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SCIENCE NEWS — Australian Archaeologists Find Fragment of World’s Oldest-Known Axe

A team of archaeologists from the University of Sydney, the Australian National University and the University of Western Australia has unearthed a small fragment from the edge of a 46,000-49,000-year-old stone axe. An analysis of the fragment was published online in the journal Australian Archaeology this week.

[They mean the world’s oldest Australian axe fragment]


SCIENCE NEWS — Climate Change Contributed to Neanderthals’ Demise, Study Suggests

Neanderthals showed signs of nutritional stress during periods of extreme cold, according to a new study published in the July 2016 issue of the Journal of Human Evolution. “Our research uncovers a pattern showing that cold, harsh environments were stressful for Neanderthals,” said lead author Dr. Jamie Hodgkins, from the University of Colorado Denver.

Humans Arrived in Southern Arabia Earlier Than Thought

An international team of genetic researchers from the United States and Europe has found new evidence that there was an Ice Age refugium in southern Arabia. 


Small brain area plays key role in making everyday decisions

A small brain structure plays a central role in the many decisions like this we make each day. But it hasn’t been clear how a limited number of neurons in this small part of the brain can support an unlimited number of choices. Now, studying how macaque monkeys choose between juice drinks, researchers have found that neurons in the orbitofrontal cortex can re-map to make different decisions when circumstances change. 

https://www.sciencedaily.com/releases/2016/05/160509133302.htm

World's oldest axe fragment found in Australia

Australian archaeologists have discovered a piece of the world’s oldest axe in the remote Kimberley region of Western Australia. 

https://www.sciencedaily.com/releases/2016/05/160510165112.htm

Brain pattern predicts how fast an adult learns a new language

A five-minute measurement of resting-state brain activity predicted how quickly adults learned a second language, report scientists. 

https://www.sciencedaily.com/releases/2016/05/160510134304.htm

Out of mind, out of sight: Brain's frontal cortex controls vision

Ever search desperately for something, then realize you were looking straight at it the whole time? Research indicates that vision is controlled by the part of the brain associated with thinking. And in sight, too, it can be absent minded. 

https://www.sciencedaily.com/releases/2016/05/160510124822.htm

Climate change may have contributed to extinction of Neanderthals

Neanderthals in Europe showed signs of nutritional stress during periods of extreme cold, suggesting climate change may have contributed to their demise around 40,000 years ago. 

https://www.sciencedaily.com/releases/2016/05/160511133201.htm

Social objects in the brain

A new study used LEGO bricks to investigate the neurocognitive underpinnings of our engagements with symbolic objects. The study suggests that we experience symbolic objects as social entities. 

https://www.sciencedaily.com/releases/2016/05/160511092649.htm

New archaeological method finds children were skilled ceramists during the Bronze Age

Artisanal interpretation of ceramics from the Bronze Age shows that a nine-year-old child could be a highly skilled artisan. This was one of the discoveries presented in a new thesis that explores how an artisanal perspective can contribute to archaeology by providing new insights into archaeological artefacts. 

https://www.sciencedaily.com/releases/2016/05/160511093033.htm

Cooperation, not struggle for survival, drives evolution, say researchers

Using a new conceptual evolutionary model, investigators have reviewed the debated mechanism of speciation, suggesting that competition and a struggle for the existence are not the main drivers of evolution. This research points out the importance of avoidance of competition, biological history, endogenosymbiosis, and three-dimensionality as the main forces that structure ecosystems and allow the evolution of biological diversity. 

https://www.sciencedaily.com/releases/2016/05/160512100708.htm

Pre-Clovis civilization in Florida; settlement 1,500 years earlier than previously believed

The discovery of stone tools alongside mastodon bones in a Florida river shows that humans settled the southeastern United States as much as 1,500 years earlier than scientists previously believed, according to a new research. This site on the Aucilla River -- about 45 minutes from Tallahassee -- is now the oldest known site of human life in the southeastern United States. It dates back 14,550 years. 

https://www.sciencedaily.com/releases/2016/05/160513151221.htm
SCIENCE DAILY – Evaluating animal threats and human intentions uses common brain network
Assessing whether a fluffy bunny or a giant spider poses a threat to our safety happens automatically. New research suggests the same brain areas may be involved in both detecting threats posed by animals and evaluating other humans’ intentions. https://www.sciencedaily.com/releases/2016/05/160513112136.htm

