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International Society of Posture & Gait Research

Message from the president



I officially took up the reins as ISPGR President last October but this is my first official announcement to the membership. Before I introduce myself I must sincerely thank the dedication and leadership of our past-president Mark Carpenter and also our officers, and board members who have contributed towards our committees, past congresses and other activities. I look forward to working with our returning and recently elected board members and have no doubt that the society will continue to thrive with the benefit of their dedication and expertise.

My first experience of ISPGR (or ISPG as it was called then) was in 1999 after arriving at the University of Waterloo, Canada to work as a post-doc with the late Aftab Patla. Aftab and Jim Frank co-hosted the meeting that year and I was thrown into the deep end, presenting in front of an audience of world-leading experts some of whom have become my heroes, collaborators, and friends. I have attended every ISPGR meeting since and have never been disappointed by the quality of the scientific programme but more importantly by the members (new and returning) that I meet. ISPGR truly is a unique organization that fosters not only excellent scientific exchange but also a sense of community that is friendly and ego-free.

Since being elected to the ISPGR board in 2012 I have acted as chair of the External relations Committee, Treasurer and Vice-president. I also had the honour of cohosting the meeting in Seville in 2015 with Shirley Rietdyk. It has been a pleasure to serve the society that has given so much to me and my own career over the years and a great honour to act as its current President. It is particularly gratifying that I will have the opportunity to open ISPGR2019 in Edinburgh as it is the first time an ISPGR meeting will be held in the United Kingdom. The co-hosts, Kristen Hollands and Mike Cinelli, together with chair of the Scientific Content Committee (and Vice-President), Vivian Weerdesteyn have put together a phenomenal programme which promises to be the biggest yet in terms of attendance and scientific presentations. When we couple this with the delights that the city of Edinburgh has to offer, #ISPGR2019 should make for a fantastic experience and I look forward to welcoming you soon.

Slàinte mhath,

Mark Hollands (ISPGR President)

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INTERNATIONAL SOCIETY OF POSTURE & GAIT

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- How can preregistration help you publish your research? (Pg. 10)



Walking and Talking with... Dr. Kristen Hollands & Dr. Michael Cinelli

In this edition, two long-time ISPGR members and all around familiar faces explain why we shouldn't be too concerned if we see them running around Edinburgh ... they have been in pre-congress training since 2017!

While many of our members are sure to recognize you both from past Congresses, how did you initially become ISPGR members?

We were both grad students in Aftab Patla's lab and were introduced to ISPGR during the University of Waterloo (Canada) meeting in 1999. All members of Aftab and Jim Frank's lab were asked (told!) to help with the organization and conference activities. Since this first exposure to ISPGR, we were hooked and have never missed a meeting since.

Do you feel that the science and topics you have pursued throughout your careers has been shaped by your involvement with ISPGR?

Past members have definitely laid the foundations from which our own research ideas have emerged, but we don't think it has shaped us as much as ISPGR has been shaped by its members. One major change that has occurred since we were grad students is a movement from very basic research to translational research. We are sure that topics at ISPGR will continue to evolve to reflect the diversity of its members and that is what we and others love about the society.

With such a history was it an easy decision to team up to put in an application to Chair this year's ISPGR Congress? Were there any other motivators?

Deciding to apply for and become ISPGR Chairs for the upcoming meeting was an inevitable next step. We have both been heavily involved with the Society, helping to shape its directions and scientific content. However, the number one reason we chose to apply to co-chair the 2019 meeting had nothing to do with location but rather was the result of the open bar at the 2017 ISPGR banquet in Florida! For those that do not know, what goes into being a Conference Chair?

Being a Conference Chair has a series of continuous duties that come and go in waves. For the most part there is a lot of planning (i.e., inviting Keynote speakers, arranging the order of the scientific content, entertainment at the meeting). We also have frequent meetings to discuss the state of affairs and planning the next course of action. A great deal of time is spent reviewing abstracts (Symposia, individual abstracts, preconference workshops) and making decisions on their acceptance.

What has been the best part of being Chair (or is it yet to come!)? Have there been any unexpected challenges?

We feel the best part of being Conference Chairs is witnessing everything unfold. We do have two significant highlights from this upcoming meeting: 1) creating a list of 5 excellent Keynote speakers that represent all areas of ISPGR and having them all agree to attend; and 2) having a record number of individual abstracts (589) submitted to be evaluated. However, we are most excited for the meeting itself because we believe that the best is yet to come!

