progressively mitigated with successive days of heat acclimation. Sweat sensitivity (the increase in sweat rate per 1°C increase in T_c) in an area of uninjured skin increased by ~30% on acclimation day 7 relative to day 1. Heat acclimation improved thermal tolerance of this patient with a large area of grafted skin, which could increase safety and comfort during thermal stress and/or exercise. (J Burn Care Res 2008;29:848-851)

Citation

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Distribution of Influence, Communication, and Relational Mentoring in the US Superintendency

Author
Rhonda L. McClellan, Gary Ivory, Ramón Domínguez

Abstract
We report on how fifty superintendents (chief executive officers of public school systems, each invited by a researcher to participate) from seven states in the US talked in eight focus groups of their perspectives on their influence as leaders, their efforts to communicate with stakeholders, and how they learn from these stakeholders. We maintain that our participants’ revelations suggest that three definitions must be expanded to fit their work. First, influence or authority must be seen not merely as vested in the superintendent; rather, these superintendents described their leadership in terms of working with and through others. Second, organizational communication for these superintendents is more than the district’s leader communicating his or her perceptions and wishes to others; it is more relational, in which a variety of actors communicate their perspectives to one another. Third, this type of interprofessional leadership leads logically to relational mentoring, where learning does not pass merely from expert to novice; rather, superintendents described their roles in terms of various parties learning from and teaching one another. We discuss implications of these insights for practice, research, and preparation.

Citation

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January 2009

The Effectiveness of Immunotherapy in Treating Exercise-Induced Pulmonary Hemorrhage

Author
Tammi S. Epp, Paul McDonough, Don E. Myers, Danielle J. Carlin, Brad J. Behnke, Casey A. Kindig, David C. Poole, Howard H. Erickson.

Abstract
Inflammatory airway disease has been linked to exercise-induced pulmonary hemorrhage (EIPH), and consequently, we hypothesized that immunomodulation via concentrated equine serum (CES) treatment would reduce EIPH as evidenced by red blood cell (RBC) concentrations in bronchoalveolar lavage fluid (BALF). Separate trials were conducted on Thoroughbred horses treated with either CES (n = 6) or placebo (0.9% saline; n = 4). All horses completed pre-treatment and post-treatment (2 and 4 weeks after initiating treatment) maximal exercise tests on a 10% inclined treadmill (1 m/s/min increments to fatigue) over a 10-week period (2–3 weeks between tests), with bronchoalveolar lavage (BAL) performed 30 minutes after exercise. Treatment ensued 10 days after the pre-treatment exercise test, with horses receiving a series of five CES or placebo injections 24 hours apart (20 mL intratracheal and 10 mL intravenously), with subsequent weekly injections for 5 weeks thereafter. After CES treatment, both EIPH (RBC in BALF) and inflammation (white blood cell concentration [WBC] in BALF) were significantly diminished by the 4-week posttreatment run, demonstrating 46 ± 12% and 24 ± 11% decreases, respectively (P < 0.05). In contrast, EIPH was elevated significantly at the 4-week time point, and inflammation remained constant in the placebo trial. In conclusion, these preliminary data suggest that therapeutic intervention involving immunomodulation may represent a viable approach to reducing the severity of EIPH.

Citation

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Where and Why There? Spatial Thinking with Geographic Information Systems

Author
Andrew J. Milson, Mary D. Curtis

Abstract
The authors developed and implemented a project for high school geography students that modeled the processes in a site selection analysis using Geographic Information Systems (GIS). They sought to explore how spatial thinking could be fostered by using the MyWorld GIS software that was designed specifically for educational uses. The task posed for the students was to: (1) perform a site selection analysis using GIS to determine the best location for a new business of their choice; and (2) present and justify their ideal location with a PowerPoint presentation. The authors divided the project into four parts that were completed during the course of three 80-minute "block" class periods. Students were given a hand-out with "Think About" and "To Do" prompts for each part and a "Proposal Checklist" on which to record their responses. The MyWorld software proved to be a valuable--though not perfect--tool for this project. Overall, most students found the software easy to use, but they were understandably frustrated when their computers crashed as they ran analyses. The results of this project reveal much about spatial thinking with GIS. Most importantly, the project demonstrates that a powerful geo-analysis tool can be used successfully in a classroom to promote students' spatial thinking. (Contains 1 table and 4 notes.)