SCIENCE DAILY – Ancient Irish musical history found in modern India
An archaeologist studying musical horns from iron-age Ireland has found musical traditions, thought to be long dead, are alive and well in south India. The realization that modern Indian horns are almost identical to many iron-age European artifacts reveals a rich cultural link between the two regions 2,000 years ago. https://www.sciencedaily.com/releases/2016/05/160513100848.htm

SCIENCE DAILY – Why animals court their own sex
Same-sex sexual behavior is common in animals but puzzles evolutionary biologists since it doesn’t carry the same obvious benefits as heterosexual courtship behavior that leads to mating and production of offspring. A study sheds new light on the pervasiveness of same-sex sexual behavior in the animal kingdom. https://www.sciencedaily.com/releases/2016/05/160512212356.htm

SAPIENS – Labor Pains and Helpless Infants: Eve or Evolution?
We often use the “obstetrical dilemma” to explain why humans have helpless infants, but there is mounting evidence that this explanation is insufficient. http://sapiens.us11.list-manage1.com/track/click?u=80f6cf678900daf984bf763b7&id=fcf1d573a9&e=dc0eff6180

PUBLICATIONS
Proceedings of the Royal Society B – 11 May 2016
PAPERS
CARL VELLER, DAVID HAIG & MARTIN A. NOWAK – The Trivers–Willard hypothesis: sex ratio or investment?
The Trivers–Willard hypothesis has commonly been considered to predict two things. First, that a mother in good condition should bias the sex ratio of her offspring towards males (if males exhibit greater variation in reproductive value). Second, that a mother in good condition should invest more per son than per daughter. These two predictions differ empirically, mechanistically and, as we demonstrate here, theoretically too. We construct a simple model of sex allocation that allows simultaneous analysis of both versions of the Trivers–Willard hypothesis. We show that the sex ratio version holds under very general conditions, being valid for a large class of male and female fitness functions. The investment version, on the other hand, is shown to hold only for a small subset of male and female fitness functions. Our results help to make sense of the observation that the sex ratio version is empirically more successful than the investment version. http://rspb.royalsocietypublishing.org/content/283/1830/20160126

MANUELA FERRARI, ANNA K. LINDHOLM & BARBARA KÖNIG – A reduced propensity to cooperate under enhanced exploitation risk in a social mammal
Conditional adjustment of cooperativeness to the expected pay-off might be a useful strategy to avoid being exploited in public good situations. Parental care provided towards all offspring in a communal nest (containing offspring of several females) resembles a public good. Females indiscriminately caring for all young share the costs equally, but the pay-off may vary depending on their contribution to the joint nest (number of own offspring). Females with fewer offspring in the joint nest will be exploited and overinvest relative to their contribution. We experimentally created a situation of high conflict in communally nursing house mice, by using a genetic tool to create a difference in birth litter sizes. Females in the high conflict situation (unequal litter sizes at birth) showed a reduced propensity to give birth as part of a communal nest, therefore adjusting their cooperativeness to the circumstances. http://rspb.royalsocietypublishing.org/content/283/1830/20160068

ALEXANDRA G. ROSATI et al – Rhesus monkeys show human-like changes in gaze following across the lifespan
Gaze following, or co-orienting with others, is a foundational skill for human social behaviour. The emergence of this capacity scaffolds critical human-specific abilities such as theory of mind and language. Non-human primates also follow others’ gaze, but less is known about how the cognitive mechanisms supporting this behaviour develop over the lifespan. Here we experimentally tested gaze following in 481 semi-free-ranging rhesus macaques (Macaca mulatta) ranging from infancy to old age. We found that monkeys began to follow gaze in infancy and this response peaked in the juvenile period—suggesting that younger monkeys were especially attuned to gaze information, like humans. After sexual maturity, monkeys exhibited human-like sex differences in gaze following, with adult females showing more gaze following than males. Finally, older monkeys showed reduced propensity to follow gaze, just as older humans do. In a second study (n = 80), we confirmed that macaques exhibit similar baseline rates of looking upwards in a control condition, regardless of age. Our findings indicate that—despite important differences in human and non-human primate life-history characteristics and typical social
experiences—monkeys undergo robust ontogenetic shifts in gaze following across early development, adulthood and ageing that are strikingly similar to those of humans.