Finally, a question we pose to everyone...is it Posture or Gait for you?

Strictly speaking it's gait research for both of us, but really without postural control you're screwed and couldn't walk so postural control is a very important aspect of our research.

Membership

Membership renewals are due for new and current ISPGR members

It's that time again!

Membership in ISPGR is open to scientists, researchers, clinicians and students from around the world involved in the many research and practical aspects of Gait and Posture. Membership dues support the ISPGR's mission of creating a community of multidisciplinary posture and gait researchers and students.

What are some of the benefits for members?

- Reduced rates for ISPGR activities
- Opportunities for jobs, positions, student scholarships and awards
- These and more are available on the website!

Our two-year membership cycle for 2018-2020 starts in October!

Student/PostDoc: \$75 USD

Regular: \$150 USD

For more information, please visit the ISPGR membership webpage.

Society News and Views

Did you get that thing I sent you?

If you submitted an abstract for the #ISPGR2019 World Congress, you will now have received a decision letter, including details on how to accept the decision and instructions on how to register for #ISPGR2019. For more information, click <u>here</u>.



Students and post docs, are you wondering about registering for the World Congress?

ISPGR wants to support the new generation of posture and gait researchers with low registration rates. Make sure to choose the student/post doc rate when registering and register before the Early Bird deadline of April 22, 2019.

Students, you'll need to include your student number in the information box. Post Docs, simply type in "post doc" in the box to move forward in the registration.

Program now online, Pre-congress workshops, Symposia and Orals confirmed!



Find out when things are happening <u>here</u>! Make sure when registering that you choose your preferred symposia attendance as this aids organizers in determining room allocations.

Have new results you want to share but missed the abstract deadline?

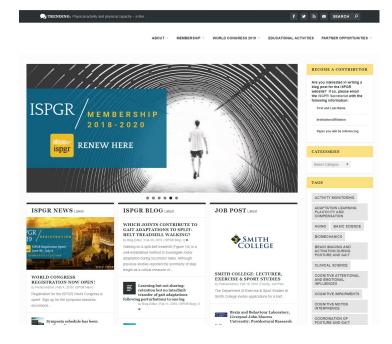
Late breaking abstracts will open in April for new research. No new data? Make sure to take advantage of the early bird membership, open until April 22. Remember, discounted access to the Congress is only one of the benefits of being an ISPGR member.

Apply now for trainee travel stipends!

Applications for travel stipends for ISPGR trainees (student and Post-doc members) are open until April 4th, 2019. Head over to <u>ispgr.org/awards</u> for more details on the application and questions.

New look website!

You may have noticed that the layout of ispgr.org has changed to incorporate a number of features straight from the homepage! Now you can access news, blog and job posts as soon as they become available. Don't forget you can also keep up to date using the RSS feed, and through our social media platforms, located in the top right hand corner of the homepage.



Gait and Posture: the official ISPGR Journal



The board recently announced that ISPGR's partnership with *Gait and Posture* would continue with the journal remaining the Official Journal of

ISPGR. The Elsevier journal sees ISPGR member Dominic Perennou vacate his position as associate editor and starting the search for a new candidate with strong ISPGR links.

Elsevier and *Gait and Posture* are also sponsoring our Emerging and Promising scientists awards at #ISPGR2019.

2019 Key Dates

Symposia Submissions:

August 6 – October 1, 2018

Pre-Congress Workshop Submissions:

October 1 – December 5, 2018

Poster and Oral

Submissions:

October 1 – December 5, 2018

Awards Applications Open:

October 1, 2018

Late Breaking Abstracts:

April 1 – 15, 2019

Travel Award Submission Deadline:

April 4, 2019

Early Registration closes:

April 22, 2019

Regular Registration closes:

June 3, 2019

2019 Congress Dates:

June 30 - July 4, 2019

Blog

We searched the <u>ISPGR Blogs</u> so you didn't have to!