Citation

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The Great Divide: Women’s Experiences with Mentoring

Author
Whitney H. Sherman, Ava J. Munoz, Anita Pankake

Abstract
Aware of the gender disparities that exist in the most coveted school district leadership positions, the researchers undertook the project reported here to uncover themes related to factors that contribute to the low numbers of women in the superintendency and assistant superintendency. Having knowledge and understanding of the factors that contribute to the dearth of women's voices and viewing this knowledge from a feminist framework helped us to understand how gender has played into assumptions and practices related to the superintendency and assistant superintendency. Readers can learn from the stories and experiences of the women reported here and understand practices that serve to block women from becoming educational leaders while also learning how to make the paths to leadership taken by a future generation of women leaders less problematic through suggested actions and strategies.

Citation

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Impact of Service-Learning on Teachers’ Efficacy

Author
Larry P. Nelson, Kathleen Tice, Shirley Theriot

Abstract
This article emphasizes the role service learning can play in enhancing preservice teachers’ sense of efficacy. Using a mixed model repeated measures design; results of the study indicate that levels of efficacy significantly increase when preservice teachers engage in service learning within a teacher education program. Findings also include a qualitative analysis of preservice teachers’ reflections to help explain how the service-learning projects played a role in enhancing efficacy.

Citation

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Altered Bone Mass, Geometry and Mechanical Properties During the Development and Progression of Type 2 Diabetes in the Zucker Diabetes

Author
Rhonda D. Prisby, Joshua M. Swift, Susan A. Bloomfield, Harry A. Hogan, Michael D. Delp

Abstract
Osteopenia and an enhanced risk of fracture often accompany type 1 diabetes. However, the association between type 2 diabetes and bone mass has been ambiguous with reports of enhanced, reduced, or similar bone mineral densities (BMDs) when compared with healthy individuals. Recently, studies have also associated type 2 diabetes with increased fracture risk even in the presence of higher BMDs. To determine the temporal relationship between type 2 diabetes and bone remodeling structural and mechanical properties at various bone sites were analyzed during pre-diabetes (7 weeks), short-term (13 weeks), and long-term (20 weeks) type 2 diabetes. BMDs and bone strength were measured in the femora and tibiae of Zucker diabetic fatty rats, a model of human type 2 diabetes. Increased BMDs (9–10%) were observed in the distal femora, proximal tibiae, and tibial mid-shafts in the pre-diabetic condition that corresponded with higher plasma insulin levels. During short- and long-term type 2 diabetes, various parameters of bone strength and BMDs were lower (9–26%) in the femoral neck, distal femora, proximal tibiae, and femoral and tibial mid-shafts. Correspondingly, blood glucose levels increased by 125% and 153% during short- and long-term diabetes respectively. These data indicate that alterations in BMDs and bone mechanical properties are closely associated with the onset of hyperinsulinemia and hyperglycemia, which may have direct adverse effects on skeletal tissue. Consequently, disparities in the human literature regarding the effects of type 2 diabetes on skeletal properties may be associated with the bone sites studied and the severity or duration of the disease in the patient population studied.

Citation

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Abstract
Osteopenia and an enhanced risk of fracture often accompany type 1 diabetes. However, the association between type 2 diabetes and bone mass has been ambiguous with reports of enhanced, reduced, or similar bone mineral densities (BMDs) when compared with healthy individuals. Recently, studies have also associated type II diabetes with increased fracture risk even in the presence of higher BMDs. To determine the temporal relationship between type 2 diabetes and bone remodeling structural and mechanical properties at various bone sites were analyzed during pre-diabetes (7 weeks), short-term (13 weeks), and long-term (20 weeks) type 2 diabetes. BMDs and bone strength were measured in the femora and tibiae of Zucker diabetic fatty rats, a model of human type II diabetes. Increased BMDs (9–10%) were observed in the distal femora, proximal tibiae, and tibial mid-shafts in the pre-diabetic condition that corresponded with higher plasma insulin levels. During short- and long-term type 2 diabetes, various parameters of bone strength and BMDs were lower (9– 26%) in the femoral neck, distal femora, proximal tibiae, and femoral and tibial mid-shafts. Correspondingly, blood glucose levels increased by 125% and 153% during short- and long-term diabetes respectively. These data indicate that alterations in BMDs and bone mechanical properties are closely associated with the onset of hyperinsulinemia and hyperglycemia, which may have direct adverse effects on skeletal tissue. Consequently, disparities in the human literature regarding the effects of type 2 diabetes on skeletal properties may be associated with the bone sites studied and the severity or duration of the disease in the patient population studied.