http://rspb.royalsocietypublishing.org/content/283/1830/20160376

Philosophical Transactions of the Royal Society B – 26 May 2016
NOTHING OF INTEREST

Royal Society Biology Letters – No issue this week

Royal Society Open Science – No issue this week

New Scientist – 14 May 2016
REVIEWS

STEVEN MITHEN – The shadows on the wall
https://www.newscientist.com/article/mg23030730-600-how-to-decode-the-shadows-on-the-wall/

ARTICLES

MAX GREEN – A history of love, art, power and religion In 10 graves
We are the only animal to bury its dead, and we have been doing it for a very long time. These moving, fascinating finds reveal how the human mind has evolved. [Rising Star, Atapuerca, Herto Bouri, Qafzeh, Sima de las Palomas, Hilazon Tachtit, the Clovis boy, Catalhoyuk, Utyevka, Atopascio]
https://www.newscientist.com/article/mg23030730-300-dead-valuable-10-graves-that-reveal-how-the-human-mind-evolved/

Science – 13 May 2016
NOTHING OF INTEREST

Science Express – 13 May 2016
NOTHING OF INTEREST

Science Advances – 13 May 2016
NOTHING OF INTEREST

Nature – 12 May 2016
ARTICLES

DANIEL SAREWITZ – The pressure to publish pushes down quality
Scientists must publish less, or good research will be swamped by the ever-increasing volume of poor work.
http://www.nature.com/news/the-pressure-to-publish-pushes-down-quality-1.19887

Nature Communications – 11 May 2016
NOTHING OF INTEREST

Nature Scientific Reports – 10 May 2016
PAPERS

BROCK FERGUSON & CASEY LEW-WILLIAMS – Communicative signals support abstract rule learning by 7-month-old Infants
The mechanisms underlying the discovery of abstract rules like those found in natural language may be evolutionarily tuned to speech, according to previous research. When infants hear speech sounds, they can learn rules that govern their combination, but when they hear non-speech sounds such as sine-wave tones, they fail to do so. Here we show that infants’ rule learning is not tied to speech per se, but is instead enhanced more broadly by communicative signals. In two control experiments, infants failed to learn the very same rules when familiarized to tones outside of a communicative exchange. These results reveal that infants’ attention to social agents and communication catalyzes a fundamental achievement of human learning.
http://www.nature.com/articles/srep25434?WT.ec_id=SREP-20160510&spMailingID=51339879&spUserID=ODY4NjU1NzU3NQS2&spJobID=921214795&spReportId=OTIxMjE0Nzk1S0
FRANCESCA GANDINI et al – Mapping human dispersals into the Horn of Africa from Arabian Ice Age refugia using mitogenomes

Rare mitochondrial lineages with relict distributions can sometimes be disproportionately informative about deep events in human prehistory. We have studied one such lineage, haplogroup R0a, which uniquely is most frequent in Arabia and the Horn of Africa, but is distributed much more widely, from Europe to India. We conclude that: (1) the lineage ancestral to R0a is more ancient than previously thought, with a relict distribution across the Mediterranean/Southwest Asia; (2) R0a has a much deeper presence in Arabia than previously thought, highlighting the role of at least one Pleistocene glacial refugium, perhaps on the Red Sea plains; (3) the main episode of dispersal into Eastern Africa, at least concerning maternal lineages, was at the end of the Late Glacial, due to major expansions from one or more refugia in Arabia; (4) there was likely a minor Late Glacial/early postglacial dispersal from Arabia through the Levant and into Europe, possibly alongside other lineages from a Levantine refugium; and (5) the presence of R0a in Southwest Arabia in the Holocene at the nexus of a trading network that developed after ~3 ka between Africa and the Indian Ocean led to some gene flow even further afield, into Iran, Pakistan and India.

http://www.nature.com/articles/srep24089?WT.ec_id=SREP-20160510&spMailingID=51339879&spUserID=ODY4NjU1NzU3NQS2&spJobID=921214795&spReportId=OTIxMjE0Nzk1S0

TETSUSHI OHDAIRA – Evolution of cooperation by the introduction of the probabilistic peer-punishment based on the difference of payoff