Multiple balance mechanisms to keep you upright while splitbelt walking. **T. Buurke**

Linking anticipatory and reactive postural control in people with Parkinson's disease. **D. Peterson**

Your mom was right, variety is the spice of life! J. Yentes

Is balancing in your feet? The contribution of foot muscles to postural control. **B. Dalton**

Does direction of loss of balance matter to prevent a fall after stroke? **P. Patel**

Maturation of arm swing during walking. P. van de Walle and P. Meyns

Learning but not sharing: Retention but no interlimb transfer of gait adaptations following perturbations to one leg. **C. McCrum**

Which joints contribute to gait adaptations to split-belt treadmill walking? **K. Hirata**

Hormones + health: gait instability and poor balance are associated with vitamin d and parathyroid hormone. **M. Bird**

The sidewalk problem: Avoidance behaviours during a collision course with an approaching person. L. Pfaff

Just Published? Contact us and Blog it!

Opportunities in 2019

Conference, school and symposium announcements:

- 29th Annual Meeting of the Neural Control of Movement Society, Apr 23 (Toyama, JP; <u>LINK</u>)
- 37th International Society of Biomechanics in Sports Conference, Jul 22 (Ohio, USA; <u>LINK</u>)
- 25th Congress of The European Society of Biomechanics, Jul 7 (Vienna, Austria; LINK)
- 4. 27th International Society of Biomechanics and 43rd American Society of Biomechanics joint conference, July 31, (Calgary, Canada; LINK)
- 5. EU Falls Festival, Oct 1 (Umea, Sweden; LINK)
- 1st World Congress on Falls and Postural Stability, Dec 4 (Kuala Lumpur, Malaysia; <u>LINK</u>)

Calls for Manuscripts

- 1. Modularity and Compositionality in Motor Control (J Neurophysiol)
- 2. Auditory and Vestibular Efferents (J Neurophysiol)

Literature scan

Bring on the Games!!

Off-the-shelf and serious games in stroke rehabilitation can enhance salience, increase motivation and improve engagement, all important factors for enhancing neuroplasticity and stroke recovery. In their recent study, Lee and Bae investigate the use of a 'Driving Game' to improve trunk control and gait ability in individuals with stroke. They reported significantly better outcomes for those who played the game compared to those trained on a treadmill. Yet another study that reiterates the importance of patient engagement in the rehabilitation process!

Lee D, Bae Y. The Effectiveness of Driving Game on Trunk Control and Gait Ability in Stroke. J Mot Behav. 2019 Feb; 1-8.

After Games it's Robots: Latest update from the world of exoskeletons!!

Aiming to improve gait training in chronic stroke, Jayaraman and colleagues used a hip-assistive robotic exoskeleton and compared it to routine functional walking training. Not only did functional outcomes measures like walking speed improve in the exoskeleton group, corticomotor excitability (measured using TMS) confirmed stronger descending corticospinal drive after therapy. The key to its future use, it wasn't a bulky robot but the less cumbersome Stride Management Assist (Honda, JP).

Jayaraman A, O'Brien MK, Madhavan S, Mummidisetty CK, Roth HR, Hohl K, Tapp A, Brennan K, Kocherginsky M, Williams KJ, Takahashi H, Rymer WZ. Stride management assist exoskeleton vs functional gait training in stroke: A randomized trial. Neurology. 2019 Jan ;92.



Different Perspectives: THE NETHERLANDS Posture and Gait around the globe

Our next instalment of Different Perspectives sees us in a place where there are more bicycles than people, 25% of the country is below sea level, and orange has never gone out of fashion ("Oranje gekte!").

This has not stopped the Netherlands from forging a hub for human movement sciences within Europe. To tell us more, Chris McCrum gathered some ISPGR Graduate student members from all over the country to share their views!



Tom JW Buurke - <u>University Medical Center Gronigen</u>, <u>University of Groningen</u>

Groningen is a vibrant city in the north of the Netherlands, where the Center for Human Movement Sciences resides. The Center's gait & posture research is directed by ISPGR members Claudine Lamoth, Tibor Hortobágyi and Rob den Otter, who work with 14 PhD students on different research projects. The focus of research is on the effect of aging and pathology on gait & balance control, as well as technical solutions (e.g. exergaming and mobile sensors) for monitoring and

developing new interventions. In our research we adopt a multidisciplinary approach. By combining biomechanics, neurophysiology and motor control theories in parallel with novel statistical analyses and advanced machine learning algorithms we go the extra mile in every stage of research to understand human balance and locomotion, its adaptability, and develop gait and balance training protocols and interventions. We work with academic learning communities, i.e. groups of bachelor and master students who participate in the PhD research projects. During weekly lab-meetings and journal clubs, students at all levels exchange knowledge, discuss and present their work. Want to know more? Feel free to approach one of Groningen's professors or graduate students at the next ISPGR World Congress, we would love to meet you!