Citation

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Review of Intrinsic Factors Related to Fall Risk in Individuals with Visual Impairments

Author
Christopher T. Ray, Steven L. Wolf

Abstract
Abundant information in the geriatric literature emphasizes the factors relevant to maintenance of independent mobility and reduction of fall risk. However, while some researchers have attempted to identify the relationship between chronic health and visual impairment, few studies have systematically explored the impact of physical interventions that aim to remediate reduced health and function in adults with visual impairments. This review identifies intrinsic physical factors that negatively affect health and independence in adults with visual impairments. By highlighting these factors, we hope to provide a basis for future exercise interventions that will target reductions in the rate of physiological decline while preserving and potentially restoring independent functioning. Because the aging population is increasing and the basis for and subsequent formulation of exercise programs for maintaining mobility and quality of life have not been definitively ascertained for individuals with declining vision, exploring the intrinsic physical factors most amenable to physical rehabilitation becomes relevant.

Citation

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Effects of Strength Training and Vascular Occlusion

Author

Abstract
The purpose of our study was to determine if vascular occlusion produced an additive effect on muscle hypertrophy and strength performance with high strength training loads. Sixteen physically active men were divided into two groups: high-intensity (HI = 6 RM) and moderate-intensity training (MI = 12 RM). An occlusion cuff was attached to the proximal end of the right thigh, so that blood flow was reduced during the exercise. The left leg served as a control, thus was trained without vascular occlusion. Knee extension 1 RM and quadriceps cross-sectional area (MRI) were evaluated pre- and post-8 weeks of training. We only found a main time effect for both strength gains and quadriceps hypertrophy (p < 0.001). Therefore, we conclude that vascular occlusion in combination with high-intensity strength training does not augment muscle strength or hypertrophy when compared to high-intensity strength training alone.

Citation

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Evaluating Function/Impairment of Low Back Pain Using SEMG

Author
Robert J. Gatchel, Mark D. Ricard, Dhruti N. Choksi, Jain Mayank, Krista Howard

Abstract
Introduction A traditional problem faced by clinicians attempting to objectively measure musculoskeletal disorders such as low back pain, where there is often primarily soft tissue involvement, is that psychosocial factors (e.g., fear-avoidance, secondary gain) frequently influence the experience/reporting of pain. Nevertheless, there is still a great need for the quantification of physical function, with appropriate criteria in place, in order to help assess both physical impairment and therapeutic endpoint following treatment. One such potentially objective measure is surface electromyographic (sEMG) recordings during purposeful muscular activity and resting states. The present randomized controlled study assessed the potential validity of a new sEMG approach—the comprehensive muscular activity profile (CMAP)—by addressing the following question: can the CMAP accurately document whether a subject is exerting appropriate muscular effort during range-of-motion and lifting testing, or is submaximum effort being exerted? Methods Eighty healthy volunteers were randomly assigned to either: (1) an instruction group encouraging maximum effort on the tests; or (2) an instruction group encouraging “faking” and not putting in maximum effort on the tests. Therapists, who then administered the CMAP protocol (range-of-motion and lifting tests), were kept blind to subject group assignment. They were also asked to complete a rating scale evaluating whether subjects were exerting maximum effort after all the tests were completed. Results In differentiating between the two instruction groups, the CMAP demonstrated high levels of sensitivity [predicting maximum effort on all tests (ranging from 84.6 to 94.9%)]. In contrast, the sensitivity of the therapists’ ratings was much lower (ranging from only 72.5 to 80.0%). Most importantly, when the CMAP data and therapists’ ratings were combined, logistic regression analyses revealed high rates of sensitivity (94.4–97.2%), specificity (84.6–92.3%), and overall classification (90.7–93.3%). Conclusion The results of this study demonstrate the potential utility of the CMAP, combined with therapist ratings, as a valid method of objectively quantifying subject muscular performance and effort during lumbar range-of-motion and lifting tasks.