There are two types of costly punishment, i.e. peer-punishment and pool-punishment. While peer-punishment applies direct face to face punishment, pool-punishment is based on multi-point, collective interaction among group members. Regarding those two types of costly punishment, peer-punishment is especially considered to have the flaws that it lowers the average payoff of all players as well as pool-punishment does, and facilitates antisocial behaviour like retaliation of a defector on a cooperator. Here, this study proposes the new peer-punishment that punishment to an opponent player works at high probability when an opponent one is uncooperative, and the difference of payoff between a player and an opponent one becomes large in order to prevent such antisocial behaviour. It is natural to think that players of high payoff do not expect to punish others of lower payoff because they do not have any complaints regarding their economic wealth. The author shows that the introduction of the proposed peer-punishment increases both the number of cooperative players and the average payoff of all players in various types of topology of connections between players.

http://www.nature.com/articles/srep25413?WT.ec_id=SREP-20160510&spMailingID=51339879&spUserID=ODY4NjU1NzU3NQS2&spJobID=921214795&spReportId=OTIxMjE0Nzk1S0

PURVA RAJHANS et al – Children’s altruistic behavior in context: The role of emotional responsiveness and culture

Altruistic behavior in humans is thought to have deep biological roots. Nonetheless, there is also evidence for considerable variation in altruistic behaviors among individuals and across cultures. Variability in altruistic behavior in adults has recently been related to individual differences in emotional responsiveness to fear in others. The current study examined the relation between emotional responsiveness (using eye-tracking) and altruistic behavior (using the Dictator Game) in 4 to 5-year-old children (N = 96) across cultures (India and Germany). The results revealed that increased altruistic behavior was associated with a greater responsiveness to fear faces (faster fixation), but not happy faces, in both cultures. This suggests that altruistic behavior is linked to our responsiveness to others in distress across cultures. Additionally, only among Indian children greater altruistic behavior was associated with greater sensitivity to context when responding to fearful faces. These findings further our understanding of the origins of altruism in humans by highlighting the importance of emotional processes and cultural context in the development of altruism.

http://www.nature.com/articles/srep24089?WT.ec_id=SREP-20160510&spMailingID=51339879&spUserID=ODY4NjU1NzU3NQS2&spJobID=921214795&spReportId=OTIxMjE0Nzk1S0


PAPERS

CYRIL C. GRUETER & TARA S. STOINSKI – Homosexual behavior in female mountain gorillas: Reflection of dominance, affiliation, reconciliation or arousal?

Humans are unique among primates for not only engaging in same-sex sexual acts, but also forming homosexual pair bonds. To shed light on the evolutionary origins of homosexuality, data on the occurrence and contexts of same-sex behavior from nonhuman primates may be of particular significance. Homosexual behavior involving females is poorly researched in most primate taxa, exceptions being Japanese macaques, rhesus macaques, Hanuman langurs and bonobos. We present data on homosexual behavior in female mountain gorillas in the Virunga Volcanoes (Rwanda) and test four functional hypotheses, namely reconciliation, affiliation, dominance expression and sexual arousal. Homosexual interactions between females involved both ventro-dorsal and ventro-ventral copulations accompanied by vocalizations and courtship displays. The only sociosexual hypothesis that received partial empirical support is the social status hypothesis, i.e., that mounting reaffirms the dominance hierarchy. There is also some limited evidence that same-sex behavior reflects an overall state of arousal or is triggered via a ‘pornographic’ effect. An adaptive function of female homosexual behavior is not readily apparent, and we
tentatively conclude (until a more rigorous test becomes available) that it may simply be related to sexual gratification or that it is an evolutionary by-product of an adaptation.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154185

JOHN J. NAY & YEVGENIY VOROBEYCHIK – Predicting Human Cooperation
The Prisoner’s Dilemma has been a subject of extensive research due to its importance in understanding the ever-present tension between individual self-interest and social benefit. A strictly dominant strategy in a Prisoner’s Dilemma (defection), when played by both players, is mutually harmful. Repetition of the Prisoner’s Dilemma can give rise to cooperation as an equilibrium, but defection is as well, and this ambiguity is difficult to resolve. The numerous behavioral experiments investigating the Prisoner’s Dilemma highlight that players often cooperate, but the level of cooperation varies significantly with the specifics of the experimental predicament. We present the first computational model of human behavior in repeated Prisoner’s Dilemma games that unifies the diversity of experimental observations in a systematic and quantitatively reliable manner. Our model relies on data we integrated from many experiments, comprising 168,386 individual decisions. The model is composed of two pieces: the first predicts the first-period action using solely the structural game parameters, while the second predicts dynamic actions using both game parameters and history of play. Our model is successful not merely at fitting the data, but in predicting behavior at multiple scales in experimental designs not used for calibration, using only information about the game structure. We demonstrate the power of our approach through a simulation analysis revealing how to best promote human cooperation.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0155656