Amsterdam is a diverse city, and so is the research conducted at the Department of Human Movement Sciences at Vrije Universiteit Amsterdam. Our lab spaces are full of different research groups focusing on a host of different topics. We are currently conducting our Ph.D. studies at the Vrije Universiteit Amsterdam as part of the EU funded project "Keep Control," an industrial-academic initial training network towards specific diagnosis and treatment of age-related gait and balance deficits. Leila investigates what constitutes proper balance control to establish plasticity of the balance control system in older adults. She quantifies changes in balance performance, correlated mechanical and

neural control, their retention, and transfer to gait over several sessions of individualized balance learning. Markus works together with Motek Medical BV (Amsterdam) and is evaluating a tool to improve reactive balance and gait in





Looking for that next position?

Check out our job notifications below!

Can't find what you are looking for? Head online for more!

Want to post a job position? Get in touch with us at, <u>ispar@ispar.ora</u> older adults at risk of falling. He is applying a gait training program with treadmill perturbations under cognitive dual-task conditions in clinical practice. We will both present our results about balance control and reactive balance training in older adults at the poster session at ISPGR 2019, and we will be happy to meet you there.

Kyra Theunissen – <u>Maastricht University</u>



The versatile motion capture laboratories of Maastricht University facilitate a broad spectrum of research and education projects related to gait and posture. The interaction between researchers, physicians and technical staff stimulates an interdisciplinary approach where theories are tested, and rehabilitation is implemented. In my eyes, this is the perfect setting to educate students in conducting research and in considering the clinical implications. Examples include pre- and postoperative clinical gait analyses and the development of a reference database of the biomechanics of gait.

Current research projects in our centre involve topics such as balance control and training; effectiveness of functional electrical stimulation in cerebral palsy gait; running economy and, in my case, the biomechanics and energetics of gait. With a unique measurement set up, my PhD topic primarily focuses on measuring the effect of walking fatigue on the biomechanics and energetics in diseased and healthy population. I'm happy to be sharing some of my results as a poster presentation during the conference in Edinburgh and hope to see you there!

From the ISPGR Job Board...

PhD

Motion analysis and imaging in older recreational runners with MSK impairments

University of British Columbia, Canada (LINK)

Flexible mechatronics and soft robotics for wearable devices

University of New South Wales, Aus (LINK)

Post-doc

Gaze training and Developmental Coordination Disorder

Liverpool John Moores University, UK (LINK)

Neural control of mobility in older adults

University of Florida, FL, USA (LINK)

Cognitive motor Rehabilitation in MS

University of Illinois at Urbana-Champaign, USA (LINK)

Muscle coordination, SCI and overground walking

Harvard, MA, USA (LINK)

Academic

2-year Lecturer – Exercise and Sport Studies Smith College, MA, USA (LINK)

Sponsor Spotlight: NICON

In the last newsletter, we started the conversation about motion capture technologies. In our first Sponsor Spotlight, we continue the conversation with Tina Holland from VICON, a brand synonymous with the term 'Mocap' for over 30 years, to shed light on where the gold-standard technology has been and where it is going!

A number of our members will be familiar with Vicon and the motion capture solutions that they have provided since the first commercial systems became available in the 1980's, what has allowed Vicon to flourish in such a niche marketplace?

A drive to always be innovating, a desire to be connected to the community and our love of the technology. Vicon has always taken pride in innovating; developing new features and moving the science of motion capture ('Mocap') forward. Our customers recognize the amount we invest in research to make this happen and we make a lot of effort to be connected to our community to ensure that we are investing in what community wants. Another great fact is that Mocap isn't as niche as it used to be! It has expanded and continues to do so. New ideas, technologies and approaches have also helped to drive our products to new heights.

Access to motion capture has improved with each iterative leap and bound that the technology itself has advanced. It was not so long ago that data processing required manual digitization of markers on a frame-by-frame basis! Thinking back over the years, what have been some of the defining shifts in Vicon technology?

That's absolutely true and I can speak from experience having worked in Mocap now for almost 25 years and still remembering having to advanced video one frame at a time, and clicking on each point to digitize just a few seconds of video. A trip down memory lane for me, but one that no longer has to be repeated for a number of thankful graduate members! Our introduction of automated labelling (no more frame by frame!), significantly higher camera resolutions, cameras with on-board processors, and the integration of Mocap with other devices and software have shaped Vicon's impact on the research and commercial landscape. When coupled with increases in computing power, reduced costs and a Mocap community with ever-increasing technical abilities, the technology has expanded at a blistering pace.