Citation

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January 2009

Putting “This We Believe” into Action in Performance-Based Teacher Education

Author
Laura Van Zandt Allen, Kim K. Ruebel, Melanie W. Greene, Janet E. McDaniel, Vikki Spencer

Abstract
The turn of the century brought a profound change in the accreditation of teacher preparation programs. This shift—from curriculum-based reviews to standards-based reviews—took place in the context of the accountability movement of the late 20th century. The 21st century ushered in what many refer to as "a culture of evidence." From P-12 to higher education, providing evidence of learning and data-driven decision making became mandatory. This change has affected no group more than teacher candidates and those who prepare them. When the National Council for the Accreditation of Teacher Education (NCATE) adopted new standards in 2000, the National Middle School Association's (NMSA's) Professional Preparation Advisory Board rewrote the 1989 NMSA guidelines, transforming them into two programmatic standards and seven performance-based standards. An institution submitting one or more programs for recognition does so by writing a context statement, responding to the two programmatic standards, and then offering six to eight program assessments that demonstrate how candidates meet the seven performance-based standards. In the authors' collective work, they have developed, enacted, and refined more than 75 assessments and rubrics aligned with NMSA standards. These are drawn from undergraduate, post-baccalaureate, and graduate middle level programs in California, Missouri, North Carolina, and Texas. Most can be adapted for either initial or advanced levels, and many meet more than one standard. For this article, the authors describe two key assessments per standard. These range from conventional to unique and occur in university-based courses as well as field experiences. What they share is the ability to demonstrate candidate knowledge, skills, and dispositions needed for teaching young adolescents. (Contains 1 figure.)

Citation

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Mathematics as a tool for inquiry in the literature classroom

Author
Christopher M. Kribs Zaleta, Kim K. Ruebel

Abstract
Originally entitled "Mathematics as a tool for inquiry in the literature classroom," this article examines ways in which mathematics (quantitative literacy) can enhance understanding of children's literature in the middle school classroom, with particular examples involving estimation and probability, the idea of infinity, and different perspectives (number systems as well as cultures).

Citation

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Miseducating Teachers about the Poor: A Critical Analysis of Ruby Payne's Claims about Poverty

Author
Randy Bomer, Joel E. Dworin, Laura May, Peggy Semingson

Abstract
Background/Context: This is the first research study to examine the content basis of Payne's in-service teacher education program, A Framework for Understanding Poverty, though others who have reviewed the book have agreed with our analysis. The study took place within a policy context in which the federal government, with the passage of the No Child Left Behind Act (2002), created a new category of students (economically disadvantaged) whose test scores would be monitored by officials in the U.S. Department of Education. This law ensures that the improvement of poor children’s test scores becomes a major concern of every public school in the country. These federal requirements have fueled the demand for professional development programs such as that offered by Ruby Payne and her Aha! Process, Inc.

Purpose: This article reports on an examination of the content of Ruby Payne's professional development offerings, as represented in A Framework for Understanding Poverty. Given the immense popularity of the program, an assessment of its representations of poor people is warranted and significant. We analyzed the relationship between Payne's claims and the existing research about low-income individuals and families. This study of Payne's work provides administrators and teachers with an evaluation of the reliability of Payne's claims. It also provides scholars in education, anthropology, sociology, and related fields with a description and critique of one of the more common conversations that is engaging teachers about the nature of the lives of many of their students, and the struggle to identify directions in which to improve schooling for the most vulnerable students in the education system.

Research Design: This is a qualitative research study whose data were derived from an analysis of A Framework for Understanding Poverty.

Conclusions/Recommendations: Our critical analysis of Payne's characterizations of people living in poverty indicates that her work represents a classic example of what has been identified as deficit thinking. We found that her truth claims, offered without any supporting evidence, are contradicted by anthropological, sociological and other research on poverty. We have demonstrated through our analysis that teachers may be misinformed by Payne's claims. As a consequence of low teacher expectations, poor students are more likely to be in lower tracks or lower ability groups and their educational experience is more often dominated by rote drill and practice.

Citation

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March 2009

What Teachers of Students with SEBD Need to Know About Speech and Language Difficulties

Author
Jodi Tommerdahl

Abstract
It is recognised increasingly that a large proportion of students in social, emotional and behavioural difficulties (SEBD) settings have speech and language difficulties (SLD). It is therefore important for school administrators and teachers to understand the links between language and behaviour. This article provides teachers with theoretical knowledge of language difficulties along with practical notions of assessment and support. After links between SLD and SEBD are explored, insight into the origins and the nature of speech and language difficulties based on recent neuroscientific research is discussed. This is followed by a description of speech and language difficulties from a linguistic perspective, which aims to provide classroom teachers with a framework that can be used to identify and assist students with SLD. A range of practical assessment activities is also provided.

Citation

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