EIJI ARAMAKI et al – Vocabulary Size in Speech May Be an Early Indicator of Cognitive Impairment
Little is known about the relationship between mild cognitive impairment (MCI) and changes to language abilities. Here, we used the revised Hasegawa Dementia Scale (HDS-R) to identify suspected MCI in elderly individuals. We then analyzed written and spoken narratives to compare the language abilities between study participants with and without MCI in order to explore the relationship between cognitive and language abilities, and to identify a possible indicator for the early detection of MCI and dementia. We recruited 22 people aged 74 to 86 years (mean: 78.32 years; standard deviation: 3.36). The participants were requested to write and talk about one of the happiest events in their lives. Based on HDS-R scores, we divided the participants into 2 groups: the MCI Group comprised 8 participants with a score of 26 or lower, while the Healthy Group comprised 14 participants with a score of 27 or higher. The transcriptions of both written and spoken samples for each participant were used in the measurement of NLP-based language ability scores. Our analysis showed no significant differences in writing abilities between the 2 groups in any of the language ability scores. However, analysis of the spoken narrative showed that the MCI Group had a significantly larger vocabulary size. In addition, analysis of a metric that signified the gap in content between the spoken and written narratives also revealed a larger vocabulary size in the MCI Group. Individuals with early-stage MCI may be engaging in behavior to conceal their deteriorating cognition, thereby leading to a temporary increase in their active spoken vocabulary. These results indicate the possible detection of early stages of reduced cognition before dementia onset through the analysis of spoken narratives.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0155195

PloS Biology – 10 May 2016
NOTHING OF INTEREST

PloS Genetics – 12 May 2016
NOTHING OF INTEREST

PNAS – 11 May 2016
PAPERS

MORGAN L. GUSTISON et al – Gelada vocal sequences follow Menzerath’s linguistic law
Human language follows a variety of structural principles, known as linguistic laws. One of these, Menzerath’s law, states that, the larger the size of the construct (e.g., the size of a word in terms of syllable number), the smaller the size of the individual constituent parts (e.g., syllables). We show for the first time (to our knowledge) that Menzerath’s law also holds in the vocal communication of a nonhuman species. In the gelada (Theropithecus gelada), a primate living in the highlands of Ethiopia, longer vocal sequences produced by adult males were associated with shorter individual calls. This result suggests that general—perhaps universal—principles underpin the structure of vocal communication in our own species and others.

http://www.pnas.org/content/113/19/E2750.abstract
Previous research showed an effect of words' rated body–object interaction (BOI) in children's visual word naming performance, but only in children 8 years of age or older (Wellsby and Pexman, 2014a). In that study, however, BOI was established using adult ratings. Here we collected ratings from a group of parents for children's BOI experience (child-BOI). We examined effects of words' child-BOI and also words' imageability on children's responses in an auditory word naming task, which is suited to the lexical processing skills of younger children. We tested a group of 54 children aged 6–7 years and a comparison group of 25 adults. Results showed significant effects of both imageability and child-BOI on children's auditory naming latencies. These results provide evidence that children younger than 8 years of age have richer semantic representations for high imageability and high child-BOI words, consistent with an embodied account of word meaning.