For our members in the posture and gait research community, motion capture goes hand in hand with a day in our working lives but are there some unusual and intriguing ways that you have heard of Vicon products being used?

Mocap usage has definitely started to expand into interesting and new areas including movies, gaming, virtual reality, architecture, ergonomics, robotics...and the list keeps expanding. Personally, the most interesting aspect of this growth is when crossovers occur between our users. For example, fine facial and finger movement capture methods created for actors in movies are being used by researches studying speech pathology and sign language, while connections developed by engineers to stream data at high rates to controlling UAVs (Unmanned Aerial Vehicles) are being used by scientists who use biofeedback for their research.

Cross-pollination - It's exciting, sometimes unexpected and always helps us push our technology forward.

Without giving away too many trade secrets, what is next for Vicon and motion capture in general? Should we be on the lookout for new hardware, intelligent software designs, or collaborations with other technologies?

As far as it's come, we're still excited about where it's going! Current developments involve active marker technology, fusing different data types with optical data, inertial technologies, integrating automation and more functionality in our platforms, and creating mobile interfaces to our software, thus freeing users from the keyboard.

Finally, who should we be searching for at #ISPGR2019 to answer all our other Vicon-related questions?

You can find us at booth #2 where you can meet our LFS Product Manager Dr Kim Duffy and our UK Sales Manager Dami Phillips.

Research Community: Origins of Balance Deficits and Falls Cluster



While the ISPGR Congress allows us to gather together every 2 years to collaborate and connect on a global scale, our ISPGR members are busy using their skills and new-found relationships to maintain these connections over off-congress years. We check in with the Origins of Balance Deficits and Falls (OBDAF) Research Cluster based out of the University of British Columbia (UBC), Vancouver, Cananda.

Dr. Mark Carpenter has been busy since he stepped down as ISPGR President in September, 2018. Along with his co-investigators and fellow ISPGR members Drs. Tim Inglis and Jean-Sebastién Blouin, they have been building a cohort of researchers spanning across departments and institutions to tackle the issue of balance deficits and falls in the modern day. Funded by a Grant for Catalyzing Research Clusters from UBC, the OBDAF features extensive multi-disciplinary collaborations between basic scientists and clinical investigators. Members of the cluster are internationally renowned experts in sensorimotor control of human balance, and factors contributing to balance deficits associated with age-related degenerative disorders, spinal cord injury, vestibular dysfunction, brain injury, osteoarthritis and Parkinson's disease.



Attendees at the 1st annual OBDAF conference in November, 2018

The cluster takes a multi-disciplinary approach to studying balance deficits and falls, integrating mechanistic and clinical sciences in order to characterize the common and disease-specific factors that underlie different pathological conditions. This has been achieved through the development of a comprehensive collection of cuttingedge balance measurement tools and techniques including dynamic balance platforms, robotic balance simulators, exoskeletons, fMRI-compatible balance devices, virtual reality systems, and force-plate embedded rooms, coupled with a wide range of biomechanical, electrophysiological and neural recording, and stimulating techniques.

In order to increase awareness around the issue of falls,

OBDAF holds community engagement events, training events for members and recently organized the first annual cluster conference in November, 2018. Featuring a list of internationally renowned keynote speakers the event focussed on the topic of "Sensorimotor control of human balance and movement." Attended by over 80 delegates over the course of 2 days (a high proportion being ISPGR members themselves) were invited to speak at the conference and gave engaging, knowledgeable presentations of their current research in the area.

Collaborations are not just limited to the academics, trainees also gain a lot from the cluster. When asked about the significance of the cluster on her research development, Emma Nielsen, a UBC graduate student and ISPGR member commented; "(its) biggest role is fostering collaborations across institutes while also providing a source of inspiration for future work. I also appreciate that this also reinforces the notion of a research community." At the conference, trainees were provided the opportunity to present their own novel ongoing research, furthering their networking opportunities and developing soft skills such as public speaking. As we continue through 2019, the cluster intends to continue it's endeavors to create more cross cutting research with trainee involvement an integral component in the process.

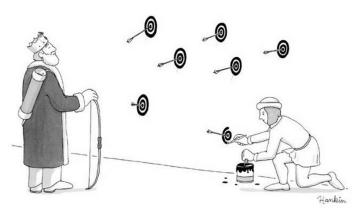
For the latest on cluster news, head to <u>www.balancefalls.ubc.ca</u> or keep us tweet informed <u>@balanceandfalls</u>!

Going through the (loco)motions: Open science and the Power of Pre-registration

We began our discussions into Open Science in our last newsletter, looking at where, as researchers, you can store and gain access to data through online repositories. But before we have data to deposit it's important to understand where those numbers have come from. Enter stage left, protocol preregistration, something that doesn't happen too often in Gait and Posture research (at least not yet!) but a key ingredient changing how research is conducted in a number of fields. In this edition, we delve into what preregistration means and how you can take part. But first,

Is exploratory a dirty word in science?

In a study on the role of hypothesis testing in biomechanical research, Rowbottom & Alexander (2012) found that "... whereas no papers had exploration as a stated aim, 58% of papers had hypothesis testing as a stated aim. [they] had strong suspicions, at the bare minimum, that presentational hypotheses were present in 31% of the papers in this latter group." While this may not always be problematic, it can certainly be, as statistics simply do not hold up when hypothesis testing occurs after the results are known. It's such an issue that it now comes with its own acronym, HARKing.



With HARKing, you can always hit the bullseye! Charlie Hankin© Published 12/3/14 in New Yorker

One of the solutions to prevent HARKing? The preregistration of a study protocol, including the expected analyses and statistical tests to be conducted on your primary outcome measure. This can be done in one of two ways; 1) preregistration, in which you put a protocol online, and can later refer to this when reporting the results of your manuscript, and 2) registered reports, in which manuscripts are examined in two stages, where an initial protocol and analysis is accepted by the journal, prior to data collection and re-examined following a full write-up.

We can take the world of clinical trials as a perfect example of preregistration in motion. Preregistration of primary outcomes in clinical trials (on ClinicalTrials.gov) has been required since 2000. Interestingly, in a review paper evaluating drugs or dietary supplements for the treatment or prevention of cardiovascular disease (Kaplan & Irvin, 2015), this has been shown to have drastic effect; studies before the year 2000 showed much larger effect sizes, while after 2000, the number of studies that reported significant effects drastically decreased. While it may indeed be so that the interventions that were proposed before 2000 were more effective, it is more likely that this finding suggests "fishing" for significant findings pre-2000. As such, this example nicely illustrates why it may be good to preregister studies when they are designed to test hypothesis.

In a similar fashion, and spurred by their own replication crisis, psychology has been one of the first scientific disciplines to also take on this idea. Recently, exercise scientists, have made their own calls to adapt and apply similar practices. In a recent preprint, <u>Caldwell and several colleagues</u> make the case for more transparency in exercise science, particularly through preregistration. At the same time, a new <u>Society for Openness and Replicability in Kinesiology</u> was created.



Get in touch with ISPGR



For any suggestions directly related to the ISPGR newsletter, please contact Masahiro Shinya or <u>Alexander Stamenkovic</u>

ISPGR on Facebook

Another advantage of specifically registered reports (in which the protocol is peerreviewed before the study takes place) is that once the protocol has been accepted, it will be much easier to get the final results published, as this is not conditional on the outcomes anymore (i.e. no more problems with reviewers who argue your work is not interesting because you find non-significant results!).

Is preregistration or writing a registered report a lot of work? When you're truly doing hypothesis driven research, we think it is not, as you would have to write down your introduction, hypothesis and methods anyway. So why not do it before your research? With registered reports, you get the added advantage that reviewers can actually help you to improve your experimental protocol. No more "it would have been nice if the authors could have measured *x*." We therefore encourage you to have a look at the links provided in this article, and have a go at a preregistered study!

Is exploratory a dirty word in science?

It doesn't have to be!

Especially when it's clear to reviewers and your audience which part of the research is hypothesis-driven, and which is exploratory. Registered reports and preregistration can be a great tool in ensuring transparency of your research findings.

Contributors

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Sponsor Spotlight: Tina Holland (<u>@tinahvicon</u>), Alexander Stamenkovic, Michelle Smith

Research Community: Sarah Wilson (@balanceandfalls)



INTERNATIONAL Society of Posture & Gait Research