MAXIME CAUCHOIX & ALEXIS S. CHAINE – How Can We Study the Evolution of Animal Minds?
During the last 50 years, comparative cognition and neurosciences have improved our understanding of animal minds while evolutionary ecology has revealed how selection acts on traits through evolutionary time. We describe how cognition can be subject to natural selection like any other biological trait and how this evolutionary approach can be used to understand the evolution of animal cognition. We recount how comparative and fitness methods have been used to understand the evolution of cognition and outline how these approaches could extend our understanding of cognition. The fitness approach, in particular, offers unprecedented opportunities to study the evolutionary mechanisms responsible for variation in cognition within species and could allow us to investigate both proximate (i.e., neural and developmental) and ultimate (i.e., ecological and evolutionary) underpinnings of animal cognition together. We highlight recent studies that have successfully shown that cognitive traits can be under selection, in particular by linking individual variation in cognition to fitness. To bridge the gap between cognitive variation and fitness consequences and to better understand why and how selection can occur on cognition, we end this review by proposing a more integrative approach to study contemporary selection on cognitive traits combining socio-ecological data, minimally invasive neuroscience methods and measurement of ecologically relevant behaviors linked to fitness. Our overall goal in this review is to build a bridge between cognitive neuroscientists and evolutionary biologists, illustrate how their research could be complementary, and encourage evolutionary ecologists to include explicit attention to cognitive processes in their studies of behavior.


Haasgat is a primate-rich fossil locality in the northeastern part of the Fossil Hominid Sites of South Africa UNESCO World Heritage Site. Here we report the first hominin identified from Haasgat, a partial maxillary molar (HGT 500), that was recovered from an ex situ calcified sediment block sampled from the locality. The in situ fossil bearing deposits of the Haasgat paleokarstic deposits are estimated to date to slightly older than 1.95 Ma based on magnetobiostratigraphy. This places the hominin specimen at a critical time period in South Africa that marks the last occurrence of Australopithecus around 1.98 Ma and the first evidence of Paranthropus and Homo in the region between ∼2.0 and 1.8 Ma. A comprehensive morphological evaluation of the Haasgat hominin molar was conducted against the current South African catalogue of hominin dental remains and imaging analyses using micro-CT, electron and confocal microscopy. The preserved occlusal morphology is most similar to Australopithecus africanus or early Homo specimens but different from Paranthropus. Occlusal linear enamel thickness measured from micro-CT scans provides an average of ∼2.0 mm consistent with Australopithecus and early Homo. Analysis of the enamel microstructure suggests an estimated periodicity of 7–9 days. Hunter–Schreger bands appear long and straight as in some Paranthropus, but contrast with this genus in the short shape of the striae of Retzius. Taken together, these data suggest that the maxillary fragment recovered from Haasgat best fits within the Australopithecus—early Homo hypodigms to the exclusion of the genus Paranthropus. At ∼1.95 Ma this specimen would either represent another example of late occurring Australopithecus or one of the earliest examples of Homo in the region. While the identification of this first hominin specimen from Haasgat is not unexpected given the composition of other South African penecontemporaneous site deposits, it represents one of the few hominin localities in the topographically-distinct
northern World Heritage Site. When coupled with the substantial differences in the mammalian faunal communities between the northern localities (e.g., Haasgat, Gondolin) and well-sampled Bloubank Valley sites (e.g., Sterkfontein, Swartkrans, Kromdraai), the recovery of the HGT 500 specimen highlights the potential for further research at the Haasgat locality for understanding the distribution and interactions of hominin populations across the landscape, ecosystems and fossil mammalian communities of early Pleistocene South Africa. Such contextual data from sites like Haasgat is critical for understanding the transition in hominin representation at \( \sim 2 \) Ma sites in the region from Australopithecus to Paranthropus and early Homo.

https://peerj.com/articles/2024/

PAPERS FOR PEER REVIEW

PAULINE FRIZELLE et al – The relationship between information carrying words, memory and language skills in school age children with language impairment

The receptive language measure information-carrying word (ICW) level is used extensively by speech and language therapists (SLTs) in the UK and Ireland. Despite this it has never been validated via its relationship to any other relevant measures. This study aims to validate the ICW measure by investigating the relationship between the receptive ICW score of children with language impairment (LI) and their performance on standardized memory and language assessments. Twenty-seven children with LI, aged between 5;07 and 8;11, completed a sentence comprehension task in which the instructions gradually increased in number of ICWs. The children also completed subtests from The Working Memory Test Battery for children and The Clinical Evaluation of Language Fundamentals – 4. Results showed that there was a significant positive relationship between both language and memory measures and children’s ICW score but that language was the greater contributor in children’s ability to do this task. ICW score is in fact a valid measure of the language ability of children with LI. However therapists should also be cognisant of its strong association with working memory when using this construct in assessment or intervention methods.

https://peerj.com/preprints/2040/